Mollusca 2014

El Encuentro de Las Américas
The Meeting of the Americas
O Encontro das Américas

El Congreso reúne cuatro sociedades interesadas en el estudio de los moluscos y sus respectivas reuniones académicas:

American Malacological Society (AMS),
LXXX Reunión Anual de la
American Malacological Society

Asociación Latinoamericana de Malacología (ALM),
IX Congreso de la Asociación Latinoamericana
de Malacología (IX CLAMA)

Sociedad de Malacología de México (SMMAC),
XIII Reunión Nacional
de Malacología y Conquiliología (XIII RENAMAC)

Western Society of Malacologists (WSM),
XLVII Reunión Anual
de la Western Society of Malacologists

PRESIDENTES ORGANIZADORES:
Edna Naranjo-García, SMMAC, IX CLAMA
Paul Valentich-Scott, AMS, WSM

CONJUNTO AMOXCALLI
DE LA FACULTAD DE CIENCIAS
Universidad Nacional Autónoma de México,
Ciudad Universitaria, D.F. México
22 al 27 de junio de 2014.

Resúmenes

Introducción

En un principio nuestra idea era organizar la XII Reunión Nacional de Malacología y Conquiliología (XII RENAMAC), idea que se gestó en el año de 2009 cuando Andrea Zamora Silva, Brian Urbano Alonso y Jazmín Deneb Ortigosa Gutiérrez me propusieron participar como presidente del comité; más tarde nos enteramos que ya se había otorgado la organización de esa reunión al M. en C. Esteban F. Félix Pico. Esperamos y se nos confirió la organización de la siguiente reunión (XIII RENAMAC); idea que acogimos con mucho entusiasmo. La planeación se inició en cuanto la asamblea de la Sociedad de Malacología de México, A. C. aprobó nuestra petición de ser el Comité organizador y proyectamos realizarla en junio de 2013. Ya teníamos cierto avance cuando Erick Baqueiro y Roberto Cipriani buscaban a los organizadores de la XIII RENAMAC, para proponerles se hicieran cargo también del IX Congreso de la Asociación Latinoamericana de Malacología (IX CLAMA). Consulté a mi equipo de trabajo sobre la posibilidad de responsabilizarnos de tal reunión, el cual aceptó, enterándonos después que el IX CLAMA se realizaría junto con las reuniones anuales de las dos sociedades malacológicas de los Estados Unidos: la American Malacological Society y la Western Society of Malacologists. De esta manera, de la Reunión Nacional de Malacología y Conquiliología pasamos a Mollusca 2014 "El Encuentro de las Américas".

Hemos andado un largo camino, pues la XIII RENAMAC estaba programada para el año 2013 y el IX CLAMA para 2014. A los asistentes de los diversos países que nos visitan les parecerá extraño que nuestros conferencistas magistrales incluyan exclusivamente hispanoparlantes; sin embargo, fueron invitados desde 2012 cuando estábamos organizando la XIII RENAMAC, a otro de nuestros invitados ya no le fue posible asistir debido al cambio de fechas (David G. Reid) pues a su vez él está organizando otra reunión malacológica en Europa conocida como Euromal.

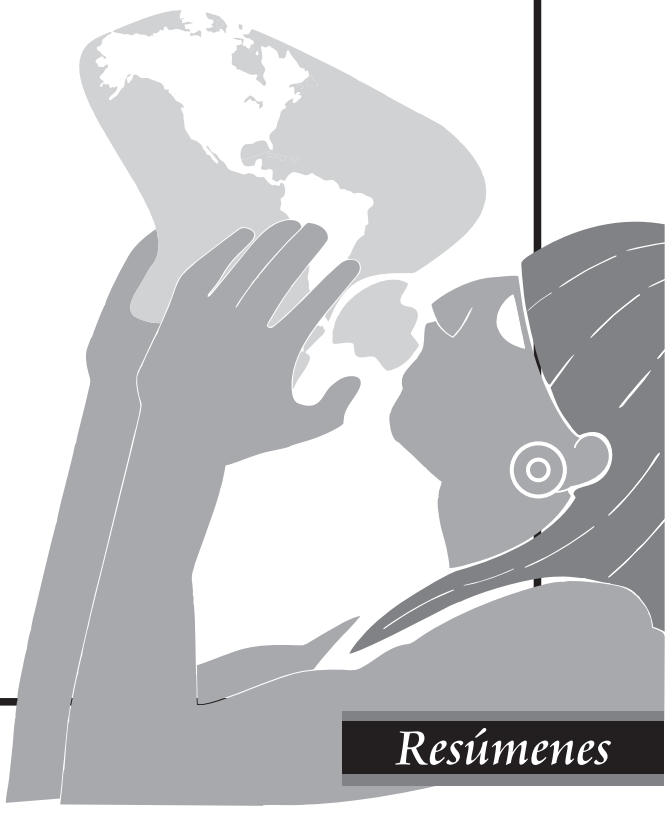
Agradezco a mi equipo de trabajo María Teresa Olivera Carrasco, Jazmín Deneb Ortigosa Gutiérrez y Brian Urbano Alonso (a todos los chicos detrás de él) su gran disposición para colaborar y a nuestras respectivas instituciones, pues sin su apoyo el congreso no podría realizarse. Agradezco la confianza de Andrea Zamora Silva por su confianza, quién por no estar físicamente en la asamblea de la SMMAC en la XII RENAMAC no pudo formar parte de este equipo.

Reconozco el apoyo de Roberto Cipriani, presidente de la Asociación Latinoamericana de Malacología, quien aportó sus ideas para la organización del congreso y por confiarnos la organización del IX CLAMA.

Una mención especial para Paul Valentich-Scott por constante interés en la organización, su paciencia en nuestros silencios, su confianza en nosotros y por su dedicación en particular en la revisión del inglés en innumerables manuscritos y resúmenes.

Bienvenidos todos a la Ciudad de México:

Edna Naranjo-García
Presidente
Mollusca 2014 "El Encuentro de las Américas"
Sociedad de Malacología de México, A.C.
XIII RENAMAC y IX CLAMA



Introduction

Initially our idea was to organize the XII National Meeting of Malacology and Conchology (XII RENAMAC), an idea that was conceived in the year 2009 when Andrea Silva Zamora, Brian Urbano Alonso y Jazmín Deneb Ortigosa Gutiérrez approached me to participate as committee president; We found out later that the organization of the meeting XII RENAMAC had already given to M. C. Esteban F. Felix Pico. We waited and the organization of the next meeting (XIII RENAMAC) was given to us. We enthusiastically started. The planning began as soon as the meeting of the Society of Malacology of Mexico, AC approved our request to be the organizing committee and projected it in June 2013. We already had some progress when Erick Baqueiro and Roberto Cipriani sought the organizers of the XIII RENAMAC to propose take charge of the IX Congress of the Latin American Malacology (IX CLAMA) also. I asked my team about the possibility of taking the responsibility of organizing such meeting, everybody which agreed. Soon after, we found out the IX CLAMA be held along with the annual meetings of the two American malacological societies the American Malacological Society and Western Society of Malacologists. Thus, we passed of organizing the National Meeting of Malacology and Conchology to Mollusca 2014 "The Meeting of the Americas".

We came a long way since the XIII RENAMAC was scheduled for 2013 and IX CLAMA 2014. Attendees from various countries who visit us will wonder that our keynote speakers include only Spanish speakers, they were invited since 2012 when we were organizing the XIII RENAMAC, another of our guests was unable to attend due to the change of dates (David G. Reid), as it turns out he is organizing another malacological meeting in Europe known as Euromal.

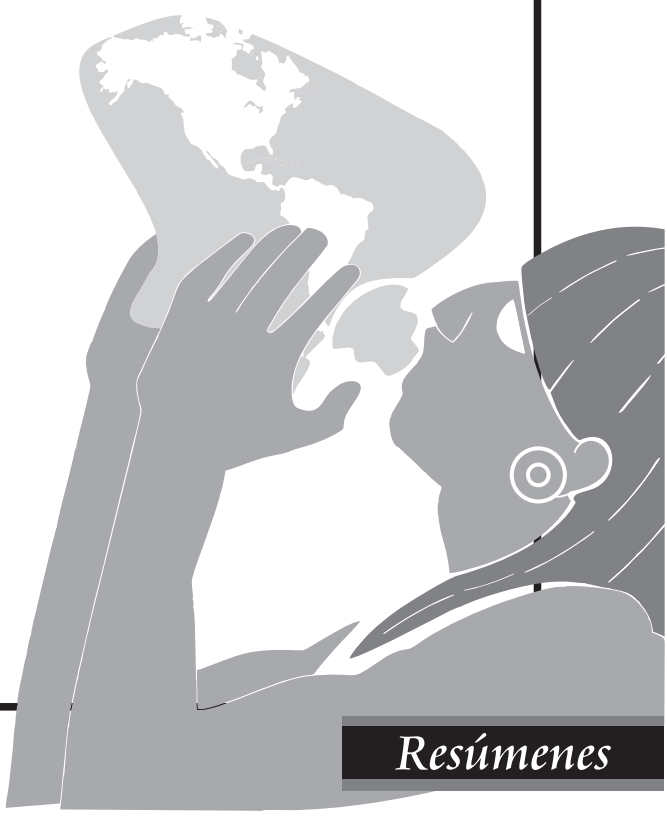
I thank my team Maria Teresa Olivera Carrasco, Jazmin Deneb Ortigosa Gutierrez and Brian Urbano Alonso (and all the guys behind him) their great willingness to cooperate and to our respective institutions, without whose support the Congress could not be performed. Thanks to Andrea Zamora Silva, who trust me, who was unable to physically be in the assembly of the XII SMMAC RENAMAC and could not be part of this team.

Roberto Cipriani, president of the Asociación Latinoamericana de Malacología, because of his ideas on the organization of the congress and for his confidence in us with the organization of the IX CLAMA.

Paul Valentich-Scott, my co-president, for his patience in our silences, his confidence in us and for his dedicated efforts especially in the English revision of numerous manuscripts and abstracts.

Welcome everyone to Mexico City:

Edna Naranjo-García
Presidente
Mollusca 2014 "El Encuentro de las Américas"
Sociedad de Malacología de México, A.C.
XIII RENAMAC y IX CLAMA



Introdução

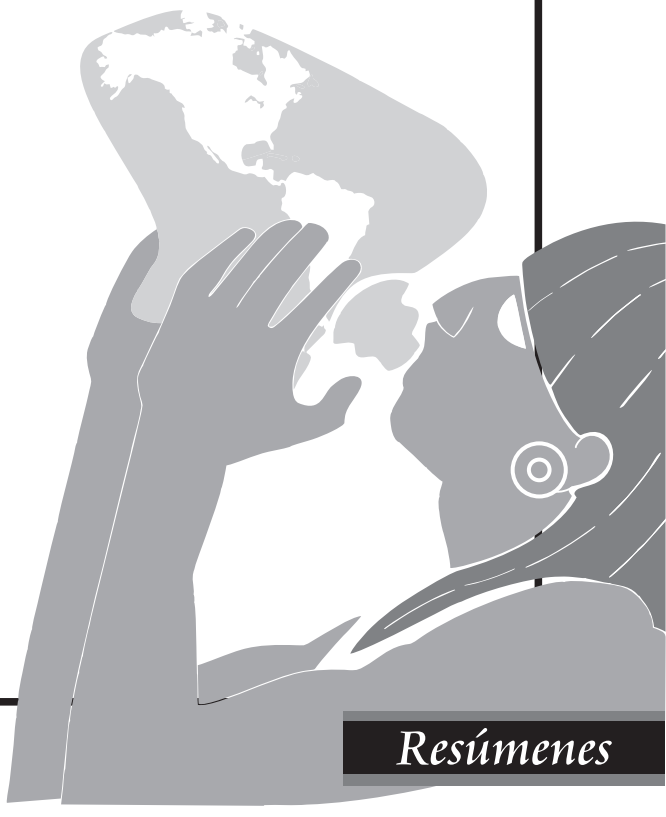
No princípio nossa idéia era organizar a XII Reunião Nacional de Malacologia e Conquiliologia (XII RENAMAC), idéia surgida no ano de 2009 quando Andrea Zamora Silva, Brian Urbano Alonso e Jazmín Deneb Ortigosa Gutiérrez propuseram-me participar como presidente do comitê. Posteriormente percebemos que a organização daquela reunião estava ao encargo de M. C. Esteban F. Félix Pico. Ficamos no aguardo e a organização do próximo encontro (XIII RENAMAC) foi, então, confiada a nós, o que foi recebido com grande entusiasmo. O pleito iniciou-se na época da assembléia da Sociedade de Malacologia do México, A.C. aprovou nossa proposta de se tornar o comitê organizador e projetamos realizá-la em junho de 2013. Já tínhamos certo avanço quanto Erick Baqueiro e Roberto Cipriani procuraram os organizadores da XII RENAMAC para propor se também poderiam se encarregar do IX Congresso da Associação Latino-Americana de Malacologia (IX CLAMA). Minha equipe foi consultada sobre a possibilidade de se responsabilizar dessa reunião, a qual aceitou. Somente ai percebemos que o IX CLAMA realizar-se-á juntamente com a reunião anual das sociedades malacológicas dos Estados Unidos: a American Malacological Society e a Western Society of Malacologists. Dessa forma, de Reunião Nacional de Malacologia e Conquiliologia passamos para Mollusca 2014 "O Encontro das Américas".

Percorremos um longo caminho, pois a XII RENAMAC estava programada para o ano de 2013 e o IX CLAMA para 2014. Representantes de diversos países que nos visitaram acharam estranho que nossos conferencistas magistrais fossem exclusivamente versados na língua hispânica. Isso ocorreu porque eles foram convidados em 2012, quando a organização era apenas do XII RENAMAC, sendo que outro convidado cancelou sua participação por razão da mudança de datas (David G. Reid), que já estava organizando outra reunião malacológica na Europa conhecida como Euromal.

Agradeço a minha equipe de trabalho María Teresa Olivera Carrasco, Jazmín Deneb Ortigosa Gutiérrez e Brian Urbano Alonso (e outros garotos por trás dele), sua grande disposição para colaborar e a nossas respectivas instituições, pois sem o apoio delas o congresso não poderia se realizar. A Andrea Zamora Silva agradeço por sua confiança, que por não estar presente fisicamente na assembléia da SMMAC e XII RENAMAC não pode tomar parte da equipe.

Sejam todos bem vindos à Cidade do México.

Edna Naranjo-García
Presidente
Mollusca 2014 “El Encuentro de las Américas”
Sociedad de Malacología de México, A.C.
XIII RENAMAC y IX CLAMA



Introducción

La reunión de esta semana ha supuesto décadas de planificación, e incluye la participación por muchos años de diversas personas que no pudieron asistir. Durante mucho tiempo la meta ha sido agrupar en una reunión a todos los malacólogosde las Américas. Mientras que los participantes han sido invitados a todas las reuniones de las sociedades de malacólogos, queríamos probar un enfoque diferente: explícitamente reunir malacólogos del Norte y del Sur, y con ello lograr una mayor colaboración científica entre ellos.

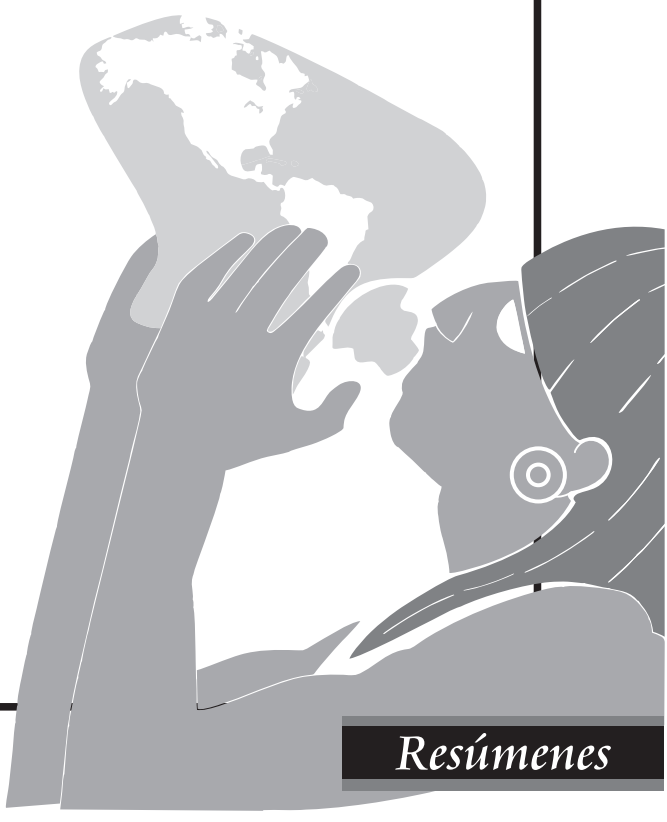
Hace mucho tiempo la semilla de Mollusca 2014 se sembró inicialmente por Roberto Cipriani y Eugene V. Coan. Pero, al igual que con muchos sueños, era difícil de llevar esta idea a la realidad. Una oportunidad surgió cuando fui elegido vice-presidente de la Western Society of Malacologists y, posteriormente, el vice-presidente de la American Malacological Society. Roberto sugirió que tratamos de reunirnos con la Asociación Latinoamericana de Malacología. El concepto de la reunión conjunta fue calurosamente recibido por el WSM y AMS. En posteriores conversaciones con Edna Naranjo-García, también acordamos celebrar la reunión en colaboración con la Sociedad de Malacología de México. Entonces, Mollusca 2014 se formó.

Muchas gracias al equipo de organización de la ciudad de México Edna Naranjo-García, Jazmín Deneb Ortigosa Gutiérrez, María Teresa Olivera Carrasco y Brian Urbano Alonso. Sin sus diligentes esfuerzos, esta reunión no hubiera sido posible.

No podríamos haber anticipado la abrumadora respuesta a Mollusca 2014. Tenemos representantes de los cinco continentes y docenas de países, que representan diversos campos de la malacología desde las altas montañas hasta alta mar. Estamos encantados de tenelos en la Ciudad de México, y esperamos con interés la reunión con gran contenido científico, así como actividades sociales agradables. Asegúrese de conocer gente nueva en esta conferencia. Una bebida ocasional con un nuevo amigo puede conducir a una vida de colaboración científica.

¡BIENVENIDOS A MOLLUSCA 2014:
EL ENCUENTRO DE LAS AMERICAS!

Paul Valentich-Scott
Presidente
American Malacological Society
Western Society of Malacologists



Introduction

The meeting this week has involved decades in planning, and includes the involvement over the years of many people who were not able to attend. It has long been a goal to have a meeting the was inclusive of all malacologists ofthe Americas. While all participants are welcome to all mollusk society meetings, we wanted to try a different approach: to explicitly join malacologists from North and South America, and thereby further scientific collaboration amongstthem.

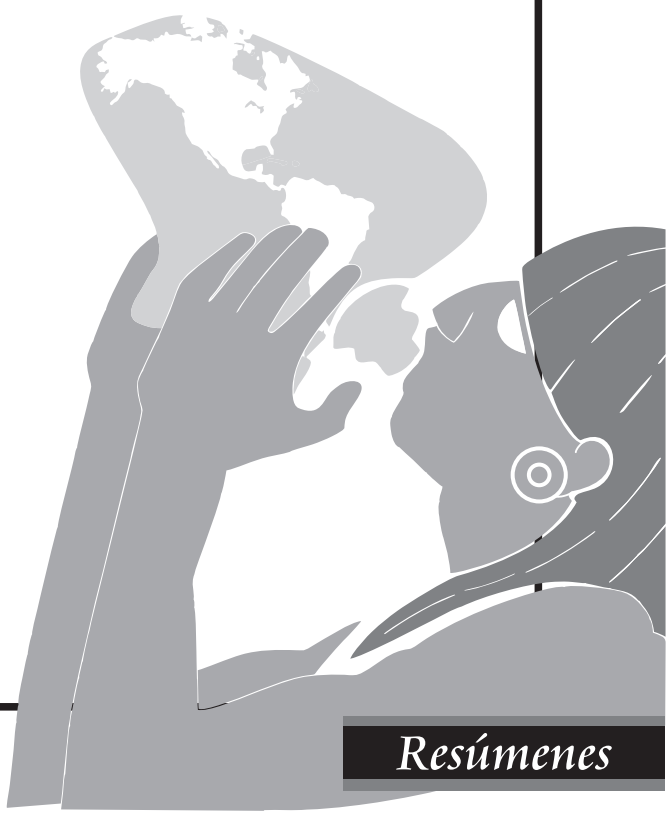
The seed of Mollusca 2014 was initially planted by Roberto Cipriani and Eugene V. Coan long ago. But, as with many dreams, it was hard to bring this idea into reality. An opportunity arose when I was elected vice-president ofthe Western Society of Malacologists and subsequently the vice-president ofthe American Malacological Society. Roberto suggested that we try to meet with the Asociación Latinoamericana de Malacología. The concept ofjoint meeting was warmly received by the WSM and AMS. In further discussions with Edna Naranjo-Garcia, we also agreed to hold the meeting in collaboration with the Sociedad de Malacología de México. Thus, Mollusca 2014 was formed.

Many thanks are due to the Mexico City organization team of Edna Naranjo-Garcia, Jazmín Deneb Ortigosa Gutiérrez, María Teresa Olivera Carrasco, and Brian Urbano Alonso. Withouttheir vigilant efforts, this meeting would not have been possible.

We could have never anticipated the overwhelming response to Mollusca 2014. We have representatives from five continents and dozens of countries, representing diverse fields of malacology from the high mountains to the deepsea. We are thrilled to have you Mexico City, and look forward to a meeting with great scientific content as well as enjoyable social activities. Be sure to meet new people atthis conference. A casual beverage with a new friend can lead to a lifetime of scientific collaboration.

WELCOME TO MOLLUSCA 2014:
THE MEETING OF THE AMERICAS!!

Paul Valentich-Scott,
Presidente
American Malacological Society
Western Society of Malacologists



Introdução

O encontro desta semana envolveu décadas em planejamento, e inclui o envolvimento ao longo dos anos de muitas pessoas que não puderam vir. Por muitos anos, tem sido um objetivo ter uma reunião que incluísse todos os malacólogos das Américas. Enquanto todos os participantes são convidados a todas as reuniões das sociedades de moluscos, nós queríamos tentar uma abordagem diferente: juntar explicitamente malacólogos do América do Norte e do Sul, e, assim, unir a colaboração científica entre eles.

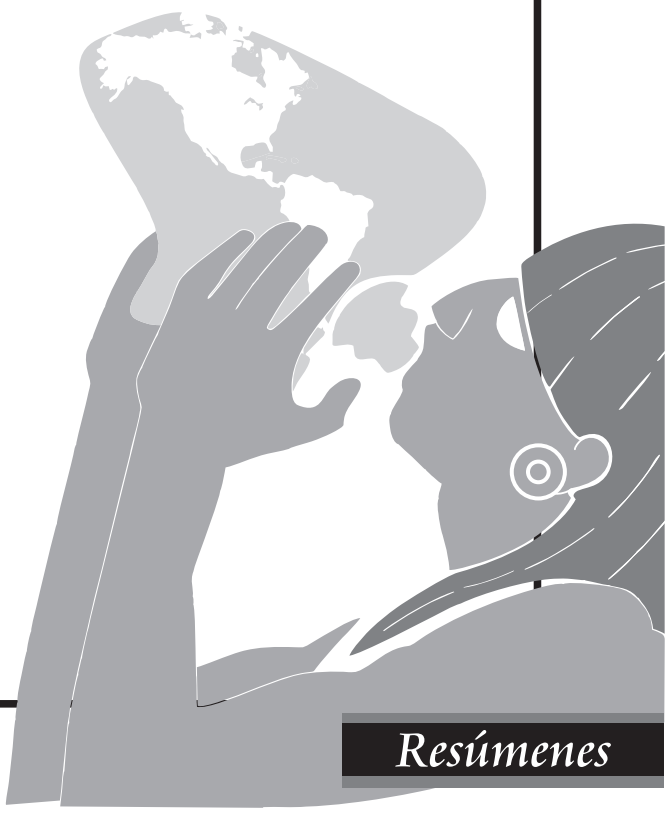
A ideia original de Mollusca 2014 foi inicialmente plantada por Roberto Cipriani e Eugene V. Coan há muito tempo. Mas, como acontece com muitos sonhos, era difícil converter essa ideia em realidade. Uma oportunidade surgiu quando fui eleito vice-presidente da Western Society of Malacologists e, posteriormente, o vice-presidente da American Malacological Society. Roberto sugeriu que tentássemos reunir-nos com a Asociación Latinoamericana de Malacología. O conceito de reunião conjunta foi calorosamente recebido pelo WSM e AMS. Em novas discussões com Edna Naranjo-Garcia, nós também concordámos em realizar a reunião em colaboração com a Sociedad de Malacología de México. Assim, Mollusca 2014 foi formada.

Temos muito que agradecer à equipe de organização da Cidade do México de Edna Naranjo-García, Jazmín Deneb Ortigosa Gutiérrez, María Teresa Olivera Carrasco e Brian Urbano Alonso. Sem os seus esforços cautelosos, esta reunião não teria sido possível.

Nós nunca poderíamos ter antecipado a resposta esmagadora para Mollusca 2014. Temos representantes de cinco continentes e dezenas de países, representando diversas áreas da malacologia desde as altas montanhas até o mar profundo. Estamos muito contentes de tê-los na Cidade do México, e estamos ansiosos dum encontro com um grande conteúdo científico, bem como atividades sociais agradáveis. Não deixe de conhecer novas pessoas nesta conferência. Uma bebida casual com um novo amigo pode levar a uma vida de colaboração científica.

BEM VINDOS A MOLLUSCA 2014:
O ENCONTRO DAS AMÉRICAS!!

Paul Valentich-Scott,
Presidente
American Malacological Society
Western Society of Malacologists



Reconocimientos Acknowledgements Agradecimientos

El comité organizador agradece a las siguientes instituciones y personas, sin cuyo apoyo no se hubiera podido realizar el congreso Mollusca 2014 "El Encuentro de las Américas", ya sea permitiendo que los organizadores dediquemos tiempo a la preparación del evento, con el préstamo de sus instalaciones, equipo, personal de apoyo logístico, diseñadores, administradores, apoyo financiero, como revisores de estilo, traductores o impartiendo cursos precongreso:

Universidad Nacional Autónoma de México:
Facultad de Ciencias
Dra. Rosaura Ruiz Gutiérrez
Directora
Lic. Alma Rosa Jiménez Chávez
Secretaria de Comunicación y Divulgación de la Ciencia
Lic. María Elena Abrín Batule
Coordinadora de actividades académicas
Lic. Luis Felipe Jiménez
Coordinador de la Carrera de Biología

Instituto de Biología
Biól. Noemí Chávez Castañeda
Secretaria Técnica

Instituto Nacional de Antropología e Historia
Museo Nacional de Las Culturas: Jorge Luis Berdeja Martínez
Subdirector de Operación
Subdirección de Laboratorios y Apoyo Académico

Santa Bárbara Museum of Natural History

Comisión Nacional para el Uso y Conocimiento de la Biodiversidad (CONABIO)

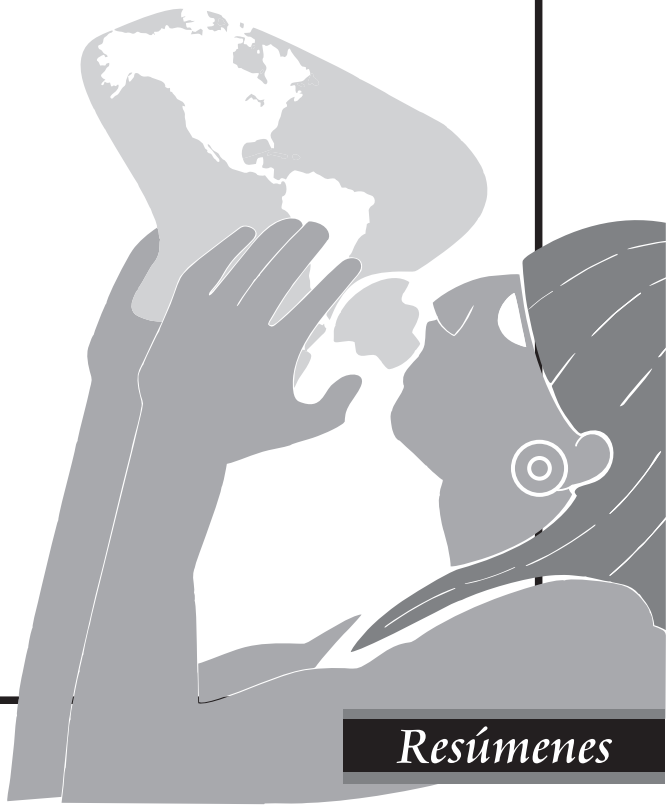
En la traducción al portugués: Lenita Tallarico, Luiz R. Simone, Xochitl Vital Arriaga

Diseño: Julio César Montero Rojas

A las investigadoras M. en C. María del Pilar Torres García y a la Biól. Adriana Reyes-Gómez por impartir el curso "Aplicación de la técnica histológica en el conocimiento de los moluscos" y de "Quitones de México (Biología, Morfología Interna, Taxonomía y Distribución)"respectivamente.

Al grupo de estudiantes que brindan su apoyo durante los días del congreso:
Eduardo García, Marbella González, Erika Alarcón, Arzu Rivera, Gabriel Aguilar, Gabriela Castillo, Sandra Zedillo, Iris García, Silvia Hansen, Eunice Molina, Elia Lemus, Jazmín Aristeo, Sebastián Cisneros, Sebastián Guerrero, Laura Álvarez, Paulina López, Jorge Garcés, Lina Romero, Cynthia Flores, Citlalli Martínez, Gabriela Arteaga, Eduardo Cárdenas, Jalil González, Diana Alvarez, Lluvia Ramos, Enrique Saldaña, Etel Sánchez, Raquel Hernández, Nely Rodríguez, Zayra López, Orquídea Lozada, Rodrigo Rodríguez, Víctor López, Samantha Sierra, Eréndira Canales, Nadja Tlalolini, Sabina Sánchez, Judith Salazar y Xochitl Vital.

Hasta aquí quienes colaboraron con la preparación del congreso y toda nuestra consideración a la otra parte, igual de importante e indispensable, a todos los participantes, quienes con sus contribuciones académicas y económicas darán vida y razón de ser al "Encuentro de las Américas".



Organización del libro

El Congreso Mollusca 2014 “El Encuentro de las Américas”, es una reunión singular desde muy diversos puntos de vista, en primer lugar porque hace que confluyan cuatro agrupaciones interesadas en el estudio de los moluscos y sus respectivas reuniones académicas en una sola gran reunión.

Esta particularidad también conjuntó distintos criterios y formas de realizar las reuniones, por tal razón, en Mollusca 2014 no hubo un comité académico que se encargara de revisar el contenido de los resúmenes, ya que algunas sociedades lo llevan a cabo y otras no, por lo que se decidió aceptar todos los trabajos y en consecuencia, el contenido de cada resumen es responsabilidad de sus autores.

La propuesta académica inicia con cuatro Conferencias Magistrales, además en esta ocasión están considerados los siguientes once simposia con sus respectivos organizadores:

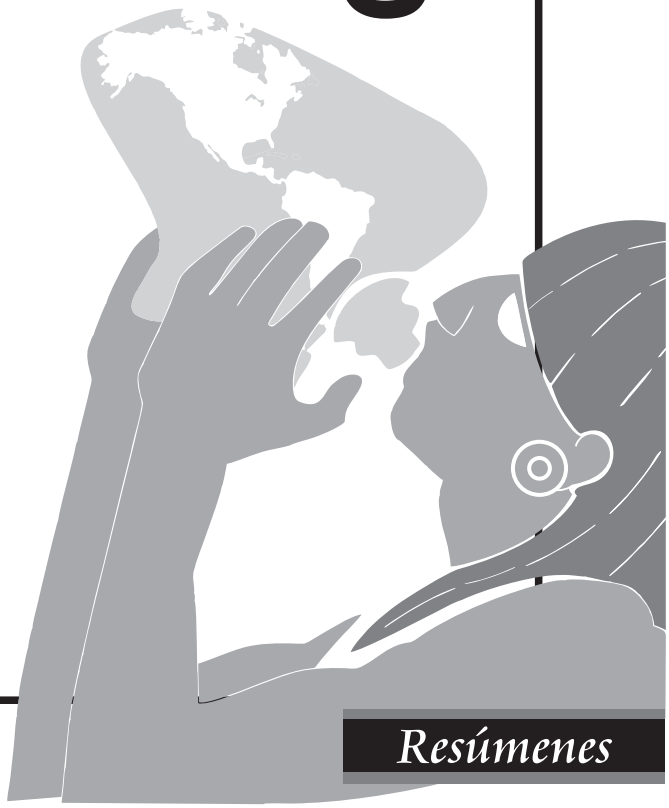
1. Moluscos y arqueología
2. Hablemos sobre Opisthobranchia
3. Cefalópodos de las Américas
4. Acuicultura de moluscos
5. Genómica de moluscos
6. ¿Hacia dónde va la Malacología?: la visión de los estudiantes.
7. Moluscos terrestres de las Américas: diversidad y relaciones en hábitats en proceso de desaparecer
8. Bivalvia de las Américas
9. Ecología de los moluscos marinos
10. Indicadores Ambientales: una síntesis
11. Sistemática y taxonomía de gasterópodos terrestres y de agua dulce

El resto de las contribuciones se organizaron en 14 temas distintos:

1. Plicopurpura
2. Paleontología
3. Morfometría
4. Moluscos de zonas costeras
5. General
6. Pesquerías
7. Distribución y Taxonomía
8. Desarrollo
9. Conidae
10. Polyplacophora
11. Invasores
12. Colecciones
13. Moluscos terrestres
14. RAMSAR

Los resúmenes están organizados en orden alfabético por autor, de la siguiente manera:

Inicia con las contribuciones magistrales, para continuar con el resto de las aportaciones académicas. A cada resumen le antecede el nombre del tema al que pertenece y la modalidad (presentación oral o cartel) en que se presenta.



Organization of the abstract book

Mollusca 2014: The Meeting of the Americas, is a unique meeting. For the first time, four malacological associations in the Americas have combined their respective meetings into one single Congress. Due to the complexities and disparities of each societies abstract review processes, it was decided to accept all submitted abstracts. For that reason, many Mollusca 2014 abstracts did not go through an academic committee for approval. Therefore the content of each abstract is the responsibility of the submitting authors.

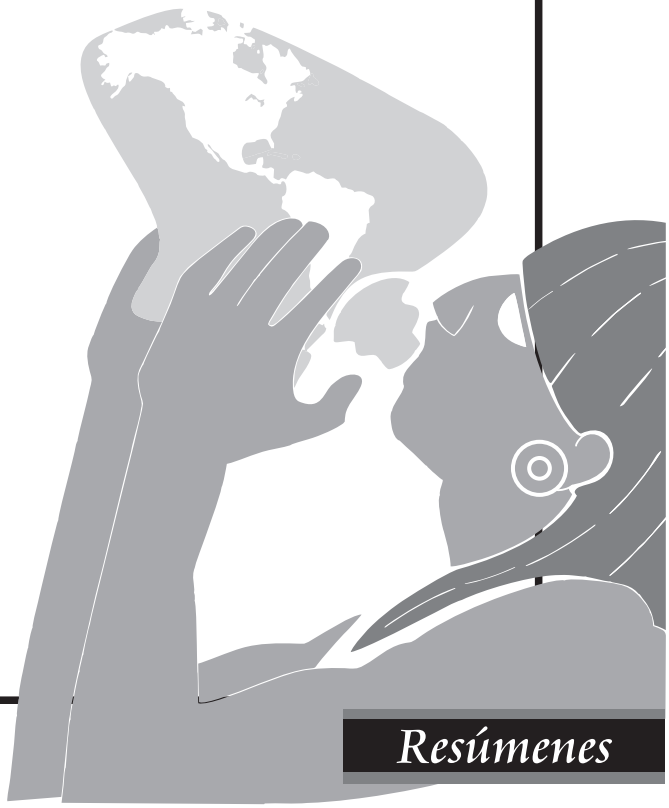
The academic program starts with four Keynote addresses, followed by 11 symposia with their respective organizers.

1. Mollusks and Archeology
2. Let's talk about Opisthobranchia
3. Cephalopods of the Americas
4. Aquaculture of mollusks
5. Molluscan Genomics
6. The future of Malacology: a perspective from Malacology students
7. Terrestrial mollusks of the Americas: diversity and relationships in vanishing habitats
8. Bivalvia of the Americas
9. Talking about ecology of marine mollusks
10. Mollusks as environmental indicators: a synthesis
11. Systematics and taxonomy of freshwater and terrestrial gastropods

The remaining contributed paper sessions are organized into 14 different topics.

1. Plicopurpura
2. Palaeontology
3. Morphometry
4. Mollusks of the intertidal
5. Diverse topics
6. Fisheries
7. Systematics and biogeography
8. Development
9. Conidae
10. Polyplacophora
11. Invasive mollusks
12. Museum Collections
13. Land mollusks
14. RAMSAR

Abstracts are organized alphabetically by author, beginning with the keynote speakers and continuing with all of the academic contributions. Each abstract is preceded by the name or theme of the symposium to which it belongs and the mode (oral or poster presentation) in which it occurs.



Mollusca 2014

Encuentro de las Américas

Resúmenes

CONFERENCIA MAGISTRAL/KEYNOTE ADDRESS

EL REGISTRO FÓSIL DE LOS RUDISTAS (BIVALVIA: HIPPURITACEA) Y SU IMPORTANCIA PARA MÉXICO

Pedro García Barrera
Museo de Paleontología, Facultad de Ciencias, Universidad Nacional Autónoma de México.
Ciudad Universitaria, México, Distrito Federal; pedrogarciab@ciencias.unam.mx

Los Rudistas son un grupo de bivalvos fósiles que habitaron las plataformas de los mares someros durante todo el periodo Cretácico, que duró aproximadamente 90 millones de años. Se conocen por los restos de sus conchas inequivalvas, grandes y gruesas que formaron bancos y arrecifes calcáreos de grandes dimensiones. Fueron animales sésiles de hábitos gregarios que evolucionaron durante el Jurásico Tardío (Oxfordiano) en lo que hoy es Europa y se dispersaron y diversificaron en América donde aparecen en el Barremiano (aproximadamente hace 145 millones de años).
Los grandes arrecifes que formaron, sirvieron como rocas entrampantes de petróleo, gas natural e incluso para la industria de la construcción.
La constante separación de los continentes durante el Cretácico, propició el aislamiento de sus poblaciones y trajo como consecuencia, procesos de especiación y provincialismo para las diferentes especies que se establecieron en América y que se encuentran incluidas en siete familias. Se extinguieron hace 65 millones de años al final del Cretácico.

EL REGISTRO FÓSIL DE LOS RUDISTAS (BIVALVIA: HIPPURITACEA) Y SU IMPORTANCIA PARA MÉXICO.

Rudists are a group of fossil bivalves that inhabited shallow marine platforms during the Cretaceous period, which lasts 90 million years. They are known by their shell remains that are large, inaequivalve and thick. They formed true calcareous reef structures and banks of different size. They were solitary, attached and gregarious animals that evolved during Late Jurassic times (Oxfordian) in what now is Europe. Later, during Barremian times, 145 million years before present, rudists are registered in America where they dispersed and diversified giving rise to new genera and species. The great reef buildings they constructed in some regions, including Mexico, became reservoir rocks of oil fields and gas, and also rocks for the construction industry. Rudists are now classified into seven families which became extinct during Late Cretaceous (Maastrichtian times), 65 million years from now.

CONFERENCIA MAGISTRAL/KEYNOTE ADDRESS

UTILIDAD DEL GEN COI PARA ESTIMAR LA CONECTIVIDAD ENTRE LAS POBLACIONES DE QUITONES EN EL CARIBE

Cedar I. García-Ríos
Departamento de Biología, Universidad de Puerto Rico en Humacao, Carretera 908 Km 1.2, Humacao, Puerto Rico 00792; cedar.uprh@gmail.com

Los malacólogos hemos tratado la región del Caribe como una homogénea, pero esa relativa homogeneidad morfológica no corresponde siempre con la evidencia bioquímica. Utilizamos secuencias del gen mitocondrial COI para conocer las divergencias inter e intraespecíficas en quitones del Caribe. Consideramos especies de los géneros *Chiton*, *Stenoplax* y *Lepidochitona.* También evaluamos las divergencias entre dos pares de especies hermanas de quitones, separadas por el istmo de Panamá, para determinar el significado temporal de los casos de aislación geográfica encontrados. El par *Stenoplax purpurascens* del Caribe y *S. limaciformis* del Pacífico mostraron 11.4% de divergencia. El par,

Acanthochitona rhodea del Caribe y *A. ferreirai* del Pacífico mostró 10.4% de divergencia. Con esos valores de referencia podemos afirmar que la divergencia intraespecífica, dentro de los géneros estudiados, se diferenció previo a la barrera del istmo. Pero encontramos valores de divergencia interespecíficos altos, que muchos sistemáticos moleculares verían como evidencia de la existencia de muchas especies crípticas, actualmente desconocidas. El patrón encontrado sugiere un eje de aislación reproductiva norte sur que corresponde a la corriente de las Antillas y la del Caribe. Mucha de esa diferenciación intraespecífica ocurrió posterior al cierre del istmo de Panamá. En el caso del complejo de especies *Lepidochitona liozonis* se evidencia un proceso de evolución morfológica muy lento. La divergencia del gen COI de ejemplares de *L. liozonis* de la Florida comparados con ejemplares de Puerto Rico es de 14%, sin embargo, no encontramos variaciones morfológicas entre ambas. Para el complejo de especies *Chiton tuberculatus* encontramos pequeñas variaciones en el tegumento, entre las poblaciones del sur y del norte del Caribe, que corresponden a divergencias superiores al 5%. Nuestros datos apoyan la hipótesis de un proceso de especiación intenso en el Caribe, posterior al cierre del istmo. En los quitones, que presentan ejemplos de lenta evolución morfológica, las herramientas bioquímicas son de especial utilidad.

USEFULNESS OF THE COI GENE TO ESTIMATE THE CONNECTIVITY AMONG POPULATIONS OF CHITONS IN THE CARIBBEAN

Malacologists have viewed the Caribbean as one homogeneous region, but that relative morphological homogeneity does not always match the biochemical evidence. We use sequences of the mitochondrial gene coding for cytochrome oxidase I (COI) to assess the magnitude of inter and intraspecific divergence in Caribbean chitons of the genera: *Chiton*, *Stenoplax* and *Lepidochitona*. We also evaluated the differences between two pairs of sister species separated by the Isthmus of Panama, to determine the temporary meaning of the geographical isolation found. The pair *Stenoplax purpurascens* (Caribbean) and *S. limaciformis* (tropical eastern Pacific) showed 11.4 % bp divergence; while *Acanthochitona rhodea* (Southern Caribbean) and *A. ferreirai* (Pacific) showed 10.4% of divergence. With these reference values we can say that the intraspecific differentiation occured prior to the barrier formation of the isthmus. However, we find high interspecific divergence values, which many molecular systematic would see as evidence of the existence of many cryptic species, currently unknown. The pattern found suggests a north-south axis of reproductive isolation which corresponds to the West Indies and the Caribbean currents. Much of this intraspecific differentiation occurred after the closure of the isthmus of Panama. A very slow morphological evolution process is evident in the case of the species complex of *Lepidochitona liozonis*. The divergence of the COI gene sequences between Florida's and Puerto Rico's *L. liozonis* is 14%, however, without showing morphological variations between them. For the species complex *Chiton tuberculatus*, small variations in the tegmentum sculpture between north and south Caribbean populations, correspond to divergences greater than 5%. Our data support the hypothesis of an intense process of Caribbean speciation, following the closing of the isthmus. In chitons, which show examples of slow morphological evolution, the biochemical tools are particularly useful.

CONFERENCIA MAGISTRAL/KEYNOTE ADDRESS

MOLUSCOS DEL MAR PROFUNDO: DIVERSOS, DISTANTES, Y EXTREMOS

José H. Leal
The Bailey-Matthews National Shell Museum, 3075 Sanibel-Captiva Road, Sanibel, FL 33957, USA;
jleal@shellmuseum.org

The deep-sea is truly the last frontier in ocean exploration: most of what we know about the ecology and systematics of deep-sea organisms has been established in the last 30–40 years, with a large number of striking advances taking place within the past ten years. The accidental discovery of hydrothermal vent ecosystems in the late 1970s may be regarded as one of the initial stages in a long succession of breakthroughs in modern deep-sea biological research. These breakthroughs comprise, among others, the description of the different communities and food webs based on chemosynthetic bacteria. Unlike plants, which derive their energy from sunlight, chemosynthetic bacteria thrive thanks to compounds present in seawater near hydrothermal vents, in areas where oil and gas seep from the seafloor, and around the dead bodies of whales and corpses of other large marine animals. Mollusks are well-represented in these singular ecosystems: the presenter will discuss some of the most remarkable and biologically intriguing species, including some recently described ones.

MOLUSCOS DE AGUAS PROFUNDAS: DIVERSOS, DISTANTES Y EXTREMOS

Las aguas profundas son verdaderamente la última frontera en la exploración de los océanos: la mayor parte de lo que conocemos acerca de la ecología y sistemática de los organismos de este ambiente, surgió en los últimos 30-40 años, con numerosos y notables avances durante la última década. El descubrimiento fortuito de ecosistemas de fuentes hidrotermales a finales de los 1970s, puede considerarse como una de las etapas iniciales de una larga sucesión de avances en la investigación moderna de este medio. Estos descubrimientos incluyen, entre otros, la descripción de diferentes comunidades y redes tróficas basadas en bacterias quimio-sintéticas. A diferencia de las plantas, las cuales obtienen su energía de la luz del sol, como bacterias quimio-sintéticas que prosperan gracias a compuestos presentes en el entorno de las fuentes hidrotermales, en áreas en las que se filtra aceite y gas desde zonas débiles del piso marino y alrededor de cadáveres de ballenas y otros grandes animales marinos. Los moluscos están bien representados en este singular ecosistema: el conferencista disertará sobre algunas de estas notables e intrigantes especies, incluyendo algunas recientemente descritas.

CONFERENCIA MAGISTRAL- KEYNOTE ADDRESS

CARACOLES MARINOS VENENOSOS

Estuardo López-Vera
Laboratorio de Toxinología Marina, Instituto de Ciencias del Mar y Limnología. Universidad Nacional Autónoma de México. Apartado Postal 70-305, México D.F. C.P. 04510; vera@cmarl.unam.mx

El uso de toxinas marina en especial las aisladas de caracoles marinos, en lo últimos 25 años han servido como herramientas moleculares para entender el funcionamiento de canales y/o receptores de membrana implicados en algunas patologías humanas. Es decir, estos canales iónicos son un diverso grupo de proteínas formadoras de poros que cruzan la membrana lipídica de las células y dejan pasar selectivamente iones a través de esta barrera. El movimiento de iones es vital para procesos esenciales y fisiológicos, que van desde el control de la fuerza y duración de los latidos cardiacos, a la regulación de la

secreción de insulina por las células beta pancreáticas. Las enfermedades causadas por mutaciones en los genes que codifican las subunidades de estos canales iónicos o las proteínas reguladoras se les conoce como canalopatías

Una aproximación para poder entender el funcionamiento de estas canalopatías o bien de los diferentes subtipos de canales iónicos, es el uso de agonistas o antagonistas específicos. Es en este punto donde las conotoxinas; toxinas aisladas de caracoles marinos pertenecientes a la Superfamilia Conoidea, han sido de gran interés dado al potente efecto que poseen y las aplicaciones farmacológicas derivadas del mismo.

POISONOUS MARINE SNAILS

In the last 25 years the use of marine toxins isolated from marine snails, has served as a molecular tool to understand membrane channel and/or receptor function involved with some humans pathologies. That is, those ionic channels are a diverse group of proteins which form pores that cross the lipid membrane of cells and lets ions get in through that barrier. The movement of ions is essential and vital physiological processes ranging from control of the force and duration of the heartbeat and the regulation of insulin secretion by the pancreatic beta cells. Illnesses caused by mutations of genes encoding subunits of these ion channels or regulatory proteins is known as channelopathies

One approach to understanding the operation of these channelopathies or of different ion channel subtypes, is the use of specific agonists or antagonists. It is at this point where the conotoxins; toxins isolated from marine snails, belonging to the superfamily Conoidea have been of great interest given the powerful effect they have and pharmacological applications derived from them.

CONFERENCIA MAGISTRAL/KEYNOTE ADDRESS

CEPHALOPODS IN LATIN AMERICA: FISHERIES, RESEARCH AND CHALLENGES

Unai Markaida [1]

[1]Laboratorio de Pesquerías Artesanales, El Colegio de la Frontera Sur, 24500 Lerma, Campeche, México; umarkaida@ecosur.mx

Latina America is currently the leading world region of cephalopod landings. Despite this fact, most catches are driven by exportation and a comparatively little share is locally consumed. Research has been focused on species leading catches as *Dosidicus gigas*, *Illex argentinus* and *Octopus maya*, although recently investigation has expanded to other species with minor economic weight. Current topics and challenges are discussed.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

OBSERVATION AND ESTABLISHMENT OF THE GONAD DEVELOPMENT STAGES IN POLYPLACOPHORA: *Chiton (Chiton) articulatus* A CASE STUDY

Quetzalli Yasú Abadia-Chanona [1*], Omar Hernando Ávila-Poveda [2], Marcial Arellano-Martínez [1], Luis Miguel Flores-Campaña [3]

[1] Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas, Av. Instituto Politécnico Nacional s/n, Col. Playa Palo de Santa Rita, C.P. 23096, La Paz, Baja California Sur, México; [1*]q_yach18@yahoo.com.mx; [1]arellano.marcial@gmail.com

[2] Universidad Tecnológica de Escuinapa, Mariano Rivas #50 Col. Centro, C.P. 82400, Escuinapa, Sinaloa, México; oavila@colombia.com

[3] Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa, Paseo Claussen s/n, C.P. 610, Mazatlán Sinaloa, México; lcampana@uas.edu.mx

Usually, the reproductive cycle is described and defined by performing histology on gonad sections and determining gonad development stages (GDS). In polyplacophorans, the gonad is a simple structure compared to other mollusks. So simple that it functions like one single follicle structured by a "follicular wall" mainly located toward the gonad's ventral side, and a "follicular lumen" decentralized toward the gonad's dorsal side. The existing descriptions of the reproductive cycle of several polyplacophoran have been done haphazardly on any gonad side (*e.g*., ventral or dorsal) without regard to the gonad's anatomical structure. Thus, previous descriptions may have erroneously established the GDS and, therefore, underestimated the reproductive cycle. For a representation of "the whole follicle" (*i.e*., the entire gonad), a panoramic observation of the gonad (*i.e.*, from the ventral to the dorsal side) has to be performed, considering the reproductive physiological process (*i.e.*, formation, development, maturation, and spawning of gametes). Since the gametes are formed in the gonad's ventral side, in turn, they will develop and move toward the gonad's dorsal side, where, finally, the mature gametes reach the gonoducts for their expulsion to the environment. Given the above, it is elemental to standardize the method of observation and establishment of GDS in polyplacophorans. Thus, in this study and for the first time, a protocol was established, which considers the physiological process of the gamete and the complete structure of the gonad. As a result, a pattern template for the observation of the gonad's histological characteristics for males and females, and qualitative graphical diagrams to visualize each GDS were generated. Finally, five stages of gonadal development were established and described: I–gametocytogenesis, II–development, III–mature, IV–spawning, V–rest or recovery.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

NI SON TODOS LOS QUE ESTÁN, NI ESTÁN TODOS LOS QUE SON, DIVERSIDAD MALACOLÓGICA DE DOS ÁREAS PROTEGIDAS DEL GOLFO DE MÉXICO.

Luis Gabriel Aguilar-Estrada [1] y Deneb Ortigosa [2]

[1] Facultad de Ciencias, Universidad Nacional Autónoma de México Av. Universidad 3000, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510 Ciudad Universitaria, D.F. México; lg.aguilarestrada@gmail.com

[2] Departamento de Biología, Facultad de Ciencias del Mar y Ambientales, Universidad de Cádiz, Polígono del Rio San Pedro s/n, Apartado 40, 11510 Puerto Real (Cádiz), España; jazmindeneb@hotmail.com

La plataforma continental del Golfo de México posee formaciones arrecifales, y aunque varíen en extensión, se les puede encontrar prácticamente frente a todos los estados costeros. En la sección SW del golfo de México se localiza el Parque Nacional Sistema Arrecifal Veracruzano (PNSAV), con una superficie de 52,238 ha, frente a la costa del Estado de Veracruz. Está constituido por un complejo de 23 arrecifes, todos ellos de forma alargada en dirección NE-SW, algunos de ellos costeros y otros hasta a 20 km de distancia de la costa. En la sección SE del golfo de México se localiza el Banco de Campeche, en donde está ubicado el Parque Nacional Arrecife Alacranes (PNAA), frente al Estado de Yucatán formado por un único arrecife de forma elíptica tipo atolón con una superficie de 333,700 ha, y con su región más cercana a la costa a 50 km.

A través de una búsqueda bibliográfica se registraron más de 500 especies representantes de cinco clases de moluscos: Bivalvia, Polyplacophora, Scaphopoda, Cephalopoda y Gastropoda, esta última con la mayor riqueza para ambos arrecifes. El análisis de la malacofauna entre localidades mostró que las especies exclusivas de cada localidad fueron 352 para el PNAA y 419 para el PNSAV, mostrando que el

20% de las especies han sido registradas en ambos arrecifes. En los cuales destaca la falta de especies de tallas pequeñas (micromoluscos) o sin estructuras rígidas (nudibranquios), así como la falta de registros de especies de importancia económica u ornamental en los trabajos más recientes.

IS EVERYBODY THERE? MALACOLOGICAL DIVERSITY OF TWO MARINE PROTECTED AREAS FORM THE GULF OF MÉXICO

The continental shelf of the Gulf of México has several reef formations of different sizes scattered along almost all the coast of México. The Marine Park Veracruz Reef System (PNSAV, acronym in Mexico), with an area of 52,238 ha, is located in the SW section of the Gulf of México, in front of the Veracruz State. It consists of a complex of 23 elongated NE-SW reefs, some coastal and others up to 20 km away from the coast. At the SE section of the Gulf of México and considered as part of the Campeche Bank, is located the Alacranes Reef National Park (PNAA acronym in Mexico), a single elliptical atoll shape reef, with an area of 333.700 ha, and its nearshore region 50 km.

By using a literature search we recorded more than 500 species from five classes of molluscs: Bivalvia, Polyplacophora, Scaphopoda, Cephalopoda, and Gastropoda, the last of which had the highest richness. The analysis showed that 352 species from the PNAA and 419 from the PNSAV where unique and only the 20% of the species have been recorded in both reefs. For both parks highlights the lack of species of small sizes (micromolluscs) or without rigid structures (nudibranchs), and the absence of economic or ornamental species of importance in the most recent works.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

MALACOFAUNA OF ZIHUATANEJO GUERRERO ROCKYSHORE AT MEXICAN TROPICAL PACIFIC COASTS: PRELIMINARY RESULTS

Luis Gabriel Aguilar-Estrada [1], Ivette Ruíz Boijseauneau [1] and Dení Rodríguez [1]

[1]Facultad de Ciencias, UNAM Av. Universidad 3000, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510 Ciudad Universitaria, D.F. México lg.aguilarestrada@gmail.com; irb@ciencias.unam.mx; denirodriguez@ciencias.unam.mx

The intertidal rocky shore is an ecosystem where a complex assembly of macroalgae and invertebrates, where they perform different interactions, in addition to the macroalgae main role providing substrate and shelter. In this prospective study were collected randomly intertidal molluscs in two locations, "El Palmar" and "Las Gatas" beach in Zihuatanejo, Gro. The total number of specimens collected were 142 molluscs of Gastropoda and Polyplacophora classes, with a total richness of 33 species, 18 species of gastropods and two species of chitons for "El Palmar" beach and 19 species of gastropod and three species of chitons for "Las Gatas" beach. A complete list of molluscs species for both areas is included here, noting that the gastropod had higher abundance and richness when comparing the two localities. The malacofauna analysis between locations showed that the exclusive species for each locality were 12 in "El Palmar" and 14 for "Las Gatas". Thus the most diverse site was "Las Gatas" ($H' = 2.64$ bits / ind.), although the value of "El Palmar" ($H' = 2.43$ bits / ind.) had no significant difference ($t = 0.50$ $p < 0.05$). The most abundant species were *Scurria mesoleuca* (17 specimens) for "Las Gatas" and *Collisella turveri* (22 specimens) for "El Palmar", representing 20.7% and 35.4% respectively of the total abundance. Of the 33 species found 19 have been reported previously in the coast of Guerrero, and the other 14 are new records for the area; however, these species have been found by other authors along the Pacific coast.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-PONENCIA/ORAL PRESENTATION

DIVERSITY AND DISTRIBUTION OF FAMILY COLUMBELLIDAE (CLASS: GASTROPODA) IN ROCKY INTERTIDIAL ZONE AT GUERRERO, MÉXICO.

Omar A. Ahumada-Martínez, Rafael Flores-Garza, Pedro Flores-Rodríguez and Alma R. Castrejón-Ríos
Universidad Autónoma de Guerrero. Unidad Académica de Ecología Marina. Laboratorio de Ecología Costera y Sustentabilidad. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero. C.P. 39390. Tel y Fax (01744) 4-83-27-80; ahumadamtz3@gmail.com; acua_uag@yahoo.com

In the state of Guerrero marine diversity is poorly known, a fact that's been reported by Conabio. The COLUMBELLIDAE Family is an important part of this diversity. Due to species richness and abundance, has been reported as representative of the rocky intertidal zone by other research. The work was carried out in the rocky intertidal of 21 sites in the three coastal regions of the state of Guerrero. The objectives were: Have a list of species of the family COLUMBELLIDAE, analyze the community structure based on the determination of abundance, simple dominance and analyze the structure sizes, estimate indices H 'and J' and the degree occurrence of species. The sampling area was 10 m^2 per site. 4766 organisms were analyzed. We identified 21 species. *Columbella fuscata* was recorded as the most dominant species, and *Columbella major* with the larger size. H '= 2,517 bits / individuals and J' = 0.573. Species diversity is high and corresponds to that expected in the area. We report as representative species of the Family Columbellidae to the coasts of Guerrero to: *Columbella fuscata*, *Mitrella ocellata*, *Anachis (C.) nigrofusca* and *Mitrella xenia*. New records for the state of Guerrero were *Anachis (G.) hilli* and *Anachis (P.) gaskoini*.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

SYSTEMATICS AND DIVERSITY PATTERNS OF POLYPLACOPHORANS IN MÉXICO.

Erika Alarcón-Chavira [1], Martha Reguero [1] and Brian Urbano [2]
[1]Universidad Nacional Autónoma de México. Instituto de Ciencias del Mar y Limnología. Laboratorio de Malacología. Apdo. Postal 70-305, México 04510, D. F; ekaachavira@gmail.com; reguero@cmarl.unam.mx.
[2]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com

In order to assess the polyplacophoran diversity present in Mexican coasts, a review of specimens of the Class Polyplacophora was conducted in this work. The specimens came from two Mexican biological collections of the Universidad Nacional Autónoma de México (UNAM) and field material of one laboratory from the Instituto de Ciencias del Mar y Limnología-UNAM; also the information about chitons was compiled from nine U.S. biological collections. A specialized literature review was carried out too. A total of 138 species and one subspecies were found, of which 118 species and one subspecies were found as records in the biological collections and 20 were compiled from the literature. Both coasts of México were represented in the present analysis, with the following states on the Pacific coast: Baja California Norte, Baja California Sur, Sonora, Sinaloa, Nayarit, Jalisco, Colima, Michoacán, Guerrero and Oaxaca, and from the Atlantic coast: Veracruz, Campeche, Yucatán and Quintana Roo. The Pacific coast was the best represented, with 111 species, meanwhile the Atlantic coast had 29 species. This work adds 20 species of chitons to known Polyplacophora of México, five of them from Mexican biological

collections and the other 15 species coming from specimens that have been referred to collections in the USA. This work is an effort to gather information from valid names and synonyms of the species known so far in México, in order to set a precedent to avoid bias in the actual number of recorded chitons in this country. Part of the reviewed literature has not been referred to in other publications or databases available, so that the integration of the species listed in this literature to the inventory of Polyplacophora of México and the information associated with the record of the species give relevance to this study.

SISTEMÁTICA Y PATRONES DE DIVERSIDAD DE LOS POLIPLACÓFOROS EN MÉXICO

En este trabajo se realizó una revisión de ejemplares de la Clase Polyplacophora resguardados en dos colecciones biológicas mexicanas de la Universidad Nacional Autónoma de México y material de campo de un laboratorio del Instituto de Ciencias del Mar y Limnología (UNAM), además se compiló la información proveniente de nueve colecciones biológicas estadounidenses. Se realizó la revisión del material bibliográfico especializado disponible que presentó avances en el estudio de los poliplacóforos en México. Se encontró un total de 138 especies y una subespecie, de las cuales 118 especies y una subespecie fueron extraídas de los registros de colecciones y 20 se documentaron a partir de la literatura. En este análisis estuvieron representados los dos litorales de México, con las siguientes entidades federativas de la costa del Pacífico: Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, Jalisco, Colima, Michoacán, Guerrero, Oaxaca, y por la costa del Atlántico: Veracruz, Campeche, Yucatán y Quintana Roo, siendo el litoral Pacífico el mejor representado, con 111 especies, mientras que el litoral Atlántico tuvo 29 especies. Este trabajo adiciona 20 especies a lo que ya se conocía de la fauna de poliplacóforos en México: cinco a partir de material de colecciones mexicanas y 15 más de material resguardado en colecciones estadounidenses. Este trabajo es un esfuerzo por recopilar la información de nombres válidos y sinonimias de las especies conocidas hasta ahora en México, con el fin de sentar un precedente para evitar sesgos en el número real de quitones registrados en futuros trabajos dentro del país. Parte de la literatura consultada se ha clasificado como del tipo “gris” ya que no se encontraron referidas en bases de datos disponibles para su consulta, por lo que la integración de esta bibliografía al inventario de poliplacóforos de México y la información asociada a su registro hacen relevante el presente estudio.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

NEW RECORDS OF CHITONS (MOLLUSCA: POLYPLACOPHORA) IN QUINTANA ROO, MÉXICO

Erika Alarcón-Chavira [1], Martha Reguero [1], Arturo Toledano-Granados [2] and Vivianne Solís-Weiss [2]

[1]Universidad Nacional Autónoma de México. Instituto de Ciencias del Mar y Limnología. Laboratorio de Malacología. Apdo. Postal 70-305, México 04510, D. F; ekaachavira@gmail.com; reguero@cmarl.unam.mx

[2]Universidad Nacional Autónoma de México. Instituto de Ciencias del Mar y Limnología. Unidad Académica Sistemas Arrecifales. Av. Niños Héroes S/N. Puerto Morelos, 77580, Quintana Roo, México, toledano@cmarl.unam.mx; solisw@cmarl.unam.mx

The state of Quintana Roo is in the Mexican portion of the Caribbean Sea. It has numerous appropriate environments for the establishment of chitons, from rocky shores to coralline substrates associated with the Mesoamerican Barrier Reef System.

This paper aims to contribute to the knowledge of the species richness of polyplacophorans at the coastal zone of the state of Quintana Roo, México, taking into account the information from two samplings conducted in the area of Mahahual in the years 2007 and 2008; and four more in the area of

Puerto Morelos in 2010, 2011, 2012 and 2013. Individuals belonging to the Polyplacophora, order Chitonida, represented by the families Acanthochitonidae, Chitonidae, Ischnochitonidae and Tonicellidae were found. A total of seven genera and 16 species were recorded, five of which are new records particularly for the state of Quintana Roo and for México in general.

NUEVOS REGISTROS DE QUITONES (MOLLUSCA: POLYPLACOPHORA) EN QUINTANA ROO, MÉXICO

El estado de Quintana Roo se encuentra en la porción mexicana del Mar Caribe, en este estado se encuentran numerosos ambientes apropiados para el asentamiento de los quitones, desde escolleras rocosas hasta superficies de coral asociadas al Sistema Arrecifal Mesoamericano.
El presente trabajo tiene como propósito contribuir al estado del conocimiento de la riqueza de especies de poliplacóforos de la zona costera del estado de Quintana Roo, México. Se revisó material biológico de algunas campañas de investigación sobre invertebrados de ese estado, que consistieron de dos muestreos realizados en el área de Mahahual en los años 2007 y 2008; y cuatro más realizados en el área de Puerto Morelos en los años 2010, 2011, 2012 y 2013. Se encontraron individuos de la Clase Polyplacophora, incluidos dentro del orden Chitonida, representado por cuatro familias: Acanthochitonidae, Chitonidae, Ischnochitonidae y Tonicellidae. Se registraron siete géneros y 16 especies, de las cuales cinco corresponden a nuevos registros para el estado de Quintana Roo.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS
/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

IS *OCTOPUS HUBBSORUM* (MOLLUSCA: CEPHALOPODA) AN INTERMITTENT TERMINAL SPAWNER?

María del Carmen Alejo-Plata [1], Lorena Rocha-Tejeda [2], Dulce María Vargas-Martínez [2] and Alejandra López-Galán [2]

[1]Instituto de Recursos. Universidad del Mar, campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Oaxaca 70902, México; plata@angel.umar.mx

[2]Programa de Biología Marina, Universidad del Mar, campus Puerto Ángel, Ciudad Universitaria, Puerto Ángel, Oaxaca 70902, México; rote_anerol18; alejandra7galan@gmail.com

Aspects of the reproductive biology of *Octopus hubbsorum* from the coast of Oaxaca, Mexico, were analysed. A total of 998 specimens of mantle length ranging from 40-220 mm were obtained from catches of artisanal fisheries during the period of January 2011 to December 2012. The reproductive activity was assessed using gonad histology, oocyte development, maximum oocyte size, maturity, and gonadosomatic index. A higher complexity in size-at-maturity was found, especially in females, suggesting that the two sizes may represent two different growth cohorts at breeding. The maximum observed potential fecundity was estimated at 22,447–545,444 oocytes. Maturing oocyte size–frequency distribution was polymodal, and the spawning season is extended over more than 6 months with two reproductive peaks. These two results are indicating that *O*. *hubbsorum* has an asynchronic ovulation and, therefore, that it is an intermittent terminal spawner. The presence of a constant mature population may be related to generally warm conditions during most of the year. The results identified the coast of Oaxaca as an important area for *O. hubbsorum* spawning in the eastern tropical Pacific.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

MOLUSCOS DE FONDOS BLANDOS DEL GOLFO DE PARIA, VENEZUELA

Thays Allen [1], Mayré Jiménez Prieto [1], Sioliz Villafranca [2], Johanna Fernández [3] y Samuel Narciso [4]
[1]Instituto Oceanográfico de Venezuela, Dpto. Biología Marina. Universidad de Oriente, Venezuela; thayscor@yahoo.com; mayrej@gmail.com
[2] Escuela de Humanidades y Educación, Núcleo de Sucre, Universidad de Oriente, Venezuela; svillafranca@yahoo.com
[3] Museo del Mar, Universidad de Oriente; johnannafer@hotmail.com
[4]FUDENA; samuelnarciso@gmail.com

Los estudios de la fauna malacológica son de utilidad para la realización de estudios específicos, entre los cuales se destacan el conocimiento de la diversidad de un medio en particular. Este trabajo tuvo como objetivo ampliar el conocimiento de la malacofauna de fondos blandos del Golfo de Paria, durante los años 2005-2006 en la época de sequía y lluvia. Las muestras fueron colectadas con la ayuda de una draga Petersen de 0,14 m² a bordo de una embarcación, a profundidades entre 5 y 50 m. El material fue depositado en un tamiz con malla de 1 mm de abertura, y los organismos retenidos fueron preservados en formalina al 10%. Se colectó un total de 107 ejemplares pertenecientes a las clases Bivalvia con 77 individuos, 14 especies, 4 órdenes, 9 familias y 9 géneros, y la clase Scaphopoda con 28 especímenes y 8 especies, los cuales sólo estuvieron presentes en la época de verano, siendo *Codalus greenlawi* con 18 organismos el más abundante. En esta misma época, para los bivalvos la especie *Nucula aeegensis* y el género *Nuculana* fueron los que presentaron el mayor número de individuos. En la época de lluvia, disminuyo el número de organismos con un total de 40, pertenecientes sólo a la clase Bivalvia, contenidos en 9 familias y 14 especies, de las cuales, *Tellina sybaritica* con 14 organismos y *Nuculana concentrica* con 10 ejemplares fueron las más abundantes. En el Golfo de Paria se observó baja abundancia de organismos y de especies, para las dos épocas estudiadas (sequía y lluvia), lo cual pudiera estar relacionado con la resuspensión de sedimentos que existe en el área por la influencia de las aguas de la desembocadura del río Orinoco, lo cual perjudica el establecimiento de muchas especies bentónicas.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

GENETIC DIVERSITY AND DIFFERENTIATION OF *FISSURELLA VIRESCENS* (GASTROPODA: FISSURELLIDAE) IN THE EASTERN TROPICAL PACIFIC

Arizbeth Alonso-Domínguez [1a], Ofelia Vargas-Ponce [2b] and Eduardo Ríos-Jara [1c]
[1]Laboratorio de Ecosistemas Marinos y Acuicultura. [2] Laboratorio de Sistemática Vegetal, IBUG. Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Camino Ramón Padilla Sánchez #2100 Nextipac, Zapopan, Jalisco, México. C.P.; [a]ariz.alonso08@gmail.com, [b]ovargas@cucba.udg.mx, [c]edurios@cucba.udg.mx

The limpet *Fissurella virescens* is a sedentary organism; it is fairly abundant in the rocky shores of the Eastern tropical Pacific. It is assumed that many marine invertebrate species with wide geographic distribution have low levels of genetic differentiation. Different environmental factors influence population connectivity, increasing differentiation. The goal of the present study was to estimate the genetic diversity and differentiation of seven populations of *F. virescens*.

A total of 210 live individuals were collected from seven populations, six from México (Mazatlán Bay, Isla Isabel, Banderas Bay, Chamela Bay, Cuastecomate and Ixtapa) and one from Panama (Veracruz beach). Extractions of DNA were made using 0.04 g of foot tissue. Three ISSR's primers were generated and evaluated in acrylamide gels. Genetic diversity was calculated with three estimators: polymorphic loci (Lp), expected heterozygosity (He) and Bayesian heterozygosity (H_B). Differentiation was inferred with the Weis and Cockerham estimator (θ), the Bayesian index (θ_B) and Nei's genetic distance (D).
We amplified 76 ISSR's fragments. The diversity values (Lp = 100%, He = 0.3180) and genetic differentiation (θ = 0.2935) were high, indicating that populations have low connectivity. Based on Nei's genetic distance 4 groups were formed, and they don't correspond to their geographic distribution as expected. It is assumed that the short larval duration, geographic distance and ocean currents influence the populations' diversity of this species.

MORFOMETRÍA/MORPHOMETRY-PONENCIA/ORAL PRESENTATION

MORPHOMETRIC VARIABILITY OF *FISSURELLA VIRESCENS* (GASTROPODA: FISSURELLIDAE) IN THE EASTERN TROPICAL PACIFIC

Arizbeth Alonso-Domínguez [a], Eduardo Ríos-Jara [b] and Ofelia Vargas-Ponce [c]
[1]Laboratorio de Ecosistemas Marinos y Acuicultura. [2]Laboratorio de Sistemática Vegetal, IBUG. Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Camino Ramón Padilla Sánchez #2100 Nextipac, Zapopan, Jalisco, México. C.P. 45110. [a]ariz.alonso08@gmail.com, [b]edurios@cucba.udg.mx, [c]ovargas@cucba.udg.mx

The study of morphological variation is important to understand the evolution and ecology of a species. The shells of mollusks may be very variable due to environmental conditions. Most multivariate methods used to analyze morphological variations tend to bias information as they are affected by the size of the individuals. To minimize this problem, several methods have been proposed based on Landmarks and on Fourier Ellipses.
The gastropod *Fissurella virescens* is common in the rocky shores of the eastern tropical Pacific. The goal of this study was to analyze morphometric differences of *F. virescens* shells using different methods. A total of 270 live individuals were collected from seven locations, six from México (Mazatlán, Isla Isabel, Banderas Bay, Chamela, Cuastecomate and Ixtapa) and one from Panama (Veracruz beach). The shells were analyzed with classic methods, geometric morphometrics and Fourier Ellipses. We applied PERMANOVAs and Canonical Discriminant Analysis to determine the existence of significant differences between populations.
The results of the three methods were different. Significant differences were recognized with two of the three methods in shells shape between populations, however these differences were influenced by Ixtapa population. Either method was able to discriminate effectively between populations, discrimination values ranged between 65% and 45%, which suggests that the shape is very consistent as has been documented in other species of mollusks. We conclude that *F. virescens* shells do not change much between populations and that these variations are subject to environmental conditions.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

EPIBIONTS ON THE POLYPLACOPHORAN *CHITON ARTICULATUS*

Laura Regina Álvarez-Cerrillo [1]; Paul Valentich-Scott [2] and Brian Urbano [3]
[1]Laboratorio de Malacología, Instituto de Ciencias del Mar, UNAM, México; letgopvd@gmail.com
[2]Santa Barbara Museum of Natural History, 2559 Puesta del Sol Road, Santa Barbara, California 93105, USA; pvscott@sbnature2.org
[3]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com

Chiton articulatus is an endemic chiton in the Mexican Pacific. This work describes, for first time, the epibionts that have been observed on and in the valves of this species. The chitons studied are from the state of Guerrero, Mexico, and were obtained in areas of high wave activity and erosion. We observed over 400 epibionts from a single chiton. The epibionts are from two kingdoms: Protista (two morphotypes) and Animalia (nine morphotypes). The animalian morphotypes are represented by five phyla: Arthropoda, Bryozoa, Annelida, Chordata and Mollusca, which correspond to five classes and at least three families. The molluscan epibionts will be discussed in detail.

EPIBIONTES DEL POLIPLACÓFORO *CHITON ARTICULATUS*

Chiton articulatus es un quiton endémico del Pacífico Mexicano. Este trabajo describe, por primera vez, los epibiontes que han sido observados sobre y dentro de las valvas de esta especie. Los quitones estudiados provienen del estado de Guerrero, México, y fueron obtenidos en áreas de alta actividad de oleaje y erosión. Observamos cerca de 400 epibiontes en un solo quiton. Los epibiontes pertenecen a dos reinos: Protista (dos morfotipos) y Animalia (nueve morfotipos). Los morfotipos de Animalia se distribuyen en cinco phyla: Arthropoda, Bryozoa, Annelida, Chordata y Mollusca, corresponden a cinco clases y al menos tres familias. Los moluscos epibiontes serán discutidos en detalle.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS- PONENCIA/ORAL PRESENTATION MORFOLOGÍA, MORFOMETRÍA Y ANATOMÍA

SPACE-TIME BIOMETRIC VARIABILITY OF *CHITON ARTICULATUS* AND *CHITON ALBOLINEATUS* ALONG THE COAST OF GUERRERO, MÉXICO

Laura Regina Álvarez-Cerrillo [1]; Adriana Reyes-Gómez [2] and Brian Urbano [3]
[1]Laboratorio de Malacología, Instituto de Ciencias del Mar, UNAM, México; letgopvd@gmail.com
[2]Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero, Acapulco, México; quitonreyes@yahoo.com
[3]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com

Here we studied two species of endemic polyplacophorans from the Mexican Pacific: *Chiton articulatus* and *Chiton albolineatus*. Besides being a dominant species with high population densities in intertidal communities in the Mexican tropical Pacific, they are a local food source. There is uncertainty in relation to their reproductive pattern, since for *C. articulatus* there are three reported reproductive types:

dioecious, facultative dioecious, where males differ from females that have not yet reached sexual maturity, and hermaphrodites (not known whether facultative or simultaneous). In the case of *C. albolineatus*, it has only been included in the second type.

This study aims to extend the knowledge of the reproductive anatomy of both species, for which we used specimens obtained at different times from six locations in Guerrero, México: Ojo de Agua; Las Gatas; Playa Poseidón, Caleta; Parque de la Reina, Muelles; Las Salinas and Punta Maldonado. For both species, we analyzed the structure sizes and weights; the relationship between the size of the gonad with respect to the body; the soft structures (number of ctenidia, position and morphology of nephidriopores or nephidria apertures and gonopores or gonad apertures) were correlated with the size and the sex. Significant differences between the sizes and weights of chitons according to the location and time of year were found. It was determined that the amount of ctenidia increases as the size of the specimen, but with no specific ratio. Until now the study of the pores is a tool that helps but can not determine the sex of chitons.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

CHARACTERIZATION OF THE FISHERY OF GREEN OCTOPUS (*OCTOPUS HUBBSORUM*) IN THE MEXICAN CENTRAL PACIFIC

Carlos Alberto Amezcua-Gómez, Sergio Fabián Cisneros Gaytán
INP-CRIP-Manzanillo, Playa Ventanas s/n. Tel 3143323750. Manzanillo, Col. México;
carlos.amezcua@inapesca.sagarpa.gob.mx

The green octopus (*Octopus hubbsorum*) is a target species in the coastal fisheries of the Central Mexican Pacific, whose captures have increased from the year 1944 to 2008. There are no management measures in this area for this species. The green octopus is distributed from the Gulf of California to the coast of Oaxaca in México, it is a benthic species of inter-subtidal areas up to 30 m deep. This work has the objective of make a diagnosis of the commercial catch of this species, using commercial information of the fishing cooperatives during two years, and also monthly samplings were performed, recording: type of boat, fishing gear, dive type and length of time, fishing areas, daily catch per fisher and monthly catch per fleet. Data on each organism was taken: total and mantle length, weight, sex, gonad maturity. As a result of this study a total of 2,928 organisms were sampled; the sex proportion was 1,075 females per male. The abundance increased between May and August; during these month the number of fishermen doubles. The capture of the octopus is mainly on organisms of 200 to 600 g, therefore organisms are being captured as juvenile of reproductively unfit, and there is a strong preference for certain fishing locations.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

INVENTARIO Y ABUNDANCIA RELATIVA DE LOS BANCOS DE OSTIÓN DE ROCA (*CRASSOSTREA IRIDISCENS*) EN LA COSTA DE JALISCO, MÉXICO.

Carlos Alberto Amezcua-Gómez
Instituto Nacional de la Pesca-Centro regional de Investigaciones Pesqueras, Manzanillo
Playa Ventanas s/n. Manzanillo, Colima México
Universidad de Guadalajara-CUCSur- DESDZC[2]. Gómez Farías 82, San Patricio-Melaque, Jalisco México;
carlos.amezcua@inapesca.sagarpa.gob.mx

El ostión de roca, *Crassostrea iridescens* de la familia Ostreidae. Es un molusco de concha relativamente grande, comúnmente 15 cm. puede medir hasta 25 cm, es robusta y engrosa con la edad, muy irregular y desigual. Su distribución va del Golfo de California hasta Perú. La pesca del ostión de roca se capturaba por buceo libre y hoy en día con equipo semiautónomo (compresor, manguera, visor y aletas) más el uso de barretas para desprender la concha de los fondos rocosos. La talla mínima de extracción es de 70 mm de longitud total. Hasta hace aproximadamente tres años, la producción de ostión en la costa de Jalisco generaba buenos ingresos a pescadores y su familia, el aumento del esfuerzo pesquero ha puesto en riesgo los bancos ostrícolas por sobreexplotación. Los pescadores propusieron auto-vedarse por dos años ya que el recurso estaba eminentemente sobreexplotado. El objetivo de este estudio fue el seguimiento de esta veda para constatar su efectividad. Se hizo un inventario de los principales bancos ostrícolas por medio del geoposicionamiento del banco y se registró la abundancia relativa por medio de transectos. Como resultado de este estudio se observó en casi todos los bancos ostrícolas pesca clandestina, mortalidad masiva y cada banco presenta una problemática muy particular de acuerdo a su ubicación. Así se concluye que la veda impuesta produjo la recuperación de algunos bancos, aun cuando no fue respetada en la Costa Sur del Estado y en la Costa Norte, los organismos presentaron un bajo reclutamiento.

DESARROLLO/DEVELOPMENT-PONENCIA/ORAL PRESENTATION

CONDICIONES EMBRIONARIAS PARA LA ECLOSION EN CAPSULAS DEL GASTROPODO *CREPIPATELLA DILATATA*

Paola Andrade Villagrán [1,2], Karen Barías [1] y Oscar R. Chaparro [1]
[1]Instituto de Ciencias Marinas y Limnológicas, Facultad de Ciencias, Universidad Austral de Chile, Valdivia, Chile; andradevill@gmail.com; karen.bariasrojas@hotmail.com; ochaparr@uach.cl
[2]Programa de Doctorado en Biología Marina, Universidad Austral de Chile, Valdivia, Chile

La reproducción en invertebrados marinos puede incluir la formación, por parte de la hembra, de estructuras envolventes de los embriones y la incubación física de ellos. En gastrópodos, el encapsulamiento de embriones es una estrategia reproductiva frecuente y suele presentar características especie-específica, particularmente relacionado al período incubatorio y a los mecanismos de eclosión. Este estudio pretende identificar las características del contenido embrionario, que expliquen el momento en que ocurre la eclosión en cada capsula de una postura. Lo anterior, en función a que capsulas hermanas, eclosionan a diferentes tiempos. Para esto, se utilizaron capsulas de *C. dilatata* en estadío avanzado, mantenidas individualmente en mini-acuarios con agua de mar filtrada y aireada previamente. Diariamente se cambió el agua y las capsulas fueron monitoreadas hasta su eclosión. En cada capsula eclosionada, se identificó el número de individuos metamorfoseados y no-metamorfoseados, la longitud de cada embrión y la biomasa total encapsulada. Cuando el 60% de las

capsulas de cada postura eclosionaron, las restantes capsulas no-eclosionadas fueron abiertas para cuantificar la condición embrionaria. Los resultados muestran que el tiempo de eclosión capsular por postura es variable, superando al tiempo invertido por la madre en el proceso de postura. Se identificaron diferencias significativas en el número y porcentaje de embriones metamorfoseados entre capsulas eclosionadas y no-eclosionadas. En promedio, el porcentaje de metamorfoseados fue de 94% y 40% para capsulas eclosionadas y no-eclosionadas, respectivamente. Por otra parte, se identificó una biomasa encapsulada mínima al momento de la eclosión de 0.4 mg por capsula. Igualmente, la longitud media de los juveniles metamorfoseados fue de 1.34 ± 0.2 mm. Lo anterior, sugiere que la eclosión esta comandada por los embriones encapsulados, requiriéndose de una biomasa eclosionante, un porcentaje de individuos metamorfoseados y un tamaño de juveniles mínimo, para que el proceso de eclosión sea exitoso.

Financiado por Fondecyt 1141052 y Beca de Doctorado Nacional Conicyt-Chile.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

GASTERÓPODOS DE ISLA SOCORRO, ARCHIPIÉLAGO DE REVILLAGIGEDO, MÉXICO

Jazmín Aristeo Hernández [1], Brian Urbano [1], Martha Reguero [2]
[1]Facultad de Ciencias, UNAM. Av. Universidad 3000, Circuito Exterior S/N. Apartado postal 70153. C.P. 04510; j_aristeo@hotmail.com; maclen55@yahoo.com
[2]Instituto de Ciencias del Mar y Limnología, UNAM. Circuito Exterior S/N. Ciudad Universitaria C.P. 04510; reguero@cmarl.unam.mx

El presente trabajo aborda el estudio de la estructura comunitaria de los moluscos gasterópodos de Isla Socorro, Archipiélago de Revillagigedo, México. El muestreo fue realizado durante el periodo del 20 de agosto al 6 de septiembre del 2008. Se realizaron catorce buceos acumulando un total de 328 h/hombre de recolecta. Se recolectaron 320 individuos, los cuales pertenecen a 19 familias, 23 géneros y 33 especies. Las especies más abundantes en orden descendiente fueron *Cerithium maculosum*, *Plicopurpura columellaris* y *Turbo funiculosus*. Las familias con mayor riqueza fueron Conidae y Muricidae con seis especies cada una. Las localidades con mayor diversidad fueron Bahía Vargas Lozano y Playa El Barquito. Los índices de diversidad obtenidos de toda la isla fueron Shannon de 3.76 y Simpson 0.13. La estructura de las comunidades de moluscos está relacionada con los sitios de muestreo, y posiblemente sea muy afectada por las corrientes, huracanes y vientos propios de la zona de muestreo.

GASTROPODA FROM SOCORRO ISLAND, REVILLIGIGEDO ARCHIPIELAGO, MÉXICO

This work details the community structure of the gastropod molluscs on Socorro Island in the Revillagigedo Archipelago, México. The samples were collected from August 20th to September 6th of 2008. We made fourteen dives accumulating 328 hours per man. We collected 320 specimens that belong to 19 families, 23 genera and 33 species. The most abundant species were *Cerithium maculosum, Plicopurpura columellaris* and *Turbo funiculosus.* The families with highest species richness values were Conidae and Muricidae, with six species each one. The localities with highest diversity index values were Bahía Vargas Lozano and Playa el Barquito. Diversity index of Shannon for the whole island were 3.76 and Simpson index was 0.13. The community structure is related with sampling site and probably highly affected by currents, hurricanes and winds.

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-PONENCIA/ORAL PRESENTATION

MASCULINIZACIÓN DE HEMBRAS EN *STRAMONITA HAEMASTOMA FLORIDANA* (CONRAD, 1837) (GASTROPODA) EN CINCO LOCALIDADES DE VERACRUZ, MÉXICO

Gabriela Arteaga y Brian Urbano
Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; starlight_2101@hotmail.com

La mayoría de los moluscos son bioindicadores por excelencia de ciertas sustancias dañinas para el ambiente. Un ejemplo de estas sustancias son los compuestos organoestanicos o ciertos metales pesados y biocidas que son descargados muchas veces en el medio marino. El término imposex es utilizado para señalar la aparición de caracteres sexuales masculinos en hembras por la exposición de tributil-estaño (TBT) y dicho fenómeno puede presentarse en diversas especies tanto de invertebrados como vertebrados. Se hicieron 5 recolectas a lo largo de Veracruz, México, para comparar que tanto se ha propagado el fenómeno de imposex. La primera recolecta fue de 86 individuos de *Stramonita haemastoma floridana* (Conrad, 1837) sobre una escollera natural en Playa Paraíso, Veracruz, en el mes de mayo 2011. Los organismos se anestesiaron con aceite de clavo y fueron preservados en alcohol al 70%. Los sexos se identificaron a través de las características de la especie. Para detectar la presencia y ausencia de imposex se prestó atención en el gonoporo, pene, y glándulas. El 59% de los organismos fueron hembras, el 26% machos y 15% presento imposex. A través de una prueba de xi^2 se obtuvo un valor de 5.991 (2 g.l., P=0.05, Xi^2_0= 28.99) que demuestra que las diferencias de las proporciones sexuales son significativas. A pesar de que en la playa Paraíso es un lugar donde el paso de embarcaciones es reducido comparado con otras áreas de Veracruz, se detectó la presencia de imposex, indicando un grado de contaminación considerable.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

VARIACIÓN TEMPORAL DEL CICLO REPRODUCTIVO DEL OSTIÓN DEL ESTE *CRASSOSTREA VIRGINICA* (GMELIN, 1791) EN LA LAGUNA DE TAMIAHUA, VERACRUZ

Luis Ascencio Aguirre [1], Martha Enríquez Díaz [1], Imelda Martínez Morales [2] y Dalila Aldana Aranda [1]
[1]Laboratorio de Biología y Cultivo de Moluscos. Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Unidad Mérida (CINVESTAV-IPN). Carretera Antigua a Progreso, Km. 6, Cordemex, C.P. 97310, Mérida, Yucatán, México; luis.ascencio86@gmail.com, menriquez@mda.cinvestav.mx; daldana@mda.cinvestav.mx
[2]Instituto de Ecología A. C. Carretera Antigua a Coatepec 351. El Haya, C. P. 91070, Xalapa, Veracruz, México; imelda.martinez@inecol.edu.mx

El ostión del este (*Crassostrea virginica*) es la especie más explotada dentro de las actividades pesqueras del Golfo de México, alcanzando el estatus de "recurso aprovechado al máximo". Como medida de protección de la pesquería, se han propuesto períodos de veda basadas en el ciclo reproductivo del ostión. El objetivo de este trabajo fue comparar el ciclo reproductivo de organismos provenientes de la laguna de Tamiahua, Veracruz, en las temporadas 2004 (T1) y 2011 (T2), para comprobar si es factible proponer períodos de veda basados en los resultados de una sola temporada reproductiva. En el caso de la T1, los datos fueron tomados del trabajo de Arias-De León *et al.* (2012). Para la T2 se colectaron

mensualmente 30 ostiones de los cuales se obtuvieron cortes histológicos de las gónadas. Se determinaron cuatro estadios de desarrollo gonadal: reposo, gametogénesis, maduración y liberación. En los ostiones de la T1, el reposo presentó su pico de abundancia en mayo (19%); la gametogénesis fue muy abundante durante todo el año (>50%) excepto en febrero (20%); los ostiones maduros se ubicaron en febrero (80%) y la liberación se presentó con baja intensidad en junio (9%), septiembre (13%) y noviembre (15%). Por otra parte, los ostiones de la T2 se encontraron en reposo principalmente en enero (38%); la gametogénesis de febrero a julio (47-72%), los organismos maduros de mayo a septiembre (30-60%) y los ostiones en liberación se presentaron durante dos períodos distintos, el primero en enero-febrero (40%) y el segundo de septiembre a noviembre (34-57%). Los ostiones de la T1 y la T2 mostraron diferencias significativas (α=0.05) en los cuatro estadios reproductivos. Los períodos de veda no pueden ser propuestos en base a la experiencia de una sola temporada reproductiva, debido a la gran variabilidad de las mismas.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

TURRIDAE (MOLLUSCA, NEOGASTROPODA, CONOIDEA) WILDLIFE ACCOMPANYING THE SHRIMP FISHING IN NORTHWEST COAST OF MEXICO

Briana Yoselin Baez Valenzuela [1], Mónica Anabel Ortíz Arellano [1,2] y Edgar P. Heimer de la Cotera [3]

[1]Colección de Moluscos de la Universidad Autónoma de Sinaloa (COMUAS), Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; yse_2bes@hotmail.com; manabel@uas.edu.mx

[2]Cuerpo Académico "Manejo de Recursos Pesqueros", FACIMAR-UAS. Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx

[3]Instituto de Neurobiología Campus Juriquilla. Universidad Nacional Autónoma de México. Santiago de Querétaro, Querétaro, México; heimer@unam.mx

The species that belong to the superfamily Conoidea (= Toxoglossa) are snails that possess biologically active poisons and are considered a resource with high potential in pharmacology. Traditionally they are grouped into three families: Conidae, Turridae and Terebridae. The hallmark of the family Turridae is a notch or sinus in the upper part of the outer lip, but the species are difficult to identify because of the high levels homoplasy for morphological and anatomical characters. In the present work we purposed to make a taxonomic list of turrids snails of Northwest Mexican Pacific coast, providing data on abundance and distribution. The samples were collected from the catch of shrimp fishing offshore of the season 2012-2013. Organisms were identified according to the characteristic of the shell and radular characteristics and taxonomic classification was performed according to Sklogund (2002), also taxonomic grouping according to Bouchet & Rocroi (2005) is provided. A total of 845 individuals belonging to 9 genera and 16 species were recorded, with *Plystita nobilis* which showed higher abundance with 401 specimens representing 47 % of all identified organisms. The species *Kefastia walkeri*, *K. funiculata*, *Imaclava andrei*, *Fusiturricula pilsbryi* included only one record each. The species that showed a wide distribution present in most collection sites was *P. nobilis*. The site with the greatest diversity of species was el Juramento, Baja California Sur, with 8 species.

DESARROLLO/DEVELOPMENT-PONENCIA/ORAL PRESENTATION

A NEW BOOK. SPAWNING: BIOLOGY, SEXUAL STRATEGIES AND ECOLOGICAL EFFECTS

Erick R. Baqueiro Cárdenas (editor)
CINVESTAV IPN Mérida, Km. 6 Carretera a Progreso, Mérida, Yucatán CP 97310, Mexico;
ebaqueiro@gmail.com

This new book describes the reproductive strategies and tactics employed by bivalve and gastropod molluscs to exploit and take advantage of different environments, and their response to environmental fluctuations.
The first chapter gives a general overview of the reproductive strategies, and tactics developed through time as a means of adaptation to different environments, including morphological variations, reserve storage strategies; gametogenic effort, duration and intensity; storage of gametes, duration and intensity of spawn and post spawn; and the need and duration of a rest or recovery period.
Chapters two and three give an up-to-date overview of histological oogenesis and spermatogenesis, pointing out the variation in morphology and gametogenic processes. While chapters four and five present the different tactics adopted by different species and populations of the same species to various environments and its variations, demonstrating the plasticity of mollusc reproduction capacities, which permits them to use different environments and to thrive in changing environments.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

MOLLUSKS FROM THE SOUTHERN PACIFIC OF MÉXICO: A LITERATURE REVIEW

Norma Arcelia Barrientos-Luján [1], Eduardo Ríos-Jara [2] and María del Carmen Esqueda-González [2]
[1]Instituto de Ecología, Universidad del Mar, Puerto Ángel, Oaxaca. AP 47, CP. 70902;
blujana@angel.umar.mx
[2]Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara, Carretera a Nogales Km. 15.5, Las Agujas Nextipac, Zapopan, Jalisco 45110, México; eriosjara@gmail.com; carmeg7@yahoo.com.mx

Molluscs of the Mexican Pacific have been studied since the 1970's. However, the same effort has not been applied equally to the entire region. In this work records of marine molluscs from the coast of Guerrero, Oaxaca and Chiapas were updated. Additionally, the average taxonomic distinctness (Δ^+) and its variation (Λ^+) were estimated.
Based on information published in 26 studies to date, a record of 633 species of molluscs were obtained, including Bivalvia (207), Cephalopoda (7), Gastropoda (393) Scaphopoda (2) and Polyplacophora (24). The greater sampling effort has been carried out in Oaxaca coast, with a total of 486 molluscs species representing one third from Southern Pacific of Mexico's malacofauna. The species of commercial interest are the most studied molluscs that inhabit the intertidal and shallow subtidal, mainly gastropods (62%) and bivalves (33%). The Δ^+ and Λ^+ values showed that three sites fell within the confidence intervals of 95% (p>0.05), indicating that contribute significantly to the total region's taxonomic diversity. In Oaxaca had the highest number of taxa, mainly gastropods and bivalves, this site was located very close to the average taxonomic inventory for this region.
Species of molluscs not recorded in the region may be due to different causes, i.e., inconspicuous shells, small size, inhabited at great depths. These require more investment in resources and equipment for

their collection. A large majority of species included in this compilation, may be accessed and reviewed at the regional and national conchological collections. An additional effort is required to complete the inventory of marine biodiversity of Guerrero, Oaxaca and Chiapas, which currently represents 25% of the Mexican Pacific.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

MOLLUSKS (GASTROPODA AND BIVALVIA) OF CORAL COMMUNITIES OF THE MEXICAN TROPICAL PACIFIC (PTM)

Norma Arcelia Barrientos-Luján [1], Fabián A. Rodríguez-Zaragoza [2], Ramón A. López-Pérez [3], Eduardo Ríos-Jara [2], Michel Hendrickx [4], Ernesto López-Uriarte [2]

[1]Doctorado en Biosistemática, Ecología y Manejo de Recursos Naturales y Agrícolas, Centro Universitario de Ciencias Biológicas y Agropecuarias de la Universidad de Guadalajara. norma.barrientos@alumno.udg.mx; conquiliologas@live.com.mx

[2]Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara, Carretera a Nogales Km. 15.5, Las Agujas Nextipac, Zapopan, Jalisco 45110, México. fabianrz2002@yahoo.com.mx; eriosjara@gmail.com; ernyboll61@yahoo.com.mx

[3]Universidad Autónoma Metropolitana, Unidad Iztapalapa. San Rafael Atlixco no. 186, colonia Vicentina, Iztapalapa. CP 09340, México; alopez@xanum.uam.mx

[4]Instituto de Ciencias del Mar y Limnología, UNAM, Unidad Académica Mazatlán. Av. Joel Montes Camarena S/N, Apartado Postal 811 C.P. 82040, Mazatlán, Sin. México; michel@ola.icmyl.unam.mx

In the Mexican Pacific, it has been estimated that the species richness is 2,576. Nevertheless, there has never been a complete inventory of mollusc species of the Mexican Pacific, due to the scarce attention that has been put in molluscs in coral reefs. In this work the species richness of gastropods and bivalves from the coral reefs and coral communities from Nayarit to Oaxaca of the Mexican Tropical Pacific is described.

Coral communities molluscs were collected using four quadrats (0.25 m^2) randomly selected per site in three substrates (coral, rock, and sand). The expected species richness (S) and the sampling effort were calculated using the nonparametric estimators Chao 1 and 2 and Jackknife 2. Average taxonomic distinctness (Δ^+) and its variation (Λ^+), were estimated for gastropods and bivalves, and each substrate.

A total of 3,985 live molluscs were recorded. Gastropods recorded 2,576 organisms, 146 species, 98 genera and 55 families, representing 70% of the total abundance. The sampling effort was representativeness ranged between 88% and 73% of the species richness for bivalves and gastropods. The species accumulation curves showed a trend towards an asymptote, with maximum values of 71 species of bivalves and 200 gastropods according to Jackknife 2 estimator. This indicates that there are still species to find, however, are representative species of the molluscs community coral communities and coral reefs of this region.

The Δ^+ and Λ^+, showed most sites within the confidence interval of 95% ($p > 0.05$), indicating a significant contribution to the average taxonomic diversity of the region. Sites with greater taxonomic diversity of gastropods and bivalves associated with coral reef in the Mexican Tropical Pacific are located in Nayarit (Islas Marietas), Guerrero and Oaxaca.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

SPATIAL VARIATION OF ASSEMBLY GASTROPODS CORAL COMMUNITIES OF MEXICAN TROPICAL PACIFIC

Norma Arcelia Barrientos-Luján [1], Fabián A. Rodríguez-Zaragoza [2], Ramón A. López-Pérez [3], Eduardo Ríos-Jara [2], Michel Hendrickx [4], Ernesto López-Uriarte [2]

[1]Doctorado en Biosistemática, Ecología y Manejo de Recursos Naturales y Agrícolas, Centro Universitario de Ciencias Biológicas y Agropecuarias de la Universidad de Guadalajara; norma.barrientos@alumno.udg.mx; conquiliologas@live.com.mx

[2]Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara, Carretera a Nogales Km. 15.5, Las Agujas Nextipac, Zapopan, Jalisco 45110, México; fabianrz2002@yahoo.com.mx; eriosjara@gmail.com; ernyboll61@yahoo.com.mx

[3]Universidad Autónoma Metropolitana, Unidad Iztapalapa. San Rafael Atlixco no. 186, colonia Vicentina, Iztapalapa. CP 09340, México; alopez@xanum.uam.mx

[4]Instituto de Ciencias del Mar y Limnología, UNAM, Unidad Académica Mazatlán. Av. Joel Montes Camarena S/N, Apartado Postal 811 C.P. 82040, Mazatlán, Sin. México; michel@ola.icmyl.unam.mx

Mollusks are one of the dominant invertebrate groups in coral communities. Where species composition, is dependent on factors operating at various spatial scales. This paper aims to describe the spatial variation of the assembly structure and functional groups of gastropods in coral communities of the Mexican tropical Pacific, from Nayarit to Oaxaca.

Gastropods of coral communities were collected using four randomly selected (0.25 m2) per site and substrate quadrants. From a matrix of Bray-Curtis, multivariate analysis of variance based on permutations (PERMANOVA) was performed to test a geographic model nested and unbalanced three-way (Y = Region + (Position Geographic (Region) + Site (Position Geographic) Region)). Canonical correspondence analysis was used to assess the relationship between the assembly and the functional groups of each site, substrate and environmental variables spatial. Subsequently an additive canonical partition was conducted.

The assembly revealed significant variation in the scale and geographical position in place all types of substrate, except coral substrate region that has a level variation. Functional groups had variation in geographical position in the three types of substrates and between rock substrate sites. Spatial variation was explained by pure environmental component. For assembly of coral was 43%, and the functional groups of 50% rock. Environmental and spatial variables that caused the spatial variation were primary productivity, phosphates and coverages *Pavona*, *Pocillopora*, *Porites*, *Psammocora*, bryozoans, hydrozoans, octocorals, sponge, sand, rock, dead coral, rubble, latitude and longitude. This shows a greater variation in the assembly of gastropods and functional groups, small and medium scale, ie between separated by hundreds of miles and sites separated by tens to hundreds of meters geographical position, possibly due to prevailing environmental conditions in each site and substrate.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
DE MOLUSCOS MARINOS-PONENCIA/ORAL PRESENTATION

TAXONOMIC COMPOSITION AND DISTRIBUTION OF MOLLUSKS FROM BAHIA CHAMELA, MÉXICO

Dafne Bastida-Izaguirre, Eduardo Ríos-Jara, Cristian Moisés Galván-Villa, María del Carmen Esqueda-González y Arizbeth Alonso-Domínguez
Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Carretera a Nogales Km 15.5. Las Agujas, Nextipac, Zapopan, Jalisco, México;
dafne.bastida@msn.com

The study describes the taxonomic composition and distribution of mollusks from the rocky and sandy intertidal, and the shallow subtidal environments of 14 different localities from Bahia Chamela, Mexico (8 islands, 2 islets and 4 costal sites). A total of 4,639 individuals of 71 species, 46 genera, 31 families, 13 orders and three classes were recorded in the intertidal; the most abundant species was the periwinkle *Nodilittorina aspera* while 17 species (24%) were unique (e.g. with a single individual in all samples). In the shallow subtidal 2,924 individuals of 202 species, 138 genera, 70 families, 20 orders and four classes were recorded; the most abundant species was the slipper limpet *Bostrycapulus aculeatus* and 67 species (33%) were unique. The Gastropoda were the most abundant and with the highest number of species; the most diverse and with a wider distribution in the bay were Muricidae (20 species), Calyptraeidae (16). Buccinidae (9), Columbelidae (9), Fissurellidae (6), and Lottidae (6). The most diverse families of Bivalvia, and with a wider distribution were Mytilidae (13 species), Venerid (12) and Arcidae (7). Four families and 15 species of Polyplacophora were recorded: Ischnochitonidae (8 species), Tonicellidae (3), Chitonidae (2) and Acanthochitonidae (2). Only one species of Cephalopoda was recorded (*Octopus hubbsorum*). The larger islands had the highest number of species (Isla Cocinas e Isla Pajarera); while a small islet (Islote Novillos) and a coastal rock beach (Playa Chamela) the lowest numbers of species. The cup-and-saucer snail *Crucibulum scutellatum* and the bearded hoofshell *Pilosabia pilosa* were the most widely distributed mollusks in the bay.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
DULCEACUÍCOLAS

ASPECTS OF POPULATION DYNAMICS OF *DIPLODON ELLIPTICUS* SPIX IN WAGNER, 1827 (BIVALVIA: HYRIIDAE) FROM CAIÇARAS LAKE, RIO DE JANEIRO, BRAZIL

Jéssica Beck Carneiro [1], Vanessa Fontoura-da-Silva [2], Igor Christo Miyahira [1,2] and Sonia B. dos Santos [1]
[1]Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier, 524, Pav. Haroldo Lisboa da Cunha, Laboratório de Malacologia Límnica e Terrestre, sala 525/2, Maracanã, Rio de Janeiro, RJ, 20550-900, Brasil; jessicabcarneiro@gmail.com; icmiyahira@yahoo.com.br; gundlachia@yahoo.com.br
[2]Universidade Federal do Estado do Rio de Janeiro, Av. Pasteur, 458, Laboratório de Zoologia de Invertebrados Marinhos, sala 309B, Urca, Rio de Janeiro, RJ, 22290-240, Brasil;
vanessa_fontoura@globo.com

The freshwater mussel *Diplodon ellipticus* is a filter feeder bivalve that inhabits sandy-muddy substract of rivers and lakes. This study aimed to evaluate growth, life expectancy and mortality of a population of *D. ellipticus* from Caiçaras Lake, Piraí, Rio de Janeiro, comparing the results of length frequency data (LFD) and mark-recapture methodology (MRM).

Samples were taken from November/2012 to November/2013 in three points of the lake. At each point, we defined an area of 15m^2, where the bivalves were searched during three minutes using bare hands and feet. Then, they were measured with a caliper in relation to total length and returned to the lake. Individuals were grouped into length classes with an interval of 2.0mm. The curve parameters of length frequencies were estimated by the program ELEFAN that adopts the von Bertalanffy model modified with seasonal oscillation and the individual growth were estimated by the method of Gulland-Holt described by von Bertalanffy model. The mortality for both methods was performed through the Length-Converted Catch Curve and life expectancy through the inverted equation of von Bertalanffy.
During the study period, 3474 bivalves were tagged and 1844 were recaptured, some of them more than once. The length of specimens ranged from 16.13 to 62.14mm; the highest frequencies were found for intermediate sizes 44-46mm, as has been observed in other populations of *Diplodon*. The lowest recaptured bivalve measured 23.58mm and was recaptured 127 days after with 25.50mm and the highest recaptured bivalve measured 62.14mm and was recaptured after 31 days with 62.20mm. The analyses of growth, life expectancy and mortality were very similar in both methods (LFD- $L\infty$= 68.9mm; K=0.5yr^{-1}; C=0.5; WP=April; ϕ'=3.37; Z=3,5; $T_{máx}$=2.96 / MRM- $L\infty$=69.95mm; K=0.47yr^{-1}; C=0.2; WP=April; ϕ'=3.36; Z=3,49; $T_{máx}$=3.05), what indicates that we can use both together to suite the growth curve of this population.
Financial support: CAPES, CNPq Protax (562291/2010-5)

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

EVALUACIÓN DE LAS CARACTERÍSTICAS QUÍMICAS, FÍSICAS Y SENSORIALES RELACIONADAS CON LA CALIDAD ALIMENTICIA DE LOS CALLOS DE HACHA *ATRINA MAURA* (SOWERBY, 1835) Y *PINNA RUGOSA* (SOWERBY, 1835)

Ana I. Beltrán-Lugo, Isidro Mora-Mayo, Carlos J. Cáceres-Martínez y César A. Ruíz-Verdugo
Departamento de Ingeniería en Pesquerías, Universidad Autónoma de Baja California Sur, Ap. Postal 19-B, 23080. La Paz, Baja California Sur. México; anabel@uabcs.mx; cruiz@uabcs.mx

Los callos de hacha *Pinna rugosa y Atrina maura* son especies muy importantes para las pesquerías en Baja California Sur. Las características de sabor y textura altamente apreciadas de su músculo aductor posterior producen una amplia demanda y altos precios en el mercado. A la fecha la información sobre sus características de calidad como alimento son escasas, siendo del conocimiento popular que existe una mayor preferencia por el músculo de *A. maura* especialmente por su textura; sin embargo no existen datos que confirmen lo anterior. En el presente trabajo se analizan y comparan diversos atributos relacionados con la calidad alimentaria de los callos de hacha *Pinna rugosa* y *Atrina maura*. Para cumplir con lo anterior, la calidad del músculo aductor fue analizada mediante métodos sensoriales (Prueba de preferencia y prueba hedónica) e instrumentales (Análisis de color, capacidad de retención de agua, pH, color, textura y análisis químico proximal). El músculo aductor se caracterizó por contener niveles por arriba del 10% de carbohidratos en ambas especies. Mediante el análisis sensorial de preferencia se encontró que el panel prefirió el músculo aductor de *A. maura* sobre el de *P. rugosa* sólo por su apariencia general no mostrando diferencias por los parámetros de sabor, color ó textura. En el caso de la prueba hedónica, la aceptabilidad fue la misma para ambas especies, Sin embargo mediante el análisis instrumental se encontró una mayor luminosidad en el color del callo de *P.* rugosa y por otra parte diferencias en texturas relacionadas con una mayor dureza y mayor masticabilidad para la especie *A. maura.*

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL /POSTER

MULTIVARIATE MORPHOMETRICS OF SHELLS FROM SPECIES IN THE *BRACHIDONTES EXUSTUS* COMPLEX REVEAL MORPHOLOGICAL DIFFERENCES

Kyle F. Bennett [1] , Sonia Leon [1], Taehwan Lee [2] and Darmaid Ó Foighil [2]
[1]Department of Biology, Elmhurst College, 190 Prospect Ave, Elmhurst Il, 60126, USA;
kbennett@elmhurst.edu; leons@net.elmhurst.edu
[2]University of Michigan Museum of Zoology, 1109 Geddes Ave. Ann Arbor, MI 48109, USA;
taehwanl@umich.edu; diarmaid@umich.edu

The scorched mussel morphospecies, *Brachidontes exustus,* is an intertidal bivalve that represents a cryptic species complex across its Western Atlantic range. Preliminary work on populations in the Florida Keys showed measurable differences in morphology among the species coexisting in this location. This study expands that data set to investigate variation in shell morphology across five species in the complex with specimens collected from the Caribbean, Gulf of México, and the Atlantic coast of North America. Specimens were typed to species by mitochondrial COI and/or nuclear ITS-1 and 28S sequences. Principal Component and Discriminant Function Analyses revealed distinct variation in shell morphology among some, but not all, of the cryptic species and lineages. For instance, the cryptic sister species pair from the Gulf of México and the Atlantic coast of Florida could be distinguished morphologically as could the Gulf/Atlantic clade and the Bahamas/Antilles clade. However, the Bahamas/Antilles cryptic sister species pair were not distinguishable. Our results will facilitate the formal naming of at least some members of this cryptic species complex.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

THE F-TYPE MITOCHONDRIAL GENE ORDER OF *BRACHIDONTES EXUSTUS* (BIVALVIA:MYTILIDAE) IS DIFFERENT FROM ALL OTHER KNOWN MYTILIDS

Kyle F. Bennett, David Brambert, Elizabeth Ferhati, Chelsea Karson, Jessica K. Wadleigh, Anders Winquist-Bailey and Amanda H. Wright
Department of Biology, Elmhurst College, 190 Prospect Ave, Elmhurst Illinois, 60126, USA;
kfbennett@elmhurst.edu; brambertd@net.elmhurst.edu; wauere@net.elmhurst.edu;
karsonc@net.elmhurst.edu; wadleighj@net.elmhurst.edu; anders.w.winquistbailey@net.elmhurst.edu;
wrighta1489@net.elmhurst.edu

The scorched mussel, *Brachidontes exustus* (Bivalvia: Mytilidae) represents a species complex composed of at least seven clades that display few easily identifiable morphological differences. Members of the complex, like many other bivalves, have doubly uniparental inheritance (DUI) of sex-linked mitochondrial lineages. Males are heteroplasmic having a maternally inherited (f-type) mitochondrial genome that is found in somatic cells and a second paternally inherited (m-type) genome found only in sperm. The full f-type mitochondrial sequence was obtained from a specimen collected from the Gulf of Mexico at John's Pass, Madeira Beach, Florida. Using long range PCR with universal primers for 16S and COI genes, two fragments of approximately 5k and 10k base pairs were amplified and subsequently sequenced using the primer walking method. Additionally, a partial mitochondrial genome sequence was obtained by the same method for the shorter of the two fragments from an individual collected from the Atlantic coast at Ponce Inlet near Port Orange, Florida. Prior to this newly obtained full mitochondrial sequence only three mytilid genera (*Mytilus*, *Perna*, and *Musculista*) have had their mitochondrial genomes sequenced.

Only two of the three genera (*Mytilus* and *Musculista*) appear to have DUI, but all three have unique mitochondrial gene arrangements. The mitochondrial gene orders of the Atlantic and Gulf clade genomes are congruent in the portions that have been sequenced, but are different from all other mytilid mitochondrial gene orders. The goal of this ongoing project is to sequence the f-type and m-type mitochondrial genomes for all species of the *B. exustus* complex. We expect to gain insight into mitochondrial genome evolution under the different selection pressures present for sperm and somatic cells and to better understand the functioning of the DUI inheritance system in mytilids.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

NUDIPLEURA INVESTIGATIONS AT BAHÍA DE LOS ÁNGELES

Hans Bertsch
Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Ensenada, BC, México. Mailing address: 192 Imperial Beach Blvd. #A, Imperial Beach, CA 91932;
hansmarvida@sbcglobal.net

Ongoing long-term investigations have found new information on the natural history, distributional records, unnamed species, and additional seasonal comparisons of the "opisthobranchs" at Bahía de los Ángeles, Baja California, México.
These new data will be compared with those published in the Base Line report published prior to the establishment of *La Reserva de la Biósfera Bahía de los Ángeles y Canales de Ballenas y Salsipuedes.*

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

LOCATING THE SACRED IN TIME AND SPACE: PETROGLYPHS AND MIDDEN MOUNDS AT LAS PINTAS AND MESA SAN CARLOS, BAJA CALIFORNIA

Hans Bertsch [1] and Carlos Figueroa Beltrán [2]
[1]Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Ensenada, BC, México. Mailing address: 192 Imperial Beach Blvd. #A, Imperial Beach, CA 91932;
hansmarvida@sbcglobal.net
[2]Ciencias Marinas, Universidad Autónoma de Baja California, Ensenada, BC, Mexico;
carlosfigueroa@uabc.edu.mx

Midden mounds are the most abundant archaeological sites along the coastal regions of Baja California. The numerous Northern Abstract Style pictograph and petroglyph sites in Baja California, were not made with the extravagance of the Cochimí Great Mural Style sites. In either case, it is relatively rare to find large accumulations of midden mounds adjacent to rock art sites. Two sites in the San Fernando Velicatá—Northern Vizcaíno Coast region have such a unique association.
Las Pintas consists of numerous carvings on fossil-laden boulders. At Mesa San Carlos the petroglyphs are concentrated on the face of the basaltic cap and on rocks at the base of the marine terrace. Caves, freshwater springs, rock circles, solstitial significance of the carvings on the mesa crest, evidence of ceremonial activities, and abundance and size of the midden mounds all indicate significant occupation and substantial use of the region.
Based on three preliminary surveys of these sites (1983, 2004, 2014), we present photographic records of their rock art, worked artifacts and midden mounds, document shared solstice elements, and reinterpret images at Las Pintas. At both locations we have found carvings of Owl Man. Ethnographic

information from modern Pai-pai correlates Owl Man, his seven daughters, and the position of the Pleiades at summer solstice. We calculate the most recent mollusk resources (species and abundance) of the pre-contact rancherías (using non-invasive transects and quadrants across the surface areas of the midden mounds).

Las Pintas and Mesa San Carlos probably shared a long history of contemporary use by related familial groups. The people also used these places at sacred times, marking the movements of the sun and stars, and the passage of their lives.

AL ENCUENTRO DE LO SAGRADO EN TIEMPO Y ESPACIO: PETROGLIFOS Y CONCHEROS EN LAS PINTAS Y MESA SAN CARLOS, BAJA CALIFORNIA

Los concheros son los sitios arqueológicos más abundantes en las regiones costeras de Baja California. Los numerosos sitios de petrograbados del estilo abstracto norteño no presentan la misma extravagancia que los sitios del estilo cochimí del Gran Mural. Es relativamente raro encontrar grandes cúmulos de concha adyacentes a sitios con manifestaciones rupestres como la de dos sitios en la región costera de San Fernando Velicatá y el Vizcaíno Norte.

En las Pintas hay numerosos grabados en rocas fosilíferas. En Mesa San Carlos hay petroglifos en la cara de la tapa basáltica y en las rocas basales de la terraza marina. Los grabados en la parte alta de la mesa, de cuevas, manantiales de agua dulce, círculos de piedra y la representación simbólica del solsticio, evidencian actividades ceremoniales; la abundancia y tamaño de los concheros muestran una ocupación significativa y el aprovechamiento ambiental de la región.

Con base en tres estudios preliminares (1983, 2004, 2014), se presentan los registros fotográficos de sus manifestaciones rupestres, de los concheros y de los artefactos trabajados; una revisión compartida de los elementos del solsticio y una reinterpretación de las imágenes de Las Pintas. En ambos sitios hemos encontrado grabados del Hombre Búho. La información etnográfica pai-pai moderna correlaciona al Hombre Búho, sus siete hijas y la posición de las Pléyades en el solsticio de verano. Se calcularon los recursos de moluscos más recientes (riqueza y abundancia) de las rancherías del tiempo del pre-contacto, utilizando transectos y cuadrantes no invasivos en la capa superficial de los concheros.

Las Pintas y Mesa San Carlos probablemente comparten una larga historia de ocupación de grupos familiares relacionados entre sí durante la prehistoria. Los grupos humanos también utilizaron estos lugares durante los tiempos sagrados, registrando los movimientos del sol y las estrellas, además del paso de sus vidas.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

VEXING VERMETID WORM-SNAILS

Rüdiger Bieler [1], Rosemary E. Golding [1,2], John M. Healy [1,3], Timothy A. Rawlings [4] and Timothy M. Collins [5]

[1]Integrative Research Center (Invertebrates), Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago, Illinois 60605, USA; rbieler@fieldmuseum.org

[2]Malacology, Australian Museum, 6 College Street, Sydney, NSW 2010, Australia; rosemary.e.golding@gmail.com

[3]Natural Environments Program, Queensland Museum, PO Box 3300 South Bank, Queensland, Australia, 4101; John.Healy@qm.qld.gov.au

[4]Department of Biology, Cape Breton University, 1250 Grand Lake Road, Sydney, Nova Scotia, B1P 6L2, Canada; Timothy_Rawlings@cbu.ca

[5]Department of Biological Sciences, Florida International University, 11200 SW 8th St., Miami, Florida 33199, USA; Collinst@fiu.edu

Members of the 'worm-snail' family Vermetidae occur in temperate and tropical seas and have developed numerous highly unusual traits, including irregular 'uncoiled' shell growth, a gregarious cementing habit (making them important reef builders as well as nuisance species when transported globally), feeding by mucous webs to trap particles from the water column, and a rapid rate of gene-order change. Their 'colonies' also mark former sea level stands, making them important indicators of sea level and climate changes. While their potential as an environmental indicator and as a model system for studying gene order change is very high, their full potential has not been realized because of unresolved species delineations and relationships. Taxonomic problems are particularly vexing in this group whose members are frequently confused with superficially similar calcareous structures such as polychaete tubes, linings of bivalve burrows, scaphopod fragments, and even fossilized vertebrate bones. Our team has been working on a combined approach of analyzing shell morphology, anatomy, molecules, sperm ultrastructure, as well as historic literature data and type material, to understand species identities and explore relationships in the group. Using this approach, we have identified several novel morphological characters that may be phylogenetically useful, and uncovered a much richer species and genus-level diversity in this family than previously recognized.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

ONTOGENIA LARVAL DE *PANOPEA GLOBOSA* ALIMENTADA CON ISOCHRYSIS SP. Y *CHAETOCEROS CALCITRANS*

Brenda Guadalupe Bonett-Calzada [1], Enrique Valenzuela-Espinoza [2], Fabiola Lafarga-De la Cruz [3], José Carlos Garduño-Franco 4, Beatriz Nava-Gómez [1], Sofia León-Mancilla, Dulce Gissel Roa-Arce [1], Brian Valenzuela-Curiel [1] y Rocio Koreisy Ojeda-Arriaza [1]

[1]Facultad de Ciencias Marinas-Universidad Autónoma de Baja California. Carretera Transpenisular Ensenada-Tijuana No. 3917 Fracc. Playitas, C.P. 22860. Ensenada, Baja California; bbonett@uabc.edu.mx

[2]Instituto de Investigaciones Oceanológicas-Universidad Autónoma de Baja california. Carretera Transpenisular Ensenada-Tijuana No. 3917 Fracc. Playitas, C.P. 22860. Ensenada, Baja California; evale@uabc.edu.mx

[3]Centro de Investigación Científica y Educación Superior de Ensenada. Carretera Ensenada- Tijuana No. 3918, Zona Playitas, C.P. 22860. Ensenada, Baja California; flafarga@cicese.mx

[4]Oceánica Laboratorio. Calle 10 No. 360-b. Parque Industrial FODEPORT. El Sauzal, Ensenada, Baja California; maricultivosmiramar@gmail.com

[5]Centro de Estudios Tecnológicos del mar No. 11. Carretera transpenisular Ensenada - Tijuana Km 6.5, C.P 22860. Ensenada, Baja California; ficacoyavi@hotmail.com

Se evaluó el crecimiento y supervivencia larval de *Panopea globosa* alimentada con dietas monoalgales y mixtas de *Isochrysis* sp. y *Chaetoceros calcitrans*, con el propósito de conocer cuál dieta ofrece mayor crecimiento y sobrevivencia larval de *P. globosa*. Para la alimentación se utilizaron estas microalgas debido a que presentan un perfil de ácidos grasos poli-insaturados distinto (17% EPA y 22% DHA respectivamente). La evaluación del desarrollo ontogénico inició con la toma de imágenes en microscopio Axioscop 40 con apoyo del programa Axiovision 4.0. Las imágenes se tomaron cada hora a partir de la fertilización de los huevos, y durante el desarrollo de estos hasta el primer estadio larvario de trocófora de la especie. El registro de imágenes de los siguientes cinco estadios larvarios se realizaron cada recambio total de agua (dos días), con el fin de conocer el tiempo entre una y otra etapa larval y el tiempo en llegar a la metamorfosis. Los resultados mostraron una supervivencia del 22% con la dieta mixta, la cual es mayor que la dieta monoalgal de *Isochrysis* sp. (14%) y *C. calcitrans* (12%). Aunque el

estadístico no mostró diferencias significativas entre tratamientos, este resultado es debido al traslape en los errores estándar, ya que al presentarse grandes diferencias entre las medias muestreadas y errores estándar grandes, la media poblacional podría ser la misma. Además, se encontró un desarrollo ontogénico hasta la etapa de metamorfosis de 17 días similar al valor que se encuentra en la literatura. Por lo tanto se concluye que el uso de dietas mixtas da como resultado mayor supervivencia que dietas monoalgales.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

PHYLOGENETIC RELATIONSHIPS OF MEGALOBULIMINAE (MOLLUSCA, GASTROPODA) REVEAL HOMOPLASY IN MORPHOLOGICAL EVOLUTION

Víctor Borda [1,2] and Rina Ramírez [1,2]

[1]Departamento de Malacología y Carcinología, Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú; vicbp1@gmail.com

[2]Laboratorio de Sistemática Molecular y Filogeografía, Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos, Lima, Perú.

Molluscan morphology involves characters that are under the influence of the environment. Megalobuliminae includes some of the largest neotropical land snails. One important problem with Megalobuliminae taxonomy is the plasticity of their anatomical characters. The goal of this work is to reveal the evolution of certain shell and reproductive characters using a molecular phylogeny based on 16S rRNA. For morphological and molecular analysis we used 10 species of *Megalobulimus* from Peru, three of them with red-lip (*M. capillaceus, M. florezi,* and *M. separabilis)* and seven with white-lip (*M. maximus, M. popelairianus, M. huascari, M. lichtensteini, M. leucostoma leucostoma, M. leucostoma lacunosus* y *M. sp. nov.*). We selected three species (*Augustula braueri, Edentulina minor* and *Natalina knysnaensis*) as outgroups. The alignment of the 16SrRNA fragments resulted in 341 positions. The GTR substitution model, obtained with JModelTest, was used to generate trees with RAxML and Mr.Bayes. Both trees showed similar topologies with two monophyletic groups. One clade includes *M. huascari, M. separabilis, M. lichtensteini, M. sp. nov, M. leucostoma leucostoma, M. popelairianus* and *M. maximus.* The other clade includes *M. florezi*, *M. capillaceus* and *M. leucostoma lacunosus.* This arrangement reveals the polyphyletic nature of the *leucostoma* complex that is supported by differences in male genitalia. The red-lip character present in *M. florezi*, *M. capillaceus* and *M. separabilis* resulted in homoplasy. Likewise, both groups include species with different shell size; *M. leucostoma lacunosus* has a more slender and larger shell with respect to *M. capillaceus* and *M. florezi*. *M. separabilis* and *M. huascari* are sister species, they share the filiform aspect of male genitalia and an internal diverticulum in their oviducts despite having very different shell features. The complex distribution of shell characters in *Megalobulimus* could be a response to different ecological niches; however, certain reproductive characters reveal some evolutionary relationships.

Financial support: UNMSM-VRI-CSI Project CON-CON Nº: 121001071 and Rufford Small Grants Foundation (Project 11451-1)

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

IMPACT OF *LIMNOPERNA FORTUNEI* (BIVALVIA: MYTILIDAE) IN BRAZILIAN HYDROPOWER SECTOR: GENETICS AS AN ALLY

Patricia D. Borges
Institutos Lactec. BR-116, KM 98, nº 8813 – Centro Politécnico da UFPR, Jardim das Américas, Curitiba, Paraná, Brasil; patricia.borges@lactec.org.br

Biological invasions are considered one of the major threats to environment and causes impacts to human activities. The invasion of bivalve *Limnoperna fortunei* (Dunker, 1857) (golden mussel) in the Brazilian waters has become an increasing concern due to the formation of macrofouling, whereas hydroelectric power plants are the most affected. Originating from Southeast Asia, *L. fortunei* was first recorded in South America in 1991, in Rio La Plata, Argentina. From the Rio La Plata estuary, the golden mussel expanded its distribution quickly, and now reaches seven Brazilian states. Trough the electricity sector engagement, together with networks of monitoring and prospecting, and using the genetics as an ally, it was possible to list the hydroelectric power plants affected by *L. fortunei* and predict new occurrences. In addition, through genetic characterization it is possible to understand the dynamics of the invasion of the golden mussel at each location, and infer about dispersal vectors to take more directed prevention actions.
The sequencing of mitochondrial gene, cytochrome oxidase subunit I, was performed from adults and larvae from three points of the Iguaçu River, and one point from Paraná River, Paraná, Brazil. It was possible to observe shared haplotypes among all points, and unique haplotypes, shared with other sites in South America, China, Taiwan and Japan. The use of larval stages to perform the genetic characterization was satisfactory.
Actually, 36 power plants have an occurrence of *L. fortunei* in Brazil. Five of them only have an occurrence of larvae, detected by molecular technique. This early detection allows control actions and prevention of impacts in the cooling system of power plants, site most affected by macrofouling. Other 54 power plants are at risk of contamination. Nearly 50.000 MW of installed power are in risk. In other words, about 59% of de Brazil´s hydroelectric capacity may be compromised, if the problem left unchecked.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

GENETIC CHARACTERIZATION OF *LIMNOPERNA FORTUNEI* (BIVALVIA: MYTILIDAE) IN THE IGUAÇU RIVER, BRAZIL

Patricia D. Borges, Sandra Ludwig and Walter A. Boeger
Laboratório de Ecologia Molecular e Parasitologia Evolutiva, Universidade Federal do Paraná; Francisco H. dos Santos 210, P.O. Box 19073, Curitiba, Paraná, Brasil; patriciadammski@hotmail.com; sand.ludwig@gmail.com; wboeger@gmail.com

Originating from Southeast Asia, *Limnoperna fortunei* is expanding its distribution around the world. In South America, its first occurrence was in Rio La Plata, Argentina, in 1991. From the Rio La Plata estuary, the golden mussel quickly reached the higher stretches of the Paraná River basin. Between 2007 and 2008, the golden mussel was detected in different points of the Iguaçu River, tributary of the Paraná River, State of Paraná, Brazil. Previous studies shown that Iguaçu River, in most part of its extension, is infested by *L. fortunei*, causing environmental and economic impacts, in special to hydroelectric power

plants. However, it the pathway and mechanisms of dispersal that allowed the golden mussel to reach the distinct stretches of the river Iguacu are not yet known. Thus, in this study, molecular markers were utilized to test hypotheses about the introduction and distribution of *L. fortunei* in the Iguaçu River basin. Adults and larvae were collected in three points of the Iguaçu River (UHSO, UHEGJR and ParNa Iguaçu) and in the Paraná River (UHE Itaipu). The mitochondrial gene cytochrome oxidase subunit I was amplified and sequenced. The number of haplotypes was estimated and their relationships were analyzed in the software NETWORK, for both adults and larvae. Bayesian Inference was performed in BEAST with sequences of *L. fortunei* available in GenBank. We detected nine haplotypes, with lfm03, previously reported from Japan, China and Taiwan, being the most abundant and shared with all sampling points. The point UHSO presented the haplotype lfm36 found in China, which was not shared with any other point in the same river. The use of larval stages to characterize the adult population produced satisfactory results and may represent an important protocol to expedite genetic analyses of invasive and native populations of the golden mussel.

INVASORES/INVASIVE-CARTEL/POSTER

METHODS OF BIOFOULING CONTROL IN POWER PLANTS

Patricia D. Borges, Leonardo P. Bastos, Camila G. C. Fontanella, Flora H. M. L. de Lima, Douglas T. Nakayama, Maurício B. de Oliveira, Mariana S. Romani, Luiz Eduardo S. dos Santos and Michelle L. Zattera

Institutos Lactec. BR-116, KM 98, nº 8813 – Centro Politécnico da UFPR, Jardim das Américas, Curitiba, Paraná, Brasil. patricia.borges@lactec.org.br; leonardo.bastos@lactec.org.br; camila.cardoso@lactec.org.br; flora@lactec.org.br; douglas.nakayama@lactec.org.br; mauricio.oliveira@lactec.org.br; mariana.romani@lactec.org.br; luiz.santos@lactec.org.br; michelle.zattera@lactec.org.br.

The process of biofouling is a natural process in structures in contact with water. This process is worsened by sessile species, causing macrofouling, especially invasive species, which increases its population wildly. Biofouling and macrofouling causes economic, environmental and social impacts. The mytilid bivalve *Limnoperna fortunei* (golden mussel) causes impacts in Brazilian hydroelectric plants, including clogging of filters and cooling equipment, increasing maintenance costs, wear of materials and may impair their operation. Thus, the control of the problem is a topic of great relevance for the hydropower sector. A Research and Development project has been executed, aiming to compare the efficiency of injection of tow chemicals, sodium hydroxide (NaOH) and MXD100, in controlling biofouling in a power plant, trough the assessment of pre and post injection products experiments, and refrigeration equipment system inspections. The population of *L. fortunei* is also monitored in the reservoir. The density of local golden mussels increased since its first occurrence in 2011, reaching more than 25.000 ind./m² in the reservoir and more than 53.000 ind./m² at some points of the cooling system, with density peaks between spring and summer. Efficiency results are still preliminary. The system of NaOH has not been activated. Regarding the MXD100, according to the inspection equipment, the method has provided good results in preventing the fouling of the golden mussel in previous locations of occurrence. However, other organisms associated, such as the hydrozoa *Cordylophora caspia,* continue to develop.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

SYSTEMATIC STUDIES OF TERRESTRIAL MOLLUSKS FROM COLOMBIA AND ADJACENT REGIONS – CURRENT STATUS, APPROACHES AND CHALLENGES

Francisco J. Borrero
Department of Malacology, Academy of Natural Sciences, Drexel University, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; fjb37@drexel.edu; borrerofcoj@gmail.com

The non-marine malacofauna of tropical America is still very poorly known. Major portions of northern South America and adjacent areas in Central America have not been the focus of sampling aimed at studying continental mollusks. However, these regions are also of significant interest for documenting the sheer magnitude of biodiversity, its geographic distribution, and possible relationships between species richness and environmental correlates including geologic history, forest types, and patterns of land utilization. Colombia is particularly well suited as a region of interest for assessing patterns of diversity distribution, due to its position at the junction of South and Central America, and to the complex geological events leading to the formation of the Isthmus of Panama and major mountain chains. The interaction of several major biogeographical regions, and the presence of recognized biodiversity hotspots for other biotic groups lend further support to this assertion. Important insights into continental-level biotic exchange through the isthmus, and its effects on shaping current faunas may be gained from focusing studies in the junction of the Americas.
Using examples from four relatively large, conspicuous and diverse genera of land snails, this presentation will describe an approach, currently in use, for assessing state of knowledge and progress in species delimitation and understanding of variation. These are required first steps towards estimating the magnitude of land snail diversity in Colombia. A collaborative program is being developed for garnering support from Colombian authorities towards facilitating surveys in poorly studied regions and habitats, including the existing network of protected areas in the country. This program is allowing a better understanding of the neotropical continental malacofauna and its distribution, will develop local expertise, and will provide insights into needed conservation actions.

COLECCIONES/COLLECTIONS PONENCIA/ORAL PRESENTATION

DIGITIZATION OF MOLLUSCAN TYPES AT THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

Francisco J. Borrero, Amanda S. Lawless, Paul Callomon and Gary Rosenberg
Department of Malacology, Academy of Natural Sciences of Drexel University, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; fjb37@drexel.edu; asl84@drexel.edu; prc44@drexel.edu; rosenberg.ansp@drexel.edu

The collection of Recent mollusks at the ANSP is one of the largest worldwide, as well as the oldest and one of the most extensive in the Americas. Holdings include > 485,000 lots, and about 10 million specimens, including ~ 40,000 lots preserved in ethanol. Type material is present for about 10,000 nominal species described by more than 600 authors, encompassing all major groups of Mollusca and nearly worldwide representation. The type holdings are 56% terrestrial, 27% marine and 17% freshwater.

The NSF-supported Mollusk Type Digitization Project currently underway is studying the name-bearing types of Recent Mollusca at the ANSP, updating the collection database, and posting project data online in a publicly accessible portal, including images of at least one specimen from each primary type lot. Information includes locality data and provenance, relevant citations affecting nomenclature and type status, measurements, and images of multiple standard views of each specimen. This is a major contribution to the nomenclature of Recent Mollusca, as well as a critical resource for systematic, ecological, conservation and phylogenetic studies. The goals, approach and main methodology used in this project are described, and specific examples of results to date are presented. Several protocols, techniques and sets of equipment have been developed specifically for this project, and details are given of their development and application, as well as the challenges encountered.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

MALACOFAUNA ALPHA´S DIVERSITY ASSOCIATED TO THE *PLICOPURPURA PANSA* (GOULD, 1853) IN HUATULCO NATIONAL PARK, SANTA CRUZ OAXACA, OAXACA

Luz A. Botero-Cobo [1], Mariela Ramos-Sánchez [1], Cindy N. Reyes-González [1], María R. Cid-Rodríguez [2], José L. Villarruel-Ordaz [3], Noé Ruíz-García [4] and Eduardo J. Ramírez-Chávez [2]

[1]Universidad del Mar, campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P.70902; nahxieli@hotmail.com; labotero@msn.com; ramos-sanchez1@hotmail.com

[2]Instituto de Ecología. Universidad del Mar. Campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 70902; cidr@angel.umar.mx; bmeduardo@msn.com

[3]Instituto de Genética. Universidad del Mar campus Puerto Escondido. Ciudad Universitaria, Puerto Escondido, Oaxaca, México. C.P 71980; josipetardo@hotmail.com

[4]Instituto de Ecología. Universidad del Mar. Campus Puerto Escondido. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 71980; nruizg@zicatela.umar.mx

The mollusks are representatives of the rocky intertidal. The abiotic characteristics posed in many extreme cases, are challenges to the life cycles of resident species, because of the substrate conditions and various physico-chemical processes caused by the action of waves and tides.

This study aims to contribute to the knowledge of diversity, using as indicators species richness and abundance of the associated malacofauna *Plicopurpura pansa*. This work will be performed inside the polygon formed by the Huatulco National Park in the Bays of Huatulco, Oaxaca, Mexico where the beach Violin, in the Mexican Pacific is situated, being this the study area five monthly surveys will be performed from January to May 2014. The sampling unit will be 1m² quadrants that will be systematically distributed at the beginning and end of a 50 meters line along the rocky strip. To calculate species richness, the Margalef and Shannon-Wiener indexes will be used. Also, an analysis of the abundance of each species will be performed to see if there are significant differences between the months of drought and rain. According to the background, we expect to find associated species, such as *Chiton articulates, Nodilittorina, Nerita scabricosta, N. aspera, N. funiculata, Coromytilus palliopunctatus, Serpulorbis oryzata*.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/PONENCIA

MORPHOLOGY OF SPERMATOPHORES OF *OCTOPUS INSULARIS* LEITE & HAIMOVICI (2008)

Bruno Braulino Batista [1], José Eduardo Amoroso Rodriguez Marian [2] and Helena Matthews-Cascon [1]
[1]Departamento de Biologia, Centro de Ciências, Universidade Federal do Ceará. Av. Mister Hull, s/n, Campus do Pici - Bloco 909. CEP: 60455-760 - Fortaleza, CE, Brazil; brunob.batista@gmail.com; helenamc@gmail.com
[2]Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo. Rua do Matão, Travessa 14, n. 101. CEP 05508-090, São Paulo, SP, Brasil; jeduardo_marian@yahoo.com.br

Octopus insularis is found in shallow and warm waters of oceanic islands and the coast of northeastern Brazil. This species has a short life cycle, high fertility rate and rapid growth, followed by sexual maturation, mating, spawning, care of the embryos by the mother, and death after hatching of eggs. The species is dioecious and the male shows a modification in its arm called hectocotylus that is used for passing spermatophores to the female. The objective of this study is to describe the morphological structure of the *Octopus insularis* spermatophore. Five specimens were collected with longline pots in Itarema, Ceará, Brazil. The animals were brought alive to the laboratory in 60 L tanks with salinity 32 and constant oxygenation. To sacrifice animals were anesthetized with seawater and ice. To obtain the spermatophores it was carried out dissection of the Needham's sack with an incision in the distal region and the terminal body (penis). Seven spermatophores were used for holding the work and then fixed in Karnovsky solution for further analysis. The spermatophores were structures in the form of white strings, which showed 40.5-± 5.0 mm total length before the spermatophoric explosion. The previous section presented ampoule and the rod-shaped body, followed by the ejaculatory tube, followed by ejaculation tube-shaped and the screw-shaped bodies. In the posterior portion was found the testicular cable. The spermatophores from *Octopus insularis* are commonly found in the cephalopods belonging to the subclass Coleoidea, however such studies may reveal more about reproductive strategies of the species.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

IMPACTO DEL OLEAJE EN LA ESTRUCTURA COMUNITARIA DE MOLUSCOS EN LA ZONA ROCOSA DE LA PUNTILLA DE SANTA ELENA, ECUADOR

María José Brito Vera
Escuela de Biología, Facultad de Ciencias Naturales, UG, Av. Raúl Gómez Lince s/n y Av. Juan Tanca Marengo (Campus Mapasingue); m_jose.90@hotmail.com

Se muestrearon dos localidades de la Provincia de Santa Elena, Ballenita por ser una zona protegida al oleaje y Punta Carnero por presentar una zona expuesta, para evaluar los efectos del oleaje en la estructura comunitaria de macro invertebrados bentónicos. Se encontró que la energía del oleaje es directamente proporcional a la altura de la ola siendo así que se obtuvo en Ballenita un máximo de altura de ola de 0.60 m y la fuerza fue de 1658.19 N/m y en Punta Carnero la altura de ola fue 2 m con una fuerza de 6441.64 N/m. Siendo así que ciertos moluscos tienen preferencia a diferentes tipos del impacto de las olas a más de otras variables físicas marcadas como son el tipo de sustrato e inclinación de la playa. Se encontró que ambas localidades en el sustrato Supralitoral están representadas por la banda de *Nodilittorinas aspera, Nodilittorinas paytensis* y *Brachidondes semilaevis*. En la zona rocosa expuesta se encontró un menor número de especie de moluscos en los sustratos mesolitoral e

infralitoral siendo analizado este proceso de forma que la fuerza de las olas proyectan arrastre, a más de que no hay mayor refugio y no permite el asentamiento de los gasterópodos. Al contrario de la zona protegida que permite un mayor refugio a las especies de los moluscos.

PALEONTOLOGÍA/PALEONTOLOGY-CARTEL/POSTER

ENCRUSTING ON RECENT MOLLUSK ASSEMBLAGE FROM BARRA DE CAZONES, VERACRUZ, GULF OF MÉXICO.

Blanca Buitrón [1], Catalina Gómez [2], Raúl Gío-Argaez [3] and Brenda Martínez [4]

[1]Instituto de Geología, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.; blancab@unam.mx

[2]Facultad de Ciencias, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.; c_gomez@ciencias.unam.mx

[3]Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.

[4]Facultad de Arquitectura, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.

Shell encrustation appears to be a relatively persistent taphonomic feature into the fossil record along the Phanerozoic. During the life of mollusks the environmental factors influence the morphology of the shell, and after their death they do not enter into the fossil record without taphonomic modification on the sediment surface or within the sediment.

We evaluate the potential of the application of the encrustations in recent supratidal mollusk accumulations (bivalve and gastropods) in order to apply it in the interpretation of the fossil record in tropical siliciclastic environments.

Bivalves and gastropods shells were sampled on the beach shell ridges of Playa Norte and Playa Sur in Barra de Cazones, Veracruz State on the Gulf of México; this is an accumulations time-averaging type. 2279 mollusks were studied in the search of encrusters; from these 75 shell showed traces of encrusting. Most of the specimens (65) have one encruster and only seven had more than one encruster.

The epibionts were identified to phylum taxonomic level and were classified into 5 grades according to the percentage coverage of the shell. Encrusters are represented by calcareous foraminifera, serpulid polychaetes and calcareous bryozoans. Areal encrustation on shells depends greater of the encruster taxa; for example briozoa encrusting a wider area because grow widespread over the shell while the foraminiferal colonies grow up.

Differential amounts of encrustation within the same environment may be caused by differences in surface ornamentation, mineralogical differences, and physical stability. An important aspect in mollusk is the presence of the preriostracum that influences the loss of encrusters before or after the burial and fossilization.Encrusting is correlated positively with productivity and it can be used as relative indicator in the fossil record.

Acknowledgment. Second author thanks the DGAPA-UNAM postdoctoral fellowship in the ICMyL during the period from September 2011 to August 2013

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-CARTEL/POSTER

PHYLOGENY, BIOGEOGRAPHY AND CONSERVATION OF THE ENDODONTOID LAND SNAILS OF BELAU (REPUBLIC OF PALAU, OCEANIA)

David A. Bullis and Rebecca J. Rundell
State University of New York College of Environmental Science and Forestry (SUNY-ESF), Department of Environmental and Forest Biology, 1 Forestry Drive, Syracuse, New York 13210 USA; dbullis@syr.edu; rrundell@esf.edu

In the wake of extensive land snail extinctions on Pacific islands, efforts to preserve the remaining diversity of land snails there are of utmost importance. Land snails are important in forest nutrient cycling and can provide insights regarding evolutionary radiation on islands. The endodontoid land snails in particular (Pulmonata: Charopidae and Endodontidae), are representative of this sharp decline of species-rich Pacific island land snail groups. The western Pacific archipelago of Belau (Republic of Palau, Oceania) is one of the few Pacific archipelagos with many endodontoids still extant. However, of the fifteen known, described species and subspecies of endodontoids on Belau, one species is endangered and eleven are critically endangered, based on IUCN criteria. Our goals are twofold: (1) to better understand the evolution and biogeography of the Belau endodontoids (e.g. using a molecular phylogenetic approach); and (2) to gain a detailed understanding of species' current geographic distributions relative to past distributions, in order to target forest areas for future protection and management. Shell morphology mapped onto phylogenetic trees and Solem's endodontoid descriptions will be used to understand not only morphological evolution within this group of snails, but also the potential evolutionary and conservation significance of Solem's subspecies. Here we present preliminary work on the Belau endodontoids that will inform these future goals.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/ORAL PRESENTATION

SAMPLING SLIME: A PCR BASED ASSAY RELIABLY IDENTIFIES THE WEST COAST LIMPETS, *LOTTIA SCABRA* OR THE MORPHOLOGICALLY SIMILAR *L. CONUS*

Christina Burdi and Douglas J. Eernisse
California State University, Fullerton, Department of Biological Sciences, 800 N. State College Blvd, Fullerton, California, 92831 USA: cburdi@csu.fullerton.edu; deernisse@exchange.fullerton.edu

Lottia scabra and *L. conus* are two closely related species of intertidal limpets that have similar morphologies, ecological habitats, and overlapping ranges in southern California with a transition zone centered around the Palos Verdes peninsula (33.7° N, 118.3° W). *L. scabra* has a more northern range that extends nearly the full length of California and *L. conus* is only known to occur south of Point Conception (34.5 °N, 120.5° W). There is thought to be a shifting ratio of abundance between these two species co-occurring near San Pedro with *L. conus* becoming more abundant than *L. scabra* towards San Diego. Initially, we were interested in understanding and documenting this transition; however, due to their similar appearance, distinguishing them in the field, and even in the lab, proved to be difficult. These species have been contrasted via dorsal and ventral shell characteristics as well as radula morphologies; however, dorsal shell plasticity contributes to inaccurate field identification when compared with all published descriptions. Based on mitochondrial 16S rDNA gene sequences, the two species are highly distinctive for this gene and we used these distinctions to help develop primers to

identify species without more costly sequencing. These primers were used separately or in combination (i.e., > 2 primers) to aid in species identifications. Because the primers can inexpensively identify individuals to species, we plan to use them to more extensively contrast the published shell characteristics and to test whether improved shell diagnoses are feasible for distinguishing *L. scabra* from *L. conus*. Our test will allow us to apply published techniques for extracting DNA from foot mucus to explore non-lethal sampling methods for species identifications in the field and help quantify the distributions and abundance of each species, so that we can study the potential competitive interactions between *L. scabra* and *L. conus.*

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ACUICULTURA

EFFECT OF FEMALE DIET ON THE YOLK CHEMICAL COMPOSITION, AND ITS CONSEQUENCES ON EGGS AND EMBRYOS MORPHOLOGY, AND HATCHLINGS QUALITY OF *OCTOPUS MAYA*

Claudia Caamal-Monsreal [1,2], Pedro Gallardo [2], Elsa Noreña [3], Sergio Rodríguez [3] y Carlos Rosas [2]
[1]Posgrado en Ciencias del Mar y Limnología, UNAM; cpcm@ciencias.unam.mx
[2]Unidad Multidisciplinaria de Docencia e Investigación, Facultad de Ciencias, UNAM Puerto de Abrigo, S/N Sisal Yucatán
[3]Unidad de Química, Sisal Yucatán

Octopus maya is a holobenthic species that has been considered a candidate for tropical marine aquaculture. In cephalopods reproduction depends of quality and quantity of food, being the female nutritional condition a fundamental factor of hatchlings production. There are many studies that indicate that lipids and in particular polyunsaturated fatty acids (PUFA) and amino acids are between most important molecules for reproduction of many marine species. The aim of this study was directed to know how different types of diets modulate the yolk chemical properties and its consequences on morphology of eggs and embryos of *O. maya.* Sixty wild females were divided in four experimental groups that were feed with crab (70%) mixed with (1) squid, (2) mussel, and (3) fish head (30%). Diet with 100% crab (4) was considered as a control diet. Ten eggs of 6 spawn from each treatment, were sampled every 10 days until hatch. Morphometric characteristics of the eggs and embryos were determined along the development. Also, PUFA of diets and yolk of recently spawned eggs were determined using gas chromatography. To evaluate the quality of hatchlings, animals were maintained without food for 10 days. After that time, survival was quantified. Yolk PUFA levels, were not related with ingested diet PUFA levels suggesting that the female biochemical pathway, made adjustments to satisfy the nutritional requirement of embryos. It is interesting to note that big embryos not necessarily are the strongest juveniles. Quality test showed that the strongest juveniles were obtained from females that were feed with crab-squid. Crab fish-head mix diet produced the small embryos. This results suggest that the real effect of female diet was not related with the morphometric characteristics of embryos or eggs, but with yolk chemical composition that at the end will determine the hatchlings quality.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

ORNAMENTOS DE CONCHA NACARADA DE LOS ANTIGUOS CALIFORNIOS DE ENSENADA DE MUERTOS, BAJA CALIFORNIA SUR, MÉXICO

Carlos J. Cáceres Martínez [1] and Alfonso Rosales López [2]

[1]Universidad Autónoma de Baja California Sur, Km 5.5 Carretera al Sur, Col. El Mezquitito, La Paz, BCS, 23080 México; ccaceres@uabsc.mx

[2]Centro INAH, BCS. Miguel de Legaspi 1637, Col. Los Olivos La Paz BCS, 23040 México; guama59@yahoo.com.mx

Durante las excavaciones realizadas por el personal del INAH (Instituto Nacional de Antropología e Historia) en 2009 en la localidad Ensenada de Muertos, Baja California Sur, fueron encontrados ornamentos de concha nacarada, sin asociación con entierros, la colección de 11 piezas fue analizada morfo-métricamente a fin de relacionar los artículos de concha con técnicas de elaboración y poder presentar una hipótesis de sus significados. Todos los ornamentos analizados fueron elaborados a partir de las valvas de la especie *Pinctada mazatlanica* o madre perla. Dos tipos de pectorales fueron identificados; los primeros, pulidos por bruñido con una perforación superior en forma periforme, en donde destacan sus caras nacaradas como atributo principal, con perforaciones cónicas. Los segundos pectorales que además del pulido presentan adornos por esgrafiado de forma circular cónica, dispuestos en bandas paralelas adornando la parte interna de las valvas talladas, también con una perforación cónica en la parte superior de forma triangular achatada. La manufactura de los ornamentos fue lograda por la aplicación de las técnicas de percusión, desgaste y perforado, así como por la aplicación de técnicas de acabado pulido, bruñido y esgrafiado. Los materiales analizados presentan marcas profundas resultantes de la aplicación de las técnicas mencionadas sugiriendo que los principales materiales usados en la manufactura fueron de origen lítico. Se destaca y discute la importancia de las conchas nacaradas para la elaboración de ornamentos en la cultura de los Antiguos Californios.

ANCIENT CALIFORNIOS MOTHER-OF-PEARL ORNAMENTS FROM ENSENADA DE MUERTOS, BAJA CALIFORNIA SUR, MEXICO

During the course of INAH (Instituto Nacional de Antropología e Historia) excavations in 2009 at Ensenada de Muertos, mother-of-pearls ornaments were found without association with burials. The collection of 11 pieces was analyzed morphometrically to understand the manufacturing techniques of the shell items, and to present an appropriate hypothesis. The studied ornaments share the features of those made from *Pinctada mazatlanica* valves or mother-of-pearl. Two types of breastplates were identified. The first had a burnished sheen. The principal attribute of the pear-shaped bi-conic perforations in the upper region is its detachment from the nacre covering, having a shape formed. In addition to polishing, the second type found was embellished with circular-conical, interrupted engravings, arranged in parallel bands on the interior part of the worked valves. There is also a conic superiorly-placed perforation, with a flattened triangular form. The manufacture of these ornaments was by percussive techniques that shaped and perforated the shell valves. Then were applied the finishing touches of polishing, burnishing and engraving. The analyzed materials show obvious marks resulting from applying the above-mentioned percussive techniques. These suggest that the principal materials used in their manufacture were lithic in origin. The importance of nacre shells used for the elaboration of ornaments is pointed of and discussed in relation to Ancient Californios culture.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

ULTRASTRUCTURE OF OOGENESIS AND OOCYTE DEGENERATION IN THE PENSHELL *ATRINA MAURA* (BIVALVIA: PINNIDAE)

Marian Alejandra Camacho-Mondragón [1], Marcial Arellano-Martínez [1], Bertha Patricia Ceballos-Vázquez [1], Esther Uría-Galicia [2], Edgar Óliver López-Villegas [2] and Josué Alonso Yee-Duarte [1]

[1] Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas. Av. Instituto Politécnico Nacional s/n, Col. Playa Palo de Santa Rita. C.P. 23096. La Paz, Baja California Sur, México; hyma06@hotmail.com; marellam@ipn.mx; bceballo@ipn.mx; casa_yee@hotmail.com

[2] Instituto Politécnico Nacional, Escuela Nacional de Ciencias Biológicas, Unidad Profesional Lázaro Cárdenas. Prolongación Manuel Carpio y Plan de Ayala s/n, Col. Santo Tomás C.P. 11340 Delegación Miguel Hidalgo, Distrito Federal, México; estherqbp@yahoo.com; ivoliver@hotmail.com

The solitary mode of oogenesis in the marine bivalve, *Atrina maura*, a species of economic importance, observed in specimens sampled in two times of the year (cold and warm) in Ensenada de La Paz, Baja California Sur, México, is described. The structures of oocytes and auxiliary cells are described using electron microscopy and histology. The ovary was found to contain oocytes in various developmental stages throughout the study period. Oocytes develop from oogonia derived from protogonia and then undergo three distinct stages of oogenesis: previtellogenesis, vitellogenesis and postvitellogenesis with mature oocytes. The auxiliary cells attached in first stage of development of the oocytes seem to play an integral role in the vitelogenesis in this study. Vitellogenic oocytes contain large and numerous rough endoplasmic reticulum and Golgi bodies in the cytoplasm, suggesting that autosynthetic vitellogenesis may occur in this species. Additionally, the oocyte degeneration is described, which seems to be more frequent in postvitelogenic oocytes during the warm time.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

AVALIAÇÃO DO ÍNDICE DE RENDIMENTO DE *MYTELLA GUYANENSIS* NA BAÍA DO IGUAPE, BAHIA, NORDESTE DO BRASIL

Valéria Macedo Almeida Camilo [1, 2], Larisa Janusic [2], Guisla Boehs [1] e Sofia Campiolo [1]

[1]Universidade Estadual de Santa Cruz, Campus Soane Nazaré de Andrade, Rodovia Jorge Amado, km 16, Bairro Salobrinho, Ilhéus, Bahia, Brasil, CEP: 45662-900; gboehs@uesc.br; sofiacampiolo@gmail.com

[2]Universidade Federal do Recôncavo da Bahia, Av. Carlos Amaral, n°1015, Cajueiro, Santo Antônio de Jesus, Bahia, Brasil, CEP: 44570-000; valeria_m@terra.com.br; larajanusic@hotmail.com

O percentual de carne disponível nos moluscos bivalves é um dos parâmetros importantes para o processamento dos mesmos, podendo ser avaliado através do cálculo do Índice de Rendimento (IR). O cálculo do IR é importante em estudos de prospecção da comercialização dos bivalves pelas comunidades tradicionais, além de constituir ferramenta auxiliar na avaliação do ciclo reprodutivo de espécies. Esse índice é afetado por vários fatores, entre eles pelo peso da gônada, condição de saúde do bivalve, qualidade ambiental, tipo de concha e efeitos sazonais. *Mytella guyanensis* (Lamarck, 1819) (Mytilidade) é um dos bivalves que faz parte da gastronomia brasileira. A espécie é explotada artesanalmente pelas comunidades ribeirinhas de regiões litorâneas do país, tanto para o consumo próprio quanto para a venda ao mercado consumidor. O objetivo deste estudo foi avaliar o IR de *M. guyanensis* de um estoque natural da Reserva Extrativista Marinha da Baía do Iguape (51^{0}49'21"S;

86^{0}01'49"W), na região do Recôncavo da Bahia, Nordeste do Brasil. Os exemplares (n = 90) foram coletados no primeiro trimestre de 2014, acondicionados em sacos plásticos estéreis devidamente etiquetados e transportados em caixa isotérmica para o laboratório. Foi realizada a biometria com auxílio de um paquímetro digital com precisão de 0,05 mm e a pesagem em balança analítica com 0,001g de precisão. As médias de temperatura e salinidade do local, medidas com um multiparâmetros, foram de 30,65^{o} C e 25,4, respectivamente. Aplicou-se a seguinte fórmula: IR = peso úmido da carne /peso úmido bruto (carne + concha) x 100, expresso em porcentagem. A análise biométrica da concha determinou valores de comprimento acima de 39,5mm, indicando que os exemplares coletados eram adultos. As médias do IR para os meses de janeiro, fevereiro e março foram de 31,29% (DP±4,80), 29,94% (DP±4,86) e 28,15% (DP±3,57), respectivamente e foram considerados economicamente apropriados.

Agradecimentos: Fundação de Amparo à Pesquisa do Estado da Bahia – FAPESB

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/ORAL PRESENTATION

A CHECKLIST OF MEXICAN MALACOFAUNA AT RISK

Eréndira Canales-Gómez
Instituto de Investigaciones Oceanológicas-Universidad Autónoma de Baja California
Km 103 Autopista Tijuana-Ensenada, Ensenada, Baja California, México; erendiracanales@gmail.com

Mollusca are underrepresented in red lists. This is of concern, as one of the first steps towards the conservation of malacofauna is the determination of vulnerable taxa. The Mexican Red List NOM-059-SEMARNAT-2010 (hereafter NOM) only recognizes 17 mollusk species as endangered, a small amount considering the remarkable diversity of mollusks. With the objective to obtain a broader list of endangered mollusks, I compared the NOM, the IUCN Red List and the Carta Nacional Pesquera (Mexican Fisheries statistics, henceforth CNP). All species listed in the NOM and the IUCN (LC, VU, EN, CR, EW, EX categories; n=80) were considered as at risk. From the CNP, I included those species with declining, overexploited or collapsed fisheries. As a result of the comparison criteria 130 species belonging to 37 families and 3 classes (Gastropoda, Bivalvia and Cephalopoda) were identified as threatened, with marine species (n=101, 40 commercial) and gastropods (n=91) being predominant. No terrestrial species were reported as threatened. The family Conidae represented 39% of the species, all listed under Low Risk category. The Hydrobiidae recorded the highest risk of extinction (8 of 10 species). Two species listed in the NOM (*Polymesoda caroliniana* and *Tivela stultorum*) are commercial, whereas 16 species not listed in the NOM are overexploited such *Haliotis cracherodii* (considered as critically endangered by the IUCN and CNP). Furthermore three species are no longer harvested as a result of the collapse of their fisheries (*Atrina tuberculosa*, *A. oldroydii*, and *Hexaplex erythrostomus*). The conservation actions implemented by the Mexican government through CONAPESCA (Mexican Fisheries Commission) have mainly focused on the regulation of commercial fisheries for species such as Queen Conch (*Lobatus gigas*). However, increased knowledge of Mexican mollusk species is necessary to effectively assess their status and therefore move towards effective conservation of threatened species.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

VARIATION IN ABUNDANCE AND SIZE OF FIVE MACROINVERTEBRATES ASSOCIATED TO MUSSEL BEDS IN BAJA CALIFORNIA, MÉXICO

Eréndira Canales-Gómez [a], Gabriela Montano [b] and Eugenio Carpizo [c]
Instituto de Investigaciones Oceanológicas-Universidad Autónoma de Baja California
Km 103 Autopista Tijuana-Ensenada, Ensenada, Baja California, México; erendiracanales@gmail.com[a]; gmontano@uabc.edu.mx[b]; ecarpizo@uabc.edu.mx[c]

Mussel beds provide biogenic habitats for several species and represent one of the most diverse communities on temperate environments. Nevertheless, they are poorly studied in Mexico despite their economic importance due the artisanal fisheries of the California mussel *Mytilus californianus*, the ochre sea star *Pisaster ochraceus* and, the purple urchin *Strongylocentrotus purpuratus*. Here, we compare the abundance and size structure of the keyhole limpet *Fissurella volcano*, the owl limpet *Lottia gigantea*, the purple urchin *S. purpuratus*, and the whelks *Nucella* sp. and *Acanthina* sp. within mussel beds among five sites along the west coast of Baja California, Mexico. Seasonal surveys were conducted between 2006 and 2007 in Bajamar (BM), Erendira (ER), Punta Baja (PB), Los Ojitos (OJ) and La Esmeralda (ES). Under their density, each mussel bed was divided into Dense and Intermediate-Sparse. Results suggest that mobile macroinvertebrates were more abundant in Dense strata. Erendira was characterized by high densities of *Nucella* sp. (2.1±2.6 org/m2); Punta Baja by *S. purpuratus* (30.6±25.6 org/m2); Los Ojitos by *F. volcano* (127.7±128 org/m2), and La Esmeralda and Bajamar by *Acanthina* sp. (20.22±35.36; 17.35±23.34 org/m2). Only the keyhole limpet (OJ) and the purple urchin (PB) sho Wright Wright ed Gaussian size distributions, with average shell length and test diameter of 18.5±7.8 and, 21.1±10.3 mm respectively. Biased size structure distributions were commonly observed; per example, near of the 70% of the owl limpets at Bajamar were juveniles (<14 mm shell length) whereas the 60% of them were adults at La Esmeralda (30-70 mm). These results agree with the general statements that mobile macroinvertebrates are more common on denser mussel beds, and also highlights the importance of the latter as recruitment sites and habitats for a wide range of species including commercial species such the purple urchin.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

SNAILS, SLUGS AND CLAMS OF MÉXICO CITY

Zenón Cano-Santana [1a], Ariana Romero-Mata [1b] and Arzu Rivera-García [2c]
[1]Departamento de Ecología y Recursos Naturales, Facultad de Ciencias, Universidad Nacional Autónoma de México. México. Ciudad Universitaria 04510 México, D.F.; [a]zcs@ciencias.unam.mx; [b]arianromat@yahoo.com.mx
[2]Colección Nacional de Moluscos, Instituto de Biología Universidad Nacional Autónoma de México. México. Ciudad Universitaria 04510 México, D.F.; [c]arzu173@hotmail.com

We conducted a bibliographic review of records of mollusks in México City. We found 54 species and subspecies, including four mussels and 50 gastropods. However, the gastropods reported for the city represent only 3.8% of the land mollusk diversity recorded for the whole country, and mussels represent

5.8% of the 69 species known for the country. The gastropods encompass one limpet, 41 snails, and eight slugs, and 26% of the species are exotic. Unfortunately, some species have been lost, as they were recorded in 1920 and nowadays they are not found. For example, the snail *Drymaeus rudis* has not been collected in the forest of Chapultepec since 1950. None of the land mollusks are protected by the government, but there are initiatives to protect green areas in specific patches of forest, and these sites provides habitat for native species of gastropods. Therefore, the urban and rural areas where the mollusks have not been recorded should be investigated to improve knowledge of this group in this region.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

DISTINCIÓN TAXONÓMICA DE LA MALACOFAUNA DE FONDOS BLANDOS DEL GOLFO DE BATABANÓ, CUBA

Norberto Capetillo Piñar [1], Arturo Tripp-Quezada [1], José Espinosa Saenz [2], Marcial Villalejo Fuerte [1], Alexander Lopeztegui Castillo [3] y Abel Betanzos Vega [3]

[1]Centro Interdisciplinario de Ciencias Marinas (CICIMAR). Instituto Politécnico Nacional. Av. IPN s/n, Col. Playa Palo de Santa Rita. Apdo. Postal 592, La Paz, B.C.S., 23096, México; norbertcap@yahoo.com;trippq@gmail.com ; golfocal@yahoo.com.mx

[2]Instituto de Oceanología (IdO), Ministerio de Ciencia, Tecnología y Medio Ambiente, Mn. Playa, C. Habana, Cuba; espinosa@oceano.inf.cu

[3]Centro de Investigaciones Pesqueras (CIP), Ministerio Industria Alimentaria, Mn. Playa, Santa Fe, C. Habana, Cuba; sasha@cip.alinet.cu; abetanzos@cip.alinet.cu

La Distinción taxonómica de la malacofauna de fondos blandos y su variación espacio temporal en 81 sitios de muestreos del Golfo de Batabanó fue evaluada. Se analizaron sets de datos de los inventarios de especies de moluscos bentónicos obtenidos en los periodos de los años 80´ (1981-1985) y 2000´ (2004, 2005, 2007, 2008 y 2009). Los índices de distinción taxonómica promedio (Delta+) y variación en la distinción taxonómica (Lambda+), fueron usados para lograr dichos objetivos. Para el periodo evaluado se registraron 227 especies distribuidas en tres clases (Bivalvia, Gastropoda y Scafopoda), 19 órdenes, 68 familias y 149 géneros. Se detectaron diferencias significativas en la diversidad taxonómica entre los periodos de los años 80´ y 2000´. La estructura taxonómica de los moluscos ha tenido cambios significativos al paso del tiempo, debido al año 2008 el cual quedó fuera y por debajo de la distribución esperada. Espacialmente varías estaciones de la década del 2000´ quedaron fuera de la distribución esperada evidenciándose diferencias estadísticamente significativas. Las diferencias temporales pueden ser debidas al paso de dos huracanes por la región y las espaciales a los efectos ocasionados por varias actividades humanas en la región.

TAXONOMIC DISTINCTNESS OF THE MALACOFAUNA OF SOFT BOTTOMS FROM BATABANO GULF, CUBA

The taxonomic distinctness of the malacofauna of soft bottoms and their variation space temporal in 81 samples sites from Batabano Gulf was evaluated. We analysed data sets from the inventories of species of benthic mollusks obtained in the periods of years 1980´ (1981-1985) and 2000´ (2004, 2005, 2007, 2008 and 2009). The indexes of average taxonomic distinctness (Delta+) and variation in taxonomic distinctness (Lambda+) were used to achieve these objectives. They registered 227 species distributed in three classes (Bivalvia, Gastropoda and Scafopoda), 19 orders, 68 families and 149 genus. Significant differences were detected in the taxonomic diversity between the periods of the years 80´ and 2000´. The taxonomic structure of mollusks had significant changes over time, due to the year 2008 which was

outside and below statistical expectation. Some stations of the 2000´ were outside of the statistical expectation yielding significant differences. The temporal differences can be attributed to two hurricanes in the región, and the spacial differences to the effects caused by human activities in the region.

CONIDAE-PONENCIA/ORAL PRESENTATION

ESTUDIO BIOLÓGICO PARA EVALUAR EL VENENO TOTAL DE DOS ESPECIES DEL GÉNERO *CONUS* (GASTROPODA: CONOIDEA) EN GUSANOS POLIQUETOS, PECES Y GASTERÓPODOS

José Eduardo Carvajal Uribe [1,2], Mónica Anabel Ortíz Arellano [2,3], Edgar P. Heimer de la Cotera [4]

[1]Posgrado en Recursos Acuáticos, FACIMAR, Universidad Autónoma de Sinaloa; eduardo_carvajal_87@hotmail.com

[2]Colección de Moluscos de la Universidad Autónoma de Sinaloa (COMUAS), Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx

[3]Cuerpo Académico "Manejo de Recursos Pesqueros", FACIMAR-UAS. Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000

[4]Instituto de Neurobiología Campus Juriquilla. Universidad Nacional Autónoma de México. Santiago de Querétaro, Querétaro, México; heimer@unam.mx

El género *Conus* es un grupo de caracoles marinos que poseen venenos biológicamente activos que son considerados un recurso con alto potencial en la farmacología. En la costa de Sinaloa hay una importante diversidad de moluscos entre los que destacan los caracoles conoideos cuya característica principal es la capacidad de inyectar venenos con toxinas que fungen como medio de defensa y herramienta de caza. El presente trabajo tiene como objetivo la estandarización de un procedimiento para evaluar el efecto del veneno de dos especies del género *Conus* (*C. fergusoni* y *C. archon)* utilizando como bioensayos gusanos poliquetos, peces y gasterópodos, además de evaluar posibles diferencias en la potencia del veneno de los *Conus* de acuerdo a la especie, talla y sexo. Las muestras se obtuvieron de la fauna de acompañamiento de la pesca de camarón de altamar. Se obtuvieron los datos de captura y los registros fotográficos, y se midieron la longitud, la anchura, la altura y el peso de los especímenes. Posteriormente, rompiendo la concha, se separó el tejido blando y se extrajo el sistema venenoso completo (bulbo, conducto y probóscide). Este procedimiento se realizó sobre una base de vidrio en una cama fría. Para obtener el veneno, se separo el conducto venenoso realizando cortes en los extremos y fue macerado adicionándole 250µl de agua de mar. S tomaron 100µl con una jeringa para insulina y se inyectó a los organismos prueba al mismo tiempo que se inyecto con agua de mar el mismo volumen al organismo control. Las principales reacciones en los organismos prueba fueron torcedura, enroscamiento, aceleración de los movimientos locomotores, aletargamiento, incapacidad de adhesión, cambio de coloración, contracciones, nado errático y finalmente la muerte de los organismos. Los mayores efectos del veneno se presentaron utilizando el veneno de los machos de ambas especies, mientras que *C. fergussoni* fue mayor efecto en los gusanos y *C. archon* en los gasterópodos.

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

MONTLY VARIATION OF THE ABALONE´S DENSITY DEMONSTRATES AGGREGATION IN THREE FISHERY ZONES OF BAJA CALIFORNIA SUR

Verónica Castañeda-Fernández de Lara, Tito L. Pérez-Vivar y José L. Gutiérrez-González
Centro Regional de Investigación Pesquera-La Paz, INAPESCA, Carretera a Pichilingue km1, Col. Esterito, C.P. 23090, La Paz, Baja California Sur, México; veronica.castaneda@inapesca.sagarpa.gob.mx; jose.gutierrez@inapesca.sagarpa.gob.mx; tperezvivar@yahoo.com.mx

In order to understand the temporal and spatial changes in the abundance of abalone as an indicator of herd behavior, monthly abalone density in a representative bank inside three fishing zones were estimated: Bahía Asuncion (San Roque Island), La Bocana and Punta Abreojos. To estimate the density, the census was conducted in three transects of 25m long and 2 meters wide in the area of distribution of green abalone *Haliotis fulgens*. The geographical position of each transect was recorded and monthly changes in abundance and density per transect was set up from May to December. First, the type of scattering abalone was determined using the Morisita Index (Im), then the density by place and month using the Distance Sampling V.6.0 program was estimated. The results indicated that the abalones were found spatially gregarious (Im > 1) every month. In the case of the monthly density of abalone we estimated average values from 0.1 ind/m^{-2} (IC 95% 0.046 - 0.217 ind/m^{-2}) to 0.3 ind/m^{-2} (IC 95% 0.157 - 0.563 ind/m^{-2}); corresponding to May and August respectively. The minimum value observed in May occurred just after the fishing season, this value increased to 0.3 ind/m-2 average for August (95% CI = 0.157-0.563) and remained until December. Knowledge of the variability in space and time is important to determine when and how to estimate population size involve in the fishing quota as well as in the reproductive success of the species.

VARIACIÓN MENSUAL DE LA DENSIDAD DE ABULÓN, QUE MUESTRA AGREGACION EN TRES ZONAS DE PESCA DE BAJA CALIFORNIA SUR

Con el fin de conocer la variabilidad espacio-temporal de los abulones en tres sitios de pesca de Baja California Sur (Bahía Asunción (Isla San Roque), La Bocana y Punta Abreojos); se cuantificó la abundancia de tres transectos de 25m de largo por 2 metros de ancho en cada sitio de muestreo para el abulón azul *Haliotis fulgens*, durante los meses de mayo a diciembre de 2013. También se registró la posición geográfica de cada transecto y se le dio seguimiento mensual a los cambios de abundancia. Se determinó el tipo de dispersión del abulón, utilizando el Índice de Morisita (Im), y se estimó la densidad promedio por mes y sitio de muestreo empleando el programa Distance Sampling V.6.0. Los resultados obtenidos fueron: el abulón forma agregaciones mensualmente y en todos los sitios muestreados (Im > 1). En cuanto a la densidad mensual de abulón se estimaron valores promedio entre 0.1 ind/m^{-2} (IC 95% 0.046 - 0.217 ind/m^{-2}) y 0.3 ind/m^{-2} (IC 95% 0.157 - 0.563); correspondientes a mayo y agosto respectivamente. La dinámica poblacional del abulón, se comportó con un mínimo en la densidad en mayo debido a la temporada de pesca, que fue en los meses anteriores, posteriormente se incrementó la densidad hacia agosto y se mantuvo oscilando hasta diciembre. El conocimiento de la variabilidad en espacio y tiempo es importante para poder determinar cuándo y cómo estimar el tamaño poblacional implicado en la cuota de pesca así como en el éxito reproductivo de la especie.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

CEPHALOPODS OF THE GULF OF TEHUANTEPEC, MEXICO

Jaime Castellanos-Cruz, Rubén García-Guillen, Oscar Illescas-Espinoza, Emilio Pérez-Pacheco and José Pablo Gómez-Porras
Programa de Biología Marina, Universidad del Mar, campus Puerto Ángel, Ciudad Universitaria, Puerto Ángel, Oaxaca 70902, México; gatitomito@hotmail.com; s.kar90@hotmail.com; perez.emilio50@hotmail.com; jpablogporras@gmail.com

The cephalopoda fauna the southernmost region of the Tropical Mexican has received little attention. Cephalopod fauna from the Gulf of Tehuantepec was collected with different methods: a) Analysis of depredator stomach contents, b) Commercial catches during 4 exploratory fishing surveys in the Gulf of Tehuantepec during the shrimp fishing season, c) direct sampling.
Of the total of 545 specimens we examined 165 were adults (30%), 19 juveniles (3.5%) and 361 paralarvae (66.5%). Specimens have been deposited at the Museum of Natural History, Universidad del Mar (MHN-UMAR). The cephalopods identified in this study consist of 8 families, 15 genera, 28 species, and 14 forms corresponding to the equal number of species. This study adds 3 squid species and 15 octopus species not recorded in previous studies for a total count of 42 species for Gulf of Tehuantepec. The cephalopod resources of the study area were evaluated for their importance as commercial fisheries. *O. hubbsorum* is subjected to fishing in Mexican Pacific waters. In addition, *Lolliguncula diomedeae* and *L. panamensis* are exploited bycatch from shrimp in the Gulf of Tehuantepec. Other species of potential commercial importance are *O. bimaculatus*, *D.* gigas, *S. oualaniensis*, and *O. bartrami*.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

PRIMER REGISTRO DE ENDOSIMBIONTES DEL PHYLUM DICYEMIDA EN EL PULPO ROJO *OCTOPUS MAYA* (VOSS Y SOLÍS, 1966) DE LA COSTA DE YUCATÁN, MEXICO

Sheila Castellanos-Martínez y Leopoldina Aguirre-Macedo
Centro de Investigación y de Estudios Avanzados del IPN, Unidad Mérida. Antigua carretera a Progreso Km. 6. Apdo. Postal 73. Cordemex, 97310. Mérida, Yucatán, México; scastellanos@mda.cinvestav.mx; leo@mda.cinvestav.mx

Los diciémidos son simbiontes comunes en los sacos renales de cefalópodos. Uno de los atributos más conspicuos de los diciémidos es su sencillez morfológica, ya que están constituidos por una sola capa de células que no forman tejidos. Debido a su alta especificidad hospedadora, algunos autores sugieren que los diciémidos son susceptibles de utilizarse como marcadores naturales para distinguir stocks e incluso especies crípticas de cefalópodos. Sin embargo, el conocimiento generado acerca de estos invertebrados en México es incipiente por lo cual, su posible utilidad como marcadores naturales de cefalópodos en aguas mexicanas es desconocida. El presente estudio muestra los resultados preliminares de los diciémidos descritos por primera vez en el pulpo rojo *Octopus maya*. Se recolectaron 15 especímenes de *O. maya* en las localidades de Progreso, Sisal y Celestún, respectivamente, presentando una prevalencia de infección superior al 80% en cada una de ellas. De cada hospedador se realizaron frotis de los sacos renales. Los frotis se fijaron en Bouin y se tiñeron con hematoxilina-eosina. La longitud total de los vermiformes (nematógeno y rombógenos) varió de 100-700 µm. La calota es de forma cónica, constituida por 4 células propolares y 4 metapolares dispuestas en posición opuesta, lo cual indica que

corresponden al género *Dicyema*. El resto del cuerpo lo conforman 2 células parapolares, 4 diapolares y 2 uropolares. La célula axial se extiende en la parte media del vermiforme hasta la mitad de las células metapolares. Los embriones vermiformes presentan 2 axoblastos en posición posterior al núcleo de la célula axial. La descripción de los embriones infusoriformes está aún en desarrollo. Los resultados obtenidos muestran la presencia de una sola especie de diciémido que representa el primer registro de estos vermiformes en *O. maya* y el cuarto registro a nivel nacional.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
TAXONOMÍA, SISTEMÁTICA Y BIOGEOGRAFÍA

ESTRUCTURA COMUNITARIA DE LA CLASE CEPHALOPODA CUVIER, 1797 (PHYLUM MOLLUSCA) EN EL MAR TERRITORIAL MEXICANO DEL GOLFO DE MÉXICO

Gabriela Castillo-Estrada and Brian Urbano
Facultad de Ciencias, UNAM. Av. Universidad 3000 Circuito Exterior S/N, C.P. 04510 Ciudad Universitaria, México, Distrito Federal; rielacaes@gmail.com

El Golfo de México (18°-30° N y 82°-98° W), es una frontera internacional entre México, Estados Unidos y Cuba en la cual, a lo largo de la historia, se han reportado individuos de la clase Cephalopoda comenzando por LeSeur (1821) y destacando tres trabajos de interés con listados puntuales de la riqueza de especies en el Golfo de México: Voss (1956) con un registro de 42 especies para todo el Golfo de México; Salcedo-Vargas (1991) con 71 especies reportadas para aguas mexicanas; Vecchione (2002) con 109 especies de Cefalópodos para Golfo de México y Mar Caribe; y Judkins *et al*. (2009) con 99 especies para todo el Golfo de México y un análisis biogeográfico y distribución de las especies basada en el área geográfica de esta clase para todo el Golfo de México incluyendo Mar Caribe.
Este trabajo analiza por primera vez la estructura comunitaria y la sistemática de la clase Cephalopoda en aguas mexicanas pertenecientes al Golfo de México, para ello se realizó un análisis en los ejemplares de las colecciones y registros bibliográficos que se presentan para la zona; la diversidad, distribución y abundancia se estimó a parir de bases de datos internacionales y colecciones nacionales reportadas específicamente para el área de estudio, incrementando la riqueza de especies en un 10 %.

COMMUNITY STRUCTURE OF CEPHALOPOD CLASS CUVIER, 1797 (PHYLLUM MOLLUSCA) IN MEXICAN WATERS OF GULF OF MEXICO

The Gulf of México (18° - 30° N y 82° - 98° W) is an international border with México, U. S and Cuba in which the Cephalopoda class have been mentions troughout the history, beginning whit LeSeur (1821) and highlighting three papers of interest with specific taxonomic lists of species richness in the Gulf of México, Voss (1956) with a record of 42 species for the Gulf of México; Salcedo-Vargas (1991) with 71 species reported in Mexican waters; Vecchione (2002) with 109 species of cephalopods to the Gulf of México and Caribbean Sea; and Judkins et. al. (2009) with 99 species for the Gulf of México and a biogeographic analysis and distribution of the species based on the geographic area of this class to the Gulf of México including the Caribbean Sea (2010).
This paper carried out the first community structural analysis proposed for the Cephalopoda class and it is a systematic update of the group. The analysis was made using the samples from the collections and bibliographic records submitted for the Gulf of México; the diversity, distribution and abundance of the fauna of the cephalopoda class from the bases of international data and national collections reported specifically for Mexican waters in the Gulf of México increasing the richness from the zone in 10 %.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

ANALYSIS OF FAMILY MURICIDAE (MOLLUSCA: GASTROPODA) ASSOCIATED WITH THE ROCKY INTERTIDAL ZONE AT GUERRERO, MÉXICO

Alma R. Castrejón-Ríos, Rafael Flores-Garza, Pedro Flores-Rodríguez and Omar A. Ahumada-Martínez
Laboratorio de Ecología Costera y Sustentabilidad Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero. C.P. 39390; riverscastrejon@gmail.com; acua_uag@yahoo.com.

The coast zone of the State of Guerrero has four priority regions for marine biodiversity conservation. The Murcidae is part of the diversity that occurs in these marine regions. This family has economic importance because of the beauty of their shells and their use as food for human consumption. This research was carried out in the rocky intertidal zone at 21 sites in three priority marine regions in the State of Guerrero. The objective was to analyze the composition of the family Muricidae based on species richness, abundance, density, geographic distribution, size structure and estimate H 'and J'. Sampling was carried out from 2009 to 2012. At each site, the sampling area was 10 m^2. Seven thousand one hundred thirty eight organisms were analyzed, and 14 species were identified. *Mancinella triangularis* had the highest abundance. The density for the state was 33.99 organisms/m^2. *M. triangularis*, *Stramonita biseralis*, *Plicopurpura pansa*, *M. speciosa and Trachipolia lugubris* were recorded as widely distributed species. The larger size submitted it *P. pansa*. H'=1.82 bits / individuals and J'= 0.47. Species richness is high and corresponds to that expected a tropical region. Sampling was conducted in rocky substrate, where there is great number of microhabitats, allowing the establishment of a greater number of species. The amount of sampling sites representing different types of substrate. The Muricidae is considered as one of the representative families of the rocky intertidal zone. Species richness of the Muricidae was greater than what has been reported in other research within the state of Guerrero.

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

MOLLUSCAN FISHERIES WITH COMMERCIAL IMPORTANCE FOR HUMAN CONSUMPTION IN ACAPULCO, MÉXICO.

Himmer Castro-Mondragón [1], Rafael Flores-Garza [2], Pedro Flores-Rodríguez [2], Sergio García-Ibáñez [2], José L. Rosas-Acevedo [1] and Arcadio Valdés-González [3]
[1]Unidad de Ciencias de Desarrollo Regional. Calle Pino S/N Colonia el Roble C.P. 39640, Acapulco, Guerrero; mondra_82@yahoo.com.mx
[2]Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Av. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Gro. C.P. 39390; floresgarza@yahoo.com
[3]Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Ciudad Universitaria, San Nicolás de los Garza, México; arcadio.valdesgn@uanl.edu.mx

In Acapulco, tourism provides beautiful beaches and a variety of molluscs that are a delight to the palate, are also a source of economic resources for the residents. However, there is little research on species that are caught and sold for human consumption. There are two investigations conducted in Acapulco and focus on species that are commonly marketed. Most reports of molluscs in Acapulco, are ecological, population, or community based. The data from government agencies on fisheries of molluscs are imprecise. The objective of this research was to determine the diversity, the size structure, and to

analyze the catches of molluscan species for human consumption in Acapulco. We conducted sampling and interviews from 2011-2013 with people selling molluscs and fishermen. Some organisms that are captured in Acapulco were collected. In the samples we found 35 species, of which 16 are Gastropoda, 18 of Bivalvia, and one of the Polyplacophora. Three species that are caught for human consumption are listed on the Mexican Official Norm NOM-059-SEMARNAT-2001 and *Pinctada mazatlanica*, *Spondylus calcifer* and *Plicopurpura pansa* that are subject to special protection. These organisms are exploited in Acapulco for human consumption without control. We need to develop management programs, and initiate cultures of native species.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

CONDICIONES PALEOAMBIENTALES A PARTIR DEL ANÁLISIS DE MOLUSCOS ARQUEOLÓGICOS PROVENIENTES DEL DELTA DEL RIO COLORADO, MEXICO

Ana K. Celis-Hernández [1] y Miguel A. Téllez Duarte [2]

[1]Departamento de Turismo Sustentable y Gestión Hotelera, Universidad del Caribe; Lote 1, Mza. 1 Región 78, Esq. Fracc. Tabachines, C.P. 77528, Cancún, Q. Roo, México; acelis@ucaribe.edu.mx; ana_katalina23@yahoo.com.mx

[2]Facultad de Ciencias Marinas, Universidad Autónoma de Baja California, Km. 103 Carretera Tijuana-Ensenada, C.P. 22860, Ensenada, B.C., México; ivonnehaide@gmail.com

Antes del represamiento de las aguas del Río Colorado en los años 30s del siglo XX, éste fungió como la fuente más importante de entrada de agua dulce hacia el Golfo de California. Hoy los depósitos arqueológicos tipo conchero son abundantes en el Alto Golfo de California lo cual apunta a que la captura de moluscos y peces fuera quizá la actividad de subsistencia más importante en el pasado. Presentamos los resultados de una tesis cuyo objetivo fue utilizar variables ecológicas (índices de Diversidad, Riqueza y Equitatividad) y ambientales ($\delta^{18}O$) para evaluar las estrategias de apropiación y las condiciones ambientales en que ocurrieron las actividades de captura de moluscos y peces por grupos humanos en el Delta. Se analizaron dos concheros arqueológicos (B18BP1 y Cala 2) de diferente temporalidad, ambos ubicados en el límite sur del antiguo estuario formado por el Río Colorado. Para inferir las condiciones paleoambientales se obtuvieron valores isotópicos de oxígeno ($\delta^{18}O$) de moluscos de las especies *Protothaca grata* y *Chione pulicaria* y se integraron a los datos procedentes de muestras de otolitos de las especies *Totoaba macdonaldi*, *Micropogonias megalops* y *Cynoscion parvipinnis*. Los datos en conjunto señalan que el depósito más antiguo (B18BP1) se formó de manera predominante bajo condiciones de no-flujo del Río Colorado. Además, la colecta de recursos en B18BP1 fue significativamente más diversa y menos selectiva en comparación con el conchero más reciente (Cala 2). Esta variación sugiere que con el tiempo los grupos humanos más tardíos pudieron haber modificado la organización de su subsistencia para enfocar sus esfuerzos en sólo algunos de los moluscos más redituables.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

DIVERSITY AND ECOLOGICAL ASPECTS OF FAMILY FISSURELLIDAE ASSOCIATED THE ROCKY INTERTIDAL SUBSTRATE IN GUERRERO, MEXICO

Juan C. Cerros-Cornelio [1], Rafael Flores-Garza [1], Pedro Flores- Rodríguez [1], Carmina Torreblanca-Ramírez [2] and Yareni M. García-Moctezuma [1]

[1]Universidad Autónoma de Guerrero Unidad Académica de Ecología Marina. Gran Vía Tropical No. 20, Fracc. Las Playas, Acapulco, Guerrero. C.P.39390. Laboratorio de Investigación en Ecología Costera y Sustentabilidad Cuerpo Académico "Ecología Acuática (UAGRO-CA-87)"; cerros_juancarlos@yahoo.com

[2]Doctorado en Ciencias Ambientales. Unidad de Ciencias de Desarrollo Regional. Universidad Autónoma de Guerrero. Calle Pino s/n, Colonia El Roble. Acapulco, Guerrero. C. P. 39640; carminatorreblanca@yahoo.com.mx

In the state of Guerrero, is necessary to study the abundant marine resources, in them we find the molluscs belonging to the Family FISSURELLIDAE. This family is one of the best represented in the rocky intertidal zone, also has commercial importance as food, for this reason was conducted this study, the which you have as objectives; a) Determine the species richness, b) estimate the abundance simple and relative, c) estimate the density, d) know the geographical distribution of species, e) analyzing the size structure of long, wide and high, f) estimate diversity indices H 'and J. We sampled the rocky intertidal zone of 23 sites located in the state of Guerrero. In each site is covered a total area of $10m^2$. The method of sampling was systematic, to delimit the area was used a quadrant of $1m^2$. The collected organisms were placed in jars with alcohol to the 96 % and transported to the laboratory to be identified, measured and quantified. 669 organisms were analyzed. Three subfamilies, three genera, two subgenera and 14 species were identified. *Fissurella (C.) morrisoni* was found as a new record. *F. nigrocincta* presented the highest abundance with 1043 organism. Were estimated a density total of 7.25 organism/m^2. Species with wide geographical distribution were *F. nigrocicnta* and *F. gemmata*. The largest size was recorded in *F. gemmata*. The índices of diversity Shannon-Wiener (H´) and equity Pielou (J´) were 1.68 bits / individual and 0.45. The species larger size they are found in places with high substrate stability (rock masses and large blocks) and exposed to the waves hit.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

REDES NEURONALES APLICADAS A LA DETERMINACIÓN DE LA VIABILIDAD DE CULTIVOS LARVARIOS DE *ATRINA MAURA* (SOWERBY, 1835)

Carlos Chacón-Ojeda [1], Manuel Rodríguez-Rodríguez [1], Miguel Robles-Mungaray [2] and César A. Ruiz-Verdugo [1]

[1]Departamento de Ingeniería en Pesquerías, Universidad Autónoma de Baja California Sur, Ap. Postal 19-B, 23080. La Paz, Baja California Sur. MÉXICO. manuelr@uabcs.mx, cruiz@uabcs.mx.

[2] Acuacultura Robles, Privada Quintana Roo Número 4120, 23098, La Paz, Baja California Sur, MÉXICO. mrobles54@hotmail.com

Las Redes Neuronales Artificiales (RNA) pueden ser consideradas como solucionadores universales de funciones acotadas. Las RNA han demostrado tener éxito en el tratamiento de datos, al detectar patrones o regularidades que no son obvias o destacables a simple vista. Esta circunstancia permite considerar la introducción de las RNA en la diferenciación de cultivos larvales viables de *Atrina maura*, en

donde se utilizan las características morfométricas de las larvas veliger para identificar los diferentes cultivos y que no dependen de la experiencia del técnico para descartar un cultivo. La metodología del trabajo fue la siguiente: los reproductores se madurarán bajo condiciones controladas de alimentación y temperatura (24°C), una vez lograda la maduración se indujo el desove utilizando la técnica de choques térmicos. Después de 20-24 h de realizada la fecundación se presentó la larva "D. A partir de ese momento se iniciaron los muestreos con alícuotas de 20 ml y la toma de las correspondientes imágenes digitales de las larvas muestreadas por medio de un microscopio con cámara digital integrada. Las imágenes digitales se sometieron a un análisis empleando Image-Pro Plus (v6.0) para obtener la información morfométrica de cada larva muestreada. Este procedimiento se repitió hasta finalizar la etapa larvaria o cuando el cultivo terminó sin ser exitoso. La información obtenida se analizó por medio de las RNA utilizando inicialmente el algoritmo de retropropagación para el entrenamiento. Su ejecución se implementó mediante recursos computacionales basados en Visual Basic for Applications (VBA) en Excel 2007 y Matlab R2007a. Los resultados de este trabajo mostraron la eficiencia de esta metodología pudiendo determinar la viabilidad de un cultivo desde el día 3 y 5, lo que permite a los acuacultores tener una herramienta sencilla para caracterizar los cultivos de *A. maura* con un ahorro significativo de tiempo y esfuerzo.

DESARROLLO/DEVELOPMENT-PONENCIA/ORAL PRESENTATION

AISLAMIENTO MATERNO POR ESTRÉS DE SALINIDAD: CONSECUENCIAS EN LOS EMBRIONES INCUBADOS Y FUTUROS JUVENILES EN EL GASTRÓPODO ESTUARINO CON DESARROLLO DIRECTO *CREPIPATELLA DILATATA*

Oscar R. Chaparro [1], C. J. Segura [1], S. J. A. Osores [1], J. A. Pechenik [2], L. M. Pardo [1] y V. M. Cubillos [1]

[1]Facultad de ciencias, Instituto de Ciencias Marinas y Limnológicas, Universidad Austral de Chile, Valdivia, Chile; ochaparr@uach.cl

[2]Biology Department, Tufts University, Medford, MA 02155, USA

Durante los momentos de baja salinidad ambiental, las hembras incubantes de algunos gastrópodos y bivalvos pueden aislar la cavidad del manto por un periodo de varios días, manteniendo la concentración osmótica interna, pero causando una severa disminución en el oxigeno disuelto y pH, y un incremento en amonio y otras sustancias toxicas en el fluido del manto. En el presente estudio se examinó las consecuencias inmediatas del aislamiento materno sobre los embriones incubados en el gastrópodo *Crepipatella dilatata*, habitante común del estuario del rio Quempillén (41°52'S, 73°46'W), sur de Chile. Específicamente se determinó el tiempo de liberación de los juveniles y la tasa de crecimiento larval durante la incubación. Además, en los juveniles originados por estos embriones se cuantificaron los efectos latentes sobre la tasas de aclaramiento, consumo de oxígeno y crecimiento durante las primeras 4 semanas de vida independiente. Hembras que estaban en un periodo de incubación inicial o intermedio y que fueron expuestas a un estrés agudo de baja salinidad por 3 días, aumentaron el tiempo de incubación embrionaria, pero el tamaño de liberación de los juveniles no fue afectado. Hubo una reducción en la tasa de crecimiento de los embriones encapsulados provenientes de madres expuestas al estrés de baja salinidad. Los juveniles presentaron efectos latentes, traducidos en una disminución tanto de sus tasas de crecimiento como en las tasas de consumo de oxígeno y aclaramiento. Los resultados indican, que la reducción en la salinidad ambiental por varios días, puede afectar indirectamente y de forma negativa el desarrollo de los embriones incubados, y además, afectar a los juveniles durante al menos las primeras semanas después de su liberación del cuidado parental físico, incluso cuando los embriones y juveniles han vuelto a niveles de salinidad normal (32 psu). **Financiado Fondecyt-Chile 1100335**.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

MALACOFAUNA DEL SISTEMA AEROLITO DE PARAÍSO, COZUMEL, QUINTANA ROO

Norma Fernanda Charqueño-Celis [1], Aurora Marrón-Becerra [1], Margarita Hermoso [2] y Vivianne Solís-Weiss [3]

[1]Laboratorio de Ecología y Biodiversidad de Invertebrados Marinos, Instituto de Ciencias del Mar y Limnología, UNAM. Av. Universidad 3000, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510 Ciudad Universitaria, D.F. México; feri2ciencias@gmail.com

[2]Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) Liga Periférico - Insurgentes Sur, 4903, Col. Parques del Pedregal, Delegación Tlalpan, 14010, México, D.F.

[3] Unidad Académica de Sistemas Arrecifales, ICML-UNAM, Puerto Morelos, Quintana Roo, CP 77580, México

En la Península de Yucatán, se ha observado que los sistemas anquihalinos (cenotes) que se encuentran en esta parte del país, presentan complejas formaciones subterráneas y externas, que sirven de habitat para una gran variedad de formas de vida. Sin embargo, no toda la fauna ha sido propiamente estudiada. Por ello, en este estudio se analizó la malacofauna en la zona externa del sistema "Aerolito de Paraíso" en la isla de Cozumel, mediante la colecta de muestras de 250 ml de sedimento kárstico y alga filamentosa, en la temporada de lluvias del 2007 y secas del 2008. Estas fueron pasadas por un tamiz de 0.5mm, fijadas y posteriormentese separadas e identificadas en el laboratorio. También se realizó una colecta manual en la zona de cuevas del sistema. De un total de 24,970 invertebrados macrobentónicos, el 23.22% de la comunidad (8,928.32 ind/250 ml) estuvo representada por los moluscos gasterópodos *Pyrgophorus coronatus* y *Cerithidea costata.* La mayor abundancia de este phylum se registró durante la época de secas (8,768.53 ind/250 ml) con respecto a la de lluvias (159.79 ind/250 ml), siendo la especie *P. coronatus* la más abundante en ambas temporadas. En cuanto a la zona de cuevas únicamente se registró la presencia del bivalvo *Ctenoides mitis* que representa el primer registro de esta especie en este sistema. Finalmente, se puede concluir, que las condiciones ambientales de este sistema permiten la presencia de fauna propia de ambientes salobres en la zona externa y especies marinas en la cueva.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

CORRELACIÓN ENTRE GAMETOGÉNESIS Y FEED INDEX EN EL CARACOL *STROMBUS PUGILIS* LINNAEUS 1758

Fabiola Chong Sánchez, Martha Enríquez Díaz y Dalila Aldana Aranda

CINVESTAV IPN Unidad Mérida, Laboratorio de Biología y Cultivo de Moluscos, Km 6. Antigua Carretera a Progreso Mérida, Yucatán, México.Cp 97115; fabiola.chong@mda.cinvestav.mx

La reproducción en moluscos marinos ha sido estudiada diversamente, en especial la vitelogénesis, un proceso complejo que involucra un gasto energético debido a la autosíntesis y heterosíntesis de proteínas. El presente trabajo evaluó los cambios de la glándula digestiva durante la gametogénesis de *S. pugilis* en el medio natural y en organismos alimentados con dietas formuladas en laboratorio. Se colectaron 130 organismos, de los cuales 78 se cultivaron durante 104 días a una temperatura de 27.5ºC, con fotoperiodo de 12/12h. Se alimentaron con una dieta formulada en el Cinvestav IPN Mérida cuyo contenido fue 41.3% de Carbohidratos, 36.3% de Proteínas y 5.37% de lípidos. Quincenalmente se disecaron 12 organismos, 6 del medio natural y 6 alimentados con la dieta balanceada. Para su análisis histológico se utilizó la tinción de Tricromo de Goldner modificada. Para la evaluación gonádica se

clasifico su desarrollo en: Gametogénesis inicial, media, final y Madurez. Por lo que respecta al estadio nutricional, éste se determinó a través del *Feed Index* de Frenkiel y Aldana Aranda. Durante la fase experimental, tanto los organismos del medio natural como los alimentados con dieta formulada presentaron gametogénesis en sus tres niveles y maduración gonádica. Por lo que respecta al *Feed Index*, los organismos del medio natural presentaron un decremento conforme la gametogénesis avanzo, al igual que los organismos alimentados en laboratorio, indicando una relación directa entre el desarrollo ovocitario, la síntesis de vitelo y la acumulación de nutrientes así como su efecto en la estructura de la glándula digestiva del caracol *S. pugilis*.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

DETERMINACIÓN DE DIETA PARA MADURACIÓN DE REPRODUCTORES *GARI SOLIDA* (BIVALVIA: PSAMMOBIIDAE), EN CONDICIONES ARTIFICIALES.

R. Contreras, F. Contreras, C. Puebla y E. Pacheco
Instituto de Ciencia y Tecnología. Universidad Arturo Prat. Ejército 443, Puerto Montt, Chile;
ramiro.contreras.guzman@gmail.com

Gari solida, conocido como culengue, es un molusco bivalvo enterrador, que se distribuye desde Perú (14°S) hasta el extremo sur de Chile (54°S).
El objetivo de esta investigación fue obtener una dieta fácil de cultivar y con una composición bioquímica adecuada para obtener reproductores maduros de esta especie.
Se evaluó la composición bioquímica de los animales en invierno y primavera; se determinó el tipo de alimentación que *G. solida* tiene en el ambiente natural; se aislaron y cultivaron las microalgas encontradas en el contenido estomacal de ejemplares de *G. solida*; se realizaron ensayos de tasa de aclaramiento, frecuencia de alimentación, cantidad de alimento a suministrar y finalmente se evaluó el efecto de la dieta seleccionada en la madurez de *G. solida*.
Los análisis bioquímicos indicaron que en hembras y en periodo de primavera, los ácidos C 20:4n6, C20: 1n9 y C22:6n3 aumentan significativamente con respecto al período invernal. Del contenido estomacal, se identificaron 30 especies de microalgas y se determinó que *G. solida* se alimenta principalmente de fitobentos. No se logró el cultivo de forma masiva de ninguna microalga nativa aislada, por lo que se decidió trabajar con *Isochrysis galbana*, *Chaetoceros* sp. y *Tetraselmis suecica*. La tasa de aclaramiento para las 3 microalgas seleccionadas fue de 7,95 ml min^{-1}gramos de peso $seco^{1}$.
Se determinó que una dieta mixta constituida por las microalgas *Isochrysis galbana*, *Chaetoceros* sp. y *Tetraselmis suecica* (50:30:20) y aportada al 3% del peso seco de las partes blandas de los reproductores en cultivo, reunió las características más adecuadas para la obtención de animales maduros en un menor período de acondicionamiento.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

BIOGEOGRAPHY OF THE TERRESTRIAL GASTROPODS IN SOUTHERN TAMAULIPAS, MÉXICO

Alfonso Correa-Sandoval [1] and Fred G. Thompson [2]

[1] División de Estudios de Posgrado e Investigación, Laboratorio de Zoología, Instituto Tecnológico de Ciudad. Victoria, Boulevard. Emilio Portes Gil 1301 Poniente, Apdo. Postal 175, C.P. 87010, Cd. Victoria, Tamaulipas, México

[2]Florida Museum of Natural History, University of Florida, Gainesville, Florida, U.S.A., 32611; alf_correas@hotmail.com

The terrestrial gastropods of the southern region of the state of Tamaulipas, México were surveyed (December, 1990 – November, 2006). This region has much elevational, topographic and climatic variation. Samples (525) were obtained from 121 localities, in differents vegetational types. The primary zoogeographical relationships are characterized by the presence of endemics taxa (45 species or subspecies: 42.86%, highest value in northeastern México), and by the grouping of species of neotropical and neartic affinities (24 species: 22.86%) and those exhibiting neotropical distributions (15 species or subspecies: 14.29%). The family Spiraxidae has the largest number of endemic species (17 species and two subspecies). This family has the largest number of endemic species (29) in northeastern México.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

MARINE BIVALVES IN THE TAMAULIPAS COAST, MEXICO: DIVERSITY AND BIOGEOGRAPHY

Alfonso Correa-Sandoval [1], Ned E. Strenth [2] and Jorge H. Rodríguez C. [1]

[1] División de Estudios de Posgrado e Investigación, Laboratorio de Zoología, Instituto Tecnológico de Ciudad. Victoria, Boulevard. Emilio Portes Gil 1301 Poniente, Apdo. Postal 175, C.P. 87010, Cd. Victoria, Tamaulipas, México

[2]Department of Biology, Angelo State University, San Angelo, Texas, 76909; alf_correas@hotmail.com

Marine bivalves were surveyed (midlittoral, supralitoral and sublittoral zones) from September 1987 to April 2010. One hundred and thirty-one species of marine bivalves representing 98 genera in 37 families are reported. Two species are first records for Tamaulipas. The families with the largest number of species are the Veneridae (18) and Arcidae (12). The largest number of species are recorded in La Pesca (79) and Playa Miramar (70). These 131 species share the following malacogeographical relationships: 62 species (47,32%) exhibit Caribbean and Carolinian affinities, 20 species (15,26%) exhibit Carolinian and Caribbean affinities, 13 species (9,92%) exhibit Carolinian and Argentinean affinities and 12 species (9,16%) exhibit Caribbean, Carolinian and Boreal affinities. Only six species (4,58%) exhibit an exclusive Caribbean distribution and four species (3,05%) are known only from the Gulf of México. The fact that approximately 82% (107 species) of the marine Tamaulipan bivalve fauna exhibits the above malacogeographical relationships provides overwhelming evidence that the Tamaulipan coast of México represents a transitional zone between the Carolinian and Caribbean malacological provinces.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

DETERMINING RELEVANT VARIABLES AND QUANTIFIABLE REFERENCE POINTS TO ESTABLISH THE MATURITY STAGES IN *ENTEROCTOPUS MEGALOCYATHUS* AND *ILLEX ARGENTINUS* USING DECISION TREE ANALYSIS

Augusto C. Crespi-Abril [1,2], Nicolás Ortiz [1,3] and David Galván [1]

[1]Centro Nacional Patagónico (CONICET), Boulevard Brown 2915, Puerto Madryn (9120), Chubut, Argentina; crespi@cenpat.edu.ar; nicortiz@cenpat.edu.ar; galván@cenpat.edu.ar

[2]Escuela Superior de Ciencias Marinas, Universidad Nacional del Comahue, San Martin 247, San Antonio Oeste (8529), Rio Negro, Argentina.

[3]Universidad Tecnológica Nacional- Facultad Regional Chubut (UTN-FRCH). Av. del Trabajo 1536, Puerto Madryn (9120), Chubut, Argentina

Determining the maturity condition of cephalopods is crucial for stock assessment and management, but this task is often difficult to conduct in practice. This study provides observer-independent criteria to classify individuals in maturity stages based on decision tree analysis (DTA). A total of 4551 squids (*Illex argentinus)* and 1447 octopuses (*Enteroctopus megalocyathus)* from patagonian coast (Argentina) were sampled. Each individual was sexed and assigned to a macroscopic maturity stage defined by specific maturity scales and validated by histological analysis. Also, for each individual the weight of the gonad, accessory glands/ducts, mantle length and total weight were recorded and Maturity and Hayashi's indexes were calculated. Two different models were fitted, one considering all maturity stages and another considering only intermediate maturity stages since these are the most difficult to determine in practice. For *I. argentinus*, the weights of nidamental gland and oviducts were the most relevant variables to classified individuals among all female stages (misclassification 23%) whilst spermatophoric complex and testis weights were the key variables for males (misclassification 23%). The second model showed that nidamental gland and spermatophoric complex weights were the most relevant variables to classify females (misclassification 19%) and males (misclassification 21%) respectively. For *E. megalocyathus*, the oviducts and ovary weights of females and the terminal organ weight of males were the most relevant variables (misclassification 16% and 18%, respectively). The second model, highlighted the same variables, but misclassification improved to 13% for both sexes. In all cases, the frequently used indexes for determining maturity were not relevant. DTA of reproductive system measurements proved to be a useful tool to develop new and simple criteria of maturity stage classification, easy to use in field and independent of observer training. Moreover, the present approach could be easily applied to other cephalopod species using the biological data already existing.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

YOUNG CEPHALOPOD RESEARCHERS GROUP A DYNAMIC NETWORK TO CONNECT INDIVIDUAL EFFORTS OF EARLY CAREER RESEARCHERS INTO CEPHALOPOD SCIENCE

Augusto C. Crespi-Abril [1], Rigoberto Rosas-Luis [2], Silvia Lourenço [3], Stefanie Keller [4] and Felipe Briceño [5]

[1]Centro Nacional Patagónico (CONICET). Boulevard Brown 2915, Puerto Madryn, Chubut, Argentina.Tel/fax: 0054 2965 451024; crespi@cenpat.edu.ar

[2]Institute of Marine Science, Barcelona Spain; rigoberto@yahoo.com.mx

[3]Centro de Oceanografia, Laboratório Marítimo da Guia, Faculdade de Ciências, Universidade de Lisboa,Avenida Nossa Senhora do Cabo 939, 2750-374 Cascais, Portugal; salourenco@fc.ul.pt

[4]Instituto Español de Oceanografía, COB, Muelle de Poniente s/n, 07015 Palma de Mallorca, Spain; stef_keller@gmx.de
[5]Institute for Marine and Antarctic Studies (IMAS), University of Tasmania. Private bag 49, Hobart, Tasmania 7001, Tasmania, Australia; Felipe.BricenoJacques@utas.edu.au

The Young Cephalopod Researchers (YCR) group aims to improve communication between early career cephalopod scientists, establishing a network and the enhanced collaboration between researchers, and focuses on keeping the members updated on integrated cephalopod research an international level. This platform is led by an interdisciplinary group of young people involved in marine research and working in population ecology, molecular ecology, biological oceanography, physiology, modeling, fisheries, ecotoxicology, environmental pollution and climate change related to cephalopod species. In this context the members of the YCR group want to contribute with further knowledge or fields where cephalopod species are involved and also collaborating and proposing new projects with international participation. The main objectives of particular YCR members vary according to the key species and their distribution in the ocean but the YCR community is conducting research that has some direct connection with climate change, looking for effects of environmental variables in cephalopods. As a result of these initiatives, YCR group has increased the number of members to sixteen people, started cooperation between Argentina and Spain and plans new strategies to affront the development of cephalopod populations under realistic future ocean scenarios and the results were presented in the World Congress of Malacology (2013, Azores, Portugal). Also, in the framework of YCR a special session of cephalopods was conducted in YOUMARES4 (2013, Oldenburg, Germany). Up to the date, YCR members were present in two international meetings showing results of cooperation studies between researchers from different countries. The aim of this proposal is to present some of these results and to invite early career researchers to join us in this initiative and unified projects that help us to understand the cephalopod science better.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

DISTRIBUTION OF THE PARASITE *CANDIDATUS XENOHALIOTIS CALIFORNIENSIS* IN BLUE AND YELLOW ABALONE IN THE MAIN FISHING AREA OF THE PENINSULA OF BAJA CALIFORNIA, MÉXICO

Roberto Cruz-Flores [1], Montserrat Muñoz-Flores [1], Jorge Cáceres-Martínez [1,2], Rebeca Vásquez-Yeomans[1], Mónica Hernández Rodríguez [1], Axayácatl Rocha-Olivares [1] and Miguel Á. Del Río-Portilla [1]
[1] Centro de Investigación Científica y Educación Superior de Ensenada, Carretera Ensenada-Tijuana No. 3918, Zona Playitas, 22860. Ensenada, Baja California, México; rocruz@cicese.edu.mx; munozf@cicese.edu.mx; jcaceres@cicese.mx; mdelrio@cicese.mx
[2]Instituto de Sanidad Acuícola, A.C. Calle 15 # 265, entre Obregón y Moctezuma, Zona Centro. Ensenada, Baja California, 22800. México; vasquezr@isamx.org

Withering syndrome (WS) is a lethal disease of abalone that inhabits the west coast of North America caused by *Candidatus Xenohaliotis californiensis,* a rickettsia-like prokaryote (WS-RLP). This parasite has been detected in some areas of the Peninsula of Baja California, Mexico by conventional histology, Polymerase Chain Reaction (PCR), and *in situ* hybridization in wild black abalone *Haliotis cracherodii,* blue abalone *Haliotis fulgens*, yellow abalone *Haliotis corrugata* and cultured red abalone *Haliotis rufescens*. However, the presence and distribution of the parasite in the main abalone fishing zone was unknown. With the objective of determining the distribution, prevalence and intensity of *Candidatus Xenohaliotis californiensis* in blue abalone and yellow abalone as well as to study the relation of the parasite and the sex of the organisms, tissue samples were obtained from Social Cooperatives that engage in the commercial capture of abalone. Samplings were conducted throughout the 2012 capture season. The

parasite was detected in all studied areas in blue and yellow abalone. A prevalence of 80% was found in blue abalone while 10% of these organisms showed an infection intensity of 3. Yellow abalone presented a prevalence of 62% and 6% of the organisms showed an infection intensity of 3. A higher prevalence and infection intensity was found in female abalone in both species. PCR analysis and *in situ* hybridization confirmed the identity and the presences of the parasite in all sampled areas. Sequence analyses of PCR products showed an identity and coverage of 100% with previously reported sequences of WS-RLO (AF133090, AF06906). These results show that *Candidatus Xenohaliotis californiensis* is widely distributed in the main fishing area of the peninsula of Baja California and is well established in natural populations of blue and yellow abalone. This data constitutes the first record of the distribution of the parasite in Mexico as well as the relation of the parasite and the sex of abalone.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

ANATOMY OF *SOLAROPSIS BRASILIANA* (DESHAYES, 1832): A CONTRIBUTION TO THE PHYLOGENY OF PLEURODONTIDAE (STYLOMMATOPHORA, HELICOIDEA)

Maria Gabriela Cuezzo [1], Augusto F. Pignataro-de-Lima [2] and Sonia B. dos Santos [2]

[1] CONICET, Facultad de Ciencias Naturales, Universidad Nacional de Tucuman, Miguel Lillo 205, 4000 Tucumán, Argentina; gcuezzo@webmail.unt.edu.ar

[2] Laboratório de Malacologia Límnica e Terrestre, Instituto de Biologia Roberto Alcantara Gomes, Universidade do Estado do Rio de Janeiro. Rua São Francisco Xavier 524, PHLC, sala 525/2, CEP: 20550-900, Maracanã, Rio de Janeiro; afpdelima@hotmail.com; gundlachia@yahoo.com.br

The genus *Solaropsis* Beck, 1837 as well as the other South American taxa formerly classified into Camaenidae have a complex systematic history needed yet to be untangled. Its systematic position is problematic due to the scarce knowledge on anatomy, because the original descriptions are short, generally based only on shell characters. *Solaropsis brasiliana* (Deshayes, 1832) is an emblematic species from eastern Brazil, known just by shell morphology. The present study describes for the first time the anatomy of this species, updates the geographical range, and also introduces continuous characters that clarified the relationships among species in order to contribute to the solution of the Pleurodontidae phylogenetic puzzle. The shell of *S. brasiliana* is helicoid, depressed, spire moderately elevated, obtuse, with four to four ½ globose whorls, thin but solid, with periphery obsoletely angular; shell surface with regularly arranged rounded to oval granules, each bearing short hairs; dorsal surface with brown zigzagged bands; ventral side with dotted brown lines; shell aperture slightly oblique, with delicate slightly expanded peristome; basal lip of aperture with slightly undulating peristome; umbilicus only partially covered by peristomal columellar fold. Roof of pallial cavity system is distinctive by its dark pigmentation. Nephridium half the length of the pallial cavity roof, shorter than in other species; secondary ureter completely closed as in most of the *Solaropsis* species. Ovotestis forming a single, compact mass; bursa copulatrix with a thick and long diverticulum, flagellum thicker and longer than in other species of the genus; epiphallus straight, penis retractor muscle bifurcated with the vas deferens passing through it. The species seems to occur in Río de Janeiro, Espírito Santo and Minas Gerais states. The phylogenetic hypothesis of relationships obtained in the present study shows resolved relationships for the clade *Solaropsis,* supporting the genus as monophyletic.

Financial Support: CNPq, CONICET, FAPERJ, UERJ.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
DULCEACUÍCOLAS

THE FRESHWATER MUSSLES (BIVALVIA: UNIONOIDA) OF COLOMBIA, VENEZEULA, THE GUIANAS AND SURINAME, SOUTH AMERICA

Kevin S. Cummings [1] and Daniel L. Graf [2]
[1]Illinois Natural History Survey, University of Illinois, Champaign, Illinois 61820, USA; kscummin@illinois.edu
[2]Biology Department, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481, USA; dgraf@uwsp.edu

The South American river basins north of the Amazon (including the Rios, Magdalena, Sinu, Orinoco, Essequibo, as well as smaller systems of Guyana, French Guiana and Surinam) are inhabited by three families of freshwater mussels: Hyriidae, Mycetopodidae, and Etheriidae. Our systematic re-evaluation of the species and genera of the region is based on fieldwork conducted with KSC in collaboration with Christine A. Mayer (1986-1995), collections-base research in 17 major research collections, and a comprehensive literature review. Digital photographs of specimen lots and geoferenced localities were integrated into a comprehensive database of freshwater mussel taxonomy, literature records, and museum specimens. To-date, we have captured >650 specimen lots from the region and nearly 7000 from South American generally (including >500 primary and secondary type lots). These data are publicly available via the MUSSEL Project Web Site (http://www.mussel-project.net/). We currently recognize 37 species in 12 genera in the region, including at least one species new to science. Of these species, 20 are endemic to the region. We will present our results on patterns of species richness and taxonomic diversity in these Neotropical basins and summarize the known deficiencies in our understanding of the biogeography and evolution of these taxa. This research was funded by grants from the USA National Science Foundation (DEB-REVSYS-0316125, 0316488).

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

GROWTH AND SURVIVAL OF THE FRESHWATER SNAIL POMACEA FLAGELLATA USING THREE DIFFERENT DIETS

Rosa M. de Jesús-Carrillo [1], Frank A. Ocaña [2] and Alberto de Jesús-Navarrete [3]
[1]Licenciatura en Biología, Instituto Tecnológico de Chetumal, Av. Insurgentes No. 330, Chetumal, Quintana Roo, México; rosycoquina@gmail.com
[2]Programa de doctorado en Ecología y Desarrollo Sustentable, El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal, Av. Centenario km 5.5, Chetumal, Quintana Roo, México; frankocisat@gmail.com
[3]Departamento de Sistemática y Ecología Acuática. El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal. Av. Centenario km 5.5, Chetumal, Quintana Roo, México; anavarre@ecosur.mx

Freshwater snails of the genus *Pomacea* are very important for humans. Some species provides an alternative source of protein and are collected from the wild or cultured. *Pomacea flagellata* is a native snail collected from lagoons in Quintana Roo, México; and local authorities are concerned about declining population abundances in natural habitats. Exploring the potential of this species for aquaculture, an experiment was carried out using three diets: A (Chaya), B (Spinach) and C (Shrimp food in slides or pellets) to assess the effect of every diet on growth and survival. Juveniles of *P. flagellata* were set in triplicate aquaria (40 individuals each) and fed during 32 weeks. At the middle of the study

period, individuals fed with diet C were larger than others fed with diets A and B. Survival rate was higher in snails fed with C and 80% of the snails fed with diet B died. By week 18, 100% of the snails fed with C died. At the final of the experiment, survival, mean individuals length and weight were significant higher in the treatment with diet C (56%, 34.17 mm and 9.72 g, respectively) than those fed with diet A. Snails fed with diet C attained sexual maturity by week 30, expressed by copulas and eggs clutches kept in the aquaria. Growth curves demonstrate that growth is slower when temperatures decline. Handling of individuals is a major issue during culture, nonetheless experiment demonstrates that more than 50% of individual survive and growth faster using diet C. To obtain better results and reduce costs of production in a larger scale of culture, it is recommended to use Shrimp food during first weeks and a combination of this diet with Chaya posteriorly.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

ABUNDANCIA Y DISTRIBUCIÓN DE LA "CHIVITA" (*POMACEA FLAGELLATA*) EN LA LAGUNA DE BACALAR, QUINTANA ROO, MÉXICO

Alberto de Jesús-Navarrete [1], Abel A. Vargas-Espósitos [2], Frank A. Ocaña [3], José J. Oliva-Rivera [1] y Rosa M. de Jesús-Carrillo [2]

[1]Departamento de Sistemática y Ecología Acuática. El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal. Av. Centenario km 5.5, Chetumal, Quintana Roo, México; anavarre@ecosur.mx; joliva@ecosur.mx

[2]Licenciatura en Biología, Instituto Tecnológico de Chetumal, Av. Insurgentes No. 330, Chetumal, Quintana Roo, México; rosycoquina@gmail.com; sharingan_7@hotmail.com

[3]Programa de doctorado en Ecología y Desarrollo Sustentable, El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal, Av. Centenario km 5.5, Chetumal, Quintana Roo, México; frankocisat@gmail.com

Para conocer la distribución y abundancia de la "chivita", se realizaron muestreos desde junio de 2012 a mayo de 2013 en 20 sitios en la laguna de Bacalar distribuidos en ambos márgenes. En cada sitio, se realizaron tres transeptos de 100 m^2, colectando todos los caracoles, mismos que se midieron con un vernier al mm más cercano, y se pesaron con una balanza granataria electrónica con una precisión de 0.05 g. Se observó una mayor abundancia de organismos en margen Oeste (17,419 individuos), que en la zona Este, donde solo se encontraron 134 individuos. Existió una mayor abundancia de caracoles en agosto, septiembre y octubre, disminuyendo gradualmente el resto del año. Espacialmente, los caracoles fueron más abundantes en la parte media de la laguna, que correspondieron con las estaciones E3 a la E11. La densidad tuvo un máximo en septiembre, con 1.27 ind.m^2 y disminuyó a 0.47 ind.m^2 en octubre posiblemente debido a condiciones climáticas. La talla de los caracoles varió de 2 a 56 mm de longitud de concha con distribución normal, que cambió a bimodal en enero-marzo, y que probablemente indica reclutamiento de la especie. *Pomacea flagellata* reflejó una relación peso-longitud con un exponente de 2.7265 que es muy cercano a 3, lo que indicaría un crecimiento isométrico. Las densidades encontradas son muy bajas durante el año y esto indica que no es posible considerar la extracción del caracol para fines comerciales.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

GENETIC ANALYSIS OF NATURAL POPULATIONS OF CALIFORNIA RED ABALONE *HALIOTIS RUFESCENS* USING EST-SSR MARKERS

Rigoberto Delgado-Vega [1], Edgar A. López-Landavery [1], Juan A. Corral-Avila [2], Miguel Ángel del Río-Portilla [1], James D. Moore [3] and Fabiola Lafarga-De la Cruz [1]

[1]Departamento de Acuicultura, Centro de Investigación Científica y de Educación Superior de Ensenada, B.C., Carretera Ensenada-Tijuana #3918. Zona Playitas. Ensenada, Baja California, México, C.P. 22860; rdelgado@cicese.edu.mx; edlopez@cicese.edu.mx; mdelrio@cicese.mx; flafarga@cicese.mx

[2] Facultad de Ciencias, Universidad Autónoma de Baja California, Carretera Tijuana-Ensenada Km. 103, Ensenada, Baja California, México, C.P. 22860; juan.corral@uabc.edu.mx

[3]U.C. Bodega Marine Laboratory, PO Box 247, Bodega Bay, CA 94923; jimmoore@ucdavis.edu

Abalones are marine gastropod mollusks in the genus *Haliotis*. Of the different species found around the world only 17 are considered of commercial interest. One is the red abalone, *Haliotis rufescens*. This species is distributed from Sunset Bay, Oregon, USA to Bahia Tortugas, Baja California Sur, México. Because the species is commercially important, they have been captured intensely, consequently their natural populations have been declined dramatically in the past six decades. The purpose of this research is to analyze the genetic variability and the possible changes that have occurred over a period of six years in the red abalone population from Van Damme, California, USA, and determine the current genetic parameters of abalone population from Santo Tomas Bay in Baja California, Mexico. Population genetic analysis was performed by amplification of 16 microsatellite loci derived from Expressed sequence tag (EST-SSR). This study contributes to genetic knowledge of abalone from California and Baja California. The genetic markers used here, may be useful in breeding programs to maintain, manage or improve the genetic diversity of individuals, as well in restoration activities. In this paper we show and discuss the preliminary results of the genetic variability of populations of red abalone in California and Baja California.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

GENOMIC ANALYSIS OF THE QUEEN CONCH *STROMBUS GIGAS* LINNAEUS, 1758

Miguel Á. Del Río-Portilla [1], Fabiola Lafarga-De La Cruz [1], Jorge Cruz-Medina [2], Salima Machkour-M'Rabet [2], Yann Hénaut [2] and Francisco García De León [3]

[1] Departamento de Acuicultura, Centro de Investigación Científica y de Educación Superior de Ensenada, B.C., Carretera Ensenada-Tijuana #3918. Zona Playitas. Ensenada, B. C. México; mdelrio@cicese.mx

2 Grupo Académico Interacción, Adaptación y Biodiversidad (GAIA-BIO), El Colegio de la Frontera Sur (ECOSUR), Avenida Centenario Km 5.5, AP 424, 77014 Chetumal, Quintana Roo, México.

[3] Laboratorio de Genética para la Conservación, Centro de Investigaciones Biológicas del Noroeste (CIBNOR), Instituto Politécnico Nacional 195, Colonia Playa Palo de Santa Rita Sur, La Paz 23096, Baja California Sur, México.

New genomic analysis tools have been developed in the past decade, which allows us to obtain a high number of molecular markers and DNA sequences from different genes. The main objectives of this work was to use the next generation sequencing in order to construct a contig library to obtain a higher number of microsatellites of the queen conch, *Strombus gigas*, and to annotate the contigs by blasting them into the Genbank and other protein libraries. A total number of 115,674 reads was obtained, which

conformed 5,962 contigs with a N50 of 279 bp and a maximum contig size of 3,713. Only 612 contigs (10.27%) were annotated. A total of 3,438 microsatellites were found, where 2683 (78.04%) had dinucleotide repetition motif, and 674 were perfect dinucleotide microsatellites. We discuss how the application can help in *S. gigas* aquaculture and fishery.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

TRANSCRIPTOMIC ANALYSIS OF FAST AND SLOW GROWING JUVENILES OF THE RED ABALONE *HALIOTIS RUFESCENS*

Miguel A. Del Río-Portilla [1] and Cristian Gallardo-Escárate [2]

[1]Departamento de Acuicultura, Centro de Investigación Científica y de Educación Superior de Ensenada, B.C., Carretera Ensenada-Tijuana #3918. Zona Playitas. Ensenada, Baja California, México, C.P. 22860; mdelrio@cicese.mx

[2]Laboratorio de Biotecnología y Genética Acuícola, Universidad de Concepción, P.O. Box 160-C, Concepción, Chile; crisgallardo@oceanografia.udec.cl

The red abalone, *Haliotis rufescens,* is one of the most important mollusk species cultured in Chile and in Mexico, but there is almost no information regarding the genes related with development, which could be useful for a genetic breeding program. In recent years, the number of available molecular markers has increased, thanks to the next generation sequencing tools. The main objective of this work was to compare the transcriptome of fast and slow growing red abalones in order to detect genes or group of genes related with growth and useful for a breeding program. We extracted RNA and sent it for 454 sequencing in order to obtain sequence reads from each group (fast and slow growing abalones). We built a pooled library in order to obtain common contigs and then separately mapped reads from each group, either fast or slow. This mapping procedure allowed us to differentiate those contigs formed with reads from both groups, and those formed exclusively with "fast reads" and those from "slow reads". A total of 764,686 and 783,261 reads were obtained from the fast and slow growing abalones, respectively. These reads conformed 44,817 contigs, from which 4,615 were produced by fast growing abalones, while 9,286 were produce by slow growing abalones. Discussion on differences between gene ontology annotations will be presented.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
TAXONOMÍA, SISTEMÁTICA Y BIOGEOGRAFÍA

REVISION OF SQUIDS IN THE FAMILY LOLIGINIDAE (SUBORDER: MYOPSIDA) FROM THE COAST OF TAMAULIPAS, GULF OF MEXICO

Mariana Díaz Santana-Iturríos [1], Francisco J. García-Rodríguez [1], César A. Salinas-Zavala [2], Jasmín Granados-Amores [2], José De la Cruz-Agüero [1] and Federico A. García-Domínguez [1]

[1] Instituto Politécnico Nacional. Centro Interdisciplinario de Ciencias Marinas. Departamento de Pesquerías y Biología Marina. Av. Instituto Politécnico Nacional s/n. Col. Playa Palo de Santa Rita. Apdo. Postal 592. Código Postal 23096. La Paz, B.C.S. México; mariana_dsi86@hotmail.com; fjgarciar@ipn.mx; jcruz@ipn.mx; fdoming@ipn.mx

[2] Centro de Investigaciones Biológicas del Noroeste, Ave: Instituto Politécnico Nacional No. 195 Col. Playa Palo de Santa Rita Sur, La Paz, B.C.S, 23096, México; csalinas@cibnor.mx; granadosamores@gmail.com

Detection of diagnostic characters for specific identification is particularly important in organisms whose characteristics are not clear, such as occurs in the squid species of the family Loliginidae. In this study, a revision concerning this issue was made using genetic and morphometric (traditional morphometry of body parts and statoliths geometric morphometrics) analyses for loliginids collected in the coast of Tamaulipas, Gulf of México. One-hundred eleven organisms from four oceanographic cruises were analyzed; basing on the characteristics from the original descriptions these where identified belonging to three (*Lolliguncula brevis*, *Doryteuthis plei*, and *Doryteuthis pealei*) of the four species whose distribution has been reported in the study area. The molecular analyses, based in sequences of the Subunit I of Cytochrome Oxidase (COI) from mitochondrial DNA of 49 organisms also revealed the presence of three different groups. It was not possible to determine if 32 females were *Doryteuthis roperi* or *D. plei* when morphological identification was made. Nonetheless, they were recognized as *D. plei* using genetic data. Both the traditional morphometric analysis based in 17 body measurements and the statolith geometric morphometric analysis allowed identifying the three groups. Results confirm that in the study area *Lolliguncula brevis*, *Doryteuthis plei*, and *Doryteuthis pealei* distribute based in bathymetry and that these species can be differentiated using genetic and morphometric characteristics. *Doryteuthis roperi*, distributed as well in this region according to literature, was not found in present research. The revision of type specimens deposited in the Smithsonian National Museum of Natural History, USA, will be relevant to confirm its taxonomic status as well as to account with more information to explain the obtained results.

MORFOMETRÍA/MORPHOMETRY-PONENCIA/ORAL PRESENTATION

THE HERITABILITY OF SHELL MORPHOMETRICS IN THE FRESHWATER PULMONATE GASTROPOD, *PHYSA*

Robert T. Dillon, Jr. [1] and Stephen J. Jacquemin [2]

[1]Department of Biology, College of Charleston, Charleston, South Carolina 29424, USA; Dillonr@cofc.edu

[2]Wright State University – Lake Campus, 7600 Lake Campus Dr., Celina, Ohio 45882, USA; Stephen.Jacquemin@wright.edu

The cosmopolitan freshwater pulmonate *Physa acuta* hybridizes readily with *Physa carolinae* in the laboratory, although their F1 progeny are sterile. The two species differ strikingly in overall shell shape, the former bearing a more globose shell and the latter more fusiform. We crossed four pairs of *P. acuta*, four pairs of *P. carolinae*, and four hybrid pairs, allowed them to lay eggs, and preserved them at age 20 weeks. We then reared 5 offspring from each of these 12 crosses, preserving them at age 20 weeks as well. We took six conventional linear measurements on the combined sample of 84 shells: total length, total width, body whorl length, second whorl width, aperture length and aperture width, and extracted the first two principal components from both the correlation and covariance matrices. Regression of the 60 offspring on their 12 mid-parent values yielded heritabilities of 0.43 (± 0.14) for total length, 0.40 (± 0.12) for second whorl width, 0.31 (± 0.07) for PC2 (correlation) and 0.31 (± 0.05) for PC2 (covariance), with negligible heritabilities for the remainder. We then analyzed our set of 84 shells using modern landmark-based geometric morphometric techniques and extracted three relative warp axes. Parent-offspring regressions yielding a heritability of 0.89 (± 0.07) for score on RWA 1 and 0.31 (± 0.12) for RWA2, with RWA3 not significant. RWA2 score was not significantly correlated with overall size (as measured from the centroid), suggesting that this metric might be especially useful for estimating evolutionary relationships under less controlled conditions.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

A NEW RECORD IN A WELL-ESTABLISHED POPULATION OF *OCTOPUS HUBBSORUM* EXPANDS ITS KNOWN GEOGRAPHIC DISTRIBUTION RANGE AND MAXIMUM SIZE

José F. Domínguez-Contreras [1,*], Bertha P. Ceballos-Vázquez [1], Frederick G. Hochberg [2], Marcial Arellano-Martínez [1] and Nefertiti T. Roldán-Wong [1]

[1]Centro Interdisciplinario de Ciencias Marinas (CICIMAR-IPN-COFAA), Departamento de Pesquerías y Biología Marina, Ave. IPN s/n, Col. Playa Palo de Santa Rita, A.P. 592, La Paz, Baja California Sur, 23096, México; * Becario PIFI; fradoco@gmail.com; bceballo@ipn.mx; marellam@ipn.mx; ntrw_88@hotmail.com

[2]Department of Invertebrate Zoology, Santa Barbara Museum of Natural History, 2559 Puesta del Sol, Santa Barbara, CA 93105, Unites States; fghochberg@sbnature2.org

Octopus hubbsorum Berry, 1953 is an important fishery species off the Pacific coasts of México. It inhabits the intertidal and subtidal zones to depths of 30 m. Its occurrence has been documented in tropical and subtropical zones. In México, it is in the Gulf of California and at some localities of the southern Mexican Pacific, including the Revillagigedo Islands. In this paper, the presence of a well established population of *O. hubbsorum* in Bahía Magdalena (on the west coast of the Baja California peninsula) is presented. This new record expands the distribution range not only in distance but also into a temperate zone. Additionally, the maximum size records for this species are extended (1020 mm total length; 220 mm dorsal mantle length; and 3705 g total weight).

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

CHARACTERIZATION OF MICROSATELLITE LOCI FROM TWO-SPOTTED OCTOPUS *OCTOPUS BIMACULATUS* VERRILL 1883 FROM PYROSEQUENCING READS

José F. Domínguez-Contreras [1,*], Adrián Munguía-Vega [2,3], Bertha P. Ceballos-Vázquez [1], Marcial Arellano-Martínez [1], Melanie Culver[4] and Nefertiti T. Roldán-Wong [1]

[1]Centro Interdisciplinario de Ciencias Marinas (CICIMAR-IPN-COFAA), Departamento de Pesquerías y Biología Marina, Av. IPN s/n, Col. Playa Palo de Santa Rita, A. P. 592, L Paz, Baja California Sur, 23096, México. *Becario PIFI; fradoco@gmail.com; bceballo2ipn.mx; marellam2ipn.mx; ntrw_882hotmail.com

[2]Conservation Genetics Laboratory, School of natural Resources and Environment, BSE-317, University of Arizona, 1311 E 4th Street, Tucson, AZ, USA, 85721.

[3]Comunidad y Biodiversidad A. C., Isla del Peruano 215, Lomas de Miramar, Guaymas, Sonora, México, 85448; Airdian2email.arizona.edu

[4]U. S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Conservation Genetics Laboratory, School of Natural Resources & Environment, BSE-317, University of Arizona, Tucson, AZ, USA, 85721; Mculver2email.arizona.edu

We isolated and characterized 22 novel microsatellite loci in the two-spotted octopus *Octopus bimaculatus* using 454 pyrosequencing reads and fluorescent labeling of M13-tailed primers. All loci were polymorphic. The mean number alleles per locus was 13.09 (range 7-19), and observed heterozygosities ranged from 0.50 to 1.00. Four pairs of loci were linked and three loci deviated significantly from Hardy-Weinberg equilibrium. The loci were tested in two related species: *Octopus bimaculoides* and *Octopus hubbsorum*, where 18 and 12 loci successfully amplified and were polymorphic, respectively.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

LAND SNAILS OF BELIZE

Daniel C. Dourson [1] and Ronald S. Caldwell [2]

[1]Belize Foundation for Research and Environmental Education, PO Box 129, Punta Gorda, Belize; theroguebiologist@gmail.com

[2]Cumberland Mountain Research Center, Lincoln Memorial University, PO Box 1657, Harrogate, Tennessee 37752, USA; ron.caldwell@lmunet.edu

"Land Snails of Belize" documents 157 native and two exotic land snail species from 23 families. 122 species are recognized with a remaining 35 species undetermined, possibly new to science, endemic or range-restricted to Belize.

Belize belongs to a much larger biotic region including México and Central America that contains many biomes, different geological structures, complex physiographic features and a myriad of ecological settings. The number of recorded land snail species (an estimated 1,239 taxa) from this area is about 35% of the actual fauna predicted with as much as 65% remaining undiscovered (Thompson 2011: Bulletin Florida Museum Natural History, 50: 1-299). Recent collection efforts and database searches have documented 85-90% of the total fauna expected to occur in Belize based on Thompson's predictions.

Belize is divided into three distinct land snail ecoregions 1) the North (Corozal, Orange Walk and Belize Districts) which includes a unique biome, the Dry Tropical Forest, 2) Western Slopes of the Maya Mountain Divide (Cayo District) and 3) Eastern Slopes of the Maya Mountain Divide (Toledo and Stann Creek District). The Maya Mountains Massif (East and West) is one of the most important molluscan regions in Belize and indeed in Central America, due to its early geographic isolation as mountains. Northern Belize harbors one of the most endangered biomes in the world, the Dry Tropical Forest. Interesting subregions such as Towel Karst of the savanna of the Belize District and Yalbac Hills (border of Orange Walk and Cayo Districts) add to the overall biodiversity.

Terrestrial gastropods are critical components in ecosystems as food sources to several taxonomic groups and dispersers of fungi and other taxonomic groups.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

PHYLOGENY OF OYSTERS FROM GULF OF CALIFORNIA AND PACIFIC COAST OF WESTERN NORTH AMERICA WITH IMPLICATIONS FOR OSTREIDAE CLASSIFICATION

Douglas J. Eernisse [1], Meredith Raith [1], Erik M. Pilgrim [2] and Danielle C. Zacherl [1]

[1]Department of Biological Science, California State University Fullerton, Fullerton, CA 92834 USA; deernisse@fullerton.edu; raithm@yahoo.com; dzacherl@fullerton.edu

[2]Ecological Exposure Research Division, National Exposure Research Laboratory, U.S. Environmental Protection Agency, 26 West Martin Luther King Dr., Cincinnati, OH 45268 USA; pilgrim.erik@epa.gov

Most oyster species worldwide have been extensively studied, but classification within Ostreidae Rafinesque 1815 has been controversial because proposed divisions are based on relatively few and

notoriously variable morphological features. Meanwhile, most oyster molecular systematics studies have been too narrowly focused to address overall relationships within Ostreidae. Here we report the phylogenetic analyses performed by one of us (DJE) of combined and separate mitochondrial 16S + COI data sets. Oysters representing about nine species were newly sampled from localities on either side of the Gulf of California and the Baja California Sur Pacific coast within México. We also included most available 16S or COI sequences from GenBank for Ostreidae and selected outgroups, and newly added COI sequences for selected oysters from a previous study from more northern West Coast localities. One conclusion was that chomata features alone do not justify separating *Myrakeena* Harry, 1985 from *Ostrea* Linnaeus, 1758, and type species for this genus should revert to *Ostrea angelica* Rochebrune, 1895. Specifically, our analysis supports *O. angelica* as sister lineage of *O. conchaphila* Carpenter, 1857 + *O. lurida* Carpenter, 1864 nested within Ostreinae, and we have better characterized the distribution of all three of these native western North American species. We also provide the first Pacific report of the Western Atlantic oyster, *O. equestris* Say 1834, which we found living in Cabo San Lucas and Bahía Magdalena, Baja California Sur. Analysis of presently sampled species supports a deep separation of four lineages within Ostreidae, represented by the genera, *Ostrea*, *Crassostrea* Sacco, 1897, *Saccostrea* Dollfus & Dautzenberg, 1920 and *Striostrea* Vialov, 1936. While our mitochondrial markers alone are insufficient to resolve their interrelationships, our results are consistent with a simpler division of Ostreidae into only four corresponding subfamilies.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

SOLEMYA PERVERNICOSA POPULATIONS NEAR TWO MUNICIPAL WASTEWATER OUTFALLS

Wendy Enright
City of San Diego Ocean Monitoring Program, 2392 Kincaid Road., San Diego, California 92101,USA;
wenright@sandiego.gov

The abundance of the sulfur-metabolizing bivalve *Solemya pervernicosa* was examined spatially and chronologically in the coastal waters near San Diego, CA, USA as part of the City of San Diego's wastewater effluent monitoring program. Although populations were above average near the outfalls as might be expected, additional areas of elevated populations were detected south of the entrance of San Diego Bay. Due to the complex geologic nature of the fault field in the area, the possibility of a previously unknown seep was proposed. Initial examination of sediment chemistry data associated with that area did not significantly correlate abundance with elevated levels of total organic carbon, total organic nitrogen or total sulfides. However, a trend was evident. Additional investigation of the area directly with a small remotely operated vehicle revealed that the area has extremely variable sediments ranging from fine sand to coarse particles and large amounts of visible shell hash indicating dynamic hydrography. Direct evidence of a seep community, e.g. bacterial mats, live sulfur-metabolizing bivalves or bubbling, was not observed. Additional, more finely tuned sampling will be necessary to determine the reason(s) for the observed localities of peaks in abundance.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

EFECTO DE LA TEMPERATURA EN EL CRECIMIENTO Y SOBREVIVIENCIA EN JUVENILES *OCTOPUS MAYA*

E. Escalante-Garnelo [1], C. Caamal-Monsreal [2], C. Pascual-Jiménez [2], F. Díaz [3], M. Mascaró [2] y C. Rosas [2]
[1]Posgrado en Ciencias del Mar y Limnología UNAM; erikaeg@gmail.com
[2]Unidad Multidisciplinaria de Docencia e Investigación, Facultad de Ciencias, UNAM Puerto de Abrigo s/n, C.P. 97356, Sisal, Yucatán, México :(988) 931 1000 Fax (988) 931 1015; crv@ciencias.unam.mx
[3]CICESE, Ensenada, BC

Octopus maya es un organismo que está ampliamente ligado a la temperatura, siendo el principal factor ambiental que controla su alimentación, metabolismo, crecimiento, desarrollo y sobrevivencia. El objetivo de este estudio fue evaluar el efecto de diferentes temperaturas 18°C, 25°C, rampa (25-30°C) y 30°C sobre el crecimiento y sobreviviencia en juveniles tempranos de *O. maya*. Se observó que los organismos mantenidos a 18°C no comían mucho, por lo cual, tuvieron el menor crecimiento, esto se pudo deber al estrés sometido por la baja temperatura, mientras que los organismos mantenidos a 30°C comían todo lo proporcionado obteniendo así los mayores pesos, pero se observo la menor sobreviviencia. La mayor sobrevivencia se observo en los organismos mantenidos a 25°C. Esto se puede deber a las respuestas adaptativas que permiten la actividad normal de un organismo en un intervalo térmico ambiental solo ocurren dentro de ciertos límites; dentro de los cuales los organismos son capaces de aclimatarse (en el laboratorio) o aclimatizarse (en su hábitat natural) mediante mecanismos de compensación térmica, que involucran procesos de tipo bioquímico, neuroendócrino y de comportamiento.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

CONSERVATION STATUS OF TERRESTRIAL MOLLUSKS FROM THE EASTERN PART OF SIERRA DE BAHORUCO, DOMINICAN REPUBLIC

Altagracia Espinosa J. and Ruth H. Bastardo
Instituto de Investigaciones Botánicas y Zoológicas, Universidad Autónoma de Santo Domingo, Ave. Alma Mater esquina Correa y Cidrón, Ciudad Universitaria, Santo Domingo, D. N., Apartado postal 10105, República Dominicana; altagraciaespinosa@yahoo.com; r_bastardo@hotmail.com

Dominican Republic and Haiti share the island of Hispaniola, the second in size in the Greater Antilles. Based on a preliminary literature review, specimen collections and data bases, we have determined that 28 families and 741 species of terrestrial mollusks have been found on this island. The Southwest region of the Dominican Republic is regarded as one inhabited by the most diverse fauna of terrestrial mollusks on the island. This is caused, in part, by its karstic soils and habitat diversity due to the complex geological history of the region. Sierra de Bahoruco is the most prominent mountain of the region (2,367 msnm); its center exhibits a complex mosaic of vegetation with cloudy forest of broadleaves modified by cattle husbandry and agriculture (coffee and minor crops) since the beginning of the 20th Century.
Thirteen families were found recently while sampling transects and plots in the Western part of Sierra de Bahoruco. According to the literature, Sierra de Bahoruco is the type locality for about 30 species, including the emblematic *Oleacina voluta*, which is found sporadically, and *Coloniconcha prima*, the only semi-slug from La Hispaniola. It is necessary to be more precise assigning the type locality of many

species that have been reported for the locality type "Sierra de Bahoruco" without specifying the side (Western or Eastern). The habitat loss due to the increasing use of land for agriculture is a threat for the permanence of terrestrial mollusk species, which are still poorly known.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIODIVARSIDAD

A DIVERSITY ANALYSIS OF BIVALVE ASSEMBLAGES OF BAHÍA DE MAZATLÁN, MÉXICO, ACROSS MULTIPLE SPATIAL SCALES

María del Carmen Esqueda-González and Eduardo, Ríos-Jara
Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Las Agujas Nextipac, Zapopan, Jalisco, México. C.P.45110; carmeg7@yahoo.com.mx; edurios@cucba.udg.mx

Bahía de Mazatlán is located in the northern limit (23˚N) of the American Tropical Pacific which is considered the region with the highest diversity of coastal infaunal and epifaunal bivalves of the Eastern Pacific. Previous studies in the bay have recorded a total of 132 species (approximately 15% of the bivalve diversity of this region). Additive diversity, multiplicative diversity, and the true diversities q=1 and q=2 (Hill numbers) were performed partitions to measure the inventory diversity (α and γ) and differentiation diversity (β and δ) of species of bivalve using multiples spatial scales. Partitions were performed at sample and sites of intertidal and shallow subtidal of the bay.
A total of 19,848 individuals, 27 families and 77 species were recorded (18, 425 individuals in the intertidal and 1,423 individuals in the shallow subtidal included in 60 and 61 species, respectively). The families with the highest number of species in both environments were Mytilidae, Veneridae, Corbulidae and Semelidae. A large number of species (19) were unique to one environment and sampling site; 16 species were singletons (e.g. with only one individual) and 9 doubletons (e.g. with only two individuals. The bivalve assemblages are composed of four main life forms: 25 epifaunal species, 23 infaunal, 14 semi-infaunal, and 15 endolithic. The patterns of diversity were closely related either to the common, dominant and rare species according to the different spatial scales. The additive partition analysis showed that the differentiation diversity (β_C and δ_L) contributed the most to the total diversity (γ) of the bay. The heterogeneity of habitats is a very important factor to determine the species richness and life forms found in the bay; the high β_C and δ_L values may be explained by the large number of rare species recorded in the different environments and sampling sites.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

REPRODUCTIVE CYCLE OF *DONAX PUNCTATOSTRIATUS* (BIVALVIA: DONACIDAE) IN THE SOUTHERN COAST OF SINALOA, MEXICO

María del Carmen Esqueda-González [1], Eduardo Ríos-Jara [1], María Cristina Chávez-Sánchez [2], Selene María Abad-Rosales [2] and Ernesto López-Uriarte [1]
[1]Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Carretera a Nogales Km 15.5. Las Agujas Nextipac, Zapopan, Jalisco, México 45110; carmeg7@yahoo.com.mx; edurios@cucba.udg.mx; ernlopez@cucba.udg.mx
[2]Laboratorio de Histopatología, Centro de Investigación en Alimentación y Desarrollo, A. C., Unidad Mazatlán. Av. Sábalo Cerritos S/N 82100; marcris@ciad.mx; selene@ciad.mx

This study describes the reproductive cycle of a population of coquina clam *Donax punctatostriatus* from a sandy beach of southern Sinaloa, México. There are few studies on the Donacidae of the Tropical Eastern Pacific; however, there is no previous information on the biology of *D. punctatostriatus* from the Mexican Pacific. Although this species has no commercial importance, it is currently used to make decorative objects and jewelry in this entire region. A total of 880 clams were collected during 36 bimonthly samplings (November 2008 - June 2010). According to gametogenensis characteristics six stages of gonadal maturity were established. The sex of all individuals was determined and an x^2 test was performed to test the hypothesis of no difference in the number of males and females. The size of the females and males at first sexual maturity was estimated (when 50% of the individuals were partially spawned or spent).
The size of all clams ranged between 3.5 - 25.67 *mm* length (mean = 13.51 *mm*); females ranged between 6.3 - 24.56 *mm* and males 6.0 - 25.64 *mm*. Most individuals (95.4%) had gonadal development, the rest were sexually undifferentiated (3.2%). Also, some individuals were infected by a parasite in the gonadal tissue (1.4%). No difference was found in the sex ratio 1:1 ($p < 0.05$). The size at first maturity was 13.30 *mm* for females, 14.49 for males and 14.07 for total clams. The gametogenesis cycle starts in March, with rapid maturation of gametes in both sexes, spawning begins in April (50% of individuals) reaching a peak of in early July (100%), continuing until November. In late October and November a new gametogenesis cycle begins. In this study, females and males showed a synchrony in the gametogenesis, this event occurs during the temperate-cold period (20 to 23 ˚C) and most individuals are in the spent phase in the temperate-warm period (27 to 29 ˚C).

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORALPRESENTATION
BIODIVERSIDAD

SPECIES COMPOSITION, RICHNESS, AND DISTRIBUTION OF MARINE BIVALVE MOLLUSKS IN BAHÍA DE MAZATLÁN, MÉXICO

María del Carmen Esqueda-González [1], Eduardo Ríos-Jara [1], Cristian Moisés Galván-Villa [1], and Fabián Alejandro Rodríguez-Zaragoza [1]

[1]Laboratorio de Ecosistemas Marinos y Acuicultura, Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara. Las Agujas Nextipac, Zapopan, Jalisco, México. C.P.45110; carmeg7@yahoo.com.mx; edurios@cucba.udg.mx; cmgv1982@yahoo.com.mx; fabianrz2002@yahoo.com.mx

We describe the composition and distribution of bivalve mollusks from the sandy and rocky intertidal and the shallow subtidal environments of Bahía de Mazatlán, México. The bivalve fauna of the bay is represented by 89 living species of 28 families, including 37 new records and four range extensions: *Lithophaga hastasia*, *Adula soleniformis*, *Mactrellona subalata* and *Strigilla ervilia*. The most diverse families were Mytilidae (14 species), Veneridae (10) and Arcidae (8). Ten families (35%) included only one species. The number of species increase from the upper (44) and lower intertidal (53) to the shallow subtidal (76), but only 11 (17%) have a wide distribution in the bay (i.e., found in all sampling sites and environments). A large number of species (27) were unique to one environment and sampling site. The bivalve assemblages are composed of four main life forms: 27 epifaunal species, 26 infaunal, 16 semi-infaunal, and 20 endolithic. A taxonomic distinctness analysis identified the sites and environments that contribute the most to the taxonomic diversity (species to suborder categories) of the bay. With the present work, the number of species of bivalves recorded in the bay increased significantly (31%) to 132 species. These species represent 34% of the bivalve diversity of the southern Golfo de California and approximately 15% of the Eastern Tropical Pacific region.

PALEONTOLOGÍA/PALEONTOLOGY-PONENCIA/ORAL PRESENTATION

ANALISIS PRELIMINAR DE LA COMPOSICIÓN DE UNA COMUNIDAD ARRECIFAL CON MOLUSCOS DEL CRETÁCICO MEDIO (ALBIANO-CENOMANIANO) EN EL BANCO CALIZO IXMIQUILPAN, HIDALGO, MÉXICO.

Carlos Esquivel Macías [1], Miriam Mejía [2] y Kinardo Flores Castro [3]

[1]Museo de Paleontología, Centro de Investigaciones Biológicas, Universidad Autónoma del Estado de Hidalgo, México

[2]Licenciatura en Geología Ambiental, Área Académica de Ciencias de la Tierra, Universidad Autónoma del Estado de Hidalgo, México.

[3]Laboratorio de Geoquímica, Área Académica de Ciencias de la Tierra, Universidad Autónoma del Estado de Hidalgo, México.

La localidad fosilífera cerro de la nube, se localiza al nororiente de la ciudad de Pachuca, Hidalgo, México, en una formación cretácica de naturaleza calcárea que corresponde a la formación El Abra /El doctor, cuyo status nomenclatural se ha discutido históricamente con base en macrofauna marina y rasgos litológicos asociados. En el presente trabajo se abordan aspectos de la petrología en un afloramiento fosilífero rico, con la finalidad de documentar la relación entre el patrón de la evolución arrecifal y los repetidos cambios en la composición de la malacofauna. Se levantó una sección de cinco metros que incluye once estratos con contactos transicionales y abundantes fósiles de gasterópodos y bivalvos aun no identificados a nivel específico. Se establecen las categorias: Caprinidos, Radiolitidos, Toucasia spp, Nerineidos y Turritelidos, entre otras, para agrupar los fósiles y establecer un índice por estrato que caracterice la asociación y evaluar los cambios que impone el cambio de régimen sedimentológico en el paleoarrecife. Los fragmentos fósiles se analizan bajo los criterios de fragmentación y densidad de Dunham para expresar los cambios de facies (Cambios laterales del ambiente) y con el criterio de Folk se categorizan las microestructuras calcáreas para establecer las tafofacies (variaciones menores del régimen de energía). Posteriormente se integra la información bajo el modelo de facies estándar de Wilson, que determina que la sección representa las facies 4, 5, 6 y 7 (Pendiente arrecifal, Arrecife orgánico, Borde de arenas de plataforma y Plataforma interna), como expresión de los cambios en la estructura de una barrera arrecifal antigua debidos a avances y retrocesos naturales.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

EFECTO DE LA DIETA DURANTE LOS PRIMEROS DÍAS DE DESARROLLO EN PARALARVAS DEL PULPO ROJO PATAGÓNICO, *ENTEROCTOPUS MEGALOCYATHUS*

Ana Farías [1,2], Emmanuel Martínez [2], Viviana Espinoza [1], Soledad Pino [2], Iker Uriarte [1,2]

[1]Hatchery de Invertebrados Marinos, Instituto de Acuicultura, Universidad Austral de Chile, P.O. Box 1327, Puerto Montt; afarias@spm.uach.cl

[2]CIEN Austral, Universidad Austral de Chile

El pulpo rojo patagónico, *Enteroctopus megalocyathus* (Gould 1852), es una especie nativa de las costas de Chile y Argentina, y representa el 12,3 % del total de la pesquería de pulpo en Chile. Esta especie ha estado en veda entre los años 2008 y 2011 y actualmente se puede extraer en áreas de manejo autorizadas. Los estudios realizados en el laboratorio para lograr la reproducción y producción de juveniles bajo condiciones controladas han demostrado que tiene conductas reproductivas diferentes a

la de especies bentónicas similares como *Octopus vulgaris* y *O.mimus*, y estrategias de vida diferentes durante el desarrollo embrionario y paralarvario, siendo más bien similar a *Enteroctopus doffleini*.
Hasta ahora los avances en el cultivo del pulpo rojo patagónico habían demostrado que los reproductores se pueden acondicionar entre 3 a 4 meses con manejo de la temperatura y la alimentación, obteniéndose una fecundidad absoluta de las hembras que puede variar desde 500 hasta 2500 huevos/kg, una incubación exitosa de los huevos fecundados en que el desarrollo embrionario es de 5 meses, seguido de un periodo de cultivo paralarvario de 4 meses hasta asentamiento, cuando pueden ser llamados juveniles con conducta bentónica. En este trabajo, se muestran los efectos del manejo de la temperatura de la incubación de huevos para acortar el periodo del desarrollo embrionario y el cultivo paralarvario, así como los primeros resultados en el cultivo de engorda desde juveniles producidos en criadero hasta alcanzar la talla de adulto. Se propone la estrategia de cultivo para esta especie de manera de lograr la sustentabilidad en un futuro de mediano plazo.
Agradecimientos: FONDECYT 1131094

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

MOLLUSKS OF THE NEW PROTECTED AREA OF FLORA AND FAUNA BALANDRA (APFF) IN THE GULF OF CALIFORNIA.

Esteban F. Félix Pico, Oscar Efraín Holguín Quiñones and G. Minerva Torres Alfaro
Centro Interdisciplinario de Ciencias Marinas del Instituto Politécnico Nacional.
Av. IPN s/n, Col. Playa Palo de Santa Rita, La Paz, Baja California Sur, México, 23096. efelix@ipn.mx; oholguin@ipn.mx

Balandra Bay was established as a “Protected Area of Flora and Fauna (APFF and Ramsar)” by the city of La Paz and the CONANP in the late 2013. The protected region is formed for 5 nucleus areas that including Balandra Bay, El Merito Bay, Island of Gaviota, Falsa Bay and Puerto Gato Bay. The Balandra Bay is an ecosystem considered as a region of high mollusks diversity. Currently 128 species have been identified in the area and based on sampling efforts in 1991 to 2006, and from 2012 to 2013. A total of 65 bivalves, 52 gastropods, 2 cephalopods, and 10 polyplacophora were identified. Panamic species include *Chiton virgulatus*, *Megapitaria squalida*, *Laevicardium elenense*, *Anadara multicostata*, *Pinna rugosa*, *Chione tumens*, *Argopecten ventricosus*, *Mytella guyanensis*, and gastropods *as Cerithium stercusmuscarum*, *Conus princeps*, *Elysia diomedea*, *Hexaplex nigritus*, *Littorina fasciata*, *Nerita scabricosta*, *Oliva spicata*, *Polinices uber*, *Strombus gracilior*, *Cerithidea mazatlanica*, and *Octopus bimaculoides*. *Lucina prolongata* and *Chione californiensis* were most abundant into substrate of sand, *Saccostrea palmula* on rocky shores, *Anadara tuberculosa* into mud, and *Stenoplax mariposa* under rocks. This list aims to compile a series of studies with information that will be useful for proper plan of management in the Protected Area of Flora and Fauna Balandra.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

ESTUDIO PRELIMINAR DE LA DIVERSIDAD DE LOS PTERÓPODOS (MOLLUSCA-EUTHECOSOMATA) DEL CAÑÓN DE CAMPECHE, GOLFO DE MÉXICO, DE ENERO-FEBRERO DEL 2013

María Ana Fernández-Álamo [1] y María Guadalupe García-Sánchez [2]
Laboratorio de Invertebrados, Facultad de Ciencias, Av. Universidad No. 3000, Universidad Nacional Autónoma de México, Coyoacán, D.F., CP. 04510, México; mafa@ciencias.unam.mx, psiloc12@yahoo.com.mx

Los Pterópodos son moluscos holoplánctonicos de distribución amplia, con mayor diversidad en las latitudes tropicales y subtropicales de los grandes océanos. En algunas zonas llegan a constituir una parte significativa de la dieta de algunos peces, varios de ellos con valor comercial. También se les considera como indicadores de masas de agua y contaminantes.
Tomando en cuenta que los Pterópodos son organismos de amplia distribución, el listado de especies incluirá aquellas descritas para la provincia tropical, así como posiblemente algunas de las aguas templadas o frías en aquellas estaciones recolectadas en la región mesopelágica del Cañón de Campeche.
El objetivo de este trabajo es determinar la composición específica, la distribución y la abundancia de los organismos separados.
Se presenta un listado taxonómico preliminar de la comunidad registrada en el periodo de estudio ya que a pesar de la importancia que tienen los Pterópodos en la comunidad pelágica, el conocimiento de dichos organismos es escaso por lo que es relevante generar más información acerca de éstos.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

MOLUSCOS DEL LITORAL ROCOSO DEL ESTADO SUCRE, VENEZUELA

Johanna Fernández [1], Mayré Jiménez Prieto [2], Siolíz Villafranca [3] Thays Allen [2] y Samuel Narciso [4]
[1] Museo del Mar, Universidad de Oriente, Cumaná, Venezuela; johnannafer@hotmail.com
[2] Instituto Oceanográfico de Venezuela, Dpto. Biología Marina, Núcleo de Sucre, Universidad de Oriente, Cumaná, Venezuela; mayrej@gmail.com; thayscor@yahoo.com
[3]Escuela de Ciencias y Humanidades, Núcleo de Sucre, Universidad de Oriente, Cumaná; svillafranca@yahoo.com
[4]FUDENA; Samuelnarciso@gmail.com

Las costas rocosas del estado Sucre se caracterizan por la incidencia de constantes vientos procedentes del nororiente del país, que permiten un fuerte oleaje. Estos factores, además del nivel mareal y el tipo de sustrato, van a permitir la existencia de los organismos adaptados a éstos ambientes. La presente investigación tiene como objetivo realizar un inventario de los moluscos asociados al litoral rocoso, del estado Sucre, Venezuela. El material de estudio fue colectado en salidas de campo en distintos períodos (2003 a 2009), de forma manual, con una espátula y como instrumento de muestreo se utilizó una cuadrata metálica de 0,25m^2. Se obtuvieron un número aproximado de 125 especies de moluscos, contenidas en 40 familias, pertenecientes a tres clases: Gastropoda con 22 familias y 84 especies, de las cuales *Tegula fasciata*, *Nerita fulgurans*, *Littorina interrupta*, *Planaxis nucleus y Acmaea leucopleura* fueron las especies de mayor abundancia. La clase Bivalvia con 15 familias y 34 especies, de las cuales los mitílidos fueron los más representativos formando grandes bancos naturales. La clase Polyplacophora estuvo conformada por tres familias y siete especies. Las especies reportadas para esta zona oriental del

país coinciden con las señaladas en otras investigaciones, en costas rocosas de otros países del Caribe y Venezuela, indicando que la presencia, adaptabilidad y plasticidad de las mismas en estos ambientes extremos, donde el sustrato, el fuerte oleaje, la temperatura y la desecación son los principales factores que condicionan este "laboratorio natural".

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

UNDER THREAT-THE MOLLUSCAN FAUNA OF BARBADOS

Angela Fields [1] and David Robinson [2]

[1]Department of Biological & Chemical Sciences, TheUniversity of the West Indies, Cave Hill Campus, P. O. Box 64, Bridgetown, Barbados; angela.fields@cavehill.uwi.edu.

[2]USDA National Malacology Laboratory, Academy of Natural Sciences, Philadelphia, USA; David.G.Robinson@aphis.usda.gov

The island of Barbados is located in the Atlantic Ocean, 150 km east of the Lesser Antillean Archipelago, at 13°10' N, 59°35' W. It is a limestone island of low relief with a land area of 430 square kilometers and a maximum elevation of 330 metres. The island was settled by the English in 1627 and suffered severe loss of original vegetation to facilitate the cultivation of sugar cane. It is densely populated with an estimated population size of 290,000. Between 1862 and the present, 39 species of terrestrial molluscs have been confirmed from the island, 33 of which are snails and six are veronicellid slugs. The endemic snail, *Pseudopineria barbadensis* was rediscovered in 2003 but its continued existence is precarious as its preferred habitat is very fragmented. Current threats to the molluscan fauna include continued habitat loss due to urbanization and mortality resulting from efforts to eradicate the giant African snail. A potential threat is the presence of a parasitic mite, *Riccardoella* sp. that is found on molluscs in several locations on the island.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

ECOLOGÍA Y ARQUEOLOGÍA EN BAJAMAR, BAJA CALIFORNIA: NUEVOS ENFOQUES PARA EL ESTUDIO DE LOS MOLUSCOS DEL INTERMAREAL

Carlos Figueroa-Beltrán [1], Krystal M. Gutiérrez-Ortíz [1], Arturo Ramírez-Valdéz [1] y Enah M. Fonseca-Ibarra [2]

[1]Facultad de Ciencias Marinas, Universidad Autónoma de Baja California, Km. 103 Carretera Tijuana-Ensenada, C.P. 22860, Ensenada, B.C. México; carlosfigueroa@uabc.edu.mx; krystal83@uabc.edu.mx; arturorv@uabc.edu.mx,

[2]Instituto Nacional de Antropología e Historia, Av. Ryerson 99 Zona Centro C.P. 22800, Ensenada, Baja California; montsenah@yahoo.com.mx

Los estudios arqueológicos en el Pacífico Noroccidental recientemente se han apoyado en los aportes de otras disciplinas, como la ecología, que han permitido tener una visión más profunda e integral de los recursos costeros a través del tiempo. Bajamar, localidad que fue habitada desde el Holoceno medio es ahora una zona de acceso restringido a la costa por la existencia de un desarrollo turístico. Para establecer cambios alocrónicos en la composición y estructura de las comunidades intermareales y

reconocer patrones de explotación de grupos humanos prehistóricos se evaluaron dos campamentos concheros y la zona intermareal adyacente actual.

Bajo un enfoque interdisciplinario, se realizó un estudio malacológico de dos muestras “testigo” de material arqueológico excavado “in situ” de dos campamentos concheros. Las muestras se cirnieron en doble malla de 1 y 3 mm, posteriormente se obtuvieron datos de diversidad y abundancia de los moluscos encontrados. Para evaluar las condiciones actuales del intermareal rocoso, adyacente a los campamentos concheros, se trazaron tres transectos perpendiculares a la línea de costa y se registró la riqueza y la abundancia de especies en cuadrantes de 1 m². El análisis de los concheros mostró la presencia de 22 especies, siendo *Mytilus californianus*, *Norrisia norrisi*, *Tegula funebralis* y *Lapas* las más representativas. La comunidad intermareal actual presenta 16 especies, *Chthamalus fissus, Littorinas*, *Mytilus californianus y Lapas* fueron las más abundantes. Aunque no todas las especies pudieron haber sido aprovechadas directamente por los grupos humanos en la prehistoria, se encuentra en análisis la relación que algunas especies pudieron haber tenido con las prácticas de explotación de los recursos costero-marinos.

El análisis indica que la disponibilidad de recursos del ambiente rocoso presenta un patrón similar en las dos temporalidades y que los grupos cazadores-recolectores-pescadores recolectaron moluscos bajo un patrón de explotación oportunista en lugar de uno selectivo.

ECOLOGY AND ARCHAEOLOGY IN BAJAMAR, BAJA CALIFORNIA: NEW APPROACHES TO THE STUDY OF INTERTIDAL MOLLUSCS

Recently, archaeological studies in the Northwestern Pacific have been nourished by the contributions of other disciplines such as ecology that have allowed a more profound and comprehensive view of coastal and marine resources through time. Bajamar is a coastal locality which has been inhabited since the middle Holocene, and currently represents an area restricted to local fishermen by the existence of a touristic resort. To recognize alocronic changes in the composition and structure of intertidal communities, and in the patterns of exploitation by human groups in prehistory, we assessed two shell middens and the actual adjacent intertidal zone.

Under an interdisciplinary approach, we conducted a study of 2 malacological "witness" samples of "in situ" excavated archaeological material from 2 shell midden camps. We proceeded to sift it in a 1 X 3 mm screen and subsequently data on diversity and abundance were obtained.

Meanwhile, a field study in the adjacent intertidal zone was performed. Three transects were laid from the beach to the waterfront and the richness and abundance of species in 1X1 mts² quadrats were recorded .

The analysis of the composition of the communities in the middens showed the presence of 22 species, where *Mytilus californianus*, *Norrisia norrisi*, *Tegula funebralis* and *Barnacles* are the most representative. While the current intertidal community was represented by 16 species, where *Chthamalus fissus*, *Littorinas*, *Mytilus californianus* and *Limpets* are the most abundant. Although not all species may have been directly exploited by human groups in prehistory, analysis on the relationship that some species may have had with the practices of exploitation is on its way.

The analysis of both communities indicates that availability of resources on rocky environment shows a similar pattern in the two temporalities and that hunter-gatherer-fishermen groups collected molluscs under a pattern of opportunistic exploitation rather than selective one.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

DIVERSIDAD DE MICROMOLUSCOS EN LAS PLAYAS DE LA REGIÓN DE CHAMELA, JALISCO, MÉXICO

Cynthia Dinorah Flores Aguirre [1] y Brian Urbano [2]
[1]Instituto de Biología, UNAM, Universidad Nacional Autónoma de México. C.P. 04510, México, Distrito Federal; dcynthia.fa@gmail.com.
[2]Facultad de Ciencias, UNAM. Av. Universidad 3000, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510 Ciudad Universitaria, D.F., México; maclen55@yahoo.com

México es un país con una gran diversidad donde aún se desconoce buena parte de su fauna marina, siendo la malacofauna uno de los vacíos más grandes que hay, sobre todo la de los micromoluscos. Se consideran a los micromoluscos a aquellos individuos cuya talla es menor de 10 mm y puede o no considerar a las formas juveniles de especies macroscópicas. Este trabajo se realizó en la región de Chamela Jalisco, México, en las playas de Xametla, Perula e Isla Cocinas en el mes de febrero del 2014, donde los individuos fueron colectados al tomar sedimento arenoso (500gr.). La muestra se tamizó y separó, fotografió e identificó hasta el menor nivel taxonómico posible. En la localidad de Xametla la abundancia de organismos fue la más baja mientras que en la playa de Perula se han podido encontrar una mayor abundancia de bivalvos que de gasterópodos, inversamente a la diversidad de la playa de Isla Cocinas. La información obtenida será procesada a modo de catálogo para entusiastas de la malacología y para apoyo a trabajos posteriores.

MICROMOLLUSCS DIVERSITY ON THE BEACHES OF REGIONAL CHAMELA, JALISCO, MÉXICO.

A few mollusk expeditions were carried out during the twentieth century along the Tropical Eastern Pacific. Despite these efforts, no checklists of mollusks based mainly on collected material from the continental slope of the Guanacaste Province, Pacific coast of Coast Rica, have been published. In this research, we partially studied the material collected during the expedition R/V Urracá-STRI, conducted in July 2005, along the Pacific coast of Costa Rica, from the Gulf of Santa Elena in the northern to the Gulf of Nicoya in the Central Pacific. The total sampling effort consisted of 55 trawls at depths ranging from 18 to 122 m. Of the collections, 20 have been sorted, catalogued, and identified. Here we report a total of 47 species of mollusks, with 40 gastropods and 7 bivalves belonging to 20 and 4 families, respectively.

GENERAL-PONENCIA

EL EFECTO DE LOS GASTERÓPODOS EN LA AGREGACIÓN DE LOS CANGREJOS ERMITAÑOS PARA LA OBTENCIÓN DE CONCHAS

Cynthia Dinorah Flores Aguirre, Karla Kruesi Cortés, Guillermina Alcaraz Zubeldia
Laboratorio de Ecofisiología, Dpto. de Ecología y Recursos Naturales, Facultad de Ciencias, Universidad Nacional Autónoma De México. C.P. 04510, México, Distrito Federal. dcynthia.fa@gmail.com

Las conchas de gasterópodos son un recurso vital para los cangrejos ermitaños. En el litoral rocoso de Troncones (Guerrero) la disponibilidad de conchas es poca, por lo cual es importante conocer cuáles son los efectos que tienen los gasterópodos como estímulo para la obtención de conchas en los cangrejos ermitaños. En este trabajo se realizaron experimentos para determinar si los cangrejos ermitaños tienden a agruparse en sitios donde los gasterópodos han sido depredados, busca agrupaciones de

gasterópodos vivos ó se agrega con sus conespecificos para tener acceso a conchas nuevas, así como estimar si la agregación se estimula ante el requerimiento de una concha adecuada.
Los resultados muestran una mayor respuesta de los cangrejos ermitaños en sitios donde había gasterópodos muertos y sugieren que la adquisición de una concha nueva esta mediada por la taza de mortalidad de los gasterópodos, representados por los sitios de depredación artificiales, los cuales son pocos en esta localidad, por lo cual hay gran asistencia de cangrejos ermitaños en conchas ajustadas o dañadas dado a la necesidad de recambiar su concha.

GASTROPODS EFFECT IN THE AGGREGATION OF HERMIT CRAB FOR THE PROCUREMENT OF SHELL

The shells of gastropods are a vital resource for hermit crabs. On the rocky coast of Troncones (Guerrero) shell availability is limited, so it is important to ascertain the effects of gastropods as a stimulus to obtain shells on hermit crabs. In this work, experiments were conducted to determine whether hermit crabs tend to cluster in places where gastropods have been predated, looking groupings of live gastropods or aggregated with conspecifics to access new shells, and to estimate if aggregation is stimulated to the requirement of an adequate shell.
The results show a greater response of hermit crabs in places where there were dead gastropods and suggest that the acquisition of a new shell is mediated mortality rate of gastropods, represented by the sites of artificial predation, which are few in this locality, so there is great assistance of hermit crabs in tight or damaged shells given to the need to replace shell.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

POPULATION STRUCTURE OF OCTOPUS (*OCTOPUS MIMUS*) IN THE REMACOPSE MARINE RESERVE, ECUADOR

Luis Flores [1], Elba Mora [1], Evelyn Arias [1], Unai Markaida [2,3]
[1]Instituto Nacional de la Pesca, Letamendi y La Ría, Guayaquil, Ecuador; lflores@inp.gob.ecu
[2]Laboratorio de Pesquerías Artesanales, El Colegio de la Frontera Sur, 24500 Lerma, Campeche, Mexico; umarkaida@ecosur.mx
[3]Secretaría Nacional de Educación Superior, Ciencia y Tecnología e Innovación, Quito, Ecuador

The marine reserve of Puntilla de Santa Elena, Ecuador, holds a small scale artisanal fishery for *Octopus mimus*, a resource with no current management in Ecuador. Catches from landing places were daily surveyed, sampling a total of 4,189 octopus from July to December 2013. Overall sex ratio did not differ from the theoretical 1:1 at any month. *Octopus mimus* of both sexes mature at a broad range of size, from 100 g to over 2,500 g. Anyway, females mature at a larger size than males, and were mostly immature during the season, while males were mostly mature. Monthly evolution of size and maturity structure by sex did not show a clear trend in the population dynamic of this octopus.

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

FIRST REPORT OF THE PRESENCE OF EXOTIC SPECIES *CORBICULA FLUMINEA* (MÜLLER, 1774) (MOLLUSCA: BIVALVIA), IN THE STATE OF GUERRERO.

Rafael Flores-Garza, Paul Arellano Díaz, Pedro Flores-Rodríguez and Jovanny Merino Hernández
Universidad Autónoma de Guerrero Unidad Académica de Ecología Marina. Gran Vía Tropical No. 20, Frac. Las Playas, Acapulco, Guerrero. C.P.39390. Tel y Fax (01744) 4 83 27 80; rfloresgarza@yahoo.com; arellanodiazpaul010@gmail.com; pfloresrodriguez@yahoo.com.

The Asian clam *Corbicula fluminea*, is one of the most common invasive species in freshwater aquatic ecosystems, this due to its rapid growth, early sexual maturity, short life, high fecundity and its relation to human activities. Currently it lives in America and Europe. The aim of this study was to report the presence of *C. fluminea* in the State of Guerrero and provide the first data on the composition of density, size and weight and the type of growth based on length-weight relationship of the population that makes up this bivalve. The first observation was obtained in the river Coyuca de Benitez at coordinates 16°57'21.63"N and 100°6'43.13"W. Sampling was performed in the lower river from the area covering the mouth of the sea (bar) following the channel up to 2.5 km inland. The sampling was carried out for three manifolds clam four banks on the basis of the collecting time. 1003 organisms were collected *C. fluminea*, Guerrero For the species is considered as a first record for México is expanding its range of invasion. The densities ranged from 13.3 to 30.3 per minute organisms / collector. The population had lengths of 8.26 to 21.58 mm long. The weight-length relationship reflects a type of isometric growth.

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

GASTROPODS WITH ECONOMIC POTENTIAL ASSOCIATED WITH THE ROCKY INTERTIDAL ZONE OF THE MARINE REGION PRIORITY NO. 32, MEXICO

Rafael Flores-Garza [1], Carmina Torreblanca-Ramírez [2], Pedro Flores-Rodríguez [1], Sergio García-Ibáñez [1], Jesús E. Michel-Morfín [3] y José L. Rosas-Acevedo [2]
[1]Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero, Av. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco Guerrero, C.P. 39390, México; rfloresgarza@yahoo.com
[2]Unidad de Ciencias de Desarrollo Regional, Universidad Autónoma de Guerrero, Calle Pino s/n Colonia El Roble, Acapulco, Guerrero, C.P. 39640 México; carminatorreblanca@yahoo.com.mx
[3]Universidad de Guadalajara, Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Av. Gómez Farías No. 82, San Patricio-Melaque Jalisco, C.P. 48980, México; michel@costera.melaque.udg.mx

There are numerous species of gastropods of commercial importance; they are used for meat and for their shell, in addition to the potential use of their toxins for pharmaceutical use. There are few studies focused on the analysis of the importance and/or the economic potential of these organisms in the State of Guerrero. This research was conducted at seven sites, which, according to the regionalization of the National Commission for the use and knowledge of biodiversity, belong to the Marine Region Priority 32, with the aim of determining species of economic potential, the current management and the possible commercial use, as well as consider the size of populations and their geographical distribution. Species of economic potential were determined as a basis the abundance of their populations and the frequency of occurrence in the sampling sites. Forty species of economic potential were found, of which 14 are already utilizing commercially, one has biomedical potential, and for 25 of them, no record was found

indicating any commercial utilization. The species of the greatest size was *Macrocypraea cervinetta*. Sixty-five percent of the species with economic potential have a wide distribution. This indicates that the region is highly diverse and with potential for commercial use of a large number of species. To carry out good fishery management of the species with economic potential, fishery-biology and ecological studies are required that allow for the development of measures and strategies for carrying out sound and sustainable use of these resources.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-PONENCIA/ORAL PRESENTATION

GASTERÓPODOS ASOCIADOS A LA ZONA SUBMAREAL ROCOSA DE PLAYA PALMITAS, ISLA LA ROQUETA, ACAPULCO, MEXICO

Marco A. Flores-Leyva [1], Rafael Flores-Garza [1], Pedro Flores-Rodriguez [1] y Carmina Torreblanca-Ramirez [2]

Laboratorio de Ecología Costera y Sustentabilidad Unidad Académica de Ecología Marina Universidad Autónoma de Guerrero. Gran vía Tropical No. 20, Fraccionamiento las playas, Acapulco, Guerrero. C.P. 39390; tfloresleyva@hotmail.com; acua_uag@yahoo.com

[1]Unidad de Ciencias de Desarrollo Regional, Universidad Autónoma de Guerrero, Calle Pino s/n Colonia El Roble, Acapulco, Guerrero. C.P. 39640 México. carminatorreblanca@yahoo.com.mx

El municipio de Acapulco tiene un litoral de aproximadamente 500 km. La costa rocosa tiene diversos tipos de hábitats, entre los cuales se encuentra el submareal rocoso que es un sustrato solido permanentemente cubierto de agua, característica que le permite albergar una amplia variedad de organismos bentónicos, que por no estar expuestos al aire, sufren menos afectaciones por los cambios bruscos de las mareas. En esta zona existen organismos importantes para actividades económicas como los de la Clase GASTROPODA. La presente investigación se enfocó en esta Clase y los objetivos fueron: elaborar un listado de especies, conocer la composición de la comunidad a partir de la representación de las Familias con base en la riqueza de especies y abundancias, estimar la densidad, Analizar la composición de tallas y estimar índice de diversidad y equidad. Se muestreo utilizando buceo apnea, realizando recorridos a lo largo de la zona rocosa de este sitio desde la orilla que permanece siempre sumergida hasta una profundidad de máxima de cinco metros. Se analizaron 139 ejemplares, se identificaron 9 familias, 13 géneros y 15 especies, *Engina tabogaensis* registró la mayor abundancia y *Leucozonia cerata* la mayor talla. El valor de los índices estimados de Shanonn Winner H´ fue 3.09 bits/organismos y Pielou J´ 0.79. La diversidad encontrada para este sitio es baja comparada para lo que se ha reportado en el intermareal rocoso, Es necesario llevar a cabo un mayor número de muestreos.

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

MARINE MOLLUSC FISHERY OF THE COSTA CHICA, GUERRERO, MEXICO

Pedro Flores-Rodríguez [1], Rafael Flores-Garza [1], Sergio García-Ibáñez [1], Lizeth Galeana-Rebolledo [2], Arquímedes Suástegui Zárate [1]

[1]Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero. C.P. 39390; pfloresrodriguez@yahoo.com

[2]Doctorado en Ciencias Ambientales, Unidad de Ciencias de Desarrollo Regional Universidad Autónoma de Guerrero, Calle Pino s/n Colonia El Roble Acapulco, Guerrero, CP. 39640, México

The coastal fisheries of marine mollusks are complex processes involving many factors. They are of great importance for fishermen and their families, and contribute to economic and social development of the region. For the Costa Chica there is little information about its current state, so that this research aims to determine the species of mollusks and they exploit the current situation in relation to his capture. Two surveys were developed, one designed for Presidents Societies Cooperative Fish Production (SCPP) and other partners. In 2013 and 2014 we visited twice, seven cooperatives, located in the coastal towns of Copala, Marquelia and Cuajinicuilapa. We surveyed seven prescient, a secretary, two independent divers and 42 members. We found nine SCPP arrival or disembarkation sites and included 168 members, of which 91% are frequently fishing. Of the SCPP 50% of the product is sold locally and the rest in Acapulco. Currently, their catch includes 16 species of marine mollusks; eight of which are gastropods, six bivalves, one polyplacophoran, and one cephalopod. The biggest catch size in length and width was for *Strombus galeatus* and the lowest for *Hexaplex princeps*. For its economic performance capture most species is *Crassostrea prismatica* (oyster rock), followed by *Hexaplex princeps* (Chinese snail). Fishermen have said that for 15 years they have not collected the giant barnacle (*Ancistromesus mexicanus*), and the sizes of catch of some species have been declining over time chireta snail (*Chicoreus regius*), callus ax (*Pinna rugosa*), red clam (*Megapitaria aurantiaca*), paw mule (*Anadara formosa*), callus margarita (*Chama corallina*), and snail machachan (*Strombus galeatus*).

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

GROWTH PARAMETERS OF THE MARINE SNAIL *TEGULA VIRIDULA*: COMPARISON OF ESTIMATES FROM MARK AND RECAPTURE AND LENGTH FREQUENCY DATA

Vanessa Fontoura-da-Silva [1], Jéssica Beck Carneiro [2], Ricardo Silva Cardoso [3] and Carlos Henrique Soares Caetano [1]

[1]Universidade Federal do Estado do Rio de Janeiro, Av. Pasteur, 458, Laboratório de Zoologia de Invertebrados Marinhos, sala 309, Urca, Rio de Janeiro, RJ, 22290-240, Brasil; vanessa_fontoura@globo.com; chcaetano@zipmail.com.br

[2]Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier, 524, Pav. Haroldo Lisboa da Cunha, Laboratório de Malacologia Límnica e Terrestre, sala 525/2, Maracanã, Rio de Janeiro, RJ, 20550-900, Brasil; jessicabcarneiro@gmail.com

[3]Universidade Federal do Estado do Rio de Janeiro, Av. Pasteur, 458, Laboratório de Ecologia Marinha, sala 407, Urca, Rio de Janeiro, RJ, Brazil, 22290-240; rcardoso@unirio.br

This work aims to compare the growth estimates calculated by two types of data, direct (mark-recapture) and indirect (modal progression analysis based on monthly length-frequency data of a population) using as a model the population of the marine snail *Tegula viridula* from Flexeiras beach, Itacuruçá Island, RJ. During the study period (May/2010-May/2012), 3789 snails were collected and measured; among these, 765 were tagged and 362 were recaptured, some of them more than once.
The population parameters of seasonalized von Bertalanffy growth function estimated by the two methods had differences in the first year (Direct: L_∞=31.23mm, K=0.49yr^{-1}, C=0.20, Wp=November; Indirect: L_∞=30.60mm, K=0.65yr^{-1}, C=0.29, Wp=May; ARSS: $F_{3,64}$ = 20.90, p = 0.000) but were not significantly different in the second year (Direct: L_∞=27.40mm, K=0.85yr^{-1}, C=0.30, Wp=March; Indirect: L_∞=27.29mm, K=1.00yr-1, C=0.37, Wp=March; ARSS: $F_{3,48}$ = 1.98, P = 0.130). The dissimilarities between the methods in the first year seems to be related to the sample size effect, especially in respect to direct method (first year: n=142, second year: n=773). Validating this statement, the data from both years were combined and the differences between the methods were softened (Direct: L_∞=27.44mm, K=0.84yr^{-1}, C=0.30, Wp=March; Indirect: L_∞=28.84mm, K=0.83yr^{-1}, C=0.25, Wp=March; ARSS: $F_{3,123}$ = 1.46, P = 0.228).

Mark-recapture analysis are usually considered to provide well growth estimates than indirect ones and are also assumed as a method that is less dependent on sample sizes. The length-frequency estimates that were once regarded with suspicion are proving to be as reliable as marking and recapture. Here we could see how the number of recaptured individuals can affect the growth-increment analysis based on mark-recapture data, what may be an incentive to carry on new studies about this subject.

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-PONENCIA/ORAL PRESENTATION

MOLLUSKS: A TOOL IN CLIMATE CHANGE RESEARCH

Helena Fortunato
Department of Natural History Sciences, Faculty of Science, Hokkaido University, N10 W8 Kita-ku, Sapporo 060-0810, Japan; helenaf@mail.sci.hokudai.ac.jp

One of the most diverse groups, with a wide distribution, good preservation and incremental shell growth, mollusks can be used as archives for environmental information. They are also generally vulnerable to negative impacts of climate change due to the reduced or absent dispersal capability of many species, often narrow physiological and thermal habitat niches, genetic bottlenecks, etc. On the other hand these constrains allow their use as indicator species. Isotope series and shell growth patterns are the most used shell proxies because they allow the development of time-scale chronologies. Other often used proxies have to do with abundance and diversity indexes aimed to reconstruct ecosystems and their response to environmental changes.
The global decline in pH due to anthropogenic emissions of CO2 is a treat to organisms that deposit calcium carbonate exoskeletons especially during early life stages. As biomineralizing organisms of high ecological and economic value, mollusks became one of the key groups used in ocean acidification studies.
This paper examines results related to effects of raised pH on calcification and dissolution patterns as well as impact on growth rates, reproductive success, larval and adult survival, physiology and evolutionary patterns.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

DIVERSITY AND DISTRIBUTION OF MOLLUSKS ALONG THE CHUKCHI AND BEAUFORT SEA SHELF AND SLOPE

Nora Foster [1], Bodil Bluhm [2] and Katrin Iken [2]
[1]NRF Taxonomic Services, 2998 Gold Hill Road, Fairbanks, Alaska 99709 USA; swamprat@mosquitonet.com
[2]School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, 905 Koyukuk Drive, PO Box 757220, Fairbanks, Alaska 99709 USA; babluhm@alaska.edu; kbiken@alaska.edu

Surveys of the shelf fauna of the Chukchi Sea, and of the Beaufort Sea shelf and slope have resulted in new information on the diversity and biogeography of the marine benthic fauna of the Pacific Arctic. The composition of benthic fauna changes both along an east-west gradient and by depth along the Chukchi shelf and Beaufort shelf and slope. Over 300 voucher specimens representing 91 molluscan species were identified for these studies. Molluscs inhabiting the Chukchi and Beaufort sea shelves are part of a Pacific Boreal fauna. The mollusks inhabiting the Beaufort Sea slope show an increasing Atlantic influence with

increasing depth and from east to west. Apparent new range information for 11 of the 91 species, better known from the north Atlantic fauna, is noted. The fauna, particularly large gastropods, is in need of further study and revision. Several genera, including *Aartensina, Turrisipho*, *Iphinopsis*, and *Siphonodentalium*, are recorded for the first time in the Beaufort Sea.

PLICOPURPURA-CARTEL/POSTER

CURRENT POPULATION STATUS OF THE *PLICOPURPURA PANSA* IN HUATULCO NATIONAL PARK, OAXACA, MEXICO

S.M. Fuente-Cid [1], M.R. Cid-Rodríguez [2], E. Ramírez-Chávez [2], J.L. Villarruel-Ordaz [3], N. Ruíz-García [4]
[1]Universidad Autónoma Metropolita, Unidad Xochimilco. Calzada del Hueso, Colonia Villa Quietud, Coyoacán, México. C.P. 04960; lu.smfc@gmail.com
[2]Instituto de Ecología. Universidad del Mar. Campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 70902 cidr@angel.umar.mx; bmeduardo@msn.com
[3]Instituto de Genética. Universidad del Mar campus Puerto Escondido. Ciudad Universitaria, Puerto Escondido, Oaxaca, México. C.P. 71980; josipetardo@hotmail.com
[4]Instituto de Ecología. Universidad del Mar. Campus Puerto Escondido. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P. 71980; nruizg@zicatela.umar.mx

In 2012, the current population status and activities of the Mixtecs on the purple snail on the coastal region of Oaxaca were evaluated. From a methodological perspective, the paper broadly covers two widely interrelated dimensions: to evaluate the population status of the purple snail in Huatulco National Park and the relationship that the Mixtecs continue to sustain with the mollusk, in Pinotepa de Don Luis, Oax. Sampling data was collected at nine stations to determine density and size distribution. For dying and knitting activities, interviews were performed in Pinotepa de Don Luis, Oax., with three variables: what is known, what is valued and how they act regarding their relationship between the snails and dyers, weavers and artisans. The results show that the density for females and males reported a total of 834 organism, 361 females and 473 males. The maximum size of males was 5.2 Cm and the maximum size of females was 7.4 Cm. While in the sociocultural aspect 100% of respondents mentioned that they are still linked to their worldview around the snail as a symbol of fertility and death, but do not receive any economic benefit from that activity, nevertheless, this activity is continued since it is a part of their tradition. The snail *Plicopurpura pansa* and activities of dying are an example of the sustainable relationship of the mollusks and dyers, but the social use of them is not permanent, is subject to the balance of power established by the various subjects, amongst the main powers are those performing the activities and policies imposed by the Mexican state.

ESTADO ACTUAL DE LA POBLACIÓN DE *PLICOPURPURA PANSA* (GOULD, 1853) EN EL PARQUE NACIONAL HUATULCO, OAXACA, MÉXICO

Se evaluó el estado actual de la población y las actividades de los mixtecos sobre el caracol morado en la región costa de Oaxaca, en el año 2012. Desde una perspectiva metodológica, el trabajo abarca dos dimensiones ampliamente interrelacionadas: evaluar el estado poblacional del caracol púrpura en el Parque Nacional Huatulco y la relación que los mixtecos siguen teniendo con el molusco, en Pinotepa de Don Luis, Oax. Se recopilaron los datos de muestreo en nueve estaciones para determinar densidad y distribución de tallas. Para las actividades de tinción y de tejido se realizaron entrevistas en Pinotepa de Don Luis, Oax., con tres variables: qué conocen, qué valoran y cómo actúan, con respecto a su relación con el caracol a tintoreros, tejedoras y artesanos. Los resultados nos muestran que la densidad por hembras y machos reporta un total de 834 organismos, 361 hembras y 473 machos. La talla máxima de

machos fue de 5.2 Cm y de hembras fue de 7.4 Cm. Mientras que en el aspecto sociocultural el 100% de los entrevistados mencionó que aún están vinculados a su cosmovisión en torno al caracol como símbolo de fertilidad y muerte, pero no reciben de esa actividad ningún beneficio económico, lo continúan por ser parte de su tradición. El caracol *Plicopurpura pansa* y las actividades de tinción son un ejemplo de relación sustentable del molusco y los tintoreros pero, el uso social de los mismos no es algo permanente, está sometido a la correlación de fuerzas establecidas por los diversos sujetos, entre las principales están los que realizan las actividades y las políticas impuestas por el estado mexicano.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

TRANSCRIPTOMIC APPROACH OF THE HEAVY METAL RESPONSE IN THE HYDROTHERMAL MUSSEL *BATHYMODIOLUS AZORICUS:* CASE OF METALLOTHIONEINS

Gonzalo Fuenzalida [1,2], François Lallier [1,2] and Arnaud Tanguy [1,2]

[1]CNRS, UMR 7144, Adaptation et Diversité en Milieu Marin, Station Biologique de Roscoff, 29680 Roscoff, France

[2]UPMC Université Paris 06, Station Biologique de Roscoff, 29680 Roscoff, France; gfuenzalida@sb-roscoff.fr

Bathymodiolus azoricus is a bivalve belonging to the Mytilidae family that is widely distributed in hydrothermal ecosystems and that has been specifically described in Mid-Atlantic Ridge. These ecosystems are characterized by strong and stressful physicochemical conditions (toxic concentrations of heavy metals and gases). However, *B. azoricus* forms large communities around hydrothermal vents, even in nearby areas where hydrothermal flow emerges at high temperatures and loaded with toxic components wich are letal to any other species. Ecotoxological and environmental marine studies using bivalves as bioindicators of aquatic contamination (including other species of Mytilidae mussels) demonstrated the importance of metallothioneins (MTs) as a main mechanism of response to toxic heavy metals. MTs are proteins expressed in different tissues, characterized by low molecular weight, rich cysteine content that gives the capacity to bind heavy metals through the thiol group of the cysteine residues. They are mainly involved in the metal uptake and detoxication but also in metal homeostasis. They have also play a role in cellular protection in response to oxidative stress by acting as a free radical scavenger. Not all the functions of these proteins seem to have been described but the existence of different isoforms has been reported in numerous species. The information generated by high throughput sequencing allows to get a better picture of the putative adaptive processes operating in species by generating candidate genes wich expretssion can then be specifically studied in response to environment parameters modulation. This works shows a transcriptomic analysis with the identification of new possible genes involved in heavy metal detoxification in *B. azoricus*, It also describes the characterization and expression of different MTs isoforms in different tissues (gill, amntle and digestive gland) in samples from three hydrothermal vents Menez Gwen, Lucky Strike and Rainbow, characterized by an increase in depth and concentration of heavy metals.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

CLOSED CIRCULATORY SYSTEM IN *SARASINULA MARGINATA* (SEMPER, 1885) (VERONICELLIDAE): CIRCULATORY PATHWAYS AND MORPHOLOGICAL CHARACTERISTICS OF THE VESSELS

Cristiane Lafetá Furtado Mendoça [1], Omar dos Santos Carvalho [1], Ester Maria Mota [2], Henrique Leonel Lenzi [2†]

[1]Laboratory of Helminthology and Medical Malacology, Centro de Pesquisas René Rachou-Fiocruz, Av. Augusto de Lima 1715, 30190-002 Belo Horizonte, MG, Brasil; lafeta@cpqrr.fiocruz.br; Omar@cpqrr.fiocruz.br

[2]Instituto Oswaldo Cruz-Fiocruz, Av Brasil 4365, CEP 21040.900, Rio de Janeiro, RJ, Brasil; ennota@ioc.fiocruz.br

In this study, we describe the type and anatomy of the circulatory system in *Sarasinula marginata* (Semper, 1885) using intravascular Indian ink injection, histology and transmission (TEM) and scanning (SEM) (low vacuum mode) electron microscopy.

This study verifies that the *S. marginata* circulatory system is composed of a closed vascular network beginning in the aortic trunk and spreading throughout the organism by vascular ramification of the anterior and posterior aortas, which irrigate all the viscera, the fibromuscular layer and the subtegumentary plexus.

The hemolymph that circulates through the viscera and subtegumentary plexus returns via afferent vessels, crossing through the kidney to reach the cardiac atrium.

In the fibromuscular layer, sphincterian vessels form a large vessel bed with muscular intermittent radial sphincters, defining inter-sphincter chambers. Sphincterian vessels are lined by an endothelium, are connected to each other as well as to the hemocele and terminate to form the subtegumentary vascular network. The bidirectional flux between sphincterian vessels and the hemocele is controlled by pre-hemocelic sphincters.

The epithelial surface and the subtegumentary plexus provide cutaneous respiratory exchange, behaving like a superficial, flat and spread-out lung. The surface area of the subtegumentary vessels is maximized by the presence of excretory ducts that allow localization of secretory mucous glands deep in the tissue, giving the non-glandular respiratory epithelium a large surface area.

The closed circulatory system in *S. marginata* performs two essential roles: 1) oxygenation and gas exchange and 2) regulation of hydrostatic pressure inside the mollusk.

The description of such features may help define an important taxonomic characteristic for the group, given that these characteristics were also observed to *S. linguaeformis* (Semper, 1885)*, Phyllocaulis boraceiensis* Thomé, 1972, and *Belocaulus* sp.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

DIFFERENTIAL CHARACTERISTICS OF THE TEGUMENTAL EXCRETORY DUCTS IN VERONICELLIDAE AND OTHER GASTROPODA MOLLUSCS

Cristiane Lafetá Furtado Mendonça [1], Omar Dos Santos Carvalho [1], Ester Maria Mota [2], Henrique Leonel Lenzi [2†]

[1]Laboratory of Helminthological malacology medical, Centro de Pesquisas René Rachou-Fiocruz, Belo Horizonte, MG, Brasil; lafeta@cpqrr.fiocruz.br; Omar@cpqrr.fiocruz.br

[2]Laboratory of Pathology, Instituto Oswaldo Cruz-Fiocruz, Rio de Janeiro, RJ, Brasil; ennota@ioc.fiocruz.br

The tegumental gland secretions of gastropods contain substances from three types of cells (mucous cells, calciferous cells and channel cells) which are responsible for Veronicellidae mucous secretion. The present study demonstrates the peculiarity of the tegumental glandular drainage in Veronicellidae compared with five gastropods belonging to the same class. Analyses of histological sections and scanning electron microscopy in low vacuum mode showed the presence of epithelial mucous cells, and possibly channel cells, that drain their secretions through epidermal invaginations. These invaginations form excretory ducts unlike the ducts of other gastropods (*Achatina fulica*, *Biomphalaria glabrata, Pomacea* sp., *Lymnaea columella* and *Melanoides tuberculatus*) that open individually and directly to the exterior. Individual Veronicellidae glands are located at different depths in the tissue around the common excretory ducts. The subepithelial regions between the ducts are rich in blood vessels, providing exclusive cutaneous respiration through the tegument.

POLYPLACOPHORA-PONENCIA/ORAL PRESENTATION

POLYPLACOPHORA OF THE STATE GUERRERO, MÉXICO

Lizeth Galeana-Rebolledo [1], Rafael Flores-Garza [2], Adriana Reyes-Gómez [2], Pedro Flores-Rodríguez [2] and Sergio García-Ibáñez [2]

[1]Doctorado en Ciencias Ambientales, Unidad de Ciencias de Desarrollo Regional Universidad Autónoma de Guerrero, Calle Pino s/n Colonia El Roble Acapulco, Guerrero, CP. 39640, México. Correo; lizeth_galeana@yahoo.com.mx

[2]Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero. C.P. 39390.

The state of Guerrero is divided into three geographic regions, Costa Grande, Acapulco and Costa Chica, where CONABIO declares four priority regions for marine biodiversity conservation. Within the biodiversity in the coastal area of Guerrero the class Polyplacophora stands out. This research focused on this class of mollusks and aimed to: determine species richness, estimation of density, the geographical distribution, analyzing the size structure, and to determine the identification of the species. The rocky intertidal zone of 23 sites was sampled between 2009 to 2012. The sampling unit was 1 m^2, while the sampling area was 10 m^2. We analyzed 6942 specimens of Polyplacophora, and 20 species were identified. The density for the state of Guerrero was calculated to be 18.76 organisms /m^2, with the highest density region at Acapulco. *Chiton* (*Chiton*) *albolineatus* recorded the highest density. *Ischnochiton* (*Ischnochiton) muscarius* and *Chiton* (*Chiton*) *articulatus* had the widest geographical

distribution. Six species were found to be dominant, four were found consistently, one species was found infrequently, and nine occasionally. The *C. articulatus* specimens were the largest size. Species richness is reported in this investigation indicates that the rocky intertidal is a highly diverse area. The above shows that knowledge of marine faunal resources for the state of Guerrero is insufficient, a fact that was reported by CONABIO. Therefore, is very important to have the inventory of species, as well as, know the populations and communities that make up the marine fauna.

PALEONTOLOGÍA/PALEONTOLOGY-CARTEL/ORAL PRESENTATION

DIVERSIDAD DE LOS GASTERÓPODOS MARINOS PALEOZOICOS DE MÉXICO

Jorge L. Garcés-Salazar [1] y Blanca E. Buitrón S. [2]
[1]Facultad de Ciencias, Universidad Nacional Autónoma de México, Del. Coyoacán, México D. F.;
jgarcessalazar@yahoo.com.mx
[2]Instituto Geología, Universidad Nacional Autónoma de México, Del. Coyoacán México D. F.;
blancab@unam.mx

Los afloramientos que contienen rocas paleozoicas con gasterópodos de México, se encuentran en los estados de Sonora (Arivechi, Bisani, El Tule, Sierra Agua Verde, La Proveedora, Las Norias, Placeritos, Pozo Nuevo, San José de Gracia), Chihuahua (Placer de Guadalupe), situados en la región norte del país; mientras que en la zona sur están expuestas en los estados de Puebla (San Salvador Patlanoaya), Guerrero (Olinalá), Oaxaca (Nochistlán-Ixtaltepec) y Chiapas (Paso Hondo, Chicomuselo y Río Cuilco). Las series litológicas corresponden con rocas carbonatadas de ambiente marino, de agua somera y cálida. Procedentes de estas rocas han sido reportados 42 diferentes géneros de gasterópodos, entre diversos y abundantes invertebrados.

Los gasterópodos de México se clasifican en siete subfamilias, 28 familias, 15 superfamilias, tres subórdenes y seis órdenes; el Orden Euomphalina representa el 45 % de la diversidad.

Los gasterópodos como *Kinishbia*, *Omphalonema*, *Oncochilus*, *Palliseria* y *Phenerotinus*, han sido escasamente reportados en México, también se mencionan de algunas localidades del Paleozoico de Estados Unidos de Norteamérica, en Europa en Irlanda, Inglaterra y Francia, que indican la existencia de un depósito de ambiente de plataforma, en posición paleogeográfica ecuatorial y relacionado al Cratón Norteamericano. Particularmente, sobre el estado de Sonora han sido citados 37 géneros de nueve localidades, mientras que para el resto de los estados únicamente han sido informados de uno a tres géneros de gasterópodos.

Especies de los géneros *Anomphalus*, *Euomphalus*, *Euphemites*, *Glabrocingulum*, *Maclurites*, *Meepkospira*, *Murchisonia*, *Orthonychia* y *Worthenia* han sido reportados con frecuencia de Canadá, Estados Unidos de Norteamérica, Groenlandia, Inglaterra, Noruega, Polonia, Alemania, Italia, Grecia, Hungría, China, Camboya, Malasia, Tailandia y Australia reafirmando la identidad paleogeográfica con Eurasia y ambientes de plataforma continental ubicados en latitudes tropicales.

Proyectos: CONACyT No. 165826; DGAPA-PAPIIT No. 105012; Francia-ECOS No. M13-U01.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS E IMPORTANCIA ECONÓMICA

MOLUSCOS DE VENTA COMERCIAL EN PESCADERIAS DE LA CIUDAD DE MÉXICO

Eduardo E. García-Cárdenas y Mariana Hernández-Pérez
Facultad de Ciencias, Universidad Nacional Autóma de México, Av. Universidad 3000, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510 Ciudad Universitaria, D.F. México. reypuma@live.com; mar25_hp@live.com

Los moluscos suelen ser comercializados como productos alimenticios que aportan grandes beneficios a nuestra alimentación, se tiene poca información acerca de las especies más vendidas en la Ciudad de México. Se realizó un estudio etnozoologico para conocer cuáles son las diferentes especies de moluscos que se venden en dos pescaderías de la Ciudad de México: San Juan (zona centro) y La Nueva Viga (zona oriente). Se realizaron 30 encuestas en las cuales se registraron los nombres de las especies comercializadas así como sus nombres comunes. Además se elaboró una lista de precios por kilogramo de producto y la variación de la venta a lo largo del año y de igual forma se registró los estados de mayor venta comercial. Las especies de moluscos que se comercializan en ambas pescaderías representan a las clases Bivalva, Cephalopoda y Gastropoda. Se obtuvo la lista con los nombres comúnmente conocidos. La variación de los precios a lo largo del año se debe a la oferta y demanda del producto. Los productos que se pueden adquirir en estas dos pescaderías provienen del Golfo de México: Tamaulipas, Veracruz, Campeche y Yucatán en tanto que para el Pacífico son: Baja California y Sinaloa.

MOLLUSC OF COMMERCIAL SALE IN FISH MARKETS IN MÉXICO CITY

The mollusks are often marketed as food products that provide great benefits to our diet; there is a few information about the species most sold in México City. We conducted a etnozoologycal study to determine the different species of mollusks sold in two fish markets in México City: San Juan (downtown) and La Nueva Viga (East). 30 surveys were conducted in which the names of the species traded and their common names were recorded. Also a list of prices per kilogram of product variation and sale throughout the year and similarly the state's most commercially recorded sale was made. Mollusk species sold in fish markets represent Bivalve, Cephalopoda and Gastropoda classes. List was obtained with commonly known names. The price variation throughout the year is due to supply and demand for the product. Items are available in these two fishmongers come from Gulf of México: Tamaulipas, Veracruz, Campeche and Yucatán while the Pacific are: Baja California and Sinaloa.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

LIPOFUSCINOSIS AND TISSULAR DAMAGE IN CATARINA SCALLOP *ARGOPECTEN VENTRICOSUS* (SOWERBY II, 1842) (BIVALVIA: PECTINIDAE) BREEDED IN LA PAZ, B.CS. MEXICO

José Luis García-Corona [1,2], Carmen Rodríguez-Jaramillo [1], José Manuel Mazón-Suasteguí [1] and Silvia Ramírez-Luna [3]
[1]Centro de Investigaciones Biológicas del Noroeste, S.C. (CIBNOR) Km. 1 Rd. San Juan de la Costa, El Comitán, La Paz B.C.S. ZIP. 23000, Mexico; jaramillo04@cibnor.com; jmazon04@cibnor.mx
[2]Universidad Autónoma de Baja California Sur. Ciencias marinas. Departamento de Biología marina. Rd. Sur KM 5.5, ZIP. 2306019-B, La Paz B.C.S. 23080, Mexico; cheliz.biolmar@gmail.com

[3]Noroeste Sustentable A.C. Coordinación del programa de restauración de la Ensenada de La Paz. Transbordadores, La Paz B.C.S. ZIP. 23060, Mexico; srluna@gmail.com

Catarina scallop *Argopecten ventricosus* is a very important fishery resource subject to intense exploitation on both coasts of the Baja California peninsula. Increase in oxidative damage and decrease in cellular maintenance (homeostasis) is often associated with aging, but, in marine ectotherms like bivalves, both processes are also strongly influenced by somatic growth, maturation and reproduction at early stages. In this study, we used a single cohort of the short-lived catarina scallop *A. ventricosus*, to investigate the effects of environment (temperature), reproduction (post spawn) and aging on oxidative tissue damage (lipid peroxidation or lipofuscin) and cellular condition in scallops breed in their natural environment. The average surface temperature in the Ensenada of La Paz during the 5 months of sampling was 26.76±0.106 °C with maximum in September (30.61±0.23 °C) and lowest in December (20.05±0.18 °C). The trend of the total weight of the organisms was positive with an average of 1.01±0.103 g and significant differences between samples ($F_{2,116}$=65,965, p<0.0001). The morpho-physiological gonadosomatic index (3.22±0.15), digestive gland (20.13±0.81), muscle (27.95±1.0) and mantle-gills (44.88± 0.98) were significantly different (P<0.05). The animals carried out partial spawning in September, October and December. However, oxidative damage (%) in tissues like gonad (5.81±0.32), digestive gland (15.21±0.47), muscle (4.97±0.47) and mantle-gills (8±0.44) was significantly higher in September and December ($F_{2,330}$=43.288, p<0.0001) where the phagocytic activity of hemocytes played a key role in the immune response to premature aging in young scallops. Compared to longer-lived bivalves, *A. ventricosus* seems more susceptible to oxidative stress with higher levels of accumulation of lipofuscin in spawn young animals. *A. ventricosus* invests huge amounts of energy during early reproduction at the expense of cell degradation, which allows evaluate the effect of environmental stress and aging in field bred specimens for restocking.

POLYPLACOPHORA-PONENCIA/ORAL PRESENTATIONS

EFFECTS OF ENVIRONMENTAL FACTORS ON THE REPRODUCTIVE CYCLE OF *CHITON ARTICULATUS* (MOLLUSCA: POLYPLACOPHORA) ACAPULCO, MEXICO

Sergio García-Ibáñez [1], Federico A. García-Domínguez [2], Citlalith Ramírez-Álvarez [1] and Nurenskaya Vélez-Arellano [2]

[1]Laboratorio de Ecología Cuantitativa. Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero, México, C.P. 39390; sergariba@yahoo.com.mx; flakys_145@hotmail.com

[2]Centro Interdisciplinario de Ciencias Marinas. Instituto Politécnico Nacional. Avenida Instituto Politécnico Nacional s/n. Col Playa Palo de Santa Rita. La Paz, Baja California Sur, México, C. P. 23096; fdoming@ipn.mx; nurens@hotmail.com

The Polyplacophora consists of a large number of dioecious species and hermaphroditism is also present in some species. Within this class, *Chiton articulatus*, Sowerby in Broderip and Sowerby, 1832, is an endemic species in the Mexican Pacific, with economic importance locally due to the consumption of its muscular foot. This study examined the reproductive cycle of *C. articulatus* and its relationship with environmental factors. During September 2010 to September 2011 surveys were conducted at systematic sampling sites at "Las Brisas" and "Playa Jaramillo," Acapulco, Guerrero, México. Every month, a total of 28 specimens of *C. articulatus* were collected at each location. Environmental parameters as "average tide level," "Chlorophyll-α" and "sea surface temperature" were recorded. Also, we determined the "gonadosomatic index," "sex," and "maturity level." We considered the five stages of

gonadal development were: 1) undifferentiated, 2) development, 3) maturity, 4) spawning and 5) resorption). We also recorded the presence of hermaphrodites. For data analysis, we used principal component analysis. The sex ratio of the species varied according to macroscopic or microscopic observations. We observed a synchrony of the species in its different gonadal stages with environmental factors. Therefore, we observed that an increase of the average tide level corresponded an increase in gonadosomatic index of the species. Also, an increase in temperature is related to an increased number of males and hermaphrodites. Finally, an increase in the estimate of primary productivity (food for herbivorous), is related with the phases of development, maturity and spawning (stages of gonadal development).

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
REPRODUCCIÓN

OBSERVATIONS ABOUT THE REPRODUCTIVE CYCLE OF *OCTOPUS HUBBSORUM* IN ACAPULCO, MEXICO

Sergio García-Ibáñez [1], María del Carmen Alejo-Plata [3], Rafael Flores-Garza [2], Pedro Flores-Rodríguez [2] and Francis G. Olea-de la Cruz [1]

[1]Laboratorio de Ecología Cuantitativa; [2]Laboratorio de Ecología Costera y Sustentabilidad. Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco, Guerrero, México, C.P. 39390; sergariba@yahoo.com.mx; rfloresgarza@yahoo.com; pfloresrodriguez@yahoo.com; francis_olea@hotmail.com.

[3]Instituto de Ecología Universidad del Mar, Ciudad Universitaria, Puerto Ángel, Distrito de San Pedro Pochutla, Oaxaca, México C.P. 70902; plata@angel.umar.mx

The cephalopod *Octopus hubbsorum* (Berry, 1953) is commonly known as "green octopus", and is captured on the coast of the Mexican Pacific Ocean, where the fishery is considered as an important provider of income for the local population. The aim of this study was to determine the breeding seasons of the species *O. hubbsorum* and its meristic, from the acquisition of samples in Acapulco, Guerrero, México. During the years 2012, 2013 and 2014, samples were obtained and species and sex were determined; we also checked the mantle length, total length and total weight and the weight of the gonad to determine the breeding season calculating it from the gonadosomatic index. One tota of 336 specimens of the species were obtained, and we determine a sex ratio of 1: 1.15 (female: male) (X2 = 1 71, df = 1, P = 0.21.). Females had a mean dorsal mantle length, total length and total weight of 8.47 cm (SD = 1.66), 41.42 cm (SD = 7.74) and 298.60 g (SD = 152.80) respectively. Males had an average mantle length, total length and total weight of 7.76 cm (SD = 1.62), 38.26 cm (SD = 7.93) and 260.85 g (SD = 129.07) respectively. The dorsal mantle length-total weight relationship obtained an R of 0.74 with an R2 of 0.55 (F-Fisher = 404.41, P = 0.0), and in the ratio of total length-weight total, we obtained an R = 0.81 with R2 = 0.65 (F-Fisher = 622.75, P = 0.0). The gonadosomatic index for females present two peak seasons in February 2013 and August 2013. Males had three seasons with high values, were recorded in January 2013, August 2013 and January 2014.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

ECOLOGICAL INTERACTIONS BETWEEN HETEROBRANCHS (MOLLUSCA: GASTROPODA) AND MACROALGAE OF THE PACIFIC OF COSTA RICA: PRELIMINARY RESULTS

Kimberly García-Méndez [1], Yolanda E. Camacho-García [1,2,3,4] and Cindy Fernández-García [1,3]

[1] Escuela de Biología, Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica; kimberly13@gmail.com

[2] Museo de Zoología, Escuela de Biología, Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica; ycamacho_99@yahoo.com

[3] Centro de Investigación en Ciencias del Mar y Limnología (CIMAR), Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica, cindyfdez@yahoo.com

[4] Centro de Investigación en Estructuras Microscópicas (CIEMIC), Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica.

Ecological associations between heterobranch mollusks and macroalgae have been poorly studied in tropical environments. The information available in the literature is scarce for tropical species, and it focuses on topics related to chemical ecology and the study of kleptoplasty in sacoglossans sea slugs. This study describes the interactions between sea slugs and macroalgae on the Costa Rican Pacific.

The study was conducted in four regions along the Pacific of Costa Rica: North Pacific (NP), Central Pacific (CP), South Pacific (SP), and Isla del Coco (IC). Sampling was carried out between June 2011 and March 2014. The specimens were collected in intertidal and subtidal areas during the day at 36 different locations. The specimens were obtained from algae using direct and indirect methods.

A total of 524 specimens of sea slugs were collected from 15 different algal substrates. We found 18 families and 39 species of heterobranchs (including 10 undescribed). Plakobranchidae was the most abundant family, followed by Aplysiidae (63% and 23%, respectively). Our preliminary results show that the green algae *Halimeda discoidea* has the highest abundance of heterobranchs, followed by *Padina* sp., *Monostroma ecuadoreanum* and *Codium* sp. The Correspondence Analysis, considering species abundance, shows four different groups of heterobranch-algae association. We found two predominant patterns: species of heterobranchs without a preference for the algae substrates (generalist), and species of heterobranchs with a clear preference for the algae substrate (specific). There is a significant association (63%) between the species of heterobranch and the algal substrate (Cramer's V, $p<0.0001$).

Our knowledge on ecological associations between sea slugs and macroalgae in tropical environments is incomplete. Distinguishing these interactions would greatly advance our understanding of the biology, evolution and natural history of sea slugs.

CONIDAE-PONENCIA/ORAL PRESENTATION

THE FAMILY CONIDAE ASSOCIATED WITH ROCKY INTERTIDAL SUBSTRATE IN GUERRERO, MÉXICO

Yareni M. García-Moctezuma [1], Rafael Flores-Garza [1], Pedro Flores-Rodríguez [1], Jesús E. Michel-Morfin [2], Carmina Torreblanca-Ramírez [3] and Juan C. Cerros-Cornelio [1]

[1]Laboratorio de Ecología Costera y Sustentabilidad Unidad Académica de Ecología Marina Universidad Autónoma de Guerrero. Gran vía Tropical No. 20, Fraccionamiento las playas, Acapulco, Guerrero. C.P. 39390; yareni_mgm@yahoo.com.mx; acua_uag@yahoo.com

[2]Universidad de Guadalajara. Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras. Av. Gómez Farías No. 82, San Patricio, Melaque, Jalisco, México; michel1012@yahoo.com.mx

[3]Unidad de Ciencias De Desarrollo Regional. Universidad Autónoma de Guerrero. Calle Pino s/n. Colonia El Roble, Acapulco, Guerrero. C.P. 39640; carminatorreblanca@yahoo.com.mx

On the coast of the State of Guerrero, there are different types of habitats. Among these we find the rocky intertidal zone, which is characterized by great diversity of marine species, including members of the family Conidae. This family has commercial and biomedical importance due to the potential use of the toxin produced to hunt their prey, such as medication for neurological problems. This research was conducted at 24 sites that are located on the rocky coast of the State of Guerrero. The objectives were: to inventory the species of the family CONIDAE associated with the rocky intertidal zone, estimate their abundance, understand their geographical distribution and analyze the size composition. Systematic sampling was carried out during the day at low tide. At each site 10 m^2 was sampled, for which a 1 m^2 framework of a was used. One hundred forty seven organisms were examined. We identified two subfamilies, five genera and five species. The highest species richness was observed in the subfamily Puncticuliinae. The most abundant and more widely distributed species were *Harmoniconus nux* and *Gladioconus gladiator*. The species richness found by this investigation is similar to what has been reported in other studies of cone shells in the Mexican Tropical Pacific. The size structure found is similar to that reported by other research. This also represents the first record of *G. gladiator* for the State of Guerrero.

PLICOPURPURA-CARTEL/POSTER

ANATOMÍA HISTOLÓGICA DE LOS ORGANOS DEL MOLUSCO *PLICOPURPURA PANSA* (GOULD 1853) DE LA ZONA COSTERA DE OAXACA

María Guadalupe García-Sánchez [1], María del Pilar Torres García [2] y Erika S. Palacios Ávila [3]
Laboratorio de Invertebrados, Facultad de Ciencias, Av. Universidad No. 3000, Universidad Nacional Autónoma de México, Coyoacán, D.F., CP. 04510, México; psiloc12@yahoo.com.mx; pilytorres@yahoo.com.mx; erisa2313@yahoo.com

Plicopurpura pansa es un gasterópodo dioico que se localiza entre las grietas y oquedades de la zona intermareal, este caracol se caracteriza por tener una glándula hipobranquial donde produce una substancia que al ser dispersada por dicho organismo, utiliza como protección y para atrapar a sus presas que le sirven de alimento ya que es un organismo carnívoro, desde la época prehispánica esta substancia ha sido utilizada por los indígenas mixtecos para teñir madejas de algodón obteniendo diferentes tonalidades de purpura, que utilizan para el tejido de sus textiles. En los 80´ el caracol se vio afectado por la captura indiscriminada de una industria japonesa que comercializaba con su tinte llevándolo casi en su totalidad al exterminio por lo que es necesario preservarlo de ahí la importancia de conocer la estructura de sus órganos por lo que se colabora con la descripción histológica.
Se realizaron 5 colectas de 15 organismos cada una, fracturando la concha del caracol para asegurar su fijación utilizando formol al 10%. En el laboratorio se aplico la técnica histológica de inclusión en parafina, realizando cortes de 7 µm con una orientación transversal y longitudinal, utilizando las técnicas de tinción de Hematoxilina-Eosina, Mallory y Masson. Se describieron estructuras de los siguientes órganos: pene, gónada de hembra, gónada de macho, cono hepatogonadal, glándula hipobranquial, rádula, Intestino, ganglio cerebral, ojo y ctenidios. Esta información pretende contribuir al conocimiento de la organografía histológica del caracol *Plicopurpura pansa* ya que existe escasa información.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

BENTHIC MICROMOLLUSCS OF THE GUAYMAS BASIN HYDROTHERMAL VENTS AND THE SONORA MARGIN COLD SEEPS: PRELIMINARY RESULTS

Iris D. García-Tello [1] and Elva G. Escobar-Briones [2]

[1]Universidad Nacional Autónoma de México, Posgrado en Ciencias del Mar y Limnología, Ciudad Universitaria, 04510 México, D.F., Mexico; irisgarciatello@gmail.com

[2]Universidad Nacional Autónoma de México, Instituto de Ciencias del Mar y Limnología, Apartado Postal 70-305 Ciudad Universitaria, 04510 México, D.F., Mexico; escobri@cmarl.unam.mx

The Guaymas Basin in the Gulf of California is characterized by the presence of hydrothermal activity in a margin context, which has led to the presence of hydrothermal sites a few kilometers away to cold seep zones. This study contributes to knowledge on the micromollusc community of two different chemosynthetic ecosystems.

Biological material was collected with the research submersible *Nautile* (Ifremer) during the BIG (Biodiversité et Interactions à Guaymas) oceanographic cruise (RV *L'Atalante*) from 30th May to 9th July 2010. Core samples were obtained from 12 immersions. The depth varied from 1550 to 1900 m.

A total of 256 individuals were collected, from which bivalves were the most abundant with 141 individuals, followed by the gastropods with 111, and the aplacophorans with 4 individuals.

MOLUSCOS TERRESTRES/LAND MOLLUSKSS-PONENCIA/ORAL PRESENTATION

BIOGEOGRAPHY AND DIVERSITY OF HAWAIIAN HELICARIONIDAE: ORIGINS AND COLONIZATION PATTERNS IN THE HAWAIIAN ISLANDS

Deena T.A. Gary [1,2], Norine W. Yeung [1,3], John D. Slapcinsky [4], Robert H. Cowie [1,2] and Kenneth A. Hayes [3,5]

[1]Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Gilmore 408, Honolulu, Hawaii, 96822, USA; dagena@hawaii.edu; nyeung@hawaii.edu; cowie@hawaii.edu

[2]Department of Biology, University of Hawaii, 3050 Maile Way, Gilmore 408, Honolulu, Hawaii, 96822, USA

[3]National Museum of Natural History, Smithsonian Institution, 1000 Jefferson Dr. SW, Washington, DC, 20004, USA; kenneth.hayes@howard.edu

[4]Florida Museum of Natural History, 245 Dickinson Hall, Gainesville, FL, 32611, USA; slapcin@flmnh.ufl.edu

[5]Department of Biology, Howard University, 415 College St. NW, EE 332, Washington, DC, 20059, USA.

Hawaiian land snails are particularly diverse despite the archipelago's remote location in the central Pacific Ocean. Ten land snail families have colonized Hawaii diversifying into over 750 recognized species, with over 99% endemicity. Species in the family Helicarionidae sensu lato occur widely across the Pacific, with 60 described endemic Hawaiian taxa in four genera: *Kaala*, *Hiona*, *Philonesia*, and *Euconulus*. To better understand the origins of Hawaiian helicarionids and the phylogenetic relationships of extant species we surveyed over 550 sites and recorded more than 1000 live specimens from the five largest Hawaiian Islands. Analysis of partial COI sequences from 236 specimens recovered 145 haplotypes; 16S sequences were generated from 79 specimens broadly covering the COI lineages identified. A preliminary phylogeny reconstructed using these sequences recovered 50 well supported, monophyletic lineages. More than 25% of the lineages recovered were referred to known species.

Additionally, there appear to be a large number of cryptic species among the Hawaiian taxa, indicating that Hawaiian helicarionid diversity may have been historically underestimated. A systematic revision of Hawaiian Helicarionidae is needed, as neither *Hiona* nor *Philonesia* were recovered as monophyletic. Similarly, the genus *Euconulus* falls well outside the Hawaiian clade and may belong in a separate family. All except three of the Hawaiian helicarionids appear to be single island endemics with many species being single volcano or even single ridge endemics. Hawaiian helicarionids do not appear to follow the biogeographic progression rule, as the youngest and most diverse lineages occur on the island of Oahu, the second oldest in the island chain. Surveys will be continued to include additional specimens to fill phylogenetic gaps, and additional analyses will include Pacific wide sampling. These data will provide insights into the origins of the Hawaiian helicarionid ancestors and reveal patterns of diversification across the Pacific Islands.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

MICRODISTRIBUCIÓN DE DOS EPIBIONTES EN LA CONCHA DE *CRESEIS CLAVA* (GASTROPODA: CAVOLINIIDAE)

Gustavo Giles-Pérez, Laura Sanvicente-Añorve, Miguel Ángel Alatorre-Mendieta y Elia Lemus-Santana
Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Cuidad Universitaria, 04510, México D.F. tavo455@hotmail.com; sanvi@cmarl.unam.mx; energiaoceano@gmail.com; lesael01@yahoo.com.mx

Se analizó la microdistribución de dos epibiontes (Suctoria: *Ephelota* sp; Hydrozoa: *Clytia hemisphaerica*) sobre la concha de la especie holoplanctónica *Creseis clava* recolectada en la zona nerítica frente a la costa norte de Tamaulipas, México (25°15´076´´N; 96°43´724´´W). El material biológico proviene de un arrastre de zooplancton efectuado con una red tipo bongo de apertura de malla de 500 µm y a 40 m de profundidad. Se separaron 4,177 individuos del molusco holoplanctónico *Creseis clava*, de los cuales el 10.94% presentaron epibiontes. Se midió la longitud y apertura de la concha de 75 individuos con epibiontes. Se cuantificaron las abundancias de suctores e hidroides, así como las distancias iniciales y finales de su distribución a lo largo de la concha, tomando la boca como la base. Cada molusco presentó entre 1 y 7 hidrozoos, distribuidos de manera colonial, y entre 1 y 86 suctores. Los resultados indican que no hubo una relación significativa entre la longitud de la concha y la abundancia de epibiontes. Los epibiontes *Ephelota* sp y *C. hemisphaerica* se distribuyeron sobre casi toda la concha del molusco, excepto en un 18% de su longitud, desde la apertura hacia el ápice. En algunas conchas, tanto suctores como hidroides se distribuyeron de manera segregada. Así pues, parece ser que los patrones de microcirculación del agua generados por la locomoción de *C. clava,* podrían estar definiendo la micro distribución de epibiontes sobre sus conchas.

MICRODISTRIBUTION OF TWO EPIBIONTS ON THE SHELL OF *CRESEIS CLAVA* (GASTROPODA: CAVOLINIIDAE)

In this study, we analyzed the microdistribution of two epibionts (Suctoria: *Ephelota* sp; Hydrozoa: *Clytia hemisphaerica*) on the shell of the holoplanktonic species *Creseis clava* collected in the neritic zone in front of the northern coast of Tamaulipas, México (25°15´076´´N; 96°43´724´´W). The biological material comes from a zooplankton trawl made with a Bongo net of 500 µm mesh size, realized at 40 m depth. A total of 4,177 individuals of the holoplanktonic mollusk *C. clava* were separated, from which only the 10.94% had epibionts. From 75 individuals with epibionts, we measured the total length and the mouth diameter of the shell. From each shell, the abundance of suctorials and hydroids were quantified as well as the initial and final distances of their distribution, taking the mouth of the shell as the basis. Each

mollusk showed between 1 and 7 hydroids distributed in colonies, and between 1 and 86 suctorials. Results showed the lack of a significative relationship between the epibiont density and the shell length. The epibionts *Ephelota* sp and *C. hemisphaerica* occurred on almost the entire shell, avoiding the upper 18% portion of the shell, from the mouth to the tip. In some shells, suctorials and hydroids showed a segregated distribution. Thus, it seems that microcirculation patterns generated from locomotion activities of *C. clava* may define the distribution pattern of epibionts on their shells.

PALEONTOLOGÍA/PALEONTOLOGY-CARTEL/ORAL PRESENTATION

BIOEROSION AS ACTUOTAPHONOMIC FEATURE IN A RECENT SHELL ASSEMBLAGE FROM A SILICICLASTIC ENVIRONMENT

Catalina Gómez [1], Raúl Gío-Argaez [2], Brenda Martínez [3] and Blanca Buitrón [4]

[1]Facultad de Ciencias, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.; c_gomez@ciencias.unam.mx

[2]Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.

[3]Facultad de Arquitectura, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.

[4]Instituto de Geología, Universidad Nacional Autónoma de México, Ciudad Universitaria S/N, 04510, México, D.F.

Bioerosion is defined as erosion of substrate by means of biological procedures, it has been used to identify the process, by which organisms penetrate hard substrates.

In a recent time-averaging assemblages bioerosional rates on mollusks were studied, located in a marine siliciclastic environment, from two beaches at Barra de Cazones in the Gulf of México. Biological activity was described in terms of ichnotaxa represented and classified ethologically agree with the classification proposed by Seilacher (1964).

A sample of 2279 shells of gastropods and bivalves, from the supratidal zone was studied. 167 specimens showed evidence of bioerosion. Ichnotaxa identified correspond to the ichnogenera *Entobia* (Domichnia), *Oichnus* (Praedichnia) and *Meandropolydora* (Domichnia).

Drilling by clionid sponges (*Entobia*) is very common in tropical environments, shells highly affected by sponges can reflect than they are older than other specimens or that can be under several cycles of burial and exhumation. *Oichnus* borings are signal of predation and indicate the presence of carnivorous gastropods (families Muricidae and Naticidae). Meandropolydora is product of serpulid polychaetes.

Considering the fossil record, mollusks constitute one of the most ubiquitous groups in marine deposits due to a high preservation potential of their shells. In intertidal and shallow sublittoral environments, boring marine organisms are the primary agent of shell destruction; bioerosion is a factor that contributes to the decrease in the resistance of the shells; specimens highly bored have fewer possibilities to be part of the fossil record.

Intensity of bioerosion is related to the residence of the shell in the water-sediment interface and their importance increases with productivity and decreases with higher sedimentation rates.

Acknowledgment

First author thanks the DGAPA-UNAM postdoctoral fellowship in the ICMyL during the period from September 2011 to August 2013

PALEONTOLOGÍA/PALEONTOLOGY-CARTEL/ORAL PRESENTATION

EVIDENCE OF DUROPHAGY IN THE HOLOCENE GASTROPOD *BUCCINANOPS DEFORMIS* (KING, 1831) AT BAHÍA BLANCA, ARGENTINA

Catalina Gómez [1], Ester A. Farinati [2] and Salvador Aliotta [2,3]
[1]Facultad de Ciencias, Circuito exterior S/N, Ciudad Universitaria, 04510 México D.F.; c_gomez@ciencias.unam.mx
[2]Universidad Nacional del Sur, San Juan 670, Bahía Blanca 8000, Argentina; farinati@uns.edu.ar
[3]Instituto Argentino de Oceanografía-CONICET, Camino La Carrindanga Km 7, Bahía Blanca 8000, Argentina; gmaliott@criba.edu.ar

The genus *Buccinanops* (d'Orbigny, 1841) (Caenogastropoda, Nassarriidae) is endemic to the SW Atlantic Ocean, from Rio de Janeiro, Brazil to San Matías Gulf, Argentina. This genus has a geological record extending from the Upper Miocene to the present day.
Samples come from the Holocene sand shell ridges at the inner part of the Bahia Blanca estuary, Buenos Aires Province, Argentina.
The aim of this study is to identify evidence of durophagous predation on the holocene gastropod *Buccinanops deformis* (King, 1831) and evaluate quantitatively frequency of predation, scars repaired and the prey effectiveness.
The predatory-prey interactions are difficult to study in the fossil record because most predators leave no trace or destroy the hard parts of their prey. The fossil record of predation in gastropod has focus most of the times in the drilling predation and less attention has been paid to the shell breakage induced by durophagy.
The presence of lethal (breakage) and sublethal predation (repaired scars) were examined for each shell under a dissecting stereo-microscope.
The shells of *B. deformis* studied exhibit predatory damage including signal of lethal and sublethal attacks. Some of the *Buccinanops* shell breakage, lethal and repaired scars show injuries of the kind of large embayed fracture of the body whorl; this kind of damage has been observed as product of predation by crabs.
A low repair scar frequency (6%) and low prey effectiveness (37%) in *B. deformis* at the Holocene sand shell ridges in Bahía Blanca can be interpreted as the result of low but effective predatory activity.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

ESTUDIO DE TRES BIOMARCADORES DE LA POBLACIÓN DE *PTERIA STERNA* (GOULD, 1851) EN CONDICIONES DE CULTIVO EN LA BAHÍA DE LA PAZ, BAJA CALIFORNIA SUR, MÉXICO, PARA DETERMINAR SU ESTADO DE SALUD

Carlos E. Gómez-Hernández [1], Carlos J. Cáceres-Martínez [2] y Alma Sobrino-Figueroa [3]
[1]Becario CONACyT (Ciencias Marinas y Costeras con orientación en Acuacultura- UABCS); azque_87@msn.com
[2]Universidad Autónoma de Baja California Sur, Km 5.5 Carretera al Sur, Col. El Mezquitito, 23080, La Paz, B.C.S. Mexico; ccaceres@uabcs.mx
[3]Laboratorio de Ecotoxicología. UAM-Iztapalapa. Av. San Rafael Atlixco # 186 Col. Vicentina. C. P. 09340 Mexico D.F.; coco@xanum.uam.mx

Se estudiaron tres biomarcadores en *Pteria sterna*, cultivada en dos localidades en Bahía de La Paz, para determinar el efecto de xenobióticos de actividades antrópicas de la Ciudad de La Paz, después de la temporada de lluvias. Se determinó la frecuencia de micronúcleos (MN)-aberraciones nucleares y el grado de lipoperoxidación-(tejido branquial), la actividad de la enzima acetilcolinesterasa (AchE)-(tejido del pie). Los organismos, se cultivaron de Octubre-2011 a Diciembre-2012 en "Marina" (influencia antrópica directa) y en "Pichilingue" (localidad de cultivo comercial; área prístina). Mensualmente fue registrado crecimiento y supervivencia. Mediciones de los biomarcadores fueron realizados en tres periodos: Diciembre-2011, Julio-2012 y Diciembre-2012 sobre 7-15 individuos. La mayor actividad de AchE se registró en organismos que se colectaron en Pichilingue en Diciembre-2012 (12.41±2.68 ηM ACTC·mín^{-1}·mg proteína^{-1}) siendo diferente al resto de las mediciones de la actividad enzimática registrada, las cuales se ubicaron entre 5-7 ηM ACTC·mín^{-1}·mg proteína^{-1}; el grado de lipoperoxidación inicialmente fue mayor en los organismos de Pichilingue de Diciembre-2011 (24.84±5.84 ηM MDA·g tejido^{-1}) en comparación con los organismos de la Marina de esa fecha (14.36±3.61 ηM MDA·g tejido^{-1}), en Julio-2012 no se presentaron diferencias y finalmente para Diciembre-2012 la mayor concentración de MDA se encontró en los organismos de la Marina (25.66±4.61 ηM MDA·g tejido^{-1}) en comparación con los moluscos de Pichilingue de esa misma fecha (16.73±0.77 ηM MDA·g tejido^{-1}); la frecuencia de aberraciones nucleares mostró en la Marina mayor frecuencia en Diciembre-2011 (0.11±0.023), el resto de las frecuencias se encontraron entre 0.070 a 0.086. Los tres biomarcadores fueron una herramienta útil para detectar la influencia de xenobióticos en los juveniles de *Pteria sterna*, el grado de lipoperoxidación fue sensible a una "situación de estrés" que se presentó en la Marina durante los arrastres Pluviales.

STUDIES ON THREE BIOMARKERS OF *PTERIA STERNA* (GOULD, 1851) POPULATION UNDER CULTURE IN LA PAZ BAY, BAJA CALIFORNIA SUR MÉXICO, TO DETERMINE THEIR HEALTH STAGE

Three biomarkers were studied in *Pteria sterna* cultivated at two locations in La Paz Bay, to determine the effect of Xenobiotics as result of the anthropic activities from the City of La Paz, after rain season. We determined the frequency of micronuclei (MN), nuclear aberrations and lipoperoxidación degree (gill tissues), the activity of the enzyme Acetylcholinesterase (AchE) (foot tissue). The organisms were kept in culture from October-2011 to December-2012 in "Marina" (direct anthropogenic influence) and other in "Pichilingue" (commercial farm location; pristine area). Growth and survival was registered monthly. Biomarkers measurements were carried out in three different periods: July-2012, December-2011 and December-2012 using 7-15 organisms. The highest activity of AchE was registered in animals from Pichilingue in December 2012 (12.41 ± 2.68 ηM actc·min^{-1}·mg^{-1}protein) being different to the rest of the enzymatic activity obtained measurements, which were between 5 to 7 ηM actc·min^{-1}·mg^{-1}protein; lipoperoxidación degree was initially higher in organisms of Pichilingue December 2011 (24.84 ± 5.84 ηM MDA·)g tissue^{-1}) compared with organisms from Marina of the same date (14.36 ± 3.61 ηM MDA·g tissue^{-1}), in July 2012 there were no differences and finally for December 2012 the largest concentration of MDA was found in organisms from Marina (25.66 ± 4.61 ηM MDA·g tissue^{-1}) compared with mollusk of the same date from Pichilingue (16.73 ± 0.77 ηM MDA·g) tissue^{-1}); the frequency of nuclear aberrations showed in the Marina the largest values for December (0.11 ± 0.023), the rest of frequencies values were found between 0.070 to 0.086. The three biomarkers were a useful tool to detect the influence of Xenobiotics in juveniles of *Pteria sterna*, the degree of lipoperoxidación was sensitive to a "stressful situation" which was presented at the Marina after the rain runoff.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

SIZE COMPOSITION, EQUALITY AND MATURITY DART SQUID *LOLLIGUNCULA (LOLIOLOPSIS) DIOMEDEAE* (CEPHALOPODA: LOLIGINIDAE) IN THE GULF OF TEHUANTEPEC, MEXICO

José Pablo Gómez-Porras, Oscar Illescas-Espinoza, Jaime Castellanos-Cruz and Emilio Pérez-Pacheco

Programa de Biología Marina, Universidad del Mar, campus Puerto Ángel, Ciudad Universitaria, Puerto Ángel, Oaxaca 70902, México; jpablogporras@gmail.com; perez.emilio50@hotmail.com; s.kar90@hotmail.com; gatitomito@hotmail.com

During shrimping season (1999-2001, 2006) fishing, four trips were made aboard the B/M UMAR in the Gulf of Tehuantepec. *L. diomedeae* is a recurring species in the bycatch of shrimp with a weight percentage of 2-4 %. 8 % of positive hauls dart total squid were obtained. The size structure and weights were analyzed by gender, grouping the ML at intervals of 5 mm and PT at intervals of 1 g. Maturity was determined by the presence of mature oocytes in females and spermatophores in males; gonadosomatic index and size at sexual maturity (L_{50}) was estimated.
1065 females (35-97 mm mantle length, ML; 2-30.9g) were recorded; 135 males (20.7 to 65mm ML, 0.4 to 12g). The weight-length relationship was type potential, with a negative allometric growth. Differences were observed in sex ratio with size, ML<60mm the sex ratio was 3:1 male: female ($p<0.05$); females were significantly more numerous than males to ML greater than 60 mm. Of the total 83 % of females were found ripe; 20 % of males and 60 % showed mature developing. The estimated ML sexual maturity (L_{50}) for females was 74.5 mm and 42.7 mm for males. The results indicate that the reproduction of dart squid is in the Gulf of Tehuantepec during the shrimping season. This species is a potential fishery resource, which can be complementary to shrimping.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

PRELIMINAR MORPHOMETRIC STUDY OF *OCTOPUS HUBBSORUM* (MOLLUSCA: CEPHALOPODA) FROM THE COAST OF OAXACA, MEXICO

Rebeca Gómez-Silva, Carlos Iván García Guadarrama and Isaías Hazarmabeth Salgado-Ugarte

Laboratorio de Biometría y Biología Pesquera, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq. Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F.; rbk1303@hotmail.com; isalgado@unam.mx

Octopus hubssorum is a common cephalopod of the Mexican Pacific that has reached considerable production figures due to its high demand and commercial value with the resulting increment of its exploitation rate without an adequate level of biological knowledge. Therefore it is necessary to carry on studies to establish its current status and to propose management strategies in the region. As a part of an age and growth research in this report we present preliminary results on some morphometric relationships for *O. hubssorum* obtained from the commercial catch at the landing shore of Huatulco, Oax. from November 2011 to December 2012. The specimens were measured (total body, total and dorsal mantle lengths) and weighted (total and eviscerated weights). The beaks were separated and measured (crest, hood and rostral lengths) for posterior analysis. Preliminarily we can state that morphometric relationships among weight and length showed an allometric growth both for males and females. On the other hand, we found a variable goodness on the fitting between body measures with beak lengths, being higher with the upper crest length.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ACUICULTURA

NUTRIENTS IN OCTOPUSES (CLASS CEPHALOPODA CUVIER, 1797) OF COMMERCIAL IMPORTANCE IN MÉXICO

Marbella Isela González-Liano [1], Juliano E. P. Abrantes [2], Virginia M. Ruíz [3] and Brian Urbano [1]
[1]Facultad de Ciencias, UNAM Av. Universidad 3000 Circuito Exterior S/N Delegación Coyoacán, 04510 Ciudad de México D.F.; marbella_lianootmail.com; maclen55yahoo.com
[2]General Guadalupe Victoria #167 casa B, Tlalpan Centro, Delegación Tlalpan, 14000 México, D.F.; jepa88mail.com
[3]Universidad Autónoma Metropolitana-Xochimilco. Calzada del Hueso 1100, Villa Quietud, Delegación Coyoacán, 04960, México, D.F.; vmeloorreo.xoc.uam.mx

Mexico is within main fishery producers in the world, and octopus ranks fifth extraction after shrimp, tuna, tilapia and sardine in the Mexican coast. The aim of this research is to quantify the amount of nutrients provided octopus consumption in Mexican diets, and thus promote consumer in the country. We analyzed six organism belonging to four species; comparisons between the nutrient input with respect to sex, size and stage of gonadal maturity were performed, a comparison between the nutrient input and the geographical area. Our results indicate that there is no significant difference between the nutrient input with respect to sex and size, there is significant difference between stage I and IV with respect to the nutrients input, and the significant difference of nutrients relative to geographic area, it is only for micronutrients and proteins.
The nutritional value of octopus for this research is 49.96 g of protein, 1.2078 grams of fat and 3.22 g of micronutrients per 100 g of food consumed. The octopuses are a new alternative food source, is easily accessible to the mexican population, economic and has standards minimal nutrient value needed to be consumed.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

OCCUPATION PATTERN AND WEIGHT OF THE SHELLS LIKE PARAMETER OF SELECTION FOR HERMIT CRABS *CLIBANARIUS ANTILLENSIS* AND *CALCINUS TIBICEN*, FROM LOS TUXTLAS, VERACRUZ, MEXICO

M. I. González-Liano [1], C. Martínez-Lorenzo [1], B. Urbano [2] and A. P. Ayala-Aguilar [1]
[1]Laboratorio de Malacología, Instituto de Ciencias del Mar y Limnología. Universidad Nacional Autónoma de México. Apdo. Postal 70-305, México, D.F., C.P. 04510; marbella_liano@hotmail.com; cilli29m@gmail.com; penelo92@hotmail.com
[2]Facultad de Ciencias. Universidad Nacional Autónoma de México. Av. Universidad, 3000, Circuito Exterior S/N, México, D.F., C.P. 04510; maclen55yahoo.com

Hermit crabs have a soft abdominal region compared with the rest of their bodies; this fact forces them to select empty shells to find protection against the environment and predators. These shells create a micro habitat that must be changed when the hermit crab grows. Our objective was to study the shell occupation pattern by hermits. We sampled in Monte Pio, Playa Divina, and Playa Tortuguita in Veracruz State, México. We sampled 203 occupied shells and recorded the size, weight, length and form. For every hermit crab we recorded its weight without shell on. We saw that *C. antillensis* do not show a specific selection for any shell genera, while *C. tibicen* showed a tendency to select the *Stramonita* genera; both species showed a preference for shells with more weight/weight ratio.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
MORFOLOGÍA, MORFOMETRÍA Y ANATOMÍA

VARIACIÓN FENOTÍPICA DE LA CONCHA DEL GASTERÓPODO *NERITINA VIRGINEA* EN VERACRUZ, MÉXICO

Jalil González-Rodarte y Brian Urbano
Facultad de Ciencias, Universidad Nacional Autónoma de México, Av. Universidad 3000, Copilco Universidad, Coyoacán, 04510 Ciudad de México, Distrito Federal**;** gonrojal@gmail.com**;** maclen55@yahoo.com

El gasterópodo *Neritina virginea* habita la mayoría de los estuarios del Golfo de México, tolera condiciones adversas y su concha presenta una gran variabilidad de colores y patrones. El propósito del presente trabajo fue analizar y comparar la variación fenotípica del tamaño de la concha, coloración y patrones de *N. virgínea* en relación a factores ambientales.
Se muestrearon cuatro localidades del norte y sur de Veracruz, México. *N. virginea* se colectó en mayo del 2011 y agosto del 2013 a lo largo de un gradiente ambiental; se midió el tamaño de la concha y en cada estación de muestreo se midió la temperatura, profundidad, tipo de sustrato, salinidad y velocidad de corriente. Los colores y patrones de la concha fueron cuantificados utilizando un método estandarizado de fotografía digital y análisis de imagen basado en un sistema continuo de RGB.
Se sugiere que la variación del color y patrones de la concha está relacionada con el gradiente de salinidad y preferencia de sustrato. Los organismos adultos tienen una coloración mayor, lo que sugiere una pigmentación diferencial durante la ontogenia del organismo. La variación intraespecífica fue mayor en áreas de influencia marina (Laguna de Sontecomapan y La Mancha) que de influencia dulceacuícola (Arroyos Balzapote y Liza) debido a condiciones espaciotemporales distintas. Comprendiendo la variación intraindividual asociada con factores abióticos se puede determinar la preferencia de hábito y su posible valor adaptativo.

SHELL PHENOTIPYC VARIATION OF THE GASTROPOD *NERITINA VIRGINEA* IN VERACRUZ, MÉXICO

The gastropod *Neritina virginea* inhabits the estuaries of the Gulf of México. This specie tolerates adverse conditions, and its shell presents a great color and patterns variability. The aim of the present study was analyze and compare the phenotypic variation of the shell size, coloration and patterns of *N. virginea* related to environmental factors.
Four localities were sampled in the north and south of Veracruz, México, *N. virginea* was collected during May 2011 and August 2013 along an environmental gradient. Size measurements of the shell were taken and at every sampling station measurements were recorded for temperature, depth, substrate type, salinity and water flow. The shell colors and patterns were quantified using a standardized digital photography method and an image analysis based on a continuous RGB system.
We suggested that variation in shell color and patterns is related to salinity gradient and substrate preference. Adult organisms have higher shell pigmentation and it suggests a differential pigment expression during organism ontogeny. Intraspecific variation was higher in areas of marine influence (Sontecomapan and La Mancha lagoon) than in areas of freshwater influence (Balzapote and Liza coastal rivers) corresponding to a different spatial and temporal environmental variation. Understanding intra individual variation associated with abiotic factors can determine habitat preference and its possible adaptive value.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

THE COMPLETE MITOCHONDRIAL GENOME OF THE LAND SNAIL *CERION INCANUM* (STYLLOMATOPHORA: MOLLUSCA) AND PHYLOGENETIC RECONTRUCTIONS WITHIN EUPULMONATA

Vanessa L. González, Ehsan Kayal, Margaret Halloran, Yesha Shrestha and M.G. Harasewych
National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, Washington DC 20013-7012 USA; gonzalezv @si.edu; kayale @si.edu; halloranm @si.edu; shresthay@si.edu; harasewych @si.edu

The complete sequence mitochondrial genome from the tropical land snail *Cerion incanum* was constructed using sequence information generated from IonTorrent PGM shotgun sequencing technology. The mitochondrion of *C. incanum* is 15,177 base pairs (bp) in size, encodes 13 protein-coding genes, 22 transfer RNA genes and two ribosomal RNA genes. Maximum likelihood and Baysian analyses of mitogenomes for *C. incanum* plus 28 previously published gastropod genomes, was conducted for nucleotide, amino acid, and rRNA sequence variation. Subsequent evaluations of the phylogenetic placement of *C. incanum* within Eupulmonata recovered strong support for the monophyly of major recognized clades including Euthyneura and Styllomatophora. In all analyses, *C. incanum* nested within the Syllomatophora clade and sister to the monophyletic Helicidae. Within Styllomatophora, *Cepaea nemoralis* which has been previously excluded from phylogenetic analyses of Gastropoda as it has been shown to be prone to spurious placement resulting from long-branch attraction due to accelerated rates of mitochondrial evolution, is recovered here sister to *Helix aspersa* regardless of phylogenetic parameterization. Opisthobranch taxa (2) included in the study nested within Pulmonata, in a clade including Siphonariidae.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

HOW MOLECULES AND MORPHOLOGY ARE TRANSFORMING OUR VIEW OF OPISTHOBRANCH MOLLUSKS

Terrence M. Gosliner
California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94108. Department of Invertebrate Zoology and Geology, California Academy of Sciences, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA 94118; tgosliner@calacademy.org

Advances in molecular techniques have fundamentally altered the way we perceive opisthobranch gastropods as a taxonomic unit as well as how their evolution has occurred. Changing perceptions of phylogenetic relationships have profound impacts on the systematics of opisthobranchs and are currently in tremendous flux. In many cases, taxonomic resolution has been advanced considerably and ambiguities have been definitively resolved. In most cases, additional diversity has been discovered in several cryptic species complexes. Many species that have been considered previously to be widespread, having circumtropical distributions, are shown to represent such species complexes with more restricted ranges. New evidence from aglajid cephalaspideans exemplifies these distributional patterns.
Examples of reclassifications that are warranted by molecular phylogenetic studies include the realignment of the taxa within the Polyceridae and the remainder of the Doridina.
These advances also correlate with morphological data as in the case of what was thought to represent a single species of *Hypselodoris*. Different morphological attributes correlate with the molecular data. In this case, body color and radular morphology are powerful predictors of the molecular phylogeny.

Another aspect of this work is that molecular phylogenies also enable us to better understand biological phenomena, such as origins of invading species in global estuaries in the cases of *Haminoea* and *Philine*

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

TOWARDS THE KNOWLEDGE OF DEEP-SEA BIVALVES OF THE COLOMBIAN PACIFIC OCEAN

Adriana Gracia C. [1], **Nancy Suarez Mozo** [1] **and Paul Valentich-Scott** [2]
[1]Instituto de Investigaciones Marinas y Costeras – Invemar, Museo de Historia Natural Marina de Colombia – MHNMC, Calle 25 # 2-55, Playa Salguero - Santa Marta, Colombia; adriana.gracia@invemar.org.co; nancy-yolimar@hotmail.com
[2]Santa Barbara Museum of Natural History 2559 Puesta del Sol Road, Santa Barbara, California 93105, USA; pvscott@sbnature2.org

The Colombian Pacific Ocean has nearly 1,300 km of shoreline and 339,500 km² between estuarine, coastal and ocean waters, with depths up to 4,000 m. However we have relatively limited knowledge of its biodiversity, especially in deep-sea waters. Recent Colombian national baseline studies on soft bottoms of the shelf and upper slopes initiated by Invemar have narrowed this knowledge gap. These projects were carried out in 2002 off Choco Department (Biodiversity Baseline Study of the Southern Colombian Pacific Coastal and Shelf Areas, Invemar - Colciencias, between 70-500 m depth), and in 2012 towards south off Nariño Department (Biological and Physical Baseline in Offshore Hydrocarbon Exploration Blocks 6 and 7, Invemar - ANH, between 200-1000 m depth). Usigin a semiquatitative trawling net (9x1 m, 10 min), the projects sampled 52 stations, and yielded both living bivalves specimens and shells, accounting for 24 families, 41 genera and 51 species. The most important family in terms of species richness was Tellinidae (7 species). The large amount of the information collected includes the first records for the country, contributing significantly to the biogeographical knowledge of the bivalve species in the Tropical Eastern Pacific.
Although the information is still being analyzed, the preliminary results indicate that this area of Colombia has been under explored and still requires baseline research efforts to understand its actual diversity. Thus, it will require the implementation of strategies in future studies that include several sampling methodologies, to reach deeper waters, to cover larger geographic areas, and to include different types of deep-sea habitats. Such information will be critical to the management and conservation of Colombian resources, especially given the increasingly possibilities of implementing deeper fisheries and offshore hydrocarbon exploration in this region.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

UPDATE ON THE STATUS OF THE MOLLUSK COLLECTION OF THE MARINE NATURAL HISTORY MUSEUM OF COLOMBIA

Adriana Gracia C., Laura Tavera, Yully Contreras, Andrea Dueñas, Deimer Martínez, Cristian Cortez, Miguel Martelo and Miguel Torralvo
Instituto de Investigaciones Marinas y Costeras – Invemar, Museo de Historia Natural Marina de Colombia – MHNMC, Calle 25 # 2-55, Playa Salguero - Santa Marta, Colombia; adriana.gracia@invemar.org.co

Consistent with its growth and research projection of the marine sciences in Colombia, since 2013 Invemar was located in a new headquarter in the city of Santa Marta. Along with this process, the biological collections of the MHNMC were moved and rearranged on a compactor system facilitating the access to and management of the collections. The Museum has more than 42,000 cataloged and stored lots, and contains one of the largest collections of marine mollusks of the country (aprox. 23% of the collection and 71,000 specimens). In detail, Mollusca material belongs to Gastropoda, Bivalvia, Cephalopoda, Scaphopoda, Polyplacophora, and Caudofoveata classes, with a total of 32 orders, 191 families, 432 genera, and over 1437 species. The best-represented groups are gastropods with 59% of the species, followed by bivalves with 34%, while the other classes add 7%. In addition, the collection includes a section of holotypes and paratypes (71 lots, 109 specimens). The material is mostly associated with species inhabiting soft bottoms of the shelf and upper slope; also is stored material from coral reefs, seagrasses, rocky shores, mangroves, sandy beaches, and artificial structures, among others. The material is divided into a wet section, arranged in mobile storage shelving following a phylogenetic order, while dry material is located temporally in close storage drawers still in organization process; 35% of material is preserved in ethanol, while the remaining 65% is stored dry. All the information associated is available online through the Colombian Marine Biodiversity Information System. Future challenges include support the Museum's mission through research, education, and exhibits; increase the mollusk species representativeness of the Caribbean Sea and Pacific Ocean ecosystems; continue contributing to the advancement in taxonomy, systematic and biology of this group of invertebrates; and position the collection as a benchmark in the management of biological collections in the Country and the region.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
DULCEACUÍCOLAS

OK, LET'S TRY THIS AGAIN: A RE-ASSESSMENT OF GLOBAL FRESHWATER MUSSEL DIVERSITY (BIVALVIA: UNIONOIDA)

Daniel L. Graf [1] and Kevin S. Cummings [2]
[1]Biology Department, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481, USA; dgraf@uwsp.edu
[2]Illinois Natural History Survey, University of Illinois, Champaign, Illinois 61820, USA; kscummin@illinois.edu

In 2007, we published the first checklist of global freshwater mussel (Order Unionoida) diversity since Haas's in 1969, and we have periodically updated the list on the MUSSEL Project Web Site (http://www.mussel-project.net/). The occasions of multiple faunistic updates (including South America, Africa, China, the Ganga Basin, Japan, and Alabama), new phylogenetic data, and a contract from the Integrated Taxonomic Information System (http://www.itis.gov/) have motivated us to re-assess the geographic and taxonomic patterns of Recent freshwater mussel species richness. We have assembled a comprehensive database of freshwater mussel nominal species, each has been assigned to a valid species (or nomen dubium) based on published synonymies. To-date, we have gathered >57,000 taxonomic opinions about 4952 nominal species and subspecies. The Order Unionoida is comprised of six extant families: Unionidae (684 spp.), Margaritiferidae (13), Hyriidae (96), Mycetopodidae (53), Iridinidae (40), and Etheriidae (4) — a total of 890 species and a net gain of 50 over our 2007 assessment. Geographically, we divide the fresh waters of the world into six realms: Nearctica (302 total spp., 20 synonymized from the previous assessment, 16 resurrected from synonymy, 2 newly described), Neotropica (217, 1, 45, 1), Afrotropica (79, 4, 0, 0), Palearctica (57, 0, 10, 2), Indotropica (222, 9, 7, 6), and Australasia (30, 2, 0, 0). In addition, we have synonymized with valid Palearctic species two new

nominal species recently described by the Russian Comparatory School. We will present data on finer scale patterns of taxonomic and geographical species richness, as well as provide suggestions for future research.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

MITOCHONDRIAL GENOME REARRANGEMENTS AND VERMETID SYSTEMATICS

Camila Granados-Cifuentes [1], Timothy A. Rawlings [2], Rüdiger Bieler [3], Rosemary E. Golding [3,4], Paul Sharp[1] and Timothy M. Collins [1]

[1]Department of Biological Sciences, Florida International University, 11200 SW 8th St., Miami, Florida 33199, USA; camilagranadoscifuentes@gmail.com, PSharp@fiu.edu, Collinst@fiu.edu,

[2]Department of Biology, Cape Breton University, 1250 Grand Lake Road, Sydney, Nova Scotia, B1P 6L2, Canada; Timothy_Rawlings@cbu.ca

[3] Integrative Research Center (Invertebrates), Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago, Illinois 60605, USA; rbieler@fieldmuseum.org

[4]Malacology, Australian Museum, 6 College Street, Sydney, NSW 2010, Australia; rosemary.e.golding@gmail.com

Identifying natural groups within the caenogastropod family Vermetidae has proven challenging. The sessile lifestyle of vermetids, with resulting xenomorphically-distorted, overgrown, and corroded shells has resulted in a long and confused taxonomic history, based primarily on adult shell characters. Our team has used morphological, anatomical, and molecular data to clarify systematics and phylogenetic relationships within the Vermetidae. In this presentation we focus on molecular data, and in particular on supplementing primary sequence data with mitochondrial gene order changes and gene duplications as higher-level characters. We present data on 15 new complete mitochondrial gene orders within the vermetids. In combination with our six previously published full or partial genomes, this provides a robust data set for inferring a phylogeny and for analyzing mitochondrial rearrangements. Mitochondrial data are supplemented with nuclear markers to improve the inferred phylogeny. Consistent with our earlier findings, vermetid genomes are quite dynamic, with almost every new mitochondrial genome showing gene order differences, some of these major. In addition to rearrangements, we are finding fragments of genes remaining from the rearrangement process. Our results should therefore prove enlightening concerning the mechanism and frequency of gene rearrangement, and will provide additional characters/events to support the inferred phylogeny.

PALEONTOLOGÍA/PALEONTOLOGY-CARTEL/POSTER

LATE PLEISTOCENE MOLLUSCA AND THEIR ENCRUSTING BIOTA FROM SOUTHERN MÉXICO

Rosalía Guerrero-Arenas, Karla Ayala-Herrada, Ariadna Leonor Merlin-Hernández, Suleima Jarquín-Ortíz and Eduardo Jiménez-Hidalgo

Laboratorio de Paleobiología, campus Puerto Escondido, Universidad del Mar. Km 2.5 Carretera Puerto Escondido-Sola de Vega, San Pedro Mixtepec, Juquila, Oaxaca. CP. 71980. Mexico; rosaliaguerreroa@gmail.com; scarlet_2906@hotmail.com; harina_lina@hotmail.com; eduardojh@zicatela.umar.mx

Quaternary marine biota from southern México is poorly known. Along the coast of Oaxaca state there are several marine terraces that bear fossil invertebrate assemblages. Here we report the bioerosion

traces observed in several mollusks from Playa Coral, a Late Pleistocene outcrop located near Puerto Escondido city. The 41 studied specimens include bivalves of Chamidae (n=19), Ostreidae (n=15), Veneridae (n=3) and Spondylidae (n=1) families, as well as gastropod specimens of the families Muricidae (n=2) and Calyptraeidae (n=1).
Trace makers include polychaetes, sponges and several kinds of small bivalves. Also, specimens of cheilostomate bryozooans were identified as episkeletozoans.
Better-represented ichnogenera in bivalves include *Entobia, Gastrochaenolites*, and *Caulostrepsis*. Also, several tubes of polychaetes were recorded. Regarding gastropods, incrustants were less diverse. Only *Entobia* galleries and a few polychaete tubes were identified in the studied specimens.
The attached organisms showed preferences of inhabiting the shell surface in the different molluscan specimens. Ostreidae specimens showed the major richness of incrustants. Cheilostomate bryozoans, polychaetes tubes and *Entobia* prevailed in the interior valves. In the other hand, bivalve burrows and *Entobia* were observed in the exterior valves. Chamidae, Veneridae and Spondylidae specimens only showed incrustants in the exterior valves.
Study of incrustant biota gives a better approximation of the taxonomic richness and structure of communities of marine fossil assemblages given that several soft-bodied taxa can be recorded. Also, it allows the inference of ecological interactions of the poorly studied marine fauna of southern México that took place during the Late Pleistocene.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCA/ORAL PRESENTATION
BIODIVERSIDAD

CHILEAN BIVALVES: KNOWNS AND UNKNOWNS

Marina Güller [1] and Diego G. Zelaya [2]
[1]Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Av. Ángel Gallardo 470, Capital Federal, C1405DJR, Argentina; mguller@macn.gov.ar
[2]Depto. Biodiversidad y Biología Experimental Facultad de Ciencias Exactas y Naturales – UBA, Ciudad Universitaria, Pab. 2, 4to piso, lab. 31, Capital Federal, C1428EHA, Argentina; dzelaya@bg.fcen.uba.ar

The Chilean territory extends for *ca.* 4.270 km, from 18º24'S (Arica) to 55º56'S (Cape Horn), showing a remarkably narrow, steep continental shelf. Its coast can be roughly divided around 42ºS in a more regular northern area, and a highly intricate southern one, the latter comprising numerous fjords, canals and islets. This change in the coastal physiognomy, associated with changes in physical conditions and faunal associations, is usually considered the boundary between the Magellan and Perú-Chilean Provinces. However, a transitional zone between 30° and 42°S has also been suggested by some authors.
A revision of extant bibliography reveals a total of 179 valid species of bivalves mentioned over the last two centuries of malacological studies in Chilean waters. But how was the study effort over time? Is at present taxonomic knowledge good enough to allow unequivocal identifications? Are all size ranges equally studied? How many of these species are actually living in the continental shelf? How well do bivalves fit with the two currently recognised biogeographic scenaria? Addressing these questions is the aim of this presentation. For that, a combined study considering all published records, and additional material from several museum collections and personal samplings, is performed. The area south of 42°S is particularly taken as an example of macro and microscale of analysis.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

THE GENUS *SIPHONARIA* (GASTROPODA) IN SOUTHERN SOUTH AMERICA

Marina Güller [1], Diego G. Zelaya [2], Benoît Dayrat [3] and Cristián Ituarte [1]

[1]Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Av. Ángel Gallardo 470, Capital Federal, C1405DJR, Argentina; mguller@macn.gov.ar; ituarte@macn.gov.ar

[2]Depto. Biodiversidad y Biología Experimental Facultad de Ciencias Exactas y Naturales – UBA, Ciudad Universitaria, Pab. 2, 4to piso, lab. 31, Capital Federal, C1428EHA, Argentina; dzelaya@bg.fcen.uba.ar

[3]Department of Biology, Pennsylvania State University, 514 Muller Lab, State College, PA 16802, USA; bdayrat@gmail.com

The false limpets of the genus *Siphonaria* are pulmonate, algae-grazing gastropods, which typically live in the rocky intertidal. Ten nominal species appear in the literature for the southern tip of South America, although in the latest comprehensive study of *Siphonaria*, Hubendick (1945) considered that only three species are valid. However, proper re-descriptions of these three species and their intraspecific variability are still lacking.

In this study, we performed a revision of the *Siphonaria* species from the Argentine and Magellanic biogeographic Provinces. A total of 198 lots, coming from the Uruguayan, Argentinean, and southern Chilean coasts, including the Malvinas (Falkland) Islands and South Georgia, were studied. Available types were examined. Characters on the shell morphology, the reproductive system and the radula were supplemented with molecular data.

Out of the ten nominal species described or reported for this area, only the presence of *Siphonaria lessonii* and *S. lateralis* is confirmed, and an additional (new) species is described. The distinctive characters for each of these species and their intraspecific variability are presented. The status of the other species mentioned for the region is discussed.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-CARTEL/POSTER

ANÁLISIS HISTÓRICO DEL ABULÓN NEGRO *HALIOTIS CRACHERODII* EN LA REGIÓN DE ENSENADA, BAJA CALIFORNIA, MÉXICO

Krystal M. Gutiérrez Ortiz, Carlos Figueroa-Beltrán, Arturo Ramírez-Valdéz

Facultad de Ciencias Marinas, Universidad Autónoma de Baja California, Km. 103 Carretera Tijuana-Ensenada, Ensenada, B.C. México; krystal83@uabc.edu.mx; carlosfigueroa@uabc.edu.mx; arturorv@uabc.edu.mx

Se recopilaron datos de la excavación de un conchero realizada en el complejo de Bajamar, Ensenada, B.C., en el año de 2012. Entre los hallazgos que se tuvieron fue encontrar restos de valvas de *Haliotis cracherodii*; las valvas fueron medidas y contabilizadas. El fechamiento de los concheros fue de la época del Holoceno tardío, indicando restos de cocha de 3,200 años a.d.p. aproximadamente. En 2013 se realizó un muestreo de *H. cracherodii* en el intermareal rocoso del complejo de Bajamar; registrando tamaño y cantidad de organismos. Se registró la talla, abundancia y frecuencia de aparición de *H. cracherodii* encontrados en las dos épocas, Holoceno tardío y en la actualidad. Con los registros obtenidos de los concheros arqueológicos correspondientes al Holoceno tardío encontramos que *H. cracherodii* presenta una talla promedio de 4.3 cm, con porcentaje de frecuencia de aparición del 78.5, y una abundancia de 33 individuos; en las muestras del 2013 la talla promedio fue de 5cm, un porcentaje de frecuencia de aparición del 13.16 y una abundancia de 11 individuos. *H. crachrerodii* es un

gasterópodo que aunque presente en ambos periodos, muestra diferencias significativas en la estructura poblacional. Los resultados sugieren cambios importantes en las condiciones que regulan los atributos poblacionales a través del tiempo y al mismo tiempo, una larga historia de explotación de la especie en la región.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-CARTEL/POSTER
MORFOLOGÍA, MORFOMETRÍA Y ANATOMÍA

PRELIMINAR MORPHOMETRIC STUDY OF SOME GASTROPODS FROM THE LITORAL COAST NEAR PUERTO ANGEL, OAXACA, MÉXICO

Edgar Omar Guzmán-Urieta, Isaías Hazarmabeth Salgado-Ugarte and Verónica Mitsui Saito-Quezada
Laboratorio de Biometría y Biología Pesquera, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq. Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F.; obbi_25@hotmail.com; isalgado@unam.mx; mitsuisaito@gmail.com

At Puerto Angel, there are mollusk species which have an economic potential and have not been the subject of biological and ecological studies. Therefore it is necessary to implement studies on fisheries biology aspects as age and growth, reproduction, condition and trophic relationships which lead to an adequate assessment and management. In this study we present preliminary results on some morphometric relationships. The specimens were obtained by means of freediving samplings at several rocky litoral zones near Puerto Ángel approximately at monthly intervals from August 2013 to date. Currently the most frequent species are *Opeatostoma pseudodon* (122), *Solenosteira (Genofus) sanguinolent* (63), *Conus princeps* (14), *Vasum caestus perioston* (18) and *Neorapana tuberculata* (30). As a preliminary result we found in general that the morphometric measures considered (total, height and width lengths and total, soft parts, foot, digestive gland, gonad and opercular weights) presented positive and statistically significant correlations.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

BREATHING NEW LIFE INTO OUR UNDERSTANDING OF GILL EVOLUTION: A MOLECULAR PHYLOGENY OF THE NUDIBRANCHIA SUBORDER DORIDINA

Joshua M. Hallas [1,2] and Terrence M. Gosliner [1]
[1]Department of Invertebrate Zoology and Geology, California Academy of Sciences, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA 94118; jhallas@calacademy.org; tgosliner@calacademy.org
[2]Department of Biology, San Francisco State University, 1600 Holloway Dr., San Francisco, CA, 94132

The Doridina represents one of the most diverse groups of marine mollusks consisting of 16 recognized families and 2000+ described species Even though morphological and molecular analyses have shown the Doridina to be monophyletic, relationships between the major groups are poorly understood due to conflicting phylogenies. To gain greater insight into dorid evolution four molecular markers (16s, 18s, 28s, and COI) were analyzed from 116 species sampled across all dorid families. Even though there was little resolution in the relationship between dorid families, the Doridina was recovered as monophyletic with *Bathydoris* placed sister to all other dorid nudibranchs. There also appears to be two major lineages within the Doridina representing radula-less and radula-bearing dorids. Among the radula-bearing dorids

neither the Cryptobranchia nor the Phanerobranchia were found to constitute natural groupings, which suggests that gill retraction has been lost over multiple lineages. Interestingly, the Cadlinidae was recovered sister to all other radula-bearing dorids and not closely related to the Chromodorididae. In addition, most major families were recovered as monophyletic, except for the Chromodorididae and Discodoridae. *Cadlinella orniatisma* was recovered sister to *Hexabranchus sanguienus* and formed a clade with the Polyceridae, which is sister to the Chromodorididae. Moreover, the caryophyllidia-bearing discodorids do not represent a monophyletic grouping. The suctorian phanerobranch dorids form a strongly supported clade consisting of members from the superfamily Onchidoridoidea. Conversely, the non-suctorian phanerobranchs are not monophyletic. This phylogeny suggests that dorid evolution requires further investigation into the group's complex morphological diversity and a revision of Doridina is needed.

RAMSAR-PONENCIA/ORAL PRESENTATION

BIVALVE HABITAT AS A RAMSAR WETLAND TYPE: NEW OPPORTUNITIES FOR GLOBAL MOLLUSCAN CONSERVATION

Boze Hancock [1a], Tim Kasoar [1b], Philine zu Ermgassen [1c], Mark Spalding [1d] and Alvar Carranza [2]

[1]The Nature Conservancy Global Marine Team, University of Rhode Island Narragansett Bay Campus, Narragansett, RI, USA; [a]bhancock@tnc.org; [b]tak29@cam.ac.uk; [c]psez2@cam.ac.uk;[d]mspalding@tnc.org

[2]Centro Universitario Regional Este-CURE, Universidad de la República, Maldonado, Uruguay and Area Biodiversidad y Conservación, Museo Nacional de Historia Natural, Montevideo, Uruguay; alvardoc@fcien.edu.uy

The Ramsar Convention on Wetlands of International Importance is an intergovernmental treaty promoting the conservation and wise use of wetlands. There are 168 countries that are signatories to the convention. The Ramsar convention has a broad definition of wetlands which includes estuarine and marine habitats to a depth of 6m including mangrove, salt marsh, seagrass and coral reef. At the last triennial 'Conference Of Parties' in 2012 The Nature Conservancy (TNC) and the US National Oceanic and Atmospheric Administration (NOAA) successfully petitioned to have bivalve habitat added to the list of wetland types recognized under the convention. TNC, NOAA and partners are promoting the conservation and restoration of bivalve habitat, such as oyster reef and mussel beds, because of the ecosystem services these habitats provide that benefit both the nearshore ecosystem and the human communities that rely on them. These beneficial services include fish production, sediment stabilization and erosion control, and improved water quality from filtering seston and increased denitrification rates. Improving the conservation of these habitats requires influencing their management to focus on the broad suite of services provided rather than managing exclusively for fishery extraction. Having bivalve habitat recognised as a wetland type under the Ramsar convention provides two immediate opportunities. The first is the opportunity to nominate Ramsar sites based, in part, on their bivalve habitat. The second is to document the existence and importance of bivalve habitat within existing Ramsar sites. TNC has begun coordinating the nomination of sites in the US with bivalve habitat as a core wetland type and is promoting similar nominations in other countries. We are also documenting the occurrence of bivalve habitat in existing sites and are asking for the help of the international malacological community to complete this task.

HABITATS FORMADOS POR BIVALVOS RECONOCIDOS EN LA CONVENCION RAMSAR: NUEVAS OPORTUNIDADES PARA LA CONSERVACION DE MOLUSCOS A NIVEL GLOBAL

La Convención RAMSAR sobre Humedales de Importancia Internacional es un tratado intergubernamental que promueve la conservación y el uso racional de los humedales. Actualmente, la convención cuenta con 168 países signatarios. La convención RAMSAR tiene una definición amplia de humedales, que incluye hábitats estuarinos y marinos hasta una profundidad de 6 m, incluyendo manglares, marismas, pastos marinos y arrecifes de coral. En la última 'Conferencia de las Partes' trienal en 2012, The Nature Conservancy (TNC) y la Administración Nacional Oceánica y Atmósferica de EE.UU. (NOAA) solicitó con éxito añadir los hábitats formados por moluscos bivalvos a la lista de tipos de humedales reconocidos por la Convención. En tal sentido, TNC, NOAA y sus socios están promoviendo la conservación y restauración de estos hábitats, tales como bancos de ostras y mejillones, debido a los bienes y servicios ecosistemicos que estos hábitats proporcionan, tanto para los ecosistemas adyacentes como para la sociedad. Estos servicios incluyen la producción de peces, estabilización de los sedimentos y control de erosión y mejoran calidad del agua mediante el filtrado de seston y aumento de las tasas de denitrificación. Una mejora del estado de conservación de estos hábitats exige cambiar los paradigmas de gestión, de manera de centrarse en el amplio conjunto de servicios prestados y no exclusivamente en la gestión de la explotación pesquera. La inclusión de estos hábitats como un tipo de humedal reconocido por la convención RAMSAR presenta dos oportunidades inmediatas: en primer lugar, la posibilidad de nominar sitios RAMSAR en base a la presencia de hábitats formado por bivalvos, y, en segundo lugar, para documentar la existencia e importancia de estos hábitat dentro de los sitios RAMSAR existentes. En esta línea, TNC ha comenzado a coordinar la designación de esos sitios en los EE.UU. y a promover nominaciones similares en otros países. Este hecho impactará positivamente la conservación de moluscos a nivel global y mejorara nuestro conocimiento sobre la importancia de los hábitats formados por moluscos bivalvos.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

MICROMOLUSCOS ASOCIADOS A MACROALGAS DEL INTERMAREAL ROCOSO DE MICHOACÁN, GUERRERO Y OAXACA, MÉXICO

Silvia Hansen-Bernal [1] , Gerardo Rivas-Lechuga [1] y Brian Urbano [2]

[1]Laboratorio de Biogeografía Acuática, Depto. de Biología Comparada, Facultad de Ciencias, UNAM; hansenhhh@gmail.com; gerard.rivas@gmail.com.

[2]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com

Con el propósito de establecer preferencias de sustrato por parte de los micromoluscos se estudió su presencia sobre diferentes macroalgas. Las macroalgas muestreadas fueron clasificadas de forma artificial en base a observaciones sobre su textura y forma de crecimiento. Mediante un análisis factorial de correspondencia se determinaron las asociaciones más evidentes entre micromolusco y macroalgas.
Se identificaron un total de 1906 microgasteropodos, correspondientes a 33 especies, en algunos casos solo se llegó a identificación a nivel de género.
La arquitectura de las macroalgas mostró un efecto significativo en la abundancia y diversidad de micromoluscos. Al realizar pruebas posteriores de comparaciones multiples se observó que las algas clasificadas como coralinas articuladas presentaron significativamente mayor abundancia. La diversidad de micromoluscos tendió a ser mayor en la categoría de céspedes no rígidos.

Los géneros de micromoluscos *Barleeia*, *Caecum*, *Crepidula* y *Caelatura* se presentaron asociados con las algas coralinas articuladas; los géneros *Fartulum*, *Fossarus*, *Lottia* y *Triphora* con las macroalgas talosas arbustivas; los céspedes no rígidos presentaron organismos de los géneros *Pyramidella, Miralda, Cerithiopsis* y *Solariobis*; y las algas talosas erectas presentaron los géneros *Puncturella* y *Vitrinella.*
Al analizar los factores ambientales como el grado de inclinación del sustrato y su nivel de exposición al oleaje se observó que en ambientes protejidos del oleaje la diversidad de micromoluscos fue significativamente mayor, independientemente de la inclinación del sustrato.

MOLUSCOS TERRESTRES/LAND MOLLUSKS-PONENCIA/ORAL PRESENTATION

HAWAIIAN LAND SNAIL BIODIVERSITY: SYSTEMATICS, PHYLOGENETICS AND CONSERVATION STATUS OF A VANISHING FAUNA

Kenneth A. Hayes [1, 2], Norine W. Yeung [2, 3], Kelley Leung [3, 4], Deena T.A. Gary [3, 5], Dylan T.B. Ressler [3, 5], John Slapcinsky [6] and Robert H. Cowie [3]

[1]Department of Biology, Howard University, 415 College St. NW, Washington, DC, 20059, USA; kenneth.hayes@howard.edu

[2]National Museum of Natural History, Smithsonian Institution, PO Box 37012, MRC 163 Washington, DC 20013-7012 Washington, DC, USA; hayesk@si.edu

[3]Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Gilmore 408 Honolulu, Hawaii, 96822, USA; nyeung@hawaii.edu; cowie@hawaii.edu

[4]Entomology Graduate Program, Plant and Environmental Protection Sciences, University of Hawaii, 3050 Maile Way, Gilmore 310, Honolulu, Hawaii, 96822, USA; kelleyle@hawaii.edu

[5]Department of Biology, University of Hawaii, 2538 McCarthy Mall Edmondson Hall 216, Honolulu, Hawaii, 96822, USA; dagena@hawaii.edu; resslerd@hawaii.edu

[6]Malacology, Florida Museum of Natural History, 345 Dickinson Hall, Gainesville, FL 32611, USA; slapcin@flmnh.ufl.edu

Islands comprise only 5% of the earth's landmass, yet studies of island biotas contribute substantially to understanding ecology and evolution broadly. The Hawaiian Islands support a spectacular radiation of land snails, which have distinctive evolutionary and ecological legacies, and play an important role in our understanding of evolution and island biology. Snails provide key ecosystem services and are indicator species for intact mid-elevation rain forests, which are key to watershed maintenance. Their shells persist after death, leaving a record of colonization and evolutionary events, which can provide insights into historical processes. The Hawaiian land snail fauna is disharmonic, with only 10 of the approximately 90 recognized land snail families, but at least 750 species. The real diversity is unknown as most taxa have not been studied comprehensively for more than 60 years, and many have not been seen since their original description. Despite this uncertainty, even conservative estimates indicate that Hawaii is an incontrovertible gastropod diversity hotspot. Even more spectacular is the >99% species endemicity, with most species found on single islands. Using an integrative approach, we are documenting the remaining Hawaiian land snails, placing them within a larger evolutionary framework and updating their taxonomic and conservation status. Preliminary results from surveys of more than 550 sites confirm that much has been irretrievably lost, but there remains a great deal of diversity among known species and unknown cryptic species that can still be saved with effective management. Sadly, only about 5% and 25% remain of the two most diverse groups, Amastridae and Achatinellinae, respectively. However we have recovered nearly a third of the known Helicarionidae diversity plus numerous undescribed species in several groups, including presumably well studied families (e.g. Amastridae). These data provide the

basis for future conservation and the context for understanding their biogeographic and evolutionary patterns.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

EFFECTS OF TEMPERATURE DURING FEMALE MATURATION, ON GROWTH, SURVIVAL AND THERMOREGULATORY BEHAVIOUR OF *OCTOPUS MAYA* HATCHLINGS

V. Hau [1], O. Juárez [2], F. Díaz [3], D. Re [3], C. Galindo [3], C. Caamal-Monsreal [4], A. Sánchez [4] and C. Rosas [4]

[1]Tecnológico de Tizimín, Yucatán., Secretaría de Educación Pública. México
[2]Posgrado en Biotecnología, CICESE, Ensenada, Baja California, México
[3]Departamento de Biotecnología Marina, Centro de Investigación Científica y de Educación Superior de Ensenada, Carretera Ensenada-Tijuana # 3918, Baja California, Ensenada B.C., México
[4]Unidad Multidisciplinaria de Docencia e Investigación, Fac. de Ciencias, UNAM. Puerto de Abrigo s/n, Sisal, Yucatán; crv@ciencias.unam.mx

In nature, octopus have ability to adapt in order to persist in a particular habitat responding to changes in the environment through metabolic or behavioral adjustments. Environmental temperature is a critical variable to all organisms but specifically to *O. maya* because it has been linked to their rate of metabolic processes and ultimately to growth and fitness. In previous studies we demonstrate that *O. maya* juveniles can apply considerable behavioral control over their body temperature by actively tracking areas that are thermally favorable and/or avoiding those are not when exposed to temperature horizontal gradient. In that study a preferred temperature of 24.3°C was obtained for *O. maya* juveniles. Spawns of *Octopus maya* females can be inhibited when temperatures are higher than 27°C. When females were exposed at a reduction of temperature of 1°C every 5 d from 31 to 24°C we observed that spawns only occurs when the sea water temperature reach 27°C, temperature that was considered the limit for *O. maya* spawn. In such experiments a group of females was maintained at 24°C that is the temperature where naturally spawn this species. In the present study hatchlings obtained from females exposed at different temperature regimes during maturation (24°C: Stable) and 31 to 24°C changing 1°C every 5 d: Changing) were exposed at 24°C and a changing regime between 24 to 30°C at a rate of 1°C every 5 d. Hatchlings obtained from females maturing in stable environment had a significant higher wet weight than hatchlings obtained from females maturing in changing environment. When hatchlings were exposed at stable or changing environments octopus from stable origin had a higher growth rate and survival than animals from females exposed to changing environment, suggesting that the parental environment can affect the hatchlings performance.

ECOLOGÍA-ECOLOGY-CARTEL

DISTRIBUCIÓN Y ECOLOGÍA DE LOS MOLUSCOS RECOLECTADOS DURANTE LAS CAMPAÑAS OCEANOGRÁFICAS SIPCO I-III (1981-1982) EN LA PLATAFORMA CONTINENTAL DE SINALOA, MÉXICO

Michel E. Hendrickx [1], Pablo Zamorano [2], José Salgado-Barragán [1] y Arturo Toledano-Granados [3]

[1] Instituto de Ciencias del Mar y Limnología (ICML), Universidad Nacional Autónoma de México, Unidad Académica Mazatlán, Sin 8200, México; michel@ola.icmyl.unam.mx
[2] Centro Regional de Investigación e Innovación Pesquera y Acuícola de Manzanillo, Instituto Nacional de Pesca; pazaha@hotmail.com

[3] Instituto de Ciencias del Mar y Limnología (ICML), Universidad Nacional Autónoma de México, Unidad Puerto Morelos, Qro, México.

Se recolectaron especímenes de moluscos marinos frente a la costa de Sinaloa, México, durante tres campañas oceanográficas a bordo del B/O "El Puma" (1981-82; proyecto SIPCO). Se obtuvo un total de 4936 especímenes de moluscos comprendidos en 205 especies (141 Gastropoda, 56 Pelecypoda, 4 Polyplacophora, 3 Cephalopoda y 1 Scaphopoda). La diversidad media más alta se registró en el SIPCO III (2.264 bits), la más baja en el SIPCO II (1.124 bits) y fue intermedia en el SIPCO I (2.181 bits). La mayor diversidad se registró en la red de arrastre del SIPCO III (2.882 bits) y la más baja con la draga Van Veen en el SIPCO II (0.562 bits). En términos generales, la equitabilidad registrada fue alta mostrando un valor medio de 0.756. Durante el SIPCO I se registró el valor medio más alto de riqueza de especies (13 especies), seguido del SIPCO III (12 especies) y del SIPCO II (6 especies). El arrastre fue el arte con la que se encontró la mayor riqueza media (15 especies). Se encontraron diferencias significativas en la diversidad obtenida entre cruceros (ANOVA: F2, 43 = 8.947; p = 0046); estas se dieron entre SIPCO I y SIPCO II, SIPCO II y SIPCO III, mientras entre SIPCO I y SIPCO III no hubo diferencias. Al asociar ambas variables (crucero x arte de pesca), se observó que no existen diferencias significativas entre las interacciones (F3, 43 = 0.497; p = 0.686). Considerando la presencia/ausencia de especies, 16 de 23 muestras con la red camaronera formaron un grupo con una similitud del 13%. Para el caso de la draga Van Veen se observaron dos grupos, una con 5 de las 17 estaciones (similitud del 18%) y otro grupo conformado por tres estaciones (15%). Para el caso de la red ostionera no se presentó un grupo definido. El análisis de similitud conducido (ANOSIM) no permitió detectar diferencias significativas entre cruceros (ANOSIM: R = 0.006) o entre las artes de pesca, (ANOSIM: R = 0.239). Los resultados indican que únicamente existe una asociación estadísticamente significativa con la profundidad (R = -0.358, p = 0.018). El intervalo de profundidad se dividió en cinco estratos de 20 m de amplitud cada uno. La mayor diversidad se encontró en 40-59 m (diversidad media 2.705 bits) y la menor se identificó en 100-119 m (diversidad media 0.913 bits). El análisis de varianza de una vía indicó que no existen diferencias significativas en la diversidad (H') entre los distintos estratos de profundidad (F3, 43 = 2.5702; p = 0.0667).

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

GASTROPODA AND BIVALVIA FROM CORAL REEF "LA PERLA DEL GOLFO", VERACRUZ, MÉXICO

Jessica Raquel Hernández-Pérez y Fernando Álvarez
Colección Nacional de Crustáceos del Instituto de Biología, UNAM, México;
raquel.hdzp@ciencias.unam.mx; falvarez@ib.unam.mx

Coral reefs are complex ecosystems that are home a large number of species, these species include organisms that are responsible for forming and maintaining these marine ecosystems. The aim of this work is to contribute to the knowledge of the diversity of gastropods and bivalves from de coral reef "La Perla del Golfo", Veracruz, México. We collected dead coral rocks in May and August 2013 and February 2014 to remove all associated bivalves and gastropods with calcareous rock. We found 19 species of bivalves and 16 species of gastropods, in the first group the families Isognomonidae, Mytilidae and Arcidae were most abundant, while in the second group the family Muricidae was the most abundant, in addition in all months the abundance and richness of bivalves was higher that of gastropods. This work contributes entirely with new record of the species richness and diversity in this reef coral.

GASTROPODA Y BIVALVIA DEL ARRECIFE DE CORAL "LA PERLA DEL GOLFO", VERACRUZ, MÉXICO

Los arrecifes de coral son complejos ecosistemas que albergan una gran cantidad de especies que se encargan de formar y mantener estos sistemas marinos. El presente trabajo se realizó con el objetivo de contribuir al conocimiento de la diversidad de gasterópodos y bivalvos que habitan en el arrecife coralino "La Perla del Golfo", Veracruz, México. Durante los meses de mayo y agosto de 2013, y febrero de 2014, se recolectaron rocas de coral muerto pertenecientes para extraer a todos los bivalvos y gasterópodos asociados a la roca calcárea. Se encontraron 19 especies de bivalvos y 16 especies de gasterópodos, dentro del primer grupo las familias Isognomonidae, Mytilidae y Arcidae fueron las más abundantes, mientras que para el segundo grupo la familia Muricidae fue la más abundante, además en todos los meses la abundancia y riqueza de bivalvos fue mayor que la de gasterópodos. Este trabajo contribuye en su totalidad con registros nuevos de la riqueza y diversidad de especies para el arrecife de coral "La Perla del Golfo", Veracruz, México.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

POLYPLACOPHORANS FROM THE CORAL REEF "LA PERLA DEL GOLFO", VERACRUZ, MÉXICO

Jessica Raquel Hernández-Pérez [1], **Laura R. Álvarez-Cerrillo** [2] **y Erika Alarcón-Chavira** [2]
[1]Colección Nacional de Crustáceos del Instituto de Biología, UNAM, México;
raquel.hdzp@ciencias.unam.mx
[2]Laboratorio de Malacología, Instituto de Ciencias del Mar, UNAM, México; letgopvd@gmail.com;
ekaachavira@gmail.com

Coral reefs are one of the most diverse ecosystems on the planet where molluscs are an important part; however, the richness of this group is not totally known. The aim of this work is to contribute to the knowledge of the species richness of polyplacophorans from the coral reef "La Perla del Golfo", Veracruz, México. Samples were collected in May and August 2013 and in February 2014. A total of 100 individuals were found belonging to the class Polyplacophora, order Chitonida, the most abundant families were: Acanthochitonidae, Chaetopleuridae and Tonicellidae. The month with the highest individual abundance was August and the lowest was May, while the highest species diversity was observed in February. This study contributes with new records for Veracruz and all of them are new for "La Perla del Golfo".

POLIPLACÓFOROS DEL ARRECIFE CORALINO "LA PERLA DEL GOLFO", VERACRUZ, MÉXICO

Los arrecifes de coral constituyen uno de los ecosistemas más diversos del planeta, dentro de ellos destacan los moluscos cuya riqueza, aún en la actualidad, se desconoce en dichos ecosistemas. El presente trabajo tuvo como objetivo el contribuir con el conocimiento de la riqueza de especies de poliplacóforos del arrecife coralino La Perla del Golfo, Veracruz, México. Estos fueron recolectados en mayo y agosto del 2013 y en febrero del 2014. Se encontraron 100 individuos pertenecientes a la clase Polyplacophora, incluidos en el orden Chitonida, donde las tres familias más abundantes fueron: Acanthochitonidae, Chaetopleuridae y Tonicellidae. El mes con mayor abundancia de individuos fue agosto y el de menor fue mayo, mientras que la mayor diversidad se observó en febrero. Este estudio contribuye con nuevos registros para Veracruz y nuevos registros en su totalidad para "La Perla del Golfo".

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

ASCENDANT THERMAL STRESS IN THE *HALIOTIS FULGENS* AND *HALIOTIS CORRUGATA* ABALONES WITH THE PRESENCE OF THE WITHERING SYNDROME

Mónica Hernández-Rodríguez, Miguel A. Del Río-Portilla, Jorge A. Cáceres-Martínez, Luis F. Bückle-Ramirez, Rebeca Vásquez-Yeomans, Axayácatl Rocha-Olivares, Oscar B. Del Rio-Zaragoza, Sergio A. Castillo, Francisco Valenzuela-Buriel, and Luis A. Murillo-Valenzuela

Centro de Investigación Científica y Educación Superior de Ensenada, Carretera Ensenada-Tijuana No. 3918, Zona Playitas, 22860. Ensenada, Baja California, México; mhernand@cicese.edu.mx; mdelrio@cicese.edu.mx; jcaceres@cicese.mx; fbuckle@cicese.mx

Xenohaliotis californiensis is an intracellular bacterium (Anaplasmataceae), which produces the withering syndrome (WS) and has been found in all abalone species from Mexico. We used the ascendant thermal stress (ATS) in order to determine which extreme temperatures induce *X. californiensis* on the blue (*H. fulgens*) and yellow (*H. corrugata*) abalones. Ten abalones from each species were exposed to ATS until detachment, five were analyzed by histology and the other five were observed in order to record stress behavior and return into acclimation temperature (17°C), where they were kept until development of WS symptoms. Activity of cephalic tentacles and epipodia (CTE) was observed at 20°C for the blue abalone, while with yellow abalone was significatively different at 18.4°C ($P<0.05$). A reduction of the CTE activity and retractions was observed at 23.7 and 24.2°C. A reduction and an enlargement of the foot was observed at 32°C y 32.9°C in blue and yellow abalones, respectivelly. *H. fulgens* showed suden contractions and balancing, while *H. corrugata* did not, instead it showed violent turns and an increase of the CTE activity. The stress caused by the increase of temperature induce abalones to secret large amounts of mucus. Histology analysis showed that all blue abalones were positive to *X. californiensis* (intensity level of 3,) while only three yellow abalones were positive to *X. californiensis* (intensity level 2-3). Of the organisms that remained under observation, after three months at 17°C, only one yellow abalone showed SD symptoms. The susceptibility of the blue and yellow abalones to the presence of the SD is a consequence of their health, which can be affected by physiological conditions dictated by the environment.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

ANÁLISIS DE LA COMUNIDAD DE MOLUSCOS MARINOS ASOCIADOS A LA ZONA DE BOCAS DE DZILAM, YUCATÁN, MÉXICO

Mauricio de J. Herrera Góngora, Lorena V. León y Jorge Navarro

Universidad Autónoma de Yucatán. Campus de Ciencias Biológicas y Agropecuarias. Carretera Mérida-Xmatkuil Km. 15.5. Apdo. Postal: 4-116 Itzimná, C.P: 97100, mj_hg@msn.com; lorena.leon@uady.mx; jorge.navarro@uady.mx

El Phylum Mollusca es uno de los grupos de invertebrados más diversos, con un estimado de 120 000 especies descritas y 70, 000 fósiles. En su mayoría son organismos cosmopolitas con una remarcada diversidad de formas y tamaños. Aunque México cuenta con una gran diversidad de malacofauna, la mayoría de los estudios se enfoca a especies encontradas en playas o de importancia económica. En lo referente a moluscos presentes en Bocas de Dzilam de Bravo ésta, es inexistente. El objetivo de este estudio es caracterizar la fauna malacológica de la Laguna Costera de Bocas de Dzilam de Bravo, y su

relación con algunos parámetros físico-químicos, durante mayo del 2013. La colecta de material fue realizada por método de dragado, en 26 estaciones de muestreo seleccionadas al azar. En cada estación de muestreo se midieron parámetros físico químicos y se caracterizó la comunidad moluscos en términos de la frecuencia y abundancia para determinar la similitud entre estaciones. Se obtuvo un total de 49 especies, agrupados en 36 familias, los cuales pertenecen a las clases Gastropoda y Bivalvia. La mayor abundancia de organismos se registro en la comunidad de Bivalvos. En el caso de los gasterópodos se obtuvo mayor número de especies. Especies como: *Cerithium lutosum*, *Crepidula maculosa*, *Anomalocardia cuneimeris* y *Codakia orbicularis* registraron las mayores valores de importancia relativa. Así mismo la familia Veneridae resulto la más abundante en toda la zona y así mismo los gasterópodos la familia Cerithiidae. La laguna de Bocas de Dzilam de Bravo, presentó características de un lugar somero, ($\hat{X}$= 1.18 m), de aguas cálidas ($\hat{X}$= 29.8ºC) y predominantemente metahalino ($\hat{X}$=36.5 ppm).

COLECCIONES/COLLECTIONS-CARTEL/POSTER

LOS *TIPOS* DE LA COLECCIÓN MALACOLÓGICA HISTÓRICA "MIGUEL L. JAUM", DEPOSITADOS EN EL MUSEO NACIONAL DE HISTORIA NATURAL DE CUBA

Jane Herrera-Uria
Museo Nacional de Historia Natural de Cuba. Calle Obispo #61 entre Oficios y Baratillo, Habana Vieja, La Habana, Cuba; janehu@mnhnc.inf.cu; jazminbd@gmail.com

Se presenta la revisión del material tipo de la colección malacológica histórica "Miguel L. Jaum" depositada en el Museo Nacional de Historia Natural de Cuba. Se ofrecen los datos de las etiquetas originales del autor y se comprueba la veracidad de esta información según las descripciones originales de cada especie. En total se contabilizaron 278 ejemplares incluidos en 20 subespecies, 13 especies, 12 géneros y seis familias, correspondiendo a 33 localidades y 17 colectores.

We have revised the historic malacological collection "Miguel L. Jaume," housed in the Cuban National Museum of Natural History. The original label data was copied and the veracity of the information was checked with the original descriptions of all species. The historic collection has 278 specimens included in 20 subspecies, 13 species, 12 generous and six families. The total of localities and collectors was 33 and 17 respectively.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-PONENCIA/ORAL PRESENTATION

MOLECULAR TAXONOMY OF *VIANA REGINA* (MORELET, 1849) IN CUBA (GASTROPODA, NERITIMORPHA, HELICINIDAE)

Jane Herrera-Uria [1], Karin Breugelmans [2] and Thierry Backeljau [2,3]
[1]Museo Nacional de Historia Natural de Cuba, Obispo 61, CP-10100, Habana Vieja, Cuba
janehu@mnhnc.inf.cu
[2]Royal Belgian Institute of Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium
Email: Karin.Breugelmans@naturalsciences.be; Thierry.Backeljau@naturalsciences.be
[3]Evolutionary Ecology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium

Cuba has a rich terrestrial malacofauna with > 1300 species of which about 95% are endemic. One of the emblematic species is *Viana regina* (Morelet, 1849), which is an endemic taxon in the region of Pinar del Rio. Currently, the species is divided in three subspecies with relatively well-defined distribution areas, viz. *V. r. regina* (Sierra de Viñales to Soroa), *V. r. laevigata* (Pfeiffer, 1865) (Sierra de los Organos) and *V. r. subunguiculata* (Poey, 1859) (Sierra de Guane to Sierra de Quemado). The three taxa differ only in a few subtle and highly variable conchological features, including shell color patterns and the form of the peristomal lip. Some authors have even suggested that the variation in these characters may reflect ecophenotypic, rather than subspecific, differentiation. As such, the significance of these supposedly taxon-specific differences and the concomitant taxonomic interpretation of the three subspecies need corroboration. Therefore we analyzed nucleotide sequence variation of three mtDNA (COI, 16S rRNA, Cyt b) and two nuclear (ITS-1, ITS-2) gene fragments in nine *V. regina* populations (165 specimens), representing the three subspecies. These sequence data were used for phylogenetic reconstruction and DNA barcoding, showing that the three subspecies are consistently differentiated under a phylogenetic (lineage) species concept. The three taxa also seem to show a strong geographic structuring. The implications of these results will be discussed in the light of future conservation plans for *V. regina*.

GENERAL-CARTEL/POSTER

BIO-ECOLOGICAL ASPECTS AND GASTROPOD SHELL USE BY THE HERMIT CRAB *CALCINUS CALIFORNIENSIS* BOUVIER (PAGUROIDEA: DIOGENIDAE) IN BAHÍA DE CHAMELA, JALISCO, MÉXICO

Diana Citlalli Jacobo Macías [1], Manuel Ayón Parente [1], Eduardo Ríos-Jara [1] and Cristian Moisés Galván Villa [1]

[1]Departamento de Ecología, Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara, Carretera a Nogales km. 15.5, Las Agujas, Nextipac, 45110 Zapopan, Jalisco, México; eriosjara@gmail.com

In the Mexican Pacific studies on hermit crab biology are scanty considering the biodiversity local. In this way, some population features such as size frequency distribution, sex ratio, fecundity and shell occupation of the hermit crab *Calcinus californiensis* Bouvier, 1898 were studied. Specimens were collected by hand and snorkel methods in the intertidal and shallow subtidal areas of Bahía de Chamela. Preliminary results using a total of 109 individuals show that shield length (SL) of male crabs ranged between 1.3-7.3 mm (mean= 3.42 ±1.21sd) and 1.3 - 7.3 mm (mean = 3.49 ±1.19 sd) for females. The sex ratio was ♀ 1:1.60 ♂, most males in the largest size classes. The hermit crab occupied shells from 15 gastropod species; *Cantharus sanguinolentus* (Duclus, 1833) was the most occupied shell (25.24%). The occupation of shells was 13 in males, 10 in ovigerous females and 7 in non-ovigerous females. To evaluate fecundity, a total of 21 ovigerous females were analyzed. Individual fecundity ranged from 106 eggs (SL= 2.1 mm) to 749 eggs (SL= 6.3 mm) and mean fecundity was 431.05±=141.86 eggs. Significant correlations were obtained in some regression analysis, thus demonstrating differences between the size of the crabs and the size the gastropod shells. In area of study, *C. californiensis* is well represented compared with other hermit crab species. The shell utilization varies as a function of its availability and hermit crabs interspecific competition.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

ABUNDANCIA Y RIQUEZA DE MOLUSCOS EN PRADERAS DE *THALASSIA TESTUDINUM* EN EL GOLFO DE CARIACO, ESTADO SUCRE, VENEZUELA

Mayré Jiménez Prieto [1], Thays Allen [1], Sioliz Villafranca [2], Johanna Fernández [3], Edris Figuera [1] y Samuel Narciso [4]

[1]Instituto Oceanográfico de Venezuela, Departamento de Biología Marina, Núcleo de Sucre, Universidad de Oriente; mayrej@gmail.com; thayscor@yahoo.com

[2]Escuela de Humanidades y Educación, Núcleo de Sucre, Venezuela; svillafranca@yahoo.com

[3] Museo del Mar, Universidad de Oriente; johnannafer@hotmail.com

[4]FUDENA; samuelnarciso@gmail.com

El Golfo de Cariaco se encuentra ubicado en la región nororiental de Venezuela, entre los 10° 25' y 10° 35' N y 63° 40' y 64° 13' O, al este de la fosa de Cariaco. Representa un área ecológicamente importante por sus diversos ambientes que van desde playas arenosas hasta bosques de mangles, incluyendo lagunas costeras, parches coralinos y praderas de *Thalassia testudinum*, siendo los moluscos un grupo de organismos ampliamente distribuidos en estos ambientes, por lo que el objetivo de esta investigación fue estudiar la fauna de moluscos asociados a estas praderas**.** El material fue colectado en cuatro estaciones localizadas dentro del Golfo, con un nucleador de PVC de 0,015 m², y fue lavado y separado con un tamiz de malla de 1 mm apertura de malla, donde fueron separados los organismos y la planta para su posterior estudio. Se colectó un total de 1980 organismos contenidos en tres clases Bivalvia, Gasteropoda y Polyplacophora contenidos en 9 órdenes, 29 familias y 72 especies. Para los bivalvos las especies constantes y más abundantes fueron *Chione cancellata, Modiolus modiolus*, *Brachidontes exustus*, *Anadara notabilis*, *Arca zebra*, *Pinctada imbricada* y *Trachicardium muricatum.* Para los gasterópodos, *Modulus modulus*, *Nasarius vibex, Turritella acropora*, *Smaragdia viridis* y *Murex pomun*, encontrándose la menor abundancia de organismos y especies para los poliplacóforos con solamente tres especies; *Ischnochiton striolatus*, *Lepidichitona liozonis* y *Chiton marmoratus*. La abundancia de organismos y especies guardó relación con la biomasa de la fanerógama debido posiblemente a la protección que ofrece la planta contra los depredadores y a la disponibilidad de alimento de este importante ecosistema.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-CARTEL/POSTER

CONTRASTING ADAPTATIONS OF TWO LIMPET SPECIES (LOTTIDAE) THAT CO-INHABIT *EGREGIA MENZIESII*, A SEASONAL KELP IN SOUTHERN CALIFORNIA

Chrystal Johnson and Douglas J. Eernisse

Department of Biological Science, California State University Fullerton, Fullerton, CA 92834; chrystalina@csu.fullerton.edu; deernisse@exchange.fullerton.edu

The seaweed limpet, *Lottia insessa* is a specialist that exclusively lives and feeds on feather boa kelp, *Egregia menziesii*. The southern (S) shield limpet, *L. pelta* (S), is a generalist that is able to live and feed on various substrata throughout the low and mid-low intertidal zones, including on the stipes of *E. menziesii*. During southern California winter storms, this kelp dramatically gets cropped resulting in the loss of its inhabitants. *L. insessa* has an annual life cycle that reflects this seasonal cropping, with population replenishment each spring from recruiting larvae. In contrast, we suspect the longer-lived *L. pelta* (S) that are on kelp stipes move to rocks underneath nearby rockweed. We inferred this pattern by finding *L. pelta* (S) under rockweeds whose shells have a peculiar morphology we call 'mid-life crisis

morph' (MCM). The lower/younger half of their shell resembles a normal 'rock morph,' while the upper/older half has a remarkable resemblance to *L. insessa*. These, and other observations, led us to predict that *L. pelta* (S) should mostly be found on the kelp on rocky shores where rockweeds are present, whereas *L. insessa* should predominate at sandy sites without nearby rockweeds. We supported this correlative hypothesis with time-search studies at southern California sites that differed in rockweed availability. In fact, we found only *L. insessa* at one sandy site without rockweeds. We also hypothesized that the MCM is a phenotypic response of *L. pelta* (S) responding to their change in microhabitat. To test this hypothesis we are tagging and periodically measuring shells of recently migrated *L. pelta* (S). So far, these shells appear to have grown longer and wider, while not growing much higher. Studies documenting phenotypic plasticity can be useful for understanding how organisms with contrasting lifestyles (e.g. specialists vs. generalist) deal with the same habitat variability.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-PONENCIA/ORAL PRESENTATION

A RE-EXAMINATION OF THE FOSSIL LAND SNAIL "*HELIX*" SP. (GASTROPODA: PULMONATA) FROM THE MIDDLE OLIGOCENE OF NUEVO LEÓN USING HIGH RESOLUTION X-RAY COMPUTED TOMOGRAPHY.

Mary Jones [1], Ned E. Strenth [1] and Alfonso Correa-Sandoval [2]

[1]Angelo State University, ASU Station 10890, San Angelo, Texas 76909, USA; mjones40@angelo.edu; ned.strenth@angelo.edu

[2]Instituto Technológico de Ciudad Victoria, Blvd. Emilio Portes Gil No. 1301 Pte., C.P. 87010, A.P. 175, Cd. Victoria, Tamaulipas, México; agutierr@uat.edu.mx

Large fossil pulmonate gastropods from the middle Oligocene of northeastern México were assigned to "*Helix*" sp. These specimens were later synonymized by in the description of a new fossil land snail, *Lysinoe breedlovei* Roth 198*,* from the Big Bend region of west Texas. The type locality of *Lysinoe breedlovei* at Capote Creek, Presidio County, Texas differs considerably from that of the "*Helix*" sp. specimen both in age and faunal associations. This study re-examines morphological variation of the type series to that of the Gardner specimen using High Resolution X-Ray Computed Tomography. X-ray CT scanning allows for a non-invasive re-examination of the internal morphology that was not available in previous studies. Linear and angular measurements were obtained for multiple characteristics with the computer software program IMAGEJ. These measurements were analyzed by means of the statistical program R, using a Bray Curtis Similarity Index. This analysis evaluates the similarities between the type series and the Nuevo Leon specimen. Statistical analysis revealed significant variation not only between the "*Helix*" sp. specimen but also within the type series of *Lysinoe breedlovei*. The variation found warrants further investigation with more specimens from this locality. Pending the examination of additional fossils, if the existing variation continues to show distinct separation, then this variation does not appear to support the assignment of "*Helix*" sp. to *Lysinoe breedlovei*.

RAMSAR-PONENCIA/ORAL PRESENTATION

CALL FOR COLLABORATION: KNOWLEDGE GAPS ON BIVALVE-FORMED HABITAT REPRESENTATION IN RAMSAR SITES

Tim Kasoar [1], Boze Hancock [2], Philine zu Ermgassen [3], Mark Spalding [4] and Alvar Carranza [5]

[1] The Nature Conservancy and Department of Zoology, University of Cambridge. tak29@cam.ac.uk

[2] The Nature Conservancy Global Marine Team, University of Rhode Island Narragansett Bay Campus, Narragansett, RI, USA. bhancock@tnc.org

[3] The Nature Conservancy and Department of Zoology, University of Cambridge. psez2@cam.ac.uk

[4] The Nature Conservancy and Department of Zoology, University of Cambridge. mspalding@tnc.org

[5] Centro Universitario Regional Este-CURE, Universidad de la República, Maldonado, Uruguay and Area Biodiversidad y Conservación, Museo Nacional de Historia Natural, Montevideo, Uruguay. alvardoc@fcien.edu.uy

Bivalve habitat (eg. oyster reefs, mussel beds) has recently been recognised as a distinct wetland type under the Ramsar Convention, due to its ecological importance and globally poor conservation state. As such, managers of sites will want to report the presence and extent of this habitat type in their Ramsar Information Sheet (RIS) updates. The aim of this study was to investigate the extent of bivalve reef in existing Ramsar sites and to encourage future RISs to accurately record this habitat where it exists. We first reviewed current RISs for references to the presence of bivalve reef or reef-forming bivalves. We then used publically available collection records and expert advice to provide additional information about the presence of bivalve reefs, to compare with the RIS data. The results suggest that there are many sites in which reef-forming bivalve species are present, but not reported in the RIS. Fewer data were available about the presence of reef itself, but it was still possible to identify a number of sites which do have bivalve reef that is not reported in the RIS. There are knowledge gaps still remaining. Reporting is geographically biased, and, in particular, data are lacking from many developing nations. We expect that experts have additional knowledge even where quantitative monitoring results are not available. Data on the presence of habitat as opposed to species is also generally lacking, but is important for our understanding of whether bivalves in a site play an ecologically significant role. In this line, we call for collaboration of the Malacological community to fill these data gaps and help identify Ramsar sites with bivalve habitat that has not been included in the site RIS. During MOLLUSCA 2014, our team will be available to discuss avenues for accomplishing this goal.

LLAMADO A COLABORACIÓN: VACÍOS DE CONOCIMIENTO ASOCIADOS A LA REPRESENTACION DE HABITATS FORMADOS POR BIVALVOS EN SITIOS RAMSAR

Los hábitats formados por moluscos bivalvos (eg. Bancos de ostras o mejillones) han sido recientemente reconocidos como una categoría de humedal bajo la Convención RAMSAR, debido a su importancia ecológica y su estado de conservación a nivel global. Por lo tanto, los administradores de los sitios RAMSAR deberían actualizar la información sobre presencia y extensión de este tipo de hábitat en la Ficha de Información RAMSAR (RIS por sus siglas en inglés). El objetivo de este estudio fue investigar la extensión de estos hábitats en los sitios RAMSAR existentes, así como promover la adecuada comunicación de dicha información en las futuras RIS. En primer lugar se revisaron las RIS buscando referencias a la presencia de hábitats formados por moluscos bivalvos y/o la presencia de especies formadoras de hábitat. Luego se utilizaron bases de datos publicados y consejo de expertos para proveer información adicional sobre la presencia de estos hábitats, y dicha información fue comparada con los datos presentados en las RISs. Los resultados sugieren que existen sitios donde existen especies

formadoras de hábitat, pero que las mismas no están representadas en las RISs. Aun menos información existe sobe la presencia de hábitats formados por bivalvos, aunque fue posible identificar algunos sitios que los presentan, mas allá de que tampoco están reportados en las RISs. Existen por lo tanto importantes vacíos de información. La información reportada presenta sesgos geográficos, y, en particular, faltan datos de los países en desarrollo. Se espera que los expertos de estos países posean información adicional, aun cuando no existan datos cuantitativos. La información sobre la presencia de hábitats, en contraste con presencia de especies formadoras de hábitat esta generalmente ausente, pero resulta de suma importancia para comprender cuando las especies de bivalvos tienen un rol ecológico importante. En tal sentido, pedimos la colaboración de la comunidad malacológica para llenar estos vacíos de información, y para identificar sitios RAMSAR que incluyan hábitats formados por bivalvos. Durante MOLLUSCA 2014, nuestro equipo estará disponible para discutir mecanismos para lograr este objetivo.

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-PONENCIA/ORAL PRESENTATION

PERSISTENCE OF HABITATS AND POPULATIONS OF SMALL, NATIVE HYDROBIID SNAILS IN BRACKISH MARSHES AROUND SAN FRANCISCO BAY, CALIFORNIA, AFTER DROUGHT CONDITIONS

Christopher L. Kitting
Department of Biological Sciences, California State University East Bay,
Hayward, CA 94542 USA; chris.kitting@csueastbay.edu

During 1999-2014, we discovered populations of inconspicuous, ~5-mm hydrobid snails at several semi-isolated marshes around San Francisco Bay, where freshwater meets salt water. Our coring indicated these are native species, including *Tryonia porrecta* (appearing to be *Hydrobia andersoni* in fossils). However, invasive New Zealand mud snails (*Potamopyrgus antipodarum*) have appeared and persisted at nearby sites, often in freshwater.

Our long-term, non-invasive monitoring at some of these sites with and without these small snails suggested these abundances to be quite stable, but the recent, record drought of 2013 risked high salinities in these vulnerable brackish areas, including a site with the endangered California brackish water snail, *Tryonia imitator*. Evaporation, relative to decreased freshwater input, could elevate these salinities from typically <8% seawater to salt flats with ~400% of seawater salinities, with salt crystals.

Sites in presently 100% seawater (30 ppt) at Elkhorn Slough, on nearby Monterey Bay, once with frequent *Tryonia imitator* endangered brackish water snails, yielded only dead shells during this past ~15 years. Yet a site nearby at 50% seawater yielded small (3mm) endangered *Tryonia imitator* brackish water snails observed (live) on green algae among pickleweed, at warm (23 degree C) water temperatures, soon after rare rains during the drought, in April, 2014. Salt pannes (with salt crystals) appeared nearby. Simultaneously, adult freshwater snails, *Physa spp*, persisted as common in only some of our freshwater ponds and creeks (without invasive New Zealand mud snails being found there).

Isolated marshes may have advantages in slowing colonization of invasive species. Despite vulnerability of semi-isolated brackish-water sites to elevated salt during drought, some sites maintained these native snails (without invasive snails) after drought conditions and decreased snail population densities there. California natives, from California's variable climate, might even be adapted to extreme conditions, unlike invasive species from more constant climates.

CONIDAE-PONENCIA/ORAL PRESENTATION

EARLY LIFE HISTORY, BIOGEOGRAPHY AND EVOLUTION OF WESTERN ATLANTIC *CONUS*

Alan J. Kohn
Department of Biology, University of Washington, Box 351800, Seattle, Washington 98195

Comparative study of embryonic and larval development by Kohn and Perron 20 years ago showed that egg size is a critical variable that allows accurate prediction of several attributes of early life history among Indo-West Pacific *Conus* species, including duration of intracapsular development, size at hatching, duration of the precompetent planktonic phase, and larval growth rate, as well as aspects of geographic distribution. The results were generally consistent with Shuto's model, which related maximum protoconch diameter and number of whorls to whether development in prosobranchs is planktotrophic or lecithotrophic. Egg diameters of IWP *Conus* range 125-800µm; those with eggs >450 mm hatch as nonplanktonic lecithotrophs. At that time, we had very little information on members of the genus in other regions, and few such data have accrued in the intervening years. I revisited this problem in connection with preparation of a forthcoming monograph of western Atlantic *Conus*, and report the results of this analysis. Because similar comparative development studies were not feasible, and we have direct information on egg size for only six of >50 western Atlantic species, the WA study relies on measurements of protoconch diameters and whorl counts from shells of juveniles and adults as proxies for observations of eggs and developing larvae.

In contrast to the IWP, the large majority of western Atlantic *Conus* species are concluded to have nonplanktonic development, consistent with data from other molluscan taxa and other marine invertebrate groups. I interpret this in relation to tectonic events mainly associated with the rise of the Central American Isthmus and the accompanying changes in patterns of ocean currents and marine primary productivity in the region. Recent advances in species-level molecular phylogeny of some western Atlantic *Conus* clades also help to relate limited dispersal abilities to geographic distributions and speciation events.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

IN-SITU EXPERIMENTS ON REMOVAL RATES OF PARTICULATED ORGANIC MATERIALS FROM TIDAL WATERS BY MANILA CLAM, *RUDITAPES PHILIPPINARUM*

Bon Joo Koo
Marine Ecosystem Research Division, Korea Institute of Ocean Science & Technology,
787 Haeanro, Sangnokgu, 426-744 Ansan, Kyeonggido, Republic of Korea; bjkoo@kiost.ac

The Korean littleneck clam or manila clam, *Ruditapes philippinarum*, belongs to the Veneridae family, which is an infaunal suspension-feeding bivalve and one of the most commercially exploited clams in the world. This clam is one of the most important shellfish resource and a popular recreational species in Korea and the annual catches reached 40,393 metric tons in 2009, of which approximately 2,800 metric tons was landed from the Geunso-bay tidal flat of this study area. To assess its role in the organic matter recycling in the coastal ecosystem, its filtering rates were evaluated in situ experiments. Filtering rates were calculated from the difference in particulate organic carbon (POC), nitrogen (PON) and chlorophyll-a (Chl-a) concentration in tidal water between before and after their feeding. The filtering rate ranged from 1.15 to 4.20 $l^{-1}h^{-1}g^{-1}$ (DW soft tissue) with respect to in situ circumstances. This study suggests that

Ruditapes philippinarum plays an important role in coupling the material fluxes from the water column to the sea bed, cleaning 15% of organic materials in water

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

GENETIC DIVERSITY OF HATCHERY-REARED RED ABALONE *HALIOTIS RUFESCENS* IN BAJA CALIFORNIA, MÉXICO

Fabiola Lafarga-De la Cruz [1], Andrea Aguilar-Espinoza [2], Carmen E. Vargas-Peralta [1], Anaid Saavedra-Flores [1], Cristian Gallardo-Escárate [2] and Miguel Á. del Río-Portilla [1]

[1] Departamento de Acuicultura, Centro de Investigación Científica y de Educación Superior de Ensenada, B.C., Carretera Ensenada-Tijuana #3918. Zona Playitas. Ensenada, Baja California, México, C.P. 22860; flafarga@cicese.mx; cevargas@cicese.mx; asaavedr@cicese.edu.mx; mdelrio@cicese.mx

[2]Laboratorio de Biotecnología y Genética Acuícola, Universidad de Concepción, P.O. Box 160-C, Concepción, Chile; aguilar.espinoza@gmail.com; crisgallardo@oceanografia.udec.cl

The red abalone, *Haliotis rufescens,* is one of the most important mollusk aquaculture species in Chile and México, which comprises more than 95% of the abalone production. Because a loss of genetic variability has been observed with other cultured abalone species worldwide (*H. iris, H. rubra, H. midae, H. discus* and *H. asinina*) as a result of selective breeding practices, small effective populations sizes, seed and juvenile movement among farms and the lack of a breeding program and therefore it is important to know the genetic status of brood stock. In order to evaluate the current genetic diversity of hatchery-reared red abalone in México, we used 15 simple sequence repeats from expression sequence tags (EST-SSR) as genetic markers. Abalone from three farms (Ejido Eréndira, San Quintín and El Rosario), and one wild population from Santo Tomas, Baja California were sampled. Total DNA was extracted from epipodial tissue and EST-SSR markers were PCR amplified and analyzed using high-resolution capillary electrophoresis. After genotyping, we estimated the genetic variability parameters as allele number (*N*), observed and expected heterozygosity (H_o, H_e), adjustment to the Hardy-Weinberg Equilibrium (*HWE*). Additionally, genetic diversity within and among the three hatchery strains and the wild population was calculated as inbreeding coefficient F_{IS} and fixation index F_{ST}. Preliminary results showed loss of genetic variation in hatchery strains of the red abalone as compared with the wild population, as evaluated in lower *N* and H_o than expected, also deviations from *HWE* (due to heterozygous deficiency, F_{IS} >0) indicating a tendency to endogamy; whereas, pair-wise F_{ST} test showed differences between hatcheries. The current study contributes to the genetic knowledge of the Mexican red abalone resource. These markers can be useful in abalone breeding programs to maintain or improve the genetic diversity of hatchery-reared individuals for aquaculture and restoration activities.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

ECOLOGICAL ASPECTS OF THE MARINE SNAILS *CONUS* ASSOCIATED TO THE CORAL REEF OF TENACATITA, JALISCO, MÉXICO.

Víctor Landa-Jaime [1], Emilio Michel-Morfin [1], Judith Arciniega-Flores [1], Israel Muñíz [1], Gilberto Medina [1], Mirella Saucedo-Lozano [1], Sergio Castillo Vargasmachuca [2], Manuel Aguilar [3] y Edgar P. Heimer de la Cotera [3]

[1]Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras. CUCSUR. Universidad de Guadalajara. Gómez Farías No. 82. San Patricio-Melaque, Jal., México; landavj@gmail.com

[2]Escuela Nacional de Ingeniería. Universidad Autónoma de Nayarit. San Blas, Nay., México.
[3]Laboratorio de Neuroarmacología Marina. Instituto de Neurobiología. Universidad Nacional Autónoma de México. Campus Juriquilla, Qro., México.

Here, we describe the marine snail population of the *Conus* genus associated with the coral reef of Tenacatita, Jalisco. We examined the ecological aspects of the reef, obtaining an overview of its biotic and abiotic attributes, such as bathymetry, substrata types, environmental diversity, and the communities present. The reef structure is formed by seven stony coral species, among which *Pocillopora damicornis* predominates. To describe the cone populations, 15 sampling events were performed during 2011 and 2012 in the intertidal zone, the reef plateau, and the deep zone. A low-impact sampling method was established in which the *Conus* snails were liberated at the same collection site after registering the pertinent information. The species found, in order of abundance, were: 503 *Conus nux*, 245 *C. brunneus,* 39 *C. princeps,* 20 *C. gladiator* y 13 *C. purpurascens.* In total, 820 live snails were collected, of which *Conus nux* and *Conus brunneus* constituted 61% and 29%, respectively. The most conspicuous species, *C. nux,* was founded in a range of 0-12 m and a maximum relative density of 16 org/200 m^2. Using Geographic Information Systems (GIS), the bathymetric distribution and spatial dispersion were determined for each species. Most of the species exhibit aggregate-type dispersion and are mainly distributed in the shallow areas of the reef, while *C. purpurascens* has a random distribution and can be found at mayor depths. The coverage analysis of the substrata preferred by each species, carried out through the Coral point count program, reveals a marked affinity of *C. nux* and *C. purpurascens* for the coralline substratum, and of *C. brunneus* for coral pieces. Finally, the relevance of the information obtained from this study is discussed with the purpose of structuring and proposing an adequate protection model for the reef and the fauna associated with it, as well as for planning its management and sustainable use.

CONIDAE-PONENCIA/ORAL PRESENTATION

MOLECULAR DATA SUGGEST THE PRESENCE OF A NEGLECTED SPECIES IN MARINE GASTROPOD GENUS *CONUS*

Alyssa Lawler [1], Thomas F. Duda, Jr. [1,2]
[1]Museum of Zoology and Department of Ecology and Evolutionary Biology, University of Michigan, 1109 Geddes Avenue, Ann Arbor, Michigan 48109, USA; ajlawler@umich.edu; tfduda@umich.edu
[2]Smithsonian Tropical Research Institute, Balboa, Ancón, Republic of Panama

Direct conflict between results from phylogenetic analyses of mitochondrial and nuclear data is a common obstacle in determining evolutionary relationships among species. This phenomenon is often attributed to incomplete lineage sorting, but recent discoveries have pointed to hybridization as a likely explanation as well. In the course of evaluating the relationships and phylogeography of two closely related members of the marine gastropod family Conidae, *Conus flavidus* and *Conus frigidus*, we discovered that individuals of *Conus flavidus* from Hawaii possess mitochondrial haplotypes that are more similar to haplotypes of *C. frigidus* than to those of *C. flavidus* from elsewhere in the Indo-West Pacific. In addition, sequences of mitochondrial gene regions from each of these groups of individuals (i.e., *C. flavidus* from Hawaii and *C. frigidus* and *C. flavidus* from Guam and American Samoa) occur in reciprocally monophyletic clades in phylogenetic reconstructions. Nuclear gene sequences of individuals of *Conus flavidus* from Hawaii though are identical or similar to sequences of *C. flavidus* from Guam and American Samoa. These results suggest that the population of *C. flavidus* at Hawaii may represent a distinct species that may have already been (aptly) described by Pease in 1861 as *C. neglectus*.

Moreover, based on the contradictory relationships inferred from analyses of mitochondrial and nuclear sequences, this species may have originated through hybridization of *C. flavidus* and *C. frigidus*.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS/PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

BIVALVE BIOGEOGRAPHIC DISTRIBUTIONS, ABUNDANCES, AND CLIMATE VULNERABILITY FROM THE BEAUFORT SEA TO THE GULF OF CALIFORNIA

Henry Lee II [1], Rene Graham [2], Paul Valentich-Scott [3], Deborah A. Reusser [4], Christina L. Folger [1], Katharine M. Marko [1]

[1]US EPA, Western Ecology Division, Pacific Coastal Ecology Branch, Newport, OR, USA; Lee.Henry@epa.gov; Marko.Katharine@epa.gov; Folger.Christina@epa.gov

[2]Dynamac Corporation, Corvallis, OR, USA; Graham.Rene@epa.gov

[3]Santa Barbara Museum of Natural History, Santa Barbara, CA, USA; pvscott@sbnature2.org

[4]USGS, Western Fisheries Research Center, Newport, OR, USA; dreusser@usgs.gov

As part of an U.S. EPA/USGS project to predict the relative vulnerability of near-coastal species to climate change along the Pacific Coast, we have synthesized the biogeographic distributions and abundances of bivalves found in depths ≤200 m. We have included the twelve "Marine Ecoregions of the World" (MEOW) ecoregions that range from the Beaufort Sea to the Gulf of California (GOC). The biogeographic patterns and life history traits are being synthesized in a web-based tool, the Coastal Biogeographic Risk Analysis Tool (CBRAT). A total of 889 bivalve species have been reported over this domain, with the GOC having the greatest species richness (627) and the Beaufort the lowest (66). There are 31 endemic bivalves, with the GOC having the majority (19) and Southern California the next highest concentration (8). Of the 71 families present, Veneridae is the most speciose with 86 species, while 10 families are only represented by a single species, of which two are considered nonindigenous. As a key trait to predicting climate vulnerability, we are presently assigning relative abundances to each species in each ecoregion. The most progress has been made in the area between Southern California and Canada, where over 94% of the species have an assigned relative abundance. Additionally, we have analyzed the biogeographic distributions of three high vulnerability species traits (endemicity, exclusively intertidal distributions, and symbionts) and one resilience trait (brooding). After further ecoregional abundances are assigned, the species traits and abundance patterns will be synthesized to generate ecoregional vulnerability scores. For example, *Nuttallia obscurata*, a nonindigenous species with an increasing population, is projected to have a lower vulnerability than *Neaeromya compressa*, a commensal with relatively rare populations everywhere.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

SEXUAL DIMORPHISM AND OVERLAP BETWEEN FEMALES AND MALES OF *FIROLOIDA DESMARESTIA* (HETEROPODA) FROM THE SOUTHERN GULF OF MEXICO

Elia Lemus-Santana and Laura Sanvicente-Añorve

Laboratorio de Ecología de Sistemas Pelágicos, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Cuidad Universitaria, 04510, México D.F.; lesael01@yahoo.com.mx; sanvi@cmarl.unam.mx

The heteropod *Firoloida desmarestia* is often found in neritic and oceanic waters of tropical and subtropical regions of the world. Despite its wide distribution, studies on the reproduction of this species are scarce. In this study we identified the main morphological characters that discriminate males from females and we determined the sex ratio. A total of 187 zooplankton samples were collected in May and November from 28 oceanographic stations located in the neritic waters of the southern Gulf of Mexico. At each station, zooplankton samples were taken at five strata of the water column (0 - 6, 6 -12, 12 - 18, 45 - 55, and 95 - 105 m) using an opening-closing net system of 500-µm mesh size nets; also, temperature and salinity were measured with a CTD probe. A total of 345 individuals of *F. desmarestia*, which represented 12% of the total heteropod abundance, were analyzed. The morphological characters that distinguish the males are: a voluminous penis, a pair of tentacles protruding from the forehead close to the base of the eyes and a small sucker located on the anterior margin of the swimming fin. In the females, all these structures are lacking, but sometimes they present an egg string extending posteriorly from base of the visceral nucleus. The female:male ratio was 1:1 in May and 1.6:1 in November. Seasonally, *F. desmarestia* population was more abundant in May (Mann-Whitney *U* test, $p < 0.05$), suggesting that the encounter rate between males and females is higher in May. To prove this hypothesis, we applied the Niche Overlap Index (*C*), an index ranging from 0 to 1, the minimum and the maximum overlap values, respectively. Thus, in May $C = 0.67$ and in November, $C = 0.54$; these results support our hypothesis. Therefore, in the warm month of May, *F. desmarestia* population is more abundant due to a high encounter rate between males and females and to warmer temperatures that stimulate the reproduction processes.

DIMORFISMO SEXUAL Y TRASLAPAMIENTO ENTRE HEMBRAS Y MACHOS DE *FIROLOIDA DESMARESTIA* (HETEROPODA) EN EL SUR DEL GOLFO DE MÉXICO

Firoloida desmarestia es un heterópodo frecuentemente registrado en aguas neríticas y oceánicas de zonas tropicales y subtropicales del mundo. A pesar de su amplia distribución, los estudios acerca de su reproducción son escasos. Tomando como objeto de estudio la población de *F. desmarestia*, en este trabajo se reconocieron los principales caracteres morfológicos que discriminan a machos de hembras y se determinó la proporción de sexos, en mayo y noviembre. Se analizaron 187 muestras de zooplancton obtenidas en 28 estaciones oceanográficas localizadas en aguas neríticas del sur del Golfo de México. En cada estación, se recolectaron muestras de zooplancton en cinco niveles de la columna de agua (0-6, 6-12, 12-18, 45-55 y 95-105 m) con una red de apertura-cierre de 500 µm de luz de malla y se tomaron registros de temperatura y salinidad con una sonda CTD. Se analizó un total de 345 individuos de *F. desmarestia*, que representaron el 12% de la abundancia total de heterópodos. Los caracteres morfológicos que distinguen a los machos son: un pene prominente, un par de tentáculos desarrollados cerca de la base de los ojos y una pequeña ventosa en el margen de la aleta natatoria. Todas estas estructuras están ausentes en las hembras, las cuales en ocasiones presentan un filamento de huevos adherido al cuerpo. La proporción hembra:macho fue de 1:1 en mayo y 1.6:1 en noviembre. Estacionalmente, la población de *F. desmarestia* fue más abundante en mayo (*U* Mann-Whitney, $p < 0.05$), lo que lleva a pensar que el encuentro entre machos y hembras es mayor en mayo. Para probar esta hipótesis, se aplicó el Índice de Sobreposición de Nichos (*C*), el cual toma valores entre 0 y 1, que significan la mínima y máxima sobreposición, respectivamente. Así, en mayo $C = 0.67$ y en noviembre $C = 0.54$, lo cual prueba nuestra hipótesis. Por tanto, en el mes cálido de mayo, la población de *F. desmarestia* es alta como consecuencias de un mayor encuentro entre machos y hembras y de las altas temperaturas que inducen la reproducción.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

GENETIC AND REPRODUCTIVE CHARACTERS IN THE GENUS *ARIOLIMAX*

Janet L Leonard [1], Thierry Backeljau [2], Karin Breugelmans [2] and John S. Pearse [1]

1Joseph M. Long Marine Laboratory, 100 Shaffer Road, University of California-Santa Cruz, Santa Cruz, CA 95060 USA; jlleonar@ucsc.edu; pearse@biology.ucsc.edu
[2]Royal Belgian Institute of Natural Sciences, Vautierstraat 29, B-1000 Brussels, BELGIUM; Thierry.Backeljau@naturalsciences.be

Banana slugs of the genus *Ariolimax* are distributed along the Pacific coast of North America from Alaska to southern California. On the basis of genital morphology, 5 taxa in two subgenera were identified by H.A. Pilsbry. Data from 3 mt DNA loci (cyt b, 16-S rDNA, COI) show four well-supported clades, with the subgenus *Ariolimax* of Pilsbry actually consisting of three clades, *A. columbianus, A. stramineus* (described as a subspecies of *A. columbianus*) and *A. buttoni,* which had been synonymized with *A. columbianus*. The fourth clade includes three taxa included by Pilsbry in the subgenus *Meadarion, A. dolichophallus, A. californicus* and *A. c. brachyphallus.* Preliminary mt DNA data also suggest that there may be an additional clade from Palomar Mountain in San Diego County, California, and a new subclade within *Meadarion* from Fremont Peak, San Benito County, California. The data support Pilsbry's subgenus *Meadarion*, but, since the four clades form a comb structure in the phylogenetic tree, no light is shed on the validity of the subgenus *Ariolimax*. The DNA evidence indicates that evolution in the genus has been rapid, since phylogenetic trees derived from mt DNA data show a pattern of short internal branches and 19 microsatellite loci identified from *A. californicus* consistently amplify in all of the described taxa, suggesting that all these taxa are very closely related. *A. stramineus* differs markedly from either *A. columbianus* or *A. buttoni* in both genital morphology and sexual behavior, and is regarded as a distinct species. The *Meadarion* taxa have separate but adjacent geographic ranges but they are not separable by mt DNA genes. However, they are clearly identifiable by genital morphology, sexual behavior and life history characteristics, suggesting they may be biological species.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

THE FIRST REGISTER OF *LOLLIGUNCULA (LOLIOPSIS) DIOMEDEAE* (HOYLE, 1904) (MOLLUSCA: CEPHALOPODA) IN PUERTO ANGEL BAY OAXACA, MEXICO

Sairi Sarai León-Guzmán, Karen Maritza Ortega-Ramírez, Antony Enrique Briceño-Vera
Programa de Biología Marina Universidad del Mar, Campus Puerto Ángel, Ciudad Universitaria, Pto. Ángel, San Pedro Pochutla, C.P. 70902, Oaxaca, México.sai-guz7@hotmail.com; ortega_karm@hotmail.com; antony.gpb3@hotmail.com

We present the first register of *Lolliguncula diomedeae* in Puerto Angel bay Oaxaca (15° 40' 8''N, 96° 29' W). During the second week of March 2014, the artisanal fishermen caught squid in surface with a spoon net. These were identified as *L. diomedeae*, they present the next characteristics: both arms hectocotylized in the males, arms modified in long all its them longitude; rings of the souckers on the arms with 10-11 squares teeth; with 4 to 10 souckers on the lobules the buccal membrane. Is measured the mantle length (ML), total weigth (TW), sex, fin length (LF), width of the fin (WF), head length (HL).

Analyzed 283 squid, the interval of mantle length for females was 21 to 65 mm, and 21 to 45 mm for males; with a proportion of sexes 2:1 female:male ($X^2_{0.05,\ 1}$= 3.849; p <0.05). Of the measurements recorded, AA in females corresponded 42% of ML and the 30% for males; similarly the HL in females was the 19% of ML and the 30% for males. The organism analyzed were inmature and maturing, the most of the stomachs were empty. *L. diomedeae* is an organims nectobentonic, are captured between 12 y 153 meters deep; is a specie recurrent and abundant in the bycatch in shrimp trawl fisheries in Gulf of Tehuantepec.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-CARTEL/POSTER

AMPULLARIIDAE REVISIONARY SYSTEMATICS: CLARYIFYING THE TAXANOMIC STATUS OF *ASOLENE PLATAE* (MATON, 1811) AND *ASOLENE PULCHELLA* (ANTON, 1838)

Julian A. Léon [1,2] Kenneth A. Hayes [3], Robert H. Cowie [2]

[1]Department of Biology, University of Hawaii, 2538 McCarthy Mall, Honolulu, Hawaii 96822, USA; jleon2@hawaii.edu

[2]Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Honolulu, Hawaii 96822, USA; cowie@hawaii.edu

[3]Department of Biology, Howard University, 415 College Street NW, Washington, DC 20059, USA; kenneth.hayes@howard.edu

Historically, gastropod species delineation has relied heavily on shell characters alone. Unfortunately, shell morphology is often phenotypically plastic, making it unreliable as the sole source for species diagnoses. The over-reliance on shell morphology has led to considerable taxonomic confusion within Gastropoda. Such confusion is especially rampant in Ampullariidae. Apple snails, as ampullariids are often called, are a group of freshwater snails comprising nine genera distributed throughout the humid tropics and subtropics. *Asolene*, an ampullariid genus containing eight species, includes two species, *Asolene platae* and *Asolene pulchella*, that have been frequently confused with one another; the former is the type species of the genus. Recent phylogenetic studies indicated that *A. platae* and *A. pulchella* were conspecific, calling into question their taxonomic status. To address this, we have characterized genetic and morphological variation among 140 individuals of three species, *A. spixii*, *A. pulchella*, *and A. platae* from four sites throughout their native range in Uruguay and from samples from the pet trade in Hawaii. Preliminary anatomical analyses of the alimentary, reno-pericardial, digestive, nervous, and reproductive systems failed to reveal diagnostic differences between *A. pulchella* and *A. platae*. Similarly, preliminary genetic analyses indicate a mean maximum likelihood distance of 0.03 at COI between them, which may indicate conspecificity. Additionally, shell morphology of both *A. platae* and *A. pulchella* are consistent with the original description of *A. platae*. Continued comparative analysis of *Asolene* spp. will provide the data necessary for taxonomic revision and redescription of the genus, and yield insights into the evolutionary relationships among Ampullariidae broadly.

INVASORES/INVASIVE-CARTEL/POSTER

EXOTIC TERRESTRIAL MOLLUSKS IN CHILE: AN UPDATED REVIEW

Sergio Letelier V. [1], **Pedro Báez R.**[1], **Andrea Rebolledo U.** [2]
[1]Laboratorio de Malacología, Museo Nacional de Historia Natural, Interior Quinta Normal s/n. Santiago de Chile. Casilla 787; sergio.letelier@mnhn.cl; pedro.baez@mnhn.cl.
[2]Sociedad Malacológica de Chile. Interior Quinta Normal s/n. Santiago de Chile; apru76mail.com.

The special geographic position of Chile in the south western edge of South America, separated from Argentina and Bolivia by the high peaks of the Andes Mountains, and from Peru by the northern desert zone, contributes to the geographical isolation of the country. However, through the reports of several authors, it has been possible to detect the presence of exotic terrestrial mollusks into the country. Therefore, the main objective of this work has been to do a scientific literature review and a registration of personal communications, including information on terrestrial mollusks introduced into Chile. For most of them, there isn't systematic baseline data, which would allow to indicate the source or route of their introduction. For this reason they have been categorized as cryptogenic species. Nontheless, the major source of exotic species brought to the country has been through the transport of agricultural inputs, plants and related materials, which usually occurs accidentally or unintentionally. The exotic species recorded in Chile are concentrated in the Family Milacidae, Limacidae, Arionidae, Zonitidae, Helicidae, Achatinellidae, Elobiidae, Higromiidae and Carychiidae. Based on this information, we developed a checklist that included the updated specific taxonomy (Family, Genus, Species, Author) of the species included in these groups, the geographic location of the recorded species, and the authors who cited them. Places with more records are the Juan Fernández Archipelago and Easter Island, followed by other records made in continental Chile, both in the central region and the southern extreme of the country. This review allows to update the introduction of mollusk species situation in the country. At the same time it shows the existing weaknesses related to the registration of systematized information about introduced mollusks into Chile.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

MORPHOLOGICAL EVOLUTION OF THE BIVALVE SUPERFAMILY GALEOMMATOIDEA

Jingchun Li [1], **Diarmaid Ó Foighil** [1]
[1]Museum of Zoology, Department of Ecology and Evolutionary Biology, University of Michigan, 1109 Geddes Ave. Ann Arbor, MI 48109, USA; Jingchun@umich.edu; diarmaid@umich.edu

Evolutionary studies of contemporary marine diversification are typically framed within abiotic hypothesis-testing contexts and have collectively lagged behind terrestrial studies in developing an integrated framework that includes a meaningful biotic perspective. I addressed this deficiency using the hyperdiverse bivalve superfmaily Galeommatoidea as a study system. It is a particularly apt group because it contains large numbers of obligate commensal as well as free-living species and is therefore amenable to comparative approaches. I collected morphometric data of 174 galeommatoidean taxa and examined their morphological evolution. Multiple statistical assessments collectively revealed a consistent discordance between the trait evolution of free-living and commensal taxa. For the free-living lineages, morphologies (lateral shell shape and size) of closely related species tend to resemble each other and among-clade disparity is higher than within-clade disparity. In contrast, most of the

morphological disparities in the commensal species are explained by within-clade rather than among-clade disparity, indicating that closely related species can be highly divergent and intercladal convergence is common. This pattern is likely driven by the clams' obligate commensal associations with diverse invertebrate hosts. Closely related commensal species sometimes occupy very different host species; therefore, it is to be expected that their shell morphologies do not reflect phylogenetic affinity, but rather characteristics of the microhabitats they occupy, which may result in rapid morphological divergence or convergence. Our results highlight that biotic interactions play important roles in shaping neontological marine biodiversity.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

GENETIC POPULATION STRUCTURE OF THE OLYMPIA OYSTER, *OSTREA LURIDA*, IN SOUTHERN CALIFORNIA

JoAnne M. Linnenbrink, Danielle C. Zacherl and Douglas J. Eernisse
California State University, Fullerton, Department of Biological Sciences, 800 N. State College Blvd, Fullerton, California, 92831 USA; jlinnenb@csu.fullerton.edu; dzacherl@fullerton.edu; deernisse@fullerton.edu

Olympia oyster, *Ostrea lurida,* restoration is ongoing at multiple sites along the west coast of the USA, but there is little information regarding genetic structure of this historically impacted oyster in southern California, where restoration is already underway. Therefore, project managers cannot yet effectively allocate time, money, and resources to best harness existing genetic variation. We aim to provide baseline genetic diversity and structure estimates for remnant Olympia oyster populations at eight sites in southern California from Mugu Lagoon to Tijuana Estuary. Previous studies using mitochondrial coding gene regions COI and 16S found little genetic variation for Olympia oysters within southern California, but we will employ more variable markers, including microsatellites and a non-coding mtDNA region upstream of COI, using a newly designed primer, to test for detectable genetic structure. We will combine our microsatellite data with existing data from central California to Washington to examine nearly range-wide genetic structure. Our null hypothesis is that southern California populations will have some genetic structure for one or both of these data sets and that genetic similarity will reflect geographic proximity, the pattern for an isolation-by-distance (IBD) model. We will estimate haplotype or nucleotide diversity, and F_{ST} in order to assess within and among-site variation and test for IBD expectations. If data fit IBD expectations then restoration practitioners should take into account these genetic distinctions across southern California. Population genetic characterization will enhance the opportunities for restoration managers to successfully restore this and possibly other native estuarine species.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

POPULATION GENETIC STRUCTURE AND DEMOGRAPHIC HISTORY OF *HUMBOLDTIANA DURANGOENSIS* (SOLEM, 1959) ESTIMATED THROUGH MICROSATELLITE LOCI

Benjamín López [1], Omar Mejía [1] and Rocío Gómez-Ortega [2]
[1]Laboratorio de Variación Biológica y Evolución, Departamento de Zoología, Escuela Nacional de Ciencias Biológicas-Instituto Politécnico Nacional; benjamín_end@hotmail.com; hmejiag@ipn.mx
[2] Departamento de Toxicología, Cinvestav, IPN; ro712005@gmail.com

Land snails represent an excellent model in evolutionary biology due to their high diversity and high rates of molecular evolution. Particularly, metapopulations, composed of ephemeral demes that have experienced several events of colonization and extinction through time are ideal to study the geographic distribution of genetic diversity in order to comprehend evolutionary dynamic of species. The genus *Humboldtiana* comprise nearly 50 recognized species, most of them known only from the type locality. Among the few exceptions is *Humboldtiana durangoensis*, an endemic species widely distributed in the Sierra Madre Occidental of Durango, México. At this moment, 110 specimens have been collected in 11 localities, besides, 13 microsatellite DNA loci have been standardized, five of them new from the previously published. These markers will be amplified on each individual and the results will be used to assess a) Genetic diversity b) Genetic divergence among populations c) Population-Genetic structure and d) Demographic history. This study is only a portion of a wider project that includes also multilocus phylogeography and morphometric variation of the shells.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA /ORAL PRESENTATION

PRELIMINARY ANALYSIS OF THE COMPOSITION OF THE PTEROPODS AND HETEROPODS (MOLLUSCA: GASTROPODA) IN BAHIA BANDERAS, MEXICAN PACIFIC, ON OCTOBER 2004.

Z. López-Cabello y M. Fernández-Álamo
Laboratorio de Invertebrados, Facultad de Ciencias, Ciudad Universitaria, Coyoacán, México. Second floor, edifice B; zayracablop@live.com.mx; mafa@ciencias.unam.mx

The holoplanktonic mollusks belonging to the class Gastropoda, they spend their entire life in the water column and thus have special adaptive features that allow them to live in this environment. The importance of these gastropods in oceanographic studies is that several species are indicators of water masses and their presence or absence can help characterize oceanic phenomena. Also important in the food chain of marine ecosystems, since they feed on micro-plankton and in turn are used as food by many other members of the community. Information on pteropods and heteropods in the Mexican Pacific is lower compared with that of the Atlantic have, so the objective of this study is to conduct a preliminary analysis of species composition obtained in Bahia de Banderas, Nayarit in the month October 2004. We reviewed and separated gastropods organisms taken from 18 zooplankton samples obtained with a trawl (1 m long and 0.50 m mouth opening and a mesh of 505 microns). These samples were separated 1 681 individuals, of which 346 belong to the superfamily Heteropoda and 1332 to Pteropoda group. Heteropods are represented by organisms of the genus *Atlanta* sp., and pteropods belong Thecostomata Orders and Gymnosomata.

ANALISIS PRELIMIMAR DE LA COMPOSICIÓN DE LOS PTEROPODOS Y HETEROPODOS (MOLLUSCA: GASTROPODA) EN BAHÍA BANDERAS, PACÍFICO MEXICANO, EN OCTUBRE DE 2004.

Los moluscos holoplanctónicos pertenecientes a la clase Gastrópoda pasan todo su ciclo de vida en la columna de agua por lo que presentan características adaptativas especiales que les permiten vivir en este ambiente. La importancia de estos gasterópodos en los estudios oceanográficos radica en que varias especies son indicadoras de masas de agua y su presencia o ausencia puede ayudar a caracterizar los fenómenos oceánicos. También son importantes en las cadenas tróficas de los ecosistemas marinos, ya que se alimentan de microplancton y a su vez son utilizados como alimento por muchos otros miembros de la comunidad. La información sobre pterópodos y heterópodos en el Pacífico Mexicano es menor en comparación con la que se tiene del Atlántico, por lo que el objetivo del presente estudio es realizar un análisis preliminar de la composición de especies obtenidas en Bahía de Banderas, Nayarit en el mes de

octubre del 2004. Se revisaron y separaron organismos gasterópodos tomados de 18 muestras de zooplancton obtenidas con una red de arrastre (de 1 m de largo y 0.50 m de apertura de boca y una malla de 505 μm). De estas muestras se separaron 1 681 individuos, de los cuales 346 pertenecen a la Superfamilia Heteropoda y 1 332 al grupo Pteropoda. Los heterópodos están representados por organismos del género *Atlanta* sp., y los pterópodos pertenecen los Ordenes Thecostomata y Gymnosomata.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION

AISLAMEINTO E IDENTIFICACIÓN DE CEPAS DE *ESCHERICHIA COLI* EN BIVALVOS MARINOS

Víctor S. López-Coldivar [1]

[1]Laboratorio de Patogénesis Bacteriana de la Facultad de Medicina UNAM, Hospital General "Doctor Manuel Gea González", Calzada de Tlalpan 2800, Tlalpan, Sección XVI, Ciudad de México, Distrito Federal, México; suein_v5@hotmail.com

Escherichia coli (*E. coli*) es probablemente el organismo mejor conocido del mundo, ya que se ha utilizado como modelo para estudiar todo tipo de aspectos de genética y fisiología. El nicho ecológico de la *E. coli* comensal son las mucosas intestinales de los mamíferos, aves, reptiles de vida libre y de moluscos bivalvos. *Escherichia* solo se había reportado en una especie la cucaracha oriental. Sin embargo no se tiene ningún reporte de la *E. coli* como habitante de ningún invertebrado sin que se asocie como parte de una contaminación. El objetivo del presente trabajo es investigar la presencia de cepas de *E. coli* silvestres aisladas de intestinos de bivalvos, alejadas de la actividad humana. En este estudio se trabajo las con cepas provenientes de los intestinos de bivalvos marinos del océano Pacífico y del Golfo de México. Las cepas de *E. coli* de los bivalvos, fueron aisladas e identificadas por pruebas bioquímicas y por la secuenciación del rRNA 16S. Como resultado se aislaron e identificaron 19 cepas diferentes de *E. coli* de 4 especies de bivalvos: *Ostrea iridescens*, *Moveotus capax, Rangia cuneata*, y *Anadara floridana.* A las cepas de se les realizó una prueba de antibiograma y una obtención de plásmidos. En general no presentaron resistencia a los antibióticos, ni presencia de plásmidos. Podemos concluir que las cepas de *E. coli* de los bivalvos obtenidas en este trabajo forman parte de su flora intestinal. Aparentemente, estas cepas de intestino de moluscos han estado alejadas de la actividad antropogénica.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

SPATIO-TEMPORAL DYNAMICS OF JUVENILE MARINE MOLLUSCS IN BAHÍA MÁLAGA, A TROPICAL ESTUARY OF THE WESTERN AMERICAN COAST

Luz Ángela López de Mesa-Agudelo [1], Edgardo Londoño-Cruz [2] and Jaime R. Cantera-Kintz [2]

[1]Texas A & M University-Corpus Christi, 6300 Ocean Drive, CS, Corpus Christi, TX 78412, USA; llopezdemesa@tamucc.edu

[2]Universidad del Valle, Calle 13 #100-00, Edi.320, Biología Marina, Cali, Colombia; edgardo.londono@correounivale.edu.co; jaime.cantera@correounivalle.edu.co

Here we report early-life stages (ELS) for more than 200 species of molluscs in a tropical estuary of the Western American Pacific coast. Most marine organisms have complex life cycles that involve several early-life stages: eggs, larvae and juveniles. Understanding the processes of ELS is important in different fields of science (such as aquaculture, fisheries, environmental conservation, phylogeography). Currently,

there is scarce information about ELS in tropical marine systems, even for economically important species. A bibliographic review for Bahía Málaga (publications up to 2004), one of the most studied zones in the Colombian Pacific, showed that research about the dynamics of ELS was needed in order to understand and design conservation programs for the bay. There were only five molluscan species with early life history data, and molluscs have both the greatest species richness (240) and representation in the literature (110 citations).
Three zones of the bay (inner, middle and outer) were sampled through rapid ecological assessments and introduced artificial habitats. The introduced artificial habitats were exposed to natural conditions for 2-3 months between September 2008 and June 2009. Reported species for Bahía Málaga increased to 417, which 44 species were new reports for the Colombian Pacific coast. Introduced artificial habitats enabled us to efficiently collect small species that were hard to collect with traditional sampling methods. The spatial-temporal distribution of molluscan species richness, abundance and diversity are related to substrate composition and adult distributions. Additionally, there was concordance between an increase in salinity and ELS in April 2009.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
REPRODUCCIÓN

SEXUAL DIFFERENTIATION USING BODY DIMENSIONS AND THE STYLETS OF *OCTOPUS HUBBSORUM:* A TRADITIONAL AND GEOMETRIC MORPHOMETRIC ANALYSIS

Alejandra López-Galán [1], María del Carmen Alejo-Plata [2] and Marcia María Ramírez Sánchez [3]
[1]Programa de Biología Marina, Universidad del Mar, campus Puerto Ángel, Ciudad Universitaria, Puerto Ángel, Oaxaca, México, C.P. 70902; alejandra7galan@gmail.com
[2]Instituto de Recursos. Universidad del Mar, campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Oaxaca, México, C.P. 70902; plata@angel.umar.mx
[3]Laboratorio de Acarología "Anita Hoffmann", Departamento de Biología, Facultad de Ciencias, Universidad Nacional Autónoma de México. Circuito Exterior s/n Cd. Universitaria, México, D.F. C.P. 04510; didymops@ciencias.unam.mx

From 100 males and 60 females of *Octopus hubbsorum* captured by artisanal fishery of Puerto Ángel, Oaxaca (15°39'59.04 N, 96°29'35.44" O) between 2011 and 2012, body measures (mantle length LM, total length TL and total weight TW) and stylets measures (rostral length RLE, post-rostral length PRLE, total length TLE and maximum width of the stylet MWE) were registered to evaluate differences between males and females. ANOVA demonstrated significant differences ($F_{7,151} = 3.31$, $p < 0.01$), because females were larger than males (to 190 mm of ML, 790 mm of TL, 1750 g of TW, 11.6 mm of RLE, 26 mm of PRLE, 35.6 mm of TLE and 4.2 mm de MWE). From the relationships between data, TW was the body measurement more related with all the stylet measures (ANCOVA $F_{4,151} = 13.93$, $p < 0.01$).
The shape of stylet outline was also analyzed to distinguish between males and females, for which were used two landmarks (anatomical loci located in the edges of the stylet) and 40 semiland marks (uniformly distributed points along contour of the stylet). Through a canonical variate analysis, differences were found in the average shape of the stylet between males and females (eigenvalue = 0.9, Mahalanobis distance = 2.16, $p < 0.01$). To verify whether were possible to predict sex of the organism, a discriminant function analysis was carried out, and it demonstrated that shape of the stylet is not adequate for this purpose ($T^2 = 175.18$ $p > 0.3$), due to the high individual variability of the stylet shape. These results revealed sexual differences in body size and shape and size of the stylet for *O. hubbsorum*, and this study may help to increase the interest in evaluating the shape and size of hard structures of cephalopods to evidence intraspecific or interspecific differences.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

EXPRESSION OF SEX-SPECIFIC GENES IN THE RED ABALONE *HALIOTIS RUFESCENS*

Edgar A. López-Landavery [1], Amelia Portillo-López [2], Cristian Gallardo-Escárate [3] and Miguel Á. del Río-Portilla [1]

[1] Departamento de Acuicultura, Centro de Investigación Científica y de Educación Superior de Ensenada, B.C., Carretera Ensenada-Tijuana #3918. Zona Playitas. Ensenada, Baja California, México, C.P. 22860; edlopez@cicese.edu.mx, mdelrio@cicese.mx

[2] Facultad de Ciencias, Universidad Autónoma de Baja California, B.C., Km 103 Carretera Tijuana-Ensenada. Zona Playitas. Ensenada, Baja California, México, C.P. 22860; portillo@uabc.edu.mx,

[3] Laboratorio de Biotecnología y Genética Acuícola, Universidad de Concepción, P.O. Box 160-C, Concepción, Chile; crisgallardo@oceanografia.udec.cl

The red abalone *Haliotis rufescens* is one of the most important species for aquaculture in Baja California, México and despite this, few gene expression studies have been done in gonad tissues. Sex determination system in abalone is unknown and currently there is an apparent skewed sex ratio, where male are changing to female and this affects broodstock availability at commercial scale. In order to determine the time in which occurs the differential expression of sex-specific genes in abalone, we use 8 genes associated with sex and evaluate their level of expression in sexually undifferentiated individuals with shell length between 5-15 mm, 16-25 mm, 26-35mm, 36-45 mm; and female and ripe male. Evaluated genes were: vitellogenin I (VTG I), vitelin coat protein (VCP), lysine receptor envelope vitelin (mVERL), sperm lysine (Lys), tektin (TEKT), protein fertilization (FP), small androgen receptor interaction protein (SARIP) and Doublesex/Mab-3 DNA-binding motif (DMRT I). Total RNA was extracted from gonad/digestive gland, single-stranded cDNA was synthesized, sex-genes were qPCR amplified and analyzed using the equations described by Pfaffl (Pfaffl, 2001) and Sedik et al (Sedik et al., 2010). Ribosomal protein L5 (*RPL5*) was used as reference to normalize gene expression. Sex allocation analysis showed that individuals with shell length between 5 and 15 mm were females. Furthermore, the genes specifically associated with a sex were expressed in the opposite sex but at significantly lower levels. Additionally, genes such as SARIP, Lys and DMRT I were not significantly different at four intervals of shell length for the female group. In the same way, we found that the differential expression of evaluated genes occurs between 16-25 mm and 26-35 mm of shell length. This study is a contribution to understand the sexual determination and differentiation in the red abalone.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

GROWTH AND SURVIVAL OF *OCTOPUS BIMACULATUS* PARALARVAE FED WITH ENRICHED *ARTEMIA*

Diana J. López-Peraza *, Mónica Hernández-Rodríguez and Benjamín Barón-Sevilla

Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), carretera Ensenada-Tijuana No. 3918, Zona Playitas, Ensenada, Baja California. México; *dlopez@cicese.edu.mx

The highly unsaturated fatty acids (HUFAs), in particular those of the n-3 and n-6 series as docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), whose contents and proportions in the diet (DHA/EPA), are essential for the development and growth of *Octopus* paralarvae. Therefore, to satisfy nutritional requirements of the paralarvae in cultivation, is necessary that HUFAs n-3 and n-6 are added to the diet. This study evaluated the effect of live food enrichment (*Artemia* 8. 2±1. 20 mm of TL)

with a tuna orbital oil emulsion (Omegamex), rich in DHA (30%) and EPA (7%), on growth and survival of *Octopus bimaculatus* paralarvae. We analyzed and compared the fatty acid profiles of the emulsion, the newly hatched paralarvae, and enriched (EA) and unenriched *Artemia* (UEA). The survival of the paralarvae fed with UEA was 1.77% at day 11 after hatching, while in the organisms fed with EA was the 1.93% at day 17. In the paralarvae fed with EA, the number of suckers increased from 5 to 9 in each arm. The EA not assimilated efficiently the HUFAs from the emulsion, particularly DHA (1.63%), which was not significantly different to the UEA, it is therefore likely that the low survival in both treatments due to the deficiencies of this fatty acid in the diet of the paralarvae. For these reasons, the use of complementary foods rich in HUFAs is highly recommended in order to improve nutrition, growth and survival of *O. bimaculatus* paralarvae.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

BIVALVES ASSOCIATED AT ROCKY INTERTIDIAL ZONE IN THE STATE OF GUERRERO, MÉXICO

Victor I. López-Rojas [1], Rafael Flores-Garza [1], Pedro Flores-Rodríguez [1], Sergio García-Ibáñez [1], Carmina Torreblanca-Ramírez [2] y Lizeth Galeana-Rebolledo [2]

[1]Laboratorio de Ecología costera y sustentabilidad Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20, Fraccionamiento Las Playas, Acapulco Gro. C. P. 39390, Tel y Fax 017444832780; vilopezrojas@yahoo.com

[2] Unidad de Ciencias de Desarrollo Regional. Universidad Autónoma de Guerrero. Calle Pino s/n Colonia El Roble, Acapulco, Guerrero. C. P. 39640.

The coast of the State of Guerrero, has an extensive coastal area that includes four priority regions for marine biodiversity conservation, this is rich in species of molluscs. This study focuses on analyzing the community of the class Bivalvia in the intertidal zone of the State of Guerrero. Sampling was carried out from 2009 to 2012 at 21 sites. The objectives of this research were: 1) make an inventory of species, 2) based on species richness and abundance, analyze the representation of families, 3) estimate the population density and 4) to determine the geographic distribution of species. Sampled unit was one square meter and the area sampled per site was 10 m^2. 5962 organisms are analyzed, we identified 44 species. The MYTILIDAE family was the best represented in species richness. The best family represented in abundance was the CHAMIDAE. The density was 18.63 organisms /m^2 Isognomon janus had the highest density with 4.02 organisms / m^2. Three species were recorded as widely distributed. Species richness is high and corresponds to that expected in a tropical area.

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-CARTEL/POSTER

PRESENCIA DE CADMIO EN *ISOGNOMON ALATUS* DE LA LAGUNA DE TAMPAMACHOCO, VERACRUZ, MÉXICO

Orquidea Lozada [1] y Marisela López [1]

[1]Facultad de Ciencias Biológicas y Agropecuarias, Universidad Veracruzana. Km. 7.5 Carretera Tuxpan-Tampico Col. Universitaria, C.P. 92895 Tuxpan, Veracruz, México; kqga@hotmail.com; mariselaloor@hotmail.com

La Laguna Tampamachoco es parte del sitio RAMSAR No 1602 "Manglares y humedales de Tuxpan". Está sometida a fuertes descargas de contaminantes producidos y depositados por el río, comunidades aledañas, industrias de construcción, plataformas petroleras y la Central Termoeléctrica Adolfo López Mateos. Los metales pesados están ampliamente distribuidos en la naturaleza, por lo que es inevitable su presencia en los seres vivos. El Cadmio (Cd) es un metal pesado, componente normal de los sedimentos marinos, sin embargo, los altos valores detectados están directamente relacionados con los desechos industriales, descargas urbanas, las características sedimentológicas y el contenido de materia orgánica. Es importante conocer la concentración y tipo de contaminantes que afectan los ecosistemas acuáticos en aras de determinar la salud de los ecosistemas. Se pretende determinar la concentración de Cd en *Isognomon alatus* (Gmelin, 1791) y la relación con parámetros fisicoquímicos para proponerla como indicador de contaminación por Cd en la laguna Tampamachoco, Tuxpan, Veracruz. La almeja plana se encuentra incluida en la Norma Oficial Mexicana para la Protección Ambiental como especie sujeta a protección especial publicada en el Diario Oficial de la Federación el 16 de mayo de 1994. Se realizaron muestreos mensuales en seis bancos ostrícolas representativos de la laguna por un periodo de un año, Septiembre 2012- Octubre 2013. La presencia de Cd se determinó por espectroscopía de absorción atómica en muestras secas de cuerpo blando y concha previa digestión ácida, encontrándose valores máximos de 6.75 mg/Kg en cuerpo blando y 1.5 mg/Kg en concha, valores que superan el LMP establecido por la NOM-SSA, 1993 a, b y c de 0.5 mg/kg de Cd/ peso fresco de peces, crustáceos y moluscos. Los parámetros fiscoquímicos no guardan relación con la concentración de Cadmio encontrada en la almeja plana. Sin embargo se observan diferencias entre los sitios de muestreo.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

THE INVASIVE *CORBICULA* SPP. (BIVALVIA, CORBICULIDAE) IN SOUTH AMERICA: LINEAGES AND MORPHOLOGICAL PATTERNS

Sandra Ludwig [1*], Walter A Boeger [1], Patricia D. Borges [2] and Gustavo Darrigran [3]

[1]Laboratório de Ecologia Molecular e Parasitologia Evolutiva, Universidade Federal do Paraná; Francisco H. dos Santos 210, P.O Box 19073, Curitiba, Brasil. *sand.ludwig@gmail.com; wboeger@gmail.com

[2] Institutos Lactec. BR-116, KM 98, nº 8813 – Centro Politécnico da UFPR, Jardim das Américas, Curitiba, Paraná, Brasil; patricia.borges@lactec.org.br

[3]División Zoología Invertebrados-Museo de La Plata (FCNyM-UNLP). Paseo del Bosque sin/nº, La Plata (1900). Argentina; invasion@fcnym.unlp.edu.ar.

The ability of exotic species to respond to different selective pressures determines their geographic range and the invasion success. Originated from Asia, *Corbicula* spp. has been introduced in various continents including South America. Reports suggest that three species have been introduced in this continent: *C. fluminea*, *C*. cf. *fluminalis* and *C. largillierti*. However, due to phenotypic plasticity, species differentiation using morphological data is difficult and often results in erroneous taxonomic determination. Thus, this study evaluates the lineages of *Corbicula* and the morphological patterns present in South America. Fragments of mtDNA, cytochrome oxidase subunit I were sequenced from *Corbicula* specimens obtained from distinct sampling sites of Brazil and Argentina. Morphometric variation was analyzed with linear and geometric morphometrics with Principal Components Analysis (PCA). The number of haplotypes was estimated in the program DnaSP and their relationships were analyzed with NETWOR with a Bayesian Inference in BEAST. We detected an extensive variation in the morphometric data. The PCA resulted in three groups: (G1) with wide morphological variation Form R/A, (G2) most similar to Form S/C and, (G3) most similar to Form IF (morphotype detected previously from the Iguassu Falls). We detected 74 haplotypes that match with haplotypes available on GenBank

Bayesian Inference, detected three Clades: (1) matching European form R and American form A of *C. fluminea* (FW5); (2) matching with European form S and American form C (FW17) of *C. largillierti* and; (3) match with European form RIc and American form B of *Corbicula* sp. (FW4). The combined analysis indicates great congruence between morphometric and genetic results and supports the great morphological variation of *C. fluminea* shells.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

CURATION OF THE DANIEL BEREZA MOLLUSK COLLECTION AT THE SMITHSONIAN NATIONAL MUSEUM OF NATURAL HISTORY

Caitlin M. Luebke and Rachel Sommer

University of Wisconsin – Stevens Point, 800 Reserve Street, Stevens Point, Wisconsin 54481 USA; Caitlin.M.Luebke@uwsp.edu; Rachel.M.Sommer@uwsp.edu

In 2011, the Smithsonian National Museum of Natural History (NMNH) acquired a collection of preserved mollusks and associated field notes from the family of Daniel Bereza (1950-2007), formerly of the Academy of Natural Sciences in Philadelphia, Pennsylvania. These field notes contain an entry for each collecting event, which include the localities of the collecting sites and lists of the species found. In January 2013, we began the process of accessioning this collection into the NMNH. We built a database of the collecting events by capturing the field notes verbatim, converting digital images of handwritten notes to searchable text strings. We learned that the field notes contain entries for over 700 collecting events between 1971 and 1984. We then normalized the collection event data into separate fields (collectors, state, county, water body, etc.) and georeferenced the localities. In January and March 2014, each specimen lot was identified and prepared for incorporation into the NMNH catalog. The collection contained 66 freshwater mussel (Order Unionoida) species from 15 U.S. states and 28 freshwater mussel species from 4 Mexican states. Our primary research interest in the Bereza Collection is the freshwater mussels from México. In general, the freshwater mussels of Central America have been understudied. The curation of this collection will facilitate a long overdue revision of the Central American freshwater mussel fauna. We would like to thank Robert Hershler of the Smithsonian and the UEI grant from the College of Letters and Sciences, University of Wisconsin-Stevens Point for funding this project. We would also like to thank Daniel Graf of the University of Wisconsin-Stevens Point and Kevin Cummings of the Illinois Natural History Survey for their support and guidance.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS- PONENCIA/ORAL PRESENTATION

GASTERÓPODOS DE AGUA DULCE DEL ESTADO DE MORELOS, MÉXICO

Gerardo Magaña-Amador[1], José Guadalupe Granados-Ramírez[2] y Edna Naranjo-García[3]

[1,2]Laboratorio de Invertebrados, Facultad de Ciencias Biológicas, Universidad Autónoma del Estado de Morelos. Av. Universidad 1001, Colonia Chamilpa, Cuernavaca, Morelos, México. germaga1990@gmail.com[1] ramgra56@yahoo.com.mx[2]

[3]Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Apartado postal 70-153, 04510 México D. F., México. naranjo@unam.mx

La malacología continental mexicana tiene una historia muy reciente; los primeros malacólogos mexicanos dedicados a esta fauna surgieron a inicios de los 80's. Anteriormente los moluscos continentales fueron estudiados principalmente por extranjeros (europeos y estadounidenses); explicando el incompleto inventario de la malacofauna continental. El estado de Morelos es ejemplo de las zonas que carecen de un listado actual, y solo están registradas algunas especies de gasterópodos, resultado de estudios esporádicos. Por tal motivo se planteó como objetivo de este estudio determinar y describir las especies de gasterópodos de agua dulce del estado de Morelos, generar información sobre el hábitat y distribución de cada especie registrada. Para esto, se visitaron y colectaron seis cuerpos de agua, tomando como variables un gradiente climático, el tipo de ambiente (lótico y léntico) y la estacionalidad (lluvias y sequía). Como puntos de muestreo se tomaron el lago Zempoala en el municipio de Huitzilac y el río Coaxtepec en Tetela del Volcán, de clima templado; la barranca Atongo en el municipio de Tepoztlán y el manantial Las Fuentes en Jiutepec, de clima semicálido. Las Estacas en Tlaltizapan y la presa Cruz Pintada en Tlaquiltenango, de clima cálido. Se colectaron once especies y siete familias, de las que ocho especies en cinco familias representan nuevos registros para la entidad: *Pyrgophorus* 1, *Pyrgophorus* 2, *Tryonia* 1 y *Tryonia* 2, (Hydrobiidae); *Pseudosuccinea columella* Say, 1817 (Lymnaeidae); *Physa acuta* Draparnaud, 1805 (Physidae); *Hebetancylus* sp, (Ancylidae) y *Pomacea flagellata* Say, 1827 (Ampullariidae), especie traslocada de su distribución original conocida en el Golfo de México a la vertiente del Pacífico. En el clima cálido se presentó mayor diversidad con once especies. De acuerdo al tipo de ambiente (lótico y léntico) se registraron 8 especies en ambos y comparten cinco. Para la estacionalidad en lluvias se colectaron nueve especies y en sequía once.

PLICOPURPURA-PONENCIA/ORAL PRESENTATION

ESTIMACIÓN DE LA DENSIDAD DE POBLACIÓN DEL CARACOL MORADO *PLICOPURPURA PANSA* (GOULD, 1853), EN LA COSTA DEL BÁLSAMO, EL SALVADOR, CON UNA RESEÑA HISTORICA DE LA EXPLOTACIÓN DE SU TINTA

Julio Magaña Cubillo [1] Ana María Rivera [2] and Emilio Michel-Morfín [3]

[1] Investigador independiente; eubranchus@yahoo.com

[2] Museo Nacional de Historia Natural de El Salvador, Eco Parque Saburo Hirao, Barrio San Jacinto, final de calle Los Viveros, Colonia Nicaragua, San Salvador, El Salvador; glandina@gmail.com

[3] Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Universidad de Guadalajara, México; michel@costera.melaque.udg.mx

El caracol púrpura, *Plicopurpura pansa* es una especie que habita en las costas rocosas del Pacífico Tropical Este. La tinta que produce ha sido un valioso recurso desde tiempos pre colombinos por varias culturas autóctonas de América. En El Salvador, América Central, la explotación de este recurso se llevó a cabo hasta la década de los 50s con el propósito de comercializar los textiles teñidos con la población indígena de Guatemala, los cuales apreciaban mucho el color obtenido de esta manera natural, en sus tradiciones. El objetivo de esta investigación es el de evaluar la población de caracol púrpura, en las costa de salvadoreña de El Bálsamo, la misma en la cual se dio tradicionalmente la explotación de este recurso durante la primera mitad del siglo XX, para poder estimar la posibilidad de una posible explotación de este recurso por la población local.

ESTIMATION OF THE POPULATION DENSITY OF THE PURPLE DYE SNAIL *PLICOPURPURA PANSA* (GOULD 1853), ON THE BALSAMO SHORE, EL SALVADOR, WITH AN HISTORICAL RESEARCH OF ITS DYE EXPLOITATION

The purple dye snail, *Plicopurpura pansa* is a conspicuous rocky-shore specie of the Tropical Eastern Pacific. The dye it produces has been used as a valuable resource since pre-Columbian times by most of the indigenous cultures in America. In El Salvador, Central America, the exploitation of that resource took place till the 50´s decade in order to market the dyed textiles with the Guatemalan indigenous population, whom appreciate the color obtained on their traditions. The advent of artificial dyes ended this tradition. The goal of this research is to evaluate the populations of *P. pansa* on the rocky shore of El Balsamo, the same place in which the exploitation took place during the XX century, in order to calculate a new possible exploitation, as a work source.

PLICOPURPURA-PONENCIA/ORAL PRESENTATION

RELOCATION AND MONITORING OF THE PURPLE DYE SNAIL *PLICOPURPURA PANSA* (GOULD 1853), LOCATED IN THE TEPALCATES CHANNEL BREAKWATERS, MANZANILLO COLIMA, MÉXICO

Julio Magaña Cubillo[1] and Emilio Michel-Morfín[2]

[1] Independent researcher; eubranchus@yahoo.com

[2]Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Universidad de Guadalajara, México; michel@costera.melaque.udg.mx

During the 1980's the snail underwent exploitation in Mexico by a Japanese company that used the dye in the manufacture of traditional kimonos. That fact caused a high mortality due to the unsustainable methods used to extract the dye. The snail is now under special protection by the Mexican law, since 1988.

During the expansion works for the Tepalcates canal developed by the Mexican electricity company Comisión Federal de Electricidad, on the Manzanillo II Power Station, the staff of its Environmental Studies Department, located and removed a total of 1539 specimens of *P. pansa* from the breakwaters in demolition to the ones under construction. After that, the new population established in the new breakwater was monitored in aspects of the calculation of its population, counting individuals in copulation, egg masses and recruits. The population density of the species that constitute the diet of *P. Pansa* was also calculated. Data on food habits and seasons of their different stages in its life cycle were also taken.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-CARTEL/POSTER

PHYLOGENETIC PLACEMENT OF THE ENIGMATIC OPISTHOBRANCH GENERA *DORIDOXA* AND *BATHYDORIS* WITHIN NUDIBRANCHIA

Jermaine Mahguib and Ángel Valdés

Department of Biological Sciences Department, California State Polytechnic University, 3801 West Temple Avenue, Pomona, California, USA; jmahguib@csupomona.edu; aavaldes@csupomona.edu

The nudibranch genera *Doridoxa* and *Bathydoris* have in the past been placed at varying positions along the nudibranch phylogeny. First as sister to each other within a group called Gnathodoridacea, which was sister to the rest of the dorids. Later *Bathydoris* was placed as sister to the dorids within a group called Euctenidiacea, and *Doridoxa* was placed as sister to Euctenidiacea. More recently *Doridoxa* has

been placed as sister to the cladobranchs. All these hypotheses were based on morphological characters alone, due in part to the unavailability of DNA sequencing technology (for older studies) and to a lack of ethanol preserved specimens from either group. For the present study we had access to representative specimens that yielded clean, usable mitochondrial gene sequences (CO1 and 16S) and a nuclear gene (H3) for use in phylogenetic analysis. The goal of this study is to use molecular data to build a phylogeny of nudibranchs to resolve the long-standing controversy surrounding the phylogenetic placement of *Doridoxa* and *Bathydoris*.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
DULCEACUÍCOLAS

FIRST STEP TO IMPLEMENT AN ACTION PLAN TO CONSERVATION OF LIMNIC BIVALVES SPECIES IN SOUTH AMERICA

Maria C. D. Mansur [1], Daniel Pereira [1], Leandro D. S. Duarte [1], Arthur S. de Oliveira [1], Daniel M. Pimpão [2], Cláudia T. Callil [3], Cristián Ituarte [4], Esperanza Parada† [5], Santiago Peredo [5], Gustavo Darrigran [6], Fabrizio Scarabino [7], Cristhian Clavijo [7], Gladys Lara [8], Igor C. Miyahira [9], Maria T. R. Rodriguez [1], and Carlos Lasso [10]

[1]UFRGS, PP-ECO,CENECO – Universidade Federal do Rio Grande do Sul, Programa de Pós-Graduação em Ecologia, Centro de Ecologia, Av. Bento Gonçalves n. 9500, 91540-000, Porto Alegre, RS, Brazil, mcrismansur@gmail.com; dani.mdourado@gmail.com, duarte.ldus@gmail.com;
[2]IBAMA - InstitutoBrasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, Rua 229 n. 95, Setor Leste Universitário, 74.605-090, Goiânia, GO, Brazil, danielpimpao@yahoo.com.br;
[3]NEPA/UFMT - Núcleo de Estudos Ecológicos do Pantanal, Universidade Federal de Mato Grosso, Av. Fernando Correa da Costa, 2367, Cuiabá, MT, Brazil. callil@ufmt.br;
[4]MACN - Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Av. Angel Gallardo 470, 140 50 JR Buenos Aires, Argentina, ituarte@macn.gov.ar;
[5]ECOHYD - Plataforma de Investigación en Ecohidrología y Ecohidráulica), Almirante Rivero 075, Providencia, Santiago, Chile;
[6]FCNyM/UNLP - Museo de La Plata, Paseo del Bosque s/nº, 1900 La Plata; Argentina, invasion@fcnym.unlp.edu.ar;
[7]MNHNM - Museo Nacional de Historia Natural, 25 de mayo 582 - CC. 399, CP. 11000 Montevideo, Uruguay, mycetopoda@gmail.com;
[8]UCT - Universidad Católica de Temuco, Facultad de Recursos Naturales, Lab. de Limnología y Recursos Hídricos, Rudecindo Ortega 02950. Campus Norte, Temuco, Chile, glara@uct.cl;
[9]UERJ - Universidade do Estado do Rio de Janeiro, Lab. de Malacologia, Rua São Francisco Xavier, 524, sala 525/2, Maracanã, 20550-900, Rio de Janeiro, RJ, Brasil, icmiyahira@yahoo.com.br;
[10]IAVH - Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Calle 28 A 15-09, Bogotá D.C., Colombia. classo@humboldtt.org.co

The recent energy demand in developing countries, in particular Brazil, encouraged the construction of numerous reservoirs that along with the change in the landscape by deforestation, agriculture and periodical burnings has caused changes in water courses that threatens the native freshwater bivalve molluscs in South America. Seeking efforts for the conservation and preservation of these fauna, thirteen Malacologists representing most part of the South American countries formed a thematic Research Net (Freshwater Bivalve of South America - BIVAS) aiming to strength the knowledge and conservations of limnic bivalves. Since 2011, an inventory on malacological collections and an intensive review of literature permitted the record of 168 native freshwater bivalves and five invasive species for 52

hydrographic regions in South America. The first result was the idenfication of high species richness areas such as the South Atlantic, Uruguay, Paraguay, and Amazon Brazilian hydrographic regions. However, not only should the richness be considered to be a criterion for prioritizing areas for conservation, but also the phylogenetic diversity of communities engaged in environmental services relevant to maintenance of aquatic ecosystem. Among other actions BIVAS include: implementing a virtual network integrating researchers and South American institutions, the elaboration of a Catalogue of bivalve species from South America, promoting the disclosure of events focusing conservation actions and drafting documents to government agencies responsible for environmental conservation in South America.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

INCUBACIÓN EMBRIONARIA EN *OSTREA CHILENSIS*: RELACIÓN MADRE-EMBRIÓN

D. B. Mardones [1], J. A. Montory, M. V. Garrido y O. R. Chaparro
Instituto de Ciencias Marinas y Limnológicas, Universidad Austral de Chile, Valdivia, Chile;
danielamardonestoledo@gmail.com

La incubación materna es un modo de reproducción que genera inmovilidad de los embriones en el interior de estructuras especializadas. En ciertos bivalvos, los embriones nadan libremente en el área de incubación. Ellos se asocian con las branquiales, lo que puede impactar en el proceso de filtración materno. *Ostrea chilensis* incuba sus embriones en la cavidad paleal durante 8 semanas. Los embriones y el alimento, se mueven usando como ruta de transporte el sistema branquial materno. Esto evidencia que la madre debe lidiar con los embriones incubados y con las perturbaciones que ellos generen en el proceso de alimentación.
En la presente investigación se identifica la respuesta materna, frente a la presencia de embriones y a la colecta de partículas en la cavidad incubatoria, considerando que la branquia y los palpos bucales se involucran a estos procesos. Se realizaron observaciones endoscópicas de la cavidad palial materna. Se cuantifico el uso de los canales branquiales y la velocidad de transporte del alimento y de los embriones (temprano y avanzado). Los resultados indican que los canales ventrales (CV) y dorsales (CD) mueven embriones y partículas hacia la región anterior, pero con velocidades diferenciadas, según la condición reproductiva de la hembra. Los embriones se mueven principalmente por el CD y con mayor velocidad que en el CV. El transporte del alimento, se hace mayoritariamente por el CV. La velocidad de las partículas es mayor en el CD. Los embriones se acumulan en la región de los palpos y las madres, mediante una contracorriente, los redistribuyen hacia la región distal. El uso de los canales en el transporte de los embriones, parece explicar las bajas tasas de aclaramiento de las hembras incubadoras. Las madres y no los embriones, manejarían el patrón de circulación embrionario dentro de la cavidad incubatoria. **Financiado Fondecyt-Chile 1141052.**

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

MORPHOMETRIC DIFFERENTIATION OF THE SHELLS OF *MACOMA* (BIVALVIA: TELLINIDAE) FROM BRAZIL

Thais Marinho [1] e Eliane Pintor Arruda [1]

[1]Universidade Federal de São Carlos, *campus* Sorocaba. Departamento de Biologia, Centro de Ciências Humanas e Biológicas, 18052-780. Rodovia João Leme dos Santos, Km 110, Itinga - Sorocaba, São Paulo State, Brasil; t.ufscar@gmail.com; arruda@ufscar.br

Currently, taxonomy is an area of biology where the number of researchers has been decreasing, a component of the so-called "taxonomic impediment". This fact is arising in part as consequence of taxonomy's subjectivity, especially, about species concept and descriptions of them, mainly based on the morphology. Geometric morphometric (GM) deals with quantitative traits and can supply alternative information to increase taxonomic resolution of a particular group. Landmark-based GM was choosing to compare homologues points in all individuals for each *Macoma* species analyzed in this work. The purposes of this study were: 1) to describe shell shape of six *Macoma* species performing a GM analysis based on 14 landmarks of the right valve; 2) to test whether geometric shape retains taxonomic information and can effectively discriminate bivalve species. In the Brazilian coast occurs ten species of genus *Macoma*, six of which were analyzed here, sampled from populations of Sao Paulo State: *Macoma biota* (Arruda&Domaneschi, 2005), *M. constricta* (Bruguière, 1792), *M. cleryana* (D'Orbigny, 1846), *M. uruguayensis* (E. A. Smith, 1885), *M. brevifrons* (Say, 1834) and *M. tageliformes*, Dall, 1900. According to results, the GM methods were efficient because it clearly can discriminate the species. The MANOVA from the "scores" of Partial Deformation of each specimen indicated highly significant differences among species (Wilks'lambda = 0.000307, F = 16.46094, p <0.0001). The discriminant function correctly classified around 97% of cases, reaching 100% for *M. biota*, *M. constricta*, *M. tageliformes* and *M. uruguayensis*. The morphology variation represented by the first three canonical axes revealed that the most significant changes among species are related to valve shape (oval or sub elliptical), position of anterior adductor muscle scar (dorsal or ventral), intersection of pallial sinus with pallial line (median-anterior or posterior) and the most ventral point of ventral margin (anterior or median).

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

SHELL USE BY THE SERIS OF SONORA, MEXICO

Cathy M. Marlett

SIL International (home: 63955 E. Condalia Pl. Tucson, AZ 85739); cathymarlett@me.com

The Seri people have lived on the eastern shore of the Gulf of California for perhaps millennia, and retain extensive knowledge of the area's natural history. Mollusks, especially those found intertidally, were well known. *Shells on a Desert Shore* (2014) presents more than 150 species, a majority of which are recognized by Seri names.

Besides being heavily consumed, mollusk shells were extensively used by the Seris, clearly evidenced in extensive shell middens both on shore and in interior desert areas. The shells were used as vessels, utensils, and tools; they were also used in magic, as medicine and in recreation.

Large shells, such as that of *Laevicardium elatum*, were important, as they are abundant in the area, durable, and easily transported. The shell was used as a container for food or face paint, as a digging tool and dipper, among other more distinct and personal uses.

Smaller shells, such as that of the common mussel *Modiolus capax* were used as spoons or as knives for butchering meat. Others served as scrapers and augers.
Some shells were used medicinally, toasted and ground into a powder for healing skin eruptions.
Shells of certain snails were used as amulets, hung around a young child's neck for protection from malevolent spirits. Others were placed in boats for good luck in hunting and fishing.
Clamshells were used in throwing games; the shells of some snails were used in gambling games or as toys.
As traditional Seri knowledge is rapidly disappearing, such information about shells, and their names as well, is being lost. The recording of Seri knowledge over the last sixty years provides a unique glimpse today at how past Gulf of California peoples used the resources found there.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
MORFOLOGÍA, MORFOMETRÍA Y ANATOMÍA

ANÁLISIS ULTRAESTRUCTURAL DE LA BRANQUÍA DEL CALLO DE HACHA *ATRINA MAURA* (SOWERBY, 1835) (BIVALVIA: PINNIDAE)

Nora G. Martínez-Alonzo [1], Andrés Reyes-Chaparro [1], Esther Uría-Galicia [1], Edgar O. López-Villegas [2] y Marcial Arellano Martínez [3]

[1]Departamento de Morfología, [2]Unidad de microscopia electrónica, Escuela Nacional de Ciencias Biológicas, prolongación de Carpio y Plan de Ayala s/n, Col. Santo Tomas, Miguel Hidalgo, D.F. CP 11340; fujiok_hp@hotmail.com[1]; latis269@hotmail.com ; estherqbp@yahoo.com; ivoliver@hotmail.com
[3]Centro Interdisciplinario de Ciencias Marinas, Av. Instituto Politécnico Nacional, s/n, Col. Playa Palo de Santa Rita, La paz, Baja California Sur. CP 23096[1,2,3] IPN, México.

Atrina maura es un bivalvo lamelibranquio de la familia Pinnidae, se distribuye desde Baja California hasta el sur de Perú. Son organismos enterradores, filtradores y por lo tanto buenos indicadores de las condiciones ambientales, llegan a medir hasta 37cm de longitud. El órgano respiratorio y filtrador, está formado por las branquias o ctenidios; su estructura es simple y por tanto estos organismos son altamente dependientes de las corrientes para su alimentación omnívora. Su importancia económica, es debida a las cualidades gastronómicas del musculo aductor o callo que se cotiza a precios altos, esto puede llevar a su desaparición en zonas del Pacífico Mexicano. Existen trabajos en otros bivalvos, pero a la fecha no se han encontrado estudios ultraestructurales de la branquia, por lo que este trabajo contribuirá al estudio de su biología. Se colectaron ejemplares en la laguna costera de Ensenada, Baja California Sur (24°06´-24°11´N y 110°19´-110°26O) para realizar el análisis ultraestructural con microscopia de transmisión. Las branquias presentan forma de hojas alargadas de color café claro, en número de cuatro y colocadas en pares a cada lado del organismo. Ultraestructuralmente forman pliegues compuestos por un epitelio cilíndrico simple con tres tipos de células: las primeras con mitocondrias, gránulos electrondensos y cilios largos, las segundas con microvellosidades, abundantes mitocondrias y gránulos electrondensos, y las ultimas con cilios, microvellosidades, vacuolas, mitocondrias y gránulos electrondensos; éstas descansan sobre una membrana basal fina; y se continúan con las criptas constituidas por epitelio cubico simple con microvellosidades o cilios, éstas descansan sobre una membrana basal evidente a continuación se encuentra tejido conjuntivo y hemocitos en transito con abundantes gránulos. La presencia de estas estructuras se relaciona con las diferencias en la capacidad de selección preingestiva, siendo afectadas por lo tanto por las altas concentraciones de partículas inertes, presentes en el fondo marino.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ECOLOGÍA TRÓFICA

TROPHIC ECOLOGY OF THE SHORT FINNED SQUID *ILLEX COINDETII* IN THE WESTERN MEDITERRANEAN SEA (SPAIN)

Francisco Martínez, Rigoberto Rosas-Luis, Joan Navarro, Marta Albo-Puigserver, Isabel Palomera
Institut de Ciències del Mar-CSIC, P. Marítim de la Barceloneta 37-45, 08003 Barcelona Spain
francisco.martinezbaena@gmail.com; riroluis@yahoo.com.mx; joan@icm.csic.es; albo@icm.csic.es; isabel@icm.csic.es

Illex coindetii is an ommastrephid squid distributed through the Mediterranean Sea, Eastern Atlantic (from the south of Britain to Namibia) and the Western Atlantic (Caribbean, Gulf of México and Straits of Florida). It is one of the most abundant squid species in the by-catch of different fisheries in the Mediterranean. In the Western Mediterranean this species plays an important ecological role as a trophic resource of fish, marine mammals and other squids, and also as active predator of a wide range of fish, crustaceans and molluscs. In this study, we determined the trophic ecology of *I. coindetii* in a wider range of size classes than in previous studies, aiming to gain a better understand of its ecological role in the ecosystem of the Northwestern Mediterranean Sea. Feeding habits were determined by combining stomach content and stable isotopic analysis from individuals collected during all the year. Our results showed that *I. coindetii* included 40 different taxa in its diet, being the crustaceans *Pasiphaea sivado* and *Plesionika sp*., other squids (Teuthida), mesopelagic fishes and Myctophids, and Amphipoda species, the main prey items according to the index of relative importance (%IRI). In summer fish species were the main prey group, whereas in winter *I. coindetti* prey mainly on crustaceans, in particular the shrimp *Pasiphaea sivado*. We also found differences in diet between small and large individuals. Specifically, small-size individuals fed mainly on *Pasiphaea sivado* whereas large-size individuals fed mainly on *Anchylomera blossevillei* and other Amphipoda. Isotopic results indicated a similar pattern to the stomach content. Isotopic values changed during the year and in overall $\delta^{15}N$ values were higher for larger-size individuals than small-size ones, suggesting that small-size individuals exploited prey of low trophic level. In conclusion, this study revealed that the feeding habits of *I. coindetii* vary according to the size of the individuals and the season probably associated to a trophic competition and prey availability, respectively.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

DIVERSIDAD Y ABUNDANCIA DE MOLUSCOS ASOCIADOS A LA CAPTURA DE CAMARÓN ROSADO EN LA RÍA DE CELESTÚN, YUCATÁN

Georgina C. Martín, Juan C. Torres, Lorena V. León y Gaspar R. Poot
Universidad Autónoma de Yucatán, Km. 15.5 Carretera Mérida-X'matkuil, apdo. postal 4-116 Itzimná Mérida, Yucatán; lorena.leon@uady.mx; gaspar.poot@uady.mx

Se realizó un estudio de la fauna malacológica asociada a los arrastres de camarón rosado (*Farfantepenaeus duorarum, F. brasiliensis* y *F notialis*) en la Ría de Celestún, Yucatán. Los ejemplares fueron capturados en siete muestreos de agosto a noviembre del 2011, utilizando una red tipo Renfro en dos estaciones de muestreo localizadas en la zona media de la ría, cuyas coordenadas fueron: Estación 1 (Bombita) 90.384° W - 20.841° N y Estación 2 (Holbax) 90.388° W - 20.824° N. Las muestras fueron

fijadas en formol al 10% y tamizadas con la finalidad de diferenciar entre moluscos y micromoluscos de la zona. Se capturaron 207 individuos de *Farfantepenaeus* sp, encontrándose asociados hasta el momento un total de 376 organismos pertenecientes al Phyllum Mollusca, los cuales se encuentran contenidos en dos clases: Bivalva y Gastropoda, distribuidos en 21 especies (15 gasterópodos y 6 bivalvos) y 13 familias de Clase Gastropoda y 4 familias de la Clase Bivalva. Las especies más abundantes fueron: *Astyris multilineata*, *Littoridinops* sp, y *Petitilla crosseana* para los gasterópodos y *Parasarte triqueta*, *Anomalocardia auberiana* y *Tlagelus plebius* para bivalvos.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS CARTEL/POSTER

MOLLUSKS PREYED BY *OCTOPUS INSULARIS* (MOLLUSCA: CEPHALOPODA) IN ITAREMA, CEARÁ, NORTHEAST BRAZIL

Helena Matthews-Cascon [1,2], Cristiane Xerez Barroso [1] and Camilla de Souza Félix [1]

[1]Universidade Federal do Ceará, Centro de Ciências, Departamento de Biologia, Laboratório de Invertebrados Marinhos do Ceará. Campus do Pici, Bloco 909. CEP: 60455 -760. Fortaleza, CE, Brazil; hmc@ufc.br; cristianexb@gmail.com; camillafelix08@gmail.com
[2]Universidade Federal do Ceará, Instituto de Ciências do Mar. Av. Abolição, 3207, Meireles. CEP: 60.165-081. Fortaleza, CE, Brazil; helenamc@gmail.com

The fishery of octopus with the use of unbaited pots has been carried out in the Coast of Itarema County, State of Ceará, Northeast Brazil, an area of occurrence of *Octopus insularis*. The objective of this study was to investigate the mollusk species preyed by *Octopus insularis* in the area through the study of the mollusk shells found inside the pots used in the octopus fishery.
In the present study, the species found inside the octopus pots were mainly gastropods and bivalves. In the pots it was found 48 species of mollusks, being 35 species and 21 families of gastropods and 13 species and 7 families of bivalves. The most representative family of Gastropoda was Strombidae (four species found – *Strombus pugilis*, *Aliger costatus*, *Aliger gallus* e *Eustrombus goliath*). In Bivalvia, Veneridae was the most representative family with four species (*Callista maculata*, *Chione phaphia*, *Ventricolaria rigida* e *Dosinia concentrica*). *Octopus insularis* is a generalist, preying in a large number of species.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-CARTEL/POSTER

DEVELOPMENT AND CHARACTERIZATION OF NEW MICROSATELITE LOCI IN GREEN ABALONE (*HALIOTIS FULGENS*)

Adriana Max Aguilar [1], Adrian Munguia-Vega, Noé Díaz Viloria [2], Ricardo Pérez Enríquez [1]
[1]Centro de Investigaciones Biológicas del Noroeste S.C., Instituto Politécnico Nacional 195, Playa Palo de Santa Rita Sur, C.P. 23096, La Paz, B.C.S. México; amax@cibnor.mx; rperez@cibnor.mx
[2]Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional s/n, Playa Palo de Santa Rita Sur, C.P. 23096, La Paz, B.C.S. México; ndviloria@hotmail.com

Microsatellite markers are DNA sequences with 2-5 nucleotide repeats useful for population genetics studies and parentage assessment, of which tetranucleotide repeats have shown adequate levels of polymorphism and clear genotyping patterns. Microsatellites were development for the green abalone *Haliotis fulgens* via 454 high-throughtput sequencing. Primers for PCR amplification were designed for a

set of 80 tetranucleotide loci. Twenty-four microsatellite loci potentially useful in genetic analysis were obtained, from which 12 polymorphic loci have been characterized in a wild population sample (N=59). From these, 11 are considered useful in paternity analysis and population studies due to their high polymorphism (number of alleles: 6-16; HE: 0.73-0.91; PIC: 0.69-0.90) and because they were in Hardy-Weinberg equilibrium (EHW). To increase the number of available loci, the other 12 microsatellites are being tested for polymorphism and HWE.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

LARVAL RETENTION IN GREEN ABALONE *HALIOTIS FULGENS* BY PARENTAGE ANALYSIS IN B.C.S., MÉXICO

Adriana Max Aguilar [1], Ricardo Pérez Enríquez [1], Sergio A. Guzmán del Próo [2], Noé Díaz Viloria [2]

[1]Centro de Investigaciones Biológicas del Noroeste S.C., Instituto Politécnico Nacional 195, Playa Palo de Santa Rita Sur, C.P. 23096, La Paz, B.C.S. México; amax@cibnor.mx; rperez@cibnor.mx

[2]Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional s/n, Playa Palo de Santa Rita Sur, C.P. 23096, La Paz, B.C.S. México; ndviloria@hotmail.com; sguzmandelproo@gmail.com

The green abalone *Haliotis fulgens* is a marine gastropod mollusk in México with a high demand in the international market. Its fishery has historically suffered a significant decline in capture rate. Thus, it is necessary to continue research and current management programs to ensure its recovery. For these, it is necessary to have a better understanding of recruitment on defined spatial scales, which depends on the larval dynamics and connectivity among reefs (given by the levels of retention and dispersal). The objective of this work was estimate the proportion of green abalone larval retention in two sites on the western coast of Baja California Sur, using microsatellite markers in paternity analysis. The larval retention was estimated by the proportion of juveniles genetically assigned to the possible parents in the same site by parentage assessment using CERVUS 3.0. The larval retention was 3.7-12.5% in the scale from tens to hundreds of meters (30-120 m). Thus, at this scale self-recruitment occurs both on reefs in the sublittoral and intertidal zones in a lower proportion compared to the recruitment from outside the collection area. Larvae produced from adults in the sublittoral zone can settle in the intertidal zone. The use of microsatellite markers is feasible in paternity analysis to evaluate whether or not larval retention exists in a specific reef and also to determine in what scales self-recruitment takes place.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

ECOLOGICAL ASPECTS OF THE MARINE SNAIL *CONUS PRINCEPS* ON THE COAST OF JALISCO, MÉXICO

Gilberto A. Medina-Vargas [1], Emilio Michel-Morfín [1], Víctor Landa-Jaime [1], Judith Arciniega-Flores [1], Álvaro Reyes-Espinoza [2], A. Israel Muñiz Castillo [1], P. Daniel Kosonoy-Muñoz [1] and Edgar P. Heimer de la Cotera [3]

[1]Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Centro Universitario de la Costa Sur, Universidad de Guadalajara, Av. Gómez Farías 82, San Patricio-Melaque, Jalisco, México. CP. 48980; landavj@gmail.com

[2]Centro Universitario de Ciencias Biológicas y Agropecuarias, Universidad de Guadalajara, Camino Ramón Padilla 2100. Nextipac, Zapopan, Jalisco, México

[3]Laboratorio de Neurofarmacología Marina. Instituto de Neurobiología. Universidad Nacional Autónoma de México. Campus Juriquilla, Qro., México.

Currently, it is considered a priority to increase our knowledge about the marine biodiversity of México. There are very few papers about the marine snails of the genus *Conus* in the coast of the Mexican Pacific. The existing papers consists of taxonomic listings which is only include the presence or absence of a current species. And even then there is no paper for the coast of Jalisco, in which population and ecological aspects are taken in to consideration about a determined species of *Conus*. Therefore this study has as objective to understand the current state of *Conus princeps* populations in the coast of Jalisco, Mexican east Pacific, which will allow increasing the knowledge of a group of snails with neurotoxical potential, due to the poisons that they produce and use in their feeding and defense process. There has been sampling for the direct search of organism in the rocky intertidal and sub tidal areas, in 13 selected stations from Point Graham in the Bay of Navidad to Pajarera Island in the Bay of Chamela. There were used Scuba diving and snorkeling. Each one of the areas was georeferenced and for each captured organism there was registered biometric and geo-localitation data. Distribution analyses were made, including abundance, relative density and substratum and depth association. A total of 180 organisms were obtained of *Conus princeps*. The Morista index (I_d) indicates that the population of *C. princeps* presents an aggregated distribution. There were observed organisms with sizes from 23 to 77 mm of total length and an average size of 43 mm. It was observed that *C. princeps* is distributed on rocks with algae and in its primarily found at depths from 0 to 5 meters.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

PRELIMINAR MORPHOMETRIC STUDY OF *PINCTADA MAZATLANICA* FROM THE LITORAL COAST NEAR PUERTO ANGEL, OAXACA, MEXICO

Mariana Evelyn Meléndez-Contreras, Isaías Hazarmabeth Salgado-Ugarte and Verónica Mitsui Saito-Quezada

Laboratorio de Biometría y Biología Pesquera, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq. Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F; earth_angel_ecm@hotmail.com; isalgado@unam.mx; mitsuisaito@gmail.com

Pearl oysters represent for Mexico an important natural resource which must be exploited in a sustainable way. However, non-controlled exploitation and the scarcity of studies on the biology and ecology of these species are some causes that have hampered the recovery of the natural populations. The morphometric relationships are a first and fundamental step for the adequate understanding of the populations in order to attain a sustainable use and exploitation as is the case of *Pinctada mazatlanica* (Hanley, 1856) at Puerto Angel, Oaxaca. As a part of a wider study on reproduction, monthly samplings from August 2013 to date were carried out in several localities at the rocky litoral in the vicinities of Puerto Angel. The specimens were maintained in a cryogenic mix (salt and ice) and transported to the laboratory where from 20 to 30 individuals were measured (height, total and width lengths), weighted (total, soft parts, foot, digestive gland and gonad weights) and dissected. As a preliminary result, a general trend towards negative allometric growth was observed in most of the morphometric relationships registered.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

DESARROLLO GONÁDICO, HERMAFRODITISMO Y TALLA DE PRIMERA MADUREZ DE *PTERIA STERNA* (MOLLUSCA: BIVALVIA) EN BAHÍA DE LOS ÁNGELES, B.C., MÉXICO

Ana Karen Meza-Buendia [1], Marcial Arellano-Martínez [2], Bertha Patricia Ceballos-Vázquez [2] y Alma Rosa Rivera Camacho [2]

[1]Universidad del Mar, Campus Puerto Ángel, C.P. 70902, Distrito de San Pedro Pochutla, Oaxaca, MÉXICO
[2]Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas, Apartado Postal 592, C.P. 23000, La Paz Baja California Sur, MÉXICO

Se analizaron algunos aspectos de la biología reproductiva de *Pteria sterna*, a partir de 10 a 20 ejemplares silvestres recolectados mensualmente por personal de PRONATURA (mayo de 2007 a febrero 2008), en Bahía de Los Ángeles, Golfo de California, México en un Centro de Actividad Biológica. De cada individuo se procesaron histológicamente secciones de tejido gonadal, para caracterizar el ciclo reproductivo a partir de cinco estadios (indiferenciado, desarrollo, madurez, desove y posdesove). Además se midió el diámetro de los ovocitos (DO) y el porcentaje de área folicular (PAF) como indicadores de la actividad reproductiva. Se analizaron 234 individuos (114 hembras, 109 machos, 8 indiferenciados y 3 hermafroditas) sin que hubiera diferencias significativas entre la proporción sexual total: 0.96 M: 1 H (χ_c^2= 0.06; P > 0.05). La actividad reproductiva de *P. sterna* fue continua con desoves polimodales presentes de junio 2007 a febrero 2008, con mayores picos en enero 2008 y febrero 2008 lo que podría estar relacionado con la alta disponibilidad de alimento en la zona de estudio. El PAF resultó ser un adecuado indicador cuantitativo de la actividad reproductiva, con valores más altos en los meses con individuos maduros (octubre 2007 y diciembre 2008) y con una disminución directamente relacionada con el desove. El DO no presentó una tendencia clara al contrastarlo con el ciclo reproductivo, resultado del patrón reproductivo asincrónico de la especie. La talla de primera madurez sexual de los machos analizados fue de 6.3 cm de altura de la concha (AC) y 7.5 cm AC para las hembras. Evidencia histológica junto con el análisis de tallas corroboran que *P. sterna* es una especie protándrica, encontrando significativamente más machos que hembras en individuos pequeños (< 6.1 cm AC) mientras que en tallas grandes (> 8.0 cm AC) se encontraron significativamente más hembras que machos (P < 0.05).

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

SEA SLUGS OF KOMODOS, INDONESIA

Michael D. Miller
mdmiller@cts.com

A fifteen-minute video will be presented based on a two-week trip to the Komodos-South Rinca region of Indonesia in September 2013. Trip was undertaken with the goal of encountering and taking video of *Melibe colemani*, a recently described bizarre member of the Thetydidae family. This mission was accomplished along with the recorded behavior of other sea slugs encountered during this once in a lifetime voyage.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-CARTEL/POSTER

HISTOLOGY OF THE BUCCAL MASS IN FIVE TERRESTRIAL GASTROPODS

M. I. Mohamed [1] and F. Ali Reham [1]

[1]Department of Zoology and Agricultural Nematology Faculty of Agriculture, Cairo University; Giza, Egypt; reham_fathey@hotmail.com

The knowledge about Egyptian terrestrial gastropods (slugs and snails) is still fragmentary and limited information available about their histology. Thus, the present study is an attempt to fulfill the different gaps in their histological and morphological studies. In these studies, little attention has been paid to the histology of the buccal mass, including jaw and radula, which is essential for the feeding function.
These studies detailed with morphological description of jaw and radula in the two slugs species *Deroceras laeve* (Müller) and *Limax flavus* (Linnaeus) together with the three land snails *Cochlicella acuta* (Müller), *Eobania vermiculata* (Müller) and *Monacha cartusiana* (Müller), which are dominate in the Egyptian agro-system.
Deroceras laeve and *L. flavus* have a single jaw with middle rib and differ in its shape and size, while the radula formula was (25 + 13 + C + 13 + 25) X 125 for the former species and (25 + 32 + C + 32 + 25) X 164 for the latter one.
Differentiations were cleared between the jaw of the snail species in both color and ribs.
In *C. acuta* is yellow orange to dark brown with striations and 8 – 9 ribs, *E. vermiculata* has a large dark brown jaw with 5 ribs, while it crescent pale to dark brown with 11 - 18 ribs in *M. cartusiana.* On the other hand, the formula of these species is (13 + 17 + C + 17 + 13) X 168 for the former species, (33 + 23 + C + 23 + 33) X 186 for the second one, while it was (10 + 15 + C + 15 + 10) X 170 for the third species respectively.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA /ORAL PRESENTATION

RIQUEZA DE OPISTOBRANQUIOS (GASTROPODA: HETEROBRANCHIA) EN CALETA, ACAPULCO, MEXICO

Eunice Molina Garduño [1], Deneb Ortigosa [1,2], Elia Lemus-Santana [1], Brian Urbano [3]

[1]Laboratorio de Malacología, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, C.U., Av. Universidad Nº 3000, Distrito Federal, México, 04510. eunimoligar@gmail.com, jazmindeneb@hotmail.com, lesael01@yahoo.com.mx, maclen55@yahoo.com

[2]Departamento de Biología, Facultad de Ciencias del Mar y Ambientales, Universidad de Cádiz, Polígono del Rio San Pedro s/n Apdo. 40, Puerto Real, España, 11510. jazmindeneb@hotmail.com

[3]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com

Existen pocos trabajos para el sur del pacífico mexicano que aborden a los opistobranquios como objetivo principal por lo que aún existe un gran vacío en el conocimiento con respecto a estos. De la literatura consultada hasta el momento, para Guerrero sólo se ha encontrado dos trabajos, uno que no hace mención de la distribución de los organismos de manera local sino que sólo los registra para el todo el estado, el otro del 2012, que trabaja cuatro localidades de Acapulco diferentes a las de este estudio. Este trabajo pretende describir la composición comunitaria de los opistobranquios, así como realizar el

primer listado de especies para la localidad de playa Caleta en Acapulco, Guerrero. Para esto se llevó a cabo un muestreo de 105 horas/hombre mediante buceo SCUBA, en el que se realizó tanto muestreo directo como indirecto. Se identificaron un total 197 individuos pertenecientes a 4 ordenes, 10 familias y 21 especies diferentes, mas dos organismos que no pudieron ser identificados. De estos, 4 son nuevos registros para Acapulco, y no se obtuvieron nuevos registros para Guerrero ó México. Tomando en cuenta este trabajo y el realizado en otras localidades de Acapulco, se puede observar que la riqueza de este grupo parece ser muy alta ya que se observa un gran número de especies en un área relativamente pequeña. Para conocer mejor esta peculiar fauna lo que hace falta es establecer programas de muestreo con las siguientes características: tomar en cuenta el uso del Buceo SCUBA como un buen recurso para facilitar la recolecta de especímenes y de muestras, ya que se obtuvieron mayor numero de organismos en menor tiempo en comparación con un muestreo a baja profundidad y mediante buceo libre, así como, aplicar tanto muestreo directo como muestreo indirecto revisando muestras de diferentes sustratos.

OPISTHOBRANCH RICHNES (GASTROPODA: HETEROBRANCHIA) IN CALETA, ACAPULCO

There are few papers focusing on the opisthobranchs from the southern Pacific coast of Mexico. Thus, there is a large gap in knowledge of these organisms. As far as we know, for the state of Guerrero there are only two studies availale, one that does not address the distribution of organisms locally but only provides records for the entire state, and the other in 2012, focusing on four locations in Acapulco, which are different from the present study. This project aims to describe the community composition of opisthobranchs and produce the first list of species from Playa Caleta in Acapulco, Guerrero. For this we conducted a sampling of 105 man hrs by SCUBA diving, which was performed both by direct and indirect sampling. A total of 197 individuals belonging to four orders, 10 families and 21 species, plus two specimens that could not be identified were found. Of these, 4 are new records for Acapulco and for Guerrero, but no new records for the country were obtained. Taking into account the results of this study and the previous one conducted in other locations in Acapulco, we can observe that the diversity of this group seems to be very high since a large number of species were observed in a relatively small area. To better understand this peculiar fauna it is necessary to establish sampling programs with the following characteristics: the use of SCUBA diving as a good technique to facilitate the collection of specimens and samples, as greater numbers of organisms were obtained in less time compared with shallow snorkeling and apply both direct and indirect sampling including different substrates.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

MONOSPECIFIC AND MIXED MICROALGAL DIETS ON LARVAL DEVELOPMENT OF *PANOPEA GENEROSA* (GOULD, 1850)

Vincent Montes-Orozco [1], Enrique Valenzuela-Espinoza [2] and Beatriz Cordero-Esquivel [1]

[1]Centro de Investigación Científica y de Educación Superior de Ensenada, Carretera Ensenada-Tijuana, N° 3918, Código Postal. 22860, Ensenada, Baja California, México; vmontes@cicese.edu.mx; bcordero@cicese.mx

[2]Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Carretera Transpeninsular Ensenada-Tijuana, No. 3917, Fracc. Playitas, Ensenada, Baja California, C.P. 22860, México; evale@uabc.edu.mx

The Pacific geoduck clam (*Panopea generosa*) is a hiatellid bivalve. At present, it is an important resource of northwestern coast of Baja California, México. Its fisheries began approximately 15 years ago. To prevent the reduction of natural beds, some laboratories are producing geoduck seed through

aquaculture to introduce these at depopulated areas. However, there are few publications about *Panopea generosa* larval development and the use of mixed microalgae diets for feeding of this species. The objective of this study was to evaluate the effect of monospecific and mixed diets of *Isochrysis* sp. and *Chaetoceros calcitrans* on growth and survival of larval geoduck clam (*Panopea generosa*). Samples were taken every two days until metamorphosis to evaluate survival and larval growth. In addition, samples were taken of *Isochrysis* sp., *Chaetoceros calcitrans* to evaluate cell density, dry weight and proximal composition of the diets. Our results showed that *Isochrysis* sp. had higher ash free dry weight (AFDW), proteins, carbohydrates and lipids that *C. calcitrans* and mixed diet. The survival observed at day 23 was 37% with a mixed diet, followed by *Isochrysis* sp. (26%) and *C. calcitrans* (4%). Nevertheless, there were not significant differences in larval survival between mixed microalgae and monospecific *Isochrysis* sp. diets. On other hand, significant differences were found in larval length (anterior posterior axis) among treatments. Always was observed that larvae fed with *C. calcitrans* registered growth less than that fed with *Isochrysis* sp. and mixed diet. Therefore, it is suggested that mixed diet can be used in the industry of aquaculture to improve *Panopea generosa* larval survival.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

SOME REPRODUCTIVE ASPECTS OF THE GIANT CLAM *PANOPEA GENEROSA* FROM MAGDALENA BAY, BAJA CALIFORNIA SUR, MÉXICO

Ana Adalia Morales-Gómez [1], Isaías Hazarmabeth Salgado-Ugarte [1], María Georgina Gluyas-Millán [2] and Esther Uría-Galicia [3]

[1] Laboratorio de Biometría y Biología Pesquera, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq. Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F.; adalia2@yahoo.com.mx; isalgado@unam.mx

[2] Departamento Central de Investigación, Universidad Laica Eloy Alfaro de Manabi, Manabi, Ecuador; maria.gluyas@uleam.edu.ec

[3] Laboratorio de Histología, Depto. de Morfología, Escuela Nacional de Ciencias Biológicas, I.P.N. Prol. de Carpio y Plan de Ayala S/N, Casco de Santo Tomás, Miguel Hidalgo,11340, México, D.F.; estherqbp@yahoo.com

In the Mexican western coast a high percentage of the demand for fishing resources is concentrated in the bivalve mollusks. The giant clam *Panopea generosa* is considered a potentially exploitable resource with high commercial value. This species is distributed from the north of the Pacific of Canada, the United States of America to South Baja California, México. Due to the lack of biological information and to the increasing demand mainly for exportation, it has being established as the study objective of this research the characterization of the reproductive cycle by means of the histological analysis of the gonad and the comparison of gonadic maturity phases with the organism's sizes to establish the reproduction size. The clams were collected from September 2005 to September 2006 in Magdalena Bay at Baja California Sur. In order to select a subsample for histological study, the analysis of frequency of sizes and weights of the total of organisms was made by means of kernel density estimators with the bandwidth from the Silverman multimodality test. The frequency estimators obtained with a significant number of modes per month permitted the characterization of Gaussian components by Bhattacharya method. Consecutively the visceral mass was extracted and fixed to carry out the histological analysis technique. With the histological analysis five phases of development were observed: undifferentiated (September and October), developing (November and December), ripe (January, February and March), partially spawned (April and May) and spent (June, July and August). This stage sequence is in agreement with the

climatic seasons: autumn (A), winter (W), spring (SP) and summer (SM) indicating the growth (A and W), reproduction (SP) and recruitment (SM) periods respectively.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

EFECTO DE LOS INDICADORES PESQUEROS EN LA DENSIDAD Y ESTRUCTURA DE TALLA DE LAS ESPECIES *ANADARA TUBERCULOSA* Y *ANADARA SIMILIS* (MOLLUSCA: ARCIDAE) EN EL ARCHIPIÉLAGO DE JAMBELÍ, ECUADOR

Elba Mora Sánchez [1, 2] y Luis Flores [1]

[1]Instituto Nacional de Pesca, Letamendi 102 y la Ría, Guayaquil, Ecuador; emora@institutopesca.gob.ec; lflores@institutopesca.gob.ec

[2]Escuela de Biología, Facultad de Ciencias Naturales, Universidad de Guayaquil (Campus Mapasingue), Av. Raúl Gómez Lince s/n y Av. Juan Tanca Marengo

Se estudió la densidad y estructura poblacional de las especies *Anadara tuberculosa* y *Anadara similis* en el ecosistema manglar del Archipiélago de Jambelí (AJ) durante los años 2006-2007 y 2009, y su relación con indicadores pesqueros [tasa de captura (CPUE) y esfuerzo de pesca] obtenidos a través de la pesquería artesanal de este recurso. En los principales sitios de extracción del AJ se muestreo al azar un área de 300 m^{-2}. El área de muestreo se estratificó en tres niveles paralelos a la línea de bajamarea y se realizaron cuadrantes de 1m^{-2} en cada estrato. Los resultados mostraron que *A. tuberculosa* es más abundante (1.43 ind m^{-2}) que *A. similis* (0.47 ind m^{-2}). Una importante disminución en la densidad de conchas se observó entre el 2006 al 2009 (43 al84%) para el AJ. Además, se encontraron diferencias significativas en las densidades a escala espacial.A escala de puerto a estructura de talla, no mostró cambios significativos; mientras que a escala de esteros, las diferencias fueron muy significativas. El mayor número de individuos en *A. tuberculosa* se concentró entre los 35-40 mm y en *A. similis* entre los 40-45 mm. Sin embargo, un alto porcentaje de ejemplares de tallas no comerciales [(55 al 76%)<45 mm]fue observado en el estudio. Se postula que el incremento del esfuerzo de pesca registrado entre los años 2003 y 2005 incidió en la disminución de conchas en el AJ. Por lo tanto, se espera para los próximos años una reducciónen el esfuerzo de pesca debido a la poca disponibilidad del recurso en su medio natural, lo cual se refleja en la tasa de captura por conchero. Esta situación da evidencia de la vulnerabilidad del recurso y el fuerte impacto que se está ejerciendo sobre las dos especies en el AJ.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

DISTRIBUTION AND ABUNDANCE OF HOLOPLANKTONIC MOLLUSCS (GASTROPODA: PTEROTRACHEOIDEA, THECOSOMATA AND GYMNOSOMATA) FROM THE GULF OF TEHUANTEPEC

María Moreno-Alcántara [1], Gerardo Aceves-Medina *[1] and Orso Angulo-Campillo [2]

[1]Instituto Politécnico Nacional. Centro Interdisciplinario de Ciencias Marinas. Departamento de Plancton y Ecología Marina. Av. Instituto Politécnico Nacional s/n Col. Playa Palo de Santa Rita C.P. 23090, La Paz, B.C.S., México. *COFAA. EDI, SNI; maria0328@yahoo.com; gaceves@ipn.mx

[2]Programa de Ecología Pesquera. Centro de Investigaciones Biológicas del Noroeste. Av. Instituto Politécnico Nacional No. 195, Col. Playa Palo de Santa Rita. Apdo. Postal 128; c.p. 23090 La Paz, B.C.S., México; orsoanguloc@gmail.com

The holoplanktonic molluscs spend their entire life cycle in the water column. They are classified within two informal groups: the superfamily Pterotracheoidea (Heteropods) in the Architaenioglossa, and the clades Thecosomata and Gymnosomata (Pteropods) in the Opisthobranchia. The Gulf of Tehuantepec is one of the most productive ecosystems in the Eastern Tropical Pacific and its high diversity is due to the oceanographic processes and the resulting ecological conditions. Nevertheless, it is one of the regions with the scarcest monitoring of oceanographic conditions in México. This is the first study regarding the distribution and abundance of holoplanktonic molluscs species and how they are affected by the oceanographic characteristics of the area in summer conditions. Zooplankton samples were taken from the Gulf of Tehuantepec during July 2007 and June 2010. At each sampling station, data on environmental variables was recorded. 21,447 organisms were obtained belonging to 40 species of which two represent new records for the Pacific of the Americas and 15 represent range extensions including *Atlanta californiensis, Carinaria japonica* and *Limacina helicina*, previously considered as water mass indicators. Among the factors that affect the distribution and abundance, temperature was one of them, as indicated in previous studies. However, our results show that other important variables are the mixed layer depth, chlorophyll concentration and topography. In June 2010, with typical summer conditions, changes in species composition and abundance were related to the neritic-oceanic transition zone and temperature. In July 2007, with presence of an anticyclonic eddy, the differences in composition and abundance of species were in an east-west pattern, mainly related to the mixed layer depth, associated to the eddy. As an exception to the above, the species *Creseis chierchiae* was very abundant in both years in the eastern coastal region of the Gulf, related to high chlorophyll concentrations.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

TAXONOMIC REVIEW OF THE SPECIES OF THE FAMILY ATLANTIDAE (GASTROPODA: PTEROTRACHEOIDEA) IN THE MEXICAN PACIFIC USING MORPHOLOGICAL AND GENETIC ANALYZES: PRELIMINARY RESULTS

María Moreno-Alcántara [1], Gerardo Aceves-Medina [1]* and Francisco J. García-Rodríguez [2]

[1] Instituto Politécnico Nacional. Centro Interdisciplinario de Ciencias Marinas. Departamento de Plancton y Ecología Marina. Av. Instituto Politécnico Nacional s/n Col. Playa Palo de Santa Rita C.P. 23090, La Paz, B.C.S., México. *COFAA. EDI, SIN; maria0328@yahoo.com; gaceves@ipn.mx

[2] Instituto Politécnico Nacional. Centro Interdisciplinario de Ciencias Marinas. Departamento de Biología Marina y Pesquerías, Colección Ictiológica. Av. Instituto Politécnico Nacional s/n Col. Playa Palo de Santa Rita C.P. 23090, La Paz, B.C.S., México; fjgarciar@ipn.mx

The holoplanktonic mollusks of the family Atlantidae have cosmopolitan distribution. They are important components of food webs, considered as energy transfer vectors in the water column due to the vertical migrations they perform, and they contribute significantly to the carbon cycle. Within the superfamily Pterotracheoidea, the family Atlantidae is the most diverse and abundant. It is composed by three genera: *Oxygyrus* and *Protatlanta*, which are monospecific, and *Atlanta*, that has 23 species. The organisms of the family Atlantidade have a dextrally coiled shell, and the last whorl of the shell bears a keel in the outer edge. The general morphology of the sell (including superficial ornamentations of the spire), the number of spires, and the eye type are of great taxonomical significance. However, within the genus *Atlanta*, there are several species that are morphologically similar. This makes that the taxonomy as well as the species identification to be complicated. In the Mexican Pacific there are 17 species of the genus *Atlanta* reported, in addition to the species *O. keraudreni* and *P. souleyeti.* Organisms of these 19 species form part of the collection of holoplanktonic mollusk of the Mexican Pacific found in CICIMAR. In

the present study we are assessing the morphological and genetic characterization of the species of the family Atlantidae with samples obtained in the Gulf of California and Gulf of Tehuantepec in order to provide information that clarifies the taxonomic status of these organisms and to facilitate their identification. Morphologic review is being conducted according to criteria established in the literature and personal observations. Genetic characterization is based on the COI gene. Here we present the first results obtained for the morphological and genetic analyzes of organisms from the Gulf of Tehuantepec.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

STRONG DIFFERENTIAL VALVE SORTING IN *PERIPLOMA MARGARITACEUM* IN BEACH DRIFT IN TEXAS

Fabio Moretzsohn
Harte Research Institute, Texas A&M University-Corpus Christi, 6300 Ocean Drive, Corpus Christi, Texas 78412, USA.; mollusca@gmail.com

Differential valve sorting is a common phenomenon that has been documented for many bivalves in several regions around the world. Several factors, such as ocean currents, wind, beach topography and valve morphology may affect how disarticulated left and right valves are sorted. The Unequal Spoon Clam, *Periploma margaritaceum*, as the name suggests, is inequivalve: the right valve is larger and more convex than the left. The ligament is thin and easily breaks in empty shells, therefore, disarticulated valves can be fairly common. It is a common species found in beach drift along Gulf beaches as well as in the bays and estuaries in Texas. Strong differential valve sorting has been observed near Corpus Christi, Texas, first on Gulf beaches, where articulated valves were very rare, then on bay beaches, where articulated valves can be more common than disarticulated valves.
Preliminary results from weekly visits to University Beach (UB) at the Texas A&M University-Corpus Christi in the past 26 months show that although the left to right (L/R) valve ratio in beach drift vary widely spatially and temporally, the average L/R valve ratio at UB was 26% (StDev: 17.1, range: 0 to 78%, n = 56), compared to 50% (StDev: 34.8, range: 2 to 150%, n = 25) on Gulf beaches along the Texas coast. About half of the samples collected have been processed, yielding a total of 872 left valves, 3430 right valves, and 2200 pairs. There were some morphological differences observed between Gulf and bay shells, as well as in the incidence of boreholes by predatory gastropods. Besides a discussion of preliminary results, this poster will also present some biological observations.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

DISTRIBUTION, DIVERSITY AND TAXONOMY OF THE DEEP-WATER NUCULIDAE AND MALLETIIDAE (BIVALVIA: PROTOBRANCHIA) IN THE GULF OF MÉXICO

Fabio Moretzsohn [1] and Bela James [2]
[1]Harte Research Institute, Texas A&M University-Corpus Christi, 6300 Ocean Drive, Corpus Christi, Texas 78412, USA; mollusca@gmail.com
[2]Retired; 239 Ridge Lake Dr., Montgomery, Texas 77316, USA; bjam68@comcast.net

The Nuculidae and Malletiidae are two species-rich families of deep-sea protobranchiate bivalves with worldwide distribution, including some species which can be locally abundant, and, thus, play important roles in the ecosystem. Bela James studied the systematics and biology of deep-water bivalves of the

Gulf of México in the 1960's and 1970's, and carried out extensive field work throughout the Gulf of México for his Ph.D. dissertation (1972), which unfortunately was never published. However, because he kept detailed collection data, photographs, notes and ancillary documents in a well-organized fashion, and the specimens were maintained in a museum, it is possible to revisit his material and data, and use new techniques to update the results so that this valuable work can be prepared for publication.

A considerable amount of material of the two families (101 samples consisting of 117 pairs plus 320 valves) was collected between the depths of 276 to 3700+ m, consisting mostly of empty shells; the relatively few specimens with soft tissue were fixed in 4% formalin then transferred to 70% ethanol, therefore, the material is not suitable for molecular studies, but may be suitable for anatomical characters. A comprehensive biotic inventory of the Gulf published in 2009 reported nine nuculids and a single malletiid species, but James' material from the Gulf has representatives from at least ten species of nuculids and four malletiids, including two and four, respectively, potentially new species. The material is being studied to confirm identifications and to characterize and describe the new taxa. In the next phase we will work on the material of Nuculanidae, which also has a number of new records and possibly new species.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

GENETIC STRUCTURE OF CORTES GEODUCK CLAM *PANOPEA GLOBOSA* (DALL, 1898)

Adrian Munguía-Vega [1,2], Ignacio Leyva-Valencia [3], Daniel B. Lluch-Cota[3] and Pedro Cruz-Hernández [3]

[1]PANGAS Science Coordination. Comunidad y Biodiversidad A.C., Isla del Peruano 215, Col. Lomas de Miramar, Guaymas, Sonora CP 85448, México

[2]Conservation Genetics Laboratory, School of Natural Resources and the Environment, University of Arizona, BSE-317, Tucson, Arizona, 85721, USA; airdrian@email.arizona.edu

[3] Centro de Investigaciones Biológicas del Noroeste, S.C., Instituto Politécnico Nacional 195, Col. Playa Palo de Santa Rita, La Paz, B.C.S. 23090, México; ileyvalencia@gmail.com; dblluch@cibnor.mx; pcruz@cibnor.mx

Panopea globosa is found in the Pacific coast of Baja California and in the Gulf of California. Even though morphometric analyses have suggested that populations from the Pacific are distinct from those inside the Gulf, it is unclear how populations are connected via larval dispersal and gene flow throughout its range.

We used 16 microsatellite loci to estimate levels of genetic diversity and evaluate the population dynamics among four exploited populations in the Pacific (Bahia Magdalena) and in the Gulf of California (San Felipe, Puerto Peñasco and Guaymas).

Clams from Bahia Magdalena showed significant genetic differentiation from populations inside the Gulf of California, particularly when compared to San Felipe and Puerto Peñasco. We found that larval dispersal and gene flow was predominantly unidirectional and followed the typical anticyclonic (clockwise) circulation of the Northern Gulf of California during late fall and winter when geoducks spawn. San Felipe is located upstream relative to the oceanographic flow, has the largest genetic diversity and effective population size, showed evidence of local retention of larvae, and seem to act as the main source of larvae to other downstream populations that show a gradient of reduced diversity and population size along the direction of the prevailing flow. The asymmetry found in population dynamics has implications for distributing the fishery effort in the Gulf of California to increase sustainability.

CONIDAE-PONENCIA/ORAL PRESENTATION

ECOLOGICAL ASPECTS OF SNAILS WITH NEUROTOXIC INTEREST ASSOCIATED WITH CORAL REEFS IN THE BAY OF CARRIZALES, TROPICAL PACIFIC OF MÉXICO

Aarón Israel Muñiz Castillo [1], J. Emilio Michel-Morfín [1], Judith Arciniega-Flores [1], Gilberto A. Medina Vargas [1], Paris Daniel Kosonoy-Muñoz [1], Víctor Landa-Jaime [1], Marco A. Liñán-Cabello [2] y Edgar P. Heimer de la Cotera [3]

[1]Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras. CUCSUR. Universidad de Guadalajara. Gómez Farías No. 82. San Patricio-Melaque, Jalisco. 48980 México; michel@costera.melaque.udg.mx; michel1012@yahoo.com.mx
[2]Facultad de Ciencias Marinas. Universidad de Colima. Km. 20 carretera Manzanillo-Barra de Navidad, Manzanillo, Colima, 28860 México
[3]Laboratorio de Neurofarmacología Marina. Instituto de Neurobiología. Universidad Nacional Autónoma de México. Campus Juriquilla, Querétaro, 76230 México

Currently, the studies related to marine gastropods of the Superfamily Conoidea have been focused in aspects related with systematic, taxonomy and the toxicology of its venoms. This paper is an ecological study that describes the diversity, the habitats preferences and spatial distribution of *Conus* snails, in the Bay of Carrizales, Colima, Mexican tropical Pacific. The Bay of Carrizales comprises a large variety of benthonic habitats, including the stand outs of coral and rocky reefs. The sampling design consisted in two stages. In the first phase involved the general characterization of the area considering bathymetry, sedimentology, reef coverage and habitat characterization. The second phase was based on the direct collection of snail specimens, and a series of ecological data, using a methodology based in non intrusive techniques on the environment (*e.g.* direct collection by SCUBA diving and the implementation of benthic collectors anchored on the ocean floor). It was observed than the largest percentage of *Conus* snails are found associated with areas of algal cespitose type coverage and their distribution in shallow waters (from the intertidal zone to the 5 meters). *Conus nux* was the most abundant species in the area of study. A preference was observed to habit over substratum of ramified corals and cespitose growth algae. This proves the existence of a relation between this group of organisms and the areas that have corals that form reefs, and local patches composed of algae coverage. This paper brings innovations in the methodology for the ecological analysis of spatial characteristics, with the implementation of the use of the Geographic Information System (GIS) and geomatic techniques applicable to organisms that are associated to the benthos.

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

MOLUSCOS INTRODUCIDOS E INVASORES EN MÉXICO.

Edna Naranjo-García [1], Zoila G. Castillo Rodríguez [2] y María Teresa Olivera Carrasco [3]

[1] Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-153, México, D.F. C.P. 04510; naranjo@unam.mx
[2]Instituto de Ciencias del Mar y Limnología, Depto. de Biodiversidad y Ecología Acuática, Universidad Nacional Autónoma de México, Apartado Postal, México, D.F. C.P. 04510; zgcr@cmarl.unam.mx
[3]Laboratorio de Arqueozoología "Ticul Álvarez Solórzano", Subdirección de Laboratorios y Apoyo Académico, Instituto Nacional de Antropología e Historia, Moneda 16, Colonia Centro, México D.F. C.P. 06060; materesaolivera@yahoo.com.mx

México es un país que se destaca por la riqueza de especies, de ecosistemas continentales y marinos debido a su ubicación geográfica y a su compleja geomorfología. Las actividades y desplazamientos humanos han favorecido consciente e inconscientemente la introducción de moluscos. A nivel nacional se han hallado 20 familias de especies introducidas de las que 11 son terrestres, 6 marinas y 3 dulceacuícolas; las más frecuentes en el ambiente terrestre son las babosas Veronicellidae y Limacidae; en el marino son las familias Mytilidae y Teredinidae y en el dulceacuícola Thiaridae y Corbiculidae.
La babosa veronicela *Sarasinula plebeia* causa problemas económicos en cultivos agrícolas de varias regiones del país y en los de vainilla en Veracruz. Otras especies terrestres introducidas aparentemente no causan daños. En el ambiente marino, los moluscos introducidos más abundantes son los bivalvos *Bankia zeteki, B*. *destructa, Teredo bartschi* y *T*. *navalis* causando daños en embarcaciones y desplazando comunidades nativas. Las especies dulceacuícolas *Melanoides tuberculata* y *Corbicula fluminea* se hallan ampliamente distribuidas en el país. El gasterópodo dulceacuícola *Tarebia granifera* se ha registrado en la región sureste de México.
El comercio exterior, el desarrollo de numerosas actividades como la pesca, acuacultura, navegación, acuarismo, agricultura y/ o el transporte biológico natural, propician la entrada de especies introducidas algunas de las cuales se han convertido en invasoras. Los registros más antiguos de especies introducidas datan de aproximadamente 150 años y desde entonces han incrementado su tasa de ocurrencia por lo que es imperativo tomar acciones normativas y de regulación, para evitar la entrada de nuevas especies y su impacto nocivo en los ámbitos ecológico, social y económico.

INTRODUCED AND INVASIVE MOLLUSKS IN MEXICO

Mexico is a country that stands out because of its species richness, inland and marine ecosystems due to its geographic position and its complex geomorphology. Human activities have instigated conscious and unconscious introductions of mollusks. At a national level, 20 families of introduced species have been recorded of which 11 are terrestrial, 6 marine and 3 freshwater. The most frequent in terrestrial environments are the slugs in the families Veronicellidae and Limacidae, in the marine environment are the families Mytilidae and Teredinidae and in freshwater the Thiaridae and Corbiculidae.
The veronicellid slug *Sarasinula plebeia* has caused economic problems in the agriculture of various regions of Mexico, including in vanilla cultivars in Veracruz. Other introduced terrestrial species do not seem to cause harm. In the marine environment, the most abundant introduced mollusks are the bivalves *Bankia zeteki, B*. *destructa, Teredo bartschi* and *T*. *navalis*. They cause damage to boats and fishing boats, and they are also responsible of displacement of native bivalve communities. The freshwater species *Melanoides tuberculata* and *Corbicula fluminea* now have large distributions in Mexico. The freshwater gastropod *Tarebia granifera* has been recorded in the south-east region of the country.
Foreign commerce, the development of numerous human activities such as fishing, aquaculture, navigation, the aquarium industry, agriculture and/ or natural biological transportation foster the entry of alien species some of which have become invasive. The earliest records of introduced species date back 150 years. Since then the rate of introductions has increased, so it is imperative to take legislative and regulatory actions to avoid the entrance of new species and their harmful ecologic, social and economic impacts.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

COLECCIÓN MALACOLÓGICA MARINA DE FUDENA-CIAC VENEZUELA

Samuel Narciso [1] y Wilfredo Freites [1]
Centro de Investigación y Atención Comunitaria de la Fundación para la Defensa de la Naturaleza; samuelnarciso@gmail.com; willfudena@gmail.com

La colección se inicio en 1995 a fin de organizar el material biológico colectado producto del inventario de moluscos marinos presentes en el Refugio de Fauna Silvestre Cuare, como parte del convenio suscrito entonces con el Ministerio del Ambiente para fortalecer la información técnica del Refugio. Desde entonces, los proyectos ejecutados por FUDENA relacionados con este grupo en diferentes localidades de la costa y zona insular de Venezuela (Isla de la Tortuga, Delta del Orinoco, Archipiélago de los Roques, entre otros) han permitido que en la actualidad se cuente con 5.223 números de registro, con un total de 116 Familias, 401 Géneros y 962 especies, representadas en cinco clases: Gastropoda: 110 familias, 267 géneros y 676 especies; seguidas por Bivalvia: 44 familias, 116 géneros, 254 especies; Cephalopoda: 5 familias, 6 géneros, 9 especies; Polyplacophora: 4 Familias, 8 géreneros, 15 especies y Scaphopoda: 3 familias, 4 generos y 8 especies. En la colección se encuentran 6 Holotipos y 8 Paratipos. Así mismo, la colección recibe el material colectado por tesistas de varias universidades, lo que ha permitido aumentar el área geográfica y sus usuarios. La colección está registrada en catálogos físicos y en digital (Excel), con información distribuida en catorce campos incluyendo la georeferenciación de los especímenes. Los ejemplares se conservan en Etanol y muestras secas. Parte de la colección está exhibida, atendiendo las frecuentes visitas de estudiantes de educación superior de todo el país, de educación básica y media de la Costa Oriental del Estado Falcón, la comunidad científica nacional e internacional y público en general, de lo cual se leva un registro en libros de visitantes. La Colección de moluscos marinos del CIAC-FUDENA se ha constituido en una colección importante para el país, que contribuye al conocimiento de la diversidad biológica, inscrita en el Registro Nacional de Colecciones Biológicas bajo el Nº CF053.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

TALLA MÍNIMA DE MADUREZ SEXUAL EN *C. BREVIFRONS* (CAENOGASTROPODA: MURICIDAE) EN EL NORTE DE CHACOPATA, VENEZUELA

Mª Gabriela Nieves , A. Carolina Peralta y Patricia Miloslavich
Laboratorio de Biología Marina Universidad Simón Bolívar Valle Sartenejas, Pab1-003, 1080 Caracas Venezuela; mgabrielan@gmail.com; anaperalta@gmail.com; pmilos@usb.ve

El gasterópodo *Chicoreus brevifrons* es un recurso pesquero que podría ser aprovechado en el campo de la acuicultura, por ser una especie prolífica, comestible y relativamente abundante. Esta especie se encuentra bajo fuerte presión pesquera siendo parte de la fauna acompañante de la pepitona (*Arca zebra*), la cual se pesca artesanalmente por arrastre en la zona oriental de Venezuela. Durante dicha pesca, se extraen 225 organismos/bote de *C. brevifrons* en una noche de faena, cantidad que podría agotar la población. A pesar de esta significativa explotación, no existe información acerca de la talla de madurez sexual. Conocer esta talla podría ser importante en la administración y manejo de las pesquerías permitiendo establecer ciertos controles sobre la población. Este trabajo tiene como objetivo determinar la talla mínima de madurez sexual en *C. brevifrons* proveniente de esta pesca de *A. zebra* en Chacopata, Venezuela. Los individuos fueron obtenidos de los bancos de pepitona ubicados al norte de Chacopata en la faena de pesca del 22 de febrero del 2013. Un total de 58 individuos (34 hembras y 24

machos) de la captura incidental, fueron utilizados para este trabajo. Los especímenes fueron medidos, pesados y posteriormente se realizaron análisis histológicos de sus gónadas con los cuales se determinó la condición de madurez sexual mediante la observación al microscopio óptico de los procesos de oogénesis y espermatogénesis. La talla de madurez sexual encontrada en este estudio fue de 89.2mm y de 57.7mm, para hembras y machos respectivamente, siendo las tallas de captura 79.10-128.60mm en hembras y 57.7-125.10mm en machos. En base a la estructura de tallas de la captura incidental de *C. brevifrons* el 49.07% de los individuos están por encima de la talla mínima; el 50.93 % restante está por debajo, lo cual podría limitar la recuperación de la población.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/ORAL PRESENTATION

VELOCIDAD DE DESPLAZAMIENTO DEL CARACOL ROSA, *STROMBUS GIGAS*

Mariana Noguez Núñez [1, 2] y Dalila Aldana Aranda[2]

[1]Posgrado en Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México (ICMyL-UNAM). Puerto de Abrigo s/n, Sisal. C.P. 97351, Hunucmá, Yucatán, México; biologa_mariana@yahoo.com

[2]Laboratorio de Biología y Cultivo de Moluscos. Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Unidad Mérida (CINVESTAV-IPN). Carretera Antigua a Progreso, Km. 6, A.P. 73 Cordemex, C.P. 97310, Mérida, Yucatán, México; daldana@mda.cinvestav.mx

El caracol rosa (*Strombus gigas*) es un gasterópodo marino, se distribuye en lechos arenosos, camas de pastos y pedazos de coral; se desplaza por medio de pequeños saltos apoyándose en su pie, para alimentarse o reproducirse. Se han realizado algunos estudios sobre migración en juveniles y adultos. En éste trabajo, las hipótesis son: La velocidad del caracol *S. gigas* es la misma en el año y si ésta es la misma en diferentes tipos de hábitat. Para lo anterior, se estudió la velocidad del caracol rosa en dos épocas y en tres horarios. El área de estudio fue la caleta de Xel-Há, realizándose el estudio en secas y lluvias. Se marcaron 40 caracoles adultos, que fueron observados en tres horarios: mañana (8-9h), medio día (12-13h) y tarde (16-17h). En cada horario, se marcó la posición del caracol cada 10 minutos hasta completar 60 minutos. Se midió la distancia entre cada una de las posiciones del caracol y las distancias se sumaron para tener la distancia total y poder calcular la velocidad por minuto. Se aplicó una prueba de Kruskal-Wallis para determinar diferencias de la velocidad entre épocas y horas con un grado de significancia de $p<0.05$. Obteniendo que la velocidad de desplazamiento promedio del caracol fue de 1.55m/h. En lluvias, la mayor velocidad se registró en la tarde con 2.92 m/h y un promedio de 1.74 m/h. Para secas, la mayor velocidad fue de 1.69m/h, con un promedio de 1.37m/h, siendo menor a la velocidad presentada en época de lluvias, sin embargo, no hubo diferencias significativas entre épocas ($p=0.1658$). Entre horarios, la velocidad de desplazamiento presentó diferencias significativas ($p=0.000004$). En la mañana, la velocidad promedio fue de 1.08m/h aumentando a 1.96m/h en la tarde. Se concluye que la velocidad del caracol *Strombus gigas* tiene una correlación diurna más que estacional.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

POPULATION DYNAMICS OF THE NATIVE SNAIL *POMACEA FLAGELLATA* (AMPULLARIIDAE) IN A COASTAL LAGOON OF THE MEXICAN CARIBBEAN

Frank A. Ocaña [1], Alberto de Jesús-Navarrete [2], José J. Oliva-Rivera [2], Rosa M. de Jesús-Carrillo [3], and Abel A. Vargas-Espósitos [3]

[1]Programa de doctorado en Ecología y Desarrollo Sustentable, El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal, Av. Centenario km 5.5, Chetumal, Quintana Roo, México; frankocisat@gmail.com
[2]Departamento de Sistemática y Ecología Acuática. El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal. Av. Centenario km 5.5, Chetumal, Quintana Roo, México; anavarre@ecosur.mx; joliva@ecosur.mx
[3]Licenciatura en Biología, Instituto Tecnológico de Chetumal, Av. Insurgentes No. 330, Chetumal, Quintana Roo, México; rosycoquina@gmail.com; sharingan_7@hotmail.com

Apple snails inhabit tropical and subtropical freshwaters. They have ecological and economic importance and some species are invasive causing severe impacts on ecosystems and agriculture. Studies on population dynamics of this species are scarce. With the aim to evaluate the population dynamics of the native *Pomacea flagellata*, samplings were carried out monthly in Guerrero Lagoon along a year. The environmental variables did no show significant differences in a spatial scale, nonetheless salinity was lower during Rainy season and temperature was lower during North season. Higher abundance occurred during Rainy season and snails were restricted to the part of the lagoon that receives freshwater discharges.

Snails size ranged from 4-55 mm. Maximum length estimated was L_∞ = 57.75mm and the growth rate was K = 0.68/year with a seasonal oscillation; the slowest growth rate occurred in early December. Longevity was estimated in 3.3 years and the mortality rate in 1.89 $year^{-1}$. Mean biomass was 124.65 g ha^{-1}; with a somatic production of 178.32 g ha^{-1} $year^{-1}$ and a turnover rate of 1.43 $year^{-1}$.

We conclude that the abundance of *P. flagellata* is very low and could be related with the influence of salinity. Growth is relatively fast and snails reach great sizes, however, the low snail density is the main factor that influences in the low secondary production of the population.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

FEATURES OF THE SMALL SCALE FISHERIES OF OCTOPUS IN ACAPULCO, GUERRERO, MÉXICO

Jonathan Ojendiz Mancilla [1], Sergio García-Ibáñez [1], María del Carmen Alejo-Plata [2], Pedro Flores-Rodríguez [1], Rafael Flores-Garza [1] y Lenin Emanuel Ayala Solís [1]

[1]Laboratorio Quantitative Ecology, Academic Unit Marine Ecology. Autonomous University of Guerrero. Tropical Gran Vía No. 20, División Las Playas, Acapulco, Guerrero, México, CP 39390; jonathan.ojendiz@hotmail.com; sergariba@yahoo.com.mx; plata@angel.umar.mx; pfloresrodriguez@yahoo.com rfloresgarza@yahoo.com
[2]Laboratorio Coastal Ecology and Sustainability, Universidad del Mar. Resources Institute. Puerto Ángel, Oaxaca C. P. 70902 A. P. 47; plata@angel.umar.mx; gclg@angel.umar.mx

Guerrero state ranks fourth among the biologically richest states in the country. However few studies on include the octopus resource. That is why this study aims to know the socioeconomic profile of people who engage in this activity, determine the characteristics of capture and capture volume of this resource

in the municipality. Between July 2012 and March 2014, visits were made to the coastline of the municipality, to locate the Fish Production Cooperative Societies as well as individuals who are dedicated to capturing the "octopus" in order to apply a survey with questions such as age, years of experience, tools, catch seasons, working hours, number of captures, earnings, etc.. These questions were divided into three corresponding to the general data of the socioeconomic cooperative sections subsequently acquired trade shows to record length and total weight. Most of the fishermen engaged in this activity have only primary and secondary studies; their workday is 3 to 6 hours starting from the sun comes up capturing a good amount of product; the average price per kilogram is $68.00 pesos. In the township the type of fishing craft and was determined as multi-specific, where the main tools are a rod with varying lengths from 50 to 150 cm, which have a hook at the tip and inner tube strips covering the handle. The product is mainly offered locally. The average size of octopuses that are caught are 39.77 cm, with an average weight of 282 gr.

CARACTERÍSTICAS DE LA PESCA RIBEREÑA DEL RECURSO PULPO EN ACAPULCO, GUERRERO, MÉXICO

El estado de Guerrero ocupa el cuarto lugar entre los estados biológicamente más ricos del país, no obstante son escasos los trabajos sobre la captura del recurso pulpo. Es por ello que el presente estudio tiene como objetivos conocer el perfil socioeconómico de las personas que se dedican a esta actividad, determinar las características de la captura y el volumen de captura de dicho recurso en el Municipio. Entre los meses de julio de 2012 a marzo de 2014, se realizaron visitas a la franja costera del Municipio, para ubicar a las Sociedades Cooperativas de Producción Pesquera así como personas que se dedican a la captura del “pulpo”, con el propósito de aplicarles una encuesta, con preguntas como: edad, años de experiencia, herramientas de trabajo, las temporadas de captura, jornadas laborales, cantidad de captura, ganancias, etc. Dichas preguntas fueron distribuidas en tres secciones correspondientes a los datos generales, de la cooperativay socioeconómicos, posteriormente se adquirieron muestras comerciales para registrar sulongitud y peso total. La mayor parte de los pescadores dedicados a esta actividad solo cuenta con estudios de primaria y secundaria; su jornada laboral es de 3 a 6 horas iniciando desde que sale el sol hasta que capturan una buena cantidad de producto; el precio promedio por kilogramo es de $68.00 pesos. En el municipio el tipo de pesca se determinó como artesanal y multi-específica, donde las principales herramientas de trabajo son una varilla con longitudes que varían entre50a150 cm, las cuales presentan un gancho en la punta y cámara de llanta en tiras que recubre el mango. El producto se oferta principalmente a nivel local. El tamaño promedio de los pulpos que se capturan son de 39.77 cm. Y con un peso promedio de 282 gr.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/ORAL PRESENTATION

DENSITY *IMPAGES CINEREA* (TEREBRIDAE) ON TWO BEACHES IN SOUTHERN BAHIA, BRAZIL

Índira Oliveira da Luz and Erminda da Conceição Guerreiro Couto
Universidade Estadual de Santa Cruz, Programa de Pós-Graduação em Sistemas Aquáticos Tropicais, Campus Prof. Soane Nazaré de Andrade, Km 16, Rodovia Jorge Amado, Sala 01EA, 1º andar, Pav Max de Menezes Cep: 45662-900, Ilhéus-Bahia-Brasil; indiraoluz@gmail.com; minda@uesc.br

The grey Atlantic auger (*Impages cinere*a) is present in the inter-tidal zone of sandy tropical beaches. Its spatial distribution on the beach is strongly aggregated and can reach high, very localized densities. The study compared the densities of the species on two urban beaches of Ilhéus, Bahia, Brazil: Avenida and Millionários. For each beach a distance of 1 km was selected and sampled from September 2013 to March 2014. During the rising tide two collectors staked a spot where the animals appeared and

captured all of them. The total lengths of all the individuals were recorded. The area of each spot was measured taking its elliptical shape as a basis and the density of individuals estimated. An ANOVA was used to compare the densities between beaches. The average density in the Avenida Beach was 75% > that on the Millionários Beach. This difference in density between the beaches was significant for all months. In contrast, the average length of individuals from the Millionários Beach was 25% > those on the Avenida Beach.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/ORAL PRESENTATION

DIVERSITY OF MOLLUSCS ON THE REEF PLATEAU OF COROA VERMELHA, NORTHEASTERN BRAZIL

Índira Oliveira da Luz and Erminda da Conceição Guerreiro Couto

Universidade Estadual de Santa Cruz, Programa de Pós-Graduação em Sistemas Aquáticos Tropicais, Campus Prof. Soane Nazaré de Andrade, Km 16, Rodovia Jorge Amado, Sala 01EA, 1º andar, Pav Max de Menezes Cep: 45662-900, Ilhéus-Bahia-Brasil; indiraoluz@gmail.com; minda@uesc.br

Molluscs have varied functions in the biological processes of their habitats. They were collected from tidal rock pools on the reef plateau of Coroa Vermelha on the southern coast of Bahia, Brazil. Ten pools with a sandy bottom, and ten with a gravel-rubble bottom, were sampled during low tide in August 2013. A single collector examined each pool for ten minutes. All the molluscs encountered were collected, fixed in 70% alcohol and identified. Indices of species richness (Chao 2), Pielou's evenness index (J'), Margalef's index (d) and Shannon-Wiener diversity (H'), and of constancy of Dajoz (C) were calculated for the two types of pools. The tests *t* and permutation ANOSIM were used to compare them. Nine species (eight Gastropoda and one Bivalvia) totalling 51 individuals were collected in the sandy pools, while 19 species (2 Polyplacophora, 13 Gastropoda and 4 Bivalvia) totalling 99 individuals were found in the gravel-rubble pools. The higher diversity in the gravel-rubble pools was due to the greater heterogeneity of the environment. There are significant differences between the pools. The gastropod *Cerithium atratum* was classified as constant species in the sandy pools and bivalve *Arcopsis adamsi* in the gravel-rubble pools.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

NICHE OVERLAP IN MARINE MOLLUSKS ASSEMBLAGES FROM A COASTAL LAGOON IN CAYO COCO, CUBA

Yunier Olivera, Roberto González de Zayas and Julio Lestayo González
Centro de Investigaciones de Ecosistemas Costeros, Cayo Coco, Morón, Ciego de Ávila, Cuba; yunier@ciec.fica.inf.cu, roberto@ciec.fica.inf.cu, jalestayo@ciec.fica.inf.cu

According to some studies, a fundamental idea behind the assessment of biodiversity patterns is the assumption of connections between the shape of species assemblages and the functional ways in which they are organized. This functional organization covers how species are related to one another, and how species face similar environmental constraints. The relationship between niche overlap in marine mollusks assemblages from a coastal lagoon in Cayo Coco, Cuba, and two species coexistence theories: habitats filtering and limiting similarity hypotheses were evaluated. Along the environmental gradient of

the lagoon, three sections with different degrees of impact were defined and sampled by randomly distributed corers in March and April 2013. For each section, taxonomic diversity and niche overlap between species for three functional traits (feeding mode, position on the substrate and biomass) were analyzed. Species richness and mollusks abundance were higher in mesotrophic and eutrophic sections, as well as the taxonomic diversity. However, in those sections, a clustering in the species distribution through the niche space was also observed, evidence of a negative pressure (habitats filtering processes) on the local biodiversity allowing only similar species and redundant niches. In the oligotrophic section, there was no defined trend toward clustering or even spacing of the species distribution, reflecting a more functionally diverse species assemblage. Marine mollusks assemblage throughout the coastal lagoon revealed an even spacing of the species distribution, evidence of the influence of interspecific interactions (limiting similarity processes), specifically on the trophic niche. Nitrogen and phosphorus proportion, the particle size and the residence time of the water were the more influential abiotic variables in the study. In general, the structure of marine mollusks assemblages of the coastal lagoon depends on the balance between habitats filtering and limiting similarity processes along the environmental gradient.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

DESCRIBING MORPHOLOGICAL FEATURES OF GAMETES PRODUCED BY *ABRA, ERVILIA* AND *SEMELE* (BIVALVIA, SEMELIDAE)

Gisele Orlandi Introíni [1,3], Lenita de Freitas Tallarico [1], Ariane Campos [1], Fabrízio Marcondes Machado [2], Marilda da Cruz Fernandes [3], Teresinha Stein [3], Flávio Dias Passos [2], and Shirlei Maria Recco-Pimentel [1]

[1]Departamento de Biologia Estrutural e Funcional, Instituto de Biologia, Universidade Estadual de Campinas, São Paulo, Brasil. arianeecampos@gmail.com; giseleorlandi@gmail.com; letallarico@gmail.com; shirlei@unicamp.br
[2]Departamento de Biologia Animal, Instituto de Biologia, Universidade Estadual de Campinas, São Paulo, Brasil; flaviodp@unicamp.br; fabriziomarcondes@yahoo.com.br
[3]Departamento de Ciências Básicas da Saúde, Universidade Federal de Ciências da Saúde de Porto Alegre, Rio Grande do Sul, Brasil; marneuro@ufcspa.edu.br

Samples of the burrowing bivalve species, *Semele proficua*, *Abra lioica* and *Ervilia nitens* were examined, aiming to identify sperm ultrastructural traits useful for taxonomic studies and phylogenetic analyses. In addition, the oocyte morphology of *Semele proficua* was investigated to recognize features related to the reproductive biology of Semelidae. The spermatozoa of the analyzed species are of the *ect-aquasperm* type, with short and conical acrosome, small nucleus, spherical mitochondria and a simple flagellum. *Semele* and *Abra* sperm cells have barrel shaped nuclei while *Ervilia nitens* produces male gametes with nuclei exhibiting a sickle format. Consulting available data on literature, the ultrastructure of the spermatozoa of the bivalve *Scrobicularia plana* (Semelidae) has already been described. The *modified* spermatozoon of *S. plana* lacked a distinct midpiece because the mitochondria extended from the region of the pericentriolar complex along the nucleus anteriorly for 1.4 microns. The occurrence of quite different sperm features reflect a remarkable morphological diversity within Semelidae and represent an invitation to raise the number of studies focused on reproductive biology of species belonging to this family. We also have described the female gametes of *Semele proficua* and our data suggest that oocytes develop within acini that constitute the female gonad. Each acinus is involved by connective tissue with haemocoelic sinus and myoepithelial cells. The site of connection between the

developing egg and the acinal wall is called stalk. Oogenesis seems to be classified into solitary type. Light Microscopy of the gonad revealed oocytes at each developmental stage within the reproductive organ. This asynchrony indicates that the investigated species spawn gametes over many months or seasons. This strategy multiplies the possibility of sexual cells experiencing propitious conditions and allows for increased triumph of external fertilization.

CONIDAE-PONENCIA/ORAL PRESENTATION

ANATOMICAL AND RADULAR TEETH COMPARISON OF CONE SHELLS (GASTROPODA: MOLLUSC: NEOGASTROPODA) IN RELATION TO THE FEEDING HABITS, ON THE SHORES OF SINALOA, MÉXICO.

Francisco M. Orozco García [1], Mónica A. Ortíz Arellano [1,2] and Edgar P. Heimer de la Cotera [3]

[1]Colección de Moluscos de la Universidad Autónoma de Sinaloa (COMUAS), Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; paco-orozco@live.com.mx; manabel@uas.edu.mx

[2]Cuerpo Académico "Manejo de Recursos Pesqueros", (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx

[3]Instituto de Neurobiología. Universidad Nacional Autónoma de México. Boulevard Juriquilla 3001. Queretaro, México; heimer@unam.mx

A collection of poison snails (Family Conidae) was conducted in the intertidal and subtidal zone of the coast of Sinaloa, México. The sampling occured during an annual cycle (June 2011 to May 2012), at four locations: Topolobampo, La Reforma, Altata and Mazatlán. Biometric data for these snails was taken and specimens labeled. Snails were placed in aquariums with seawater for behavioral observations, as well as to assist in identifying the type of preferred diet of each species. Some specimens were sacrificed for dissection, to extract the gills with osfradio, the venom system (proboscis, radular sac, duct and poison bulb) and the radular tooth. A total of seven species of Cone snails were found: *Conus brunneus, C. gladiator, C. nux, C. regularis, C. purpurascens, C. perplexus,* and *C. fergusoni*. They were collected in three habitats: sandy, muddy and rocky. Diet type of each species was identified and found to be: *C. purpurascens* as piscivorous species, and all other vermivorous. A few exceptions include *C. brunneus* which can presumably on mollusks and worms, and *C. perplexus* proved to be piscivorous and vermivorous simultaneously. As for comparisons of the anatomy and radula, we observed that the osfradio development level is not related to the type of diet that presents each species. By contrast, the proboscis, radular sac and poison bulb apparently have a relation to the type of food they prefer. The poison duct does not show clearly whether its length may or may not be related to food preference. However, the characteristics of the radular tooth are related, and it was also noted that this structure is directly related to the length of the radular sac.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

DETECTANDO EL EFECTO DE LOS HURACANES SOBRE LA MALACOFAUNA DE FONDOS BLANDOS, MEDIANTE EL USO DE LAS CURVAS DE COMPARACIÓN ABUNDANCIA BIOMASA (ABC)

Maray Ortega Martínez, Norberto Capetillo Piñar y Arturo Tripp-Quezada

Centro Interdisciplinario de Ciencias Marinas (CICIMAR). Instituto Politécnico Nacional. Av. IPN s/n, Col. Playa Palo de Santa Rita. Apdo. Postal 592, La Paz, B.C.S., 23096, México; mar.ortega87@gmail.com; norbertcap@yahoo.com; trippq@gmail.com

El posible efecto de los huracanes sobre la estructura comunitaria de la malacofauna de fondos blandos en 13 sitios de muestreo del Golfo de Batabanó se evaluó usando las curvas de comparación abundancia biomasa (ABC) para los años 2008 y 2009. El patrón temporal de las curcas ABC y el estadístico W pre y post huracán mostró cambios en los ensamblajes de moluscos de fondos blandos de no estrés para los meses de agosto/2008 (antes del paso de los huracanes) y abril (siete meses después del paso de los huracanes) y agosto de 2009 (un año después del paso de los huracanes) y de estrés a los 33 días después del paso de los huracanes (octubre/2008), sugiriendo el efecto de los huracanes sobre la malacofauna en esta región. El resultado de este estudio sugiere que este método puede ser usado para detectar el efecto de los huracanes sobre las comunidades de moluscos de fondos blandos. Sin embargo este efecto pudo ser detectado por la intensidad y frecuencia de aparición de ambos eventos y al tiempo en el cual el muestreo se ejecutó después del paso de los huracanes por la región.

DETECTING THE EFFECT OF THE HURRICANES ON THE MALACOFAUNA OF SOFT BOTTOMS USING ABUNDANCE BIOMASS COMPARISON (ABC) CURVES

The possible effect of hurricanes on communities structure of the malacofaunal of soft bottoms in 13 samples sites from Batabano Gulf is assessed using Abundance Biomass Comparison (ABC) curves for the years 2008 and 2009. The temporal pattern in the ABC curves and W-statistic pre (August/2008) and post (October/2008: 33 days after passed of hurricanes, April/2009: seven monts after passed of hurricanes and August/2009: one year after passed of hurricanes) hurricane shows changes in the assemblages of the mollusk of soft bottoms from not strees for the months of Agosto/2008 (before passed of hurricanes) and April and August of 2009 (after passed of hurricanes) and strees to 33 days after passed of hurricanes (October/2008), suggestioning the effect of the hurricanes on the malacofauna of this región. The result obtained in this study suggests that this method can be used for detecting the effect of the hurricanes on the communities of mollusks of soft bottoms. However this effect could be detected by the intensity and frequency of appearance of both events and at the time in which the sampling was executed after the step of the hurricanes by the region.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

YELLOW SPOTS AND STRIPES OVER THE BLUE, IS THE CHROMODORID NUDIBRANCH "*FELIMARE PICTA*" (SCHULTZ IN PHILIPPI, 1836) A COMPLEX SPECIES?

Deneb Ortigosa [1], Marta Pola [2], Vinicius Padula [3], Leila Carmona [1], Gonçalo Calado [4] and Juan Lucas Cervera [1]

[1]Departamento de Biología, Facultad de Ciencias del Mar y Ambientales, Universidad de Cádiz, Polígono del Rio San Pedro s/n, Apartado 40, 11510 Puerto Real (Cádiz), Spain; jazmindeneb@htomail.com; leila.carmona@uca.es; lucas.cervera@uca.es

[2]Departamento de Biología, Edificio de Biología, Campus de Excelencia Internacional UAM+CSIC, Universidad Autónoma de Madrid, C/ Darwin, 2, 28049 Madrid Spain; mpolaperez@gmail.com

[3]SNSB-Zoologische Staatssammlung München, Münchhausenstrasse 21, 81247, München, Germany and Department Biology II and GeoBio-Center, Ludwig-Maximilians-Universität München, Germany; viniciuspadula@yahoo.com

[4]Departamento de Ciências da Vida; Escola de Psicologia e Ciências da Vida, Universidade Lusófona de Humanidades e Tecnologias, Av. do Campo Grande, 376 1749-024, Lisboa, Portugal; goncalo.calado@ulusofona.pt

The sponge-eating *Felimare picta* (Schultz in Philippi, 1836), known as *Hypselodoris picta* until 2012, has been reported from temperate/warm waters in both coasts of the Atlantic Ocean as well as in the Mediterranean Sea, where it was originally described. High variability in its dark blue body color and the irregular pattern of stripes and/or yellow spots leaded to the proposal of several nominal subspecies. Since 1996, *Felimare picta picta* (Schultz in Philippi, 1836) from the Mediterranean Sea is accepted as the nominal species, as well as four subspecies: *F. picta webbi* (d'Orbigny, 1839) from the West Atlantic, *F. picta azorica* (Ortea, Valdés and García-Gómez, 1996) from Azores Islands, *F. picta verdensis* (Ortea, Valdés and García-Gómez, 1996) from Cape Verde, and *F. picta tema* (Edmunds, 1981) from Ghana. Two years later, an additional new subspecies was described from Brazil as *F. picta lajensis* (Troncoso, García and Urgorri, 1998), although it was elevated to specific level in 2000.
In the present contribution we test the taxonomic status of all the subspecies of "*Felimare picta*", excluding the Ghanaian subspecies, using two mitochondrial [cytochrome *c* oxidase subunit I (COI) and16S rRNA (16S)] and one nuclear [Histone-3 (H3)] to clarify whether it is a species complex or a single species with regional morphotypes.

PUNTOS Y LÍNEAS AMARILLAS SOBRE AZUL, ¿ES EL NUDIBRANQUIO "*FELIMARE PICTA*" (SCHULTZ IN PHILIPPI, 1836) UN COMPLEJO DE ESPECIES?

El comedor de esponjas *Felimare picta* (Schultz in Philippi, 1836), conocido como *Hypselodoris picta* hasta el año 2012, ha sido citado en aguas templadas/cálidas de ambas costas del océano Atlántico y en el mar Mediterráneo, de donde fue originalmente descrito.
Su coloración azul oscuro y su patrón irregulares de líneas y/o puntos de color amarillo, condujo a mediados de los años 90´s a la descripción de varias subspecies. Desde ese entonces, se reconoce a *Felimare picta picta* (Schultz in Philippi, 1836) del mar Mediterráneo como especie nominal y a cuatro subespecies: *F. picta* webbi (d'Orbigny, 1839) del Atlántico oeste, *F. picta azorica* (Ortea, Valdés y García-Gómez, 1996) de las Islas Azores, *F. picta verdensis* (Ortea, Valdés y García-Gómez, 1996) de Cabo Verde y *F. picta tema* (Edmunds, 1981) de Ghana. Unos años después, otra especie descrita originalmente como una subespecie de Brasil, *F. picta lajensis* (Troncoso, García y Urgorri, 1998), fue elevada a la categoría de especie dos años más tarde.
En el presente trabajo estudiamos la validez de las subspecies de "*Felimare picta*", excluyendo ejemplares de Ghana, usando dos marcadores mitocondriales [citocromo oxidasa subunidad I (COI) y16S rRNA (16S)] y uno nuclear [Histona-3 (H3)] para identificar cuantas especies están enmascaradas bajo un mismo nombre, o si la diferencia es debida a morfotipos regionales.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
ECOLOGÍA, SALUD Y BIOTECNOLOGÍA

OBSERVACIONES DE HÁBITOS ALIMENTICIOS DE CARACOLES CÓNIDOS EN CAUTIVERIO

Mónica Anabel Ortíz Arellano [1, 2] J. Emilio Michel-Morfín [3] y Edgar P Heimer de la Cotera [4]
[1]Colección de Moluscos de la Universidad Autónoma de Sinaloa (COMUAS), Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx
[2]Cuerpo Académico "Manejo de Recursos Pesqueros", FACIMAR-UAS. Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx
[3]Laboratorio de Invertebrados acuáticos. Departamento de Estudios para el desarrollo sustentable de zonas costeras. Universidad de Guadalajara-CUCSUR. Gómez Farías 82, San Patricio Melaque, Jal C.P. 48980 México; michel@costera.melaque.udg.mx

[4]Instituto de Neurobiología Campus Juriquilla. Universidad Nacional Autónoma de México. Santiago de Querétaro, Querétaro, México; heimer@unam.mx

Los caracoles cónidos pertenecientes a la superfamilia Conoidea (= Toxoglossa) son gasterópodos marinos depredadores especializados en anélidos, peces y otros moluscos. Presentan un sofisticado método de captura, clavando sus dientes como arpones en sus presas he inyectando venenos paralizantes, compuestos por una mezcla potente de 100 a 200 neurotoxinas diferentes llamadas conotoxinas. Las conotoxinas son consideradas un recurso con alto potencial en la farmacología, el primer anestésico utilizado para aliviar el dolor crónico en pacientes en fase terminal de VIH y cáncer derivado de toxinas de cónidos, el ziconotide fue aprobado por el U.S. Food and Drug Administration en diciembre de 2004, otras drogas están en ensayos clínicos y preclínicos para Alzheimer, Parkinson y epilepsia. El presente trabajo tiene como objetivo describir el mecanismo de alimentación de los caracoles cónidos en cautiverio y determinar su tipo de dieta. Se observaron por un periodo de 2 años un total de 63 ejemplares de 7 especies (*Conus purpurascens*, *C. brunneus*, *C. perplexus*, *C. regularis*, *C. gladiator*, *C. nux* y *C. princeps*) que fueron recolectados en la costa de Sinaloa. Cada ejemplar fue medido y marcado para llevar el registro individual, se mantuvieron en acuarios adaptados con condiciones marinas, se les ofreció un elenco de presas de varios taxones de gusanos, peces y moluscos, durante las observaciones se tomaron registros fotográficos y videograbaciones utilizando equipo digital. Se identificó el tipo de dieta y la estrategia de caza de 6 especies, resultando ser 6 vermívoros y 1 piscívoro. *C. brunneus*, *C. perplexus* y *C. purpurascen* presentaron dieta facultativa al presentar cambio en su dieta al menos en un evento. *C. brunneus* siendo vemívoro se le sorprendió comiendo un gasterópodo, *C. perplexus* (vermívoro) en un análisis del contenido estomacal se encontraron restos de un pez y *C. purpurascen* (piscívoro) durante el periodo de reproducción se le captó comiendo un bivalvo.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

COLECCIÓN DE MOLUSCOS MARINOS DE LA UNIVERSIDAD AUTÓNOMA DE SINALOA

Mónica Anabel Ortíz Arellano [1, 2], Briana Yoselin Baez Valenzuela [1], Francisco M. Orozco García [1], Jesús Uriel González Pardo [1] y A. Karina Minero Biciego [1]

[1]Colección de Moluscos de la Universidad Autónoma de Sinaloa (COMUAS), Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa (FACIMAR-UAS). Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000; manabel@uas.edu.mx; yse_2bes@hotmail.com; paco-orozco@live.com.mx

[2]Cuerpo Académico "Manejo de Recursos Pesqueros", FACIMAR-UAS. Paseo Claussen s/n Apdo. Postal 610. Mazatlán, Sinaloa. México. C.P. 82000.

La colección malacológica de la Universidad Autónoma de Sinaloa (COMUAS) creada desde el año 2003, está integrada por dos secciones (conquiliológica y malacológica), que a su vez se dividen en bloques de acuerdo a la región de recolecta. El objetivo de la COMUAS es representar y documentar la biodiversidad malacológica del Noroeste de México con fines de investigación científica. En la actualidad el acervo cuenta con 426 especies catalogadas de moluscos marinos representadas por 109 familias de las clases Bivalvia, Gastropoda, Polyplacophora y Cephalopoda, los ejemplares fueron recolectados en la zona intermareal y submareal producto de varios proyectos de la COMUAS y de donaciones biológicas de proyectos externos, Instituciones gubernamentales pesqueras y de la iniciativa privada, lo que ha permitido tener ejemplares representativos de los estados de Baja California, Sonora, Sinaloa y Nayarit, adicionalmente se tienen ejemplares de Veracruz y Yucatán. La COMUAS cuenta con una base de datos con la información taxonómica, ecológica, registro fotográfico de cada especie y un acervo de videograbaciones del comportamiento en cautiverio de algunas especies; con la que se han elaborado

catálogos descriptivos, esquemas ilustrativos y guías de campo para el estudio de la malacofauna marina. El acervo e información de la COMUAS ha permitido ser fuente de consulta para la investigación científica y a partir del estudio de sus ejemplares se han realizado tesis de licenciatura, maestría y Doctorado. Se agradece la donación de muestras por parte de Pesca Industrial Maros S.A de C.V, Instituto Nacional de Pesca, GEOMARE, A.C. Pescadores ribereños de Sinaloa y de Altamar de la Flota camaronera de Mazatlán, Biólogos y alumnos de la FACIMAR.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/ORAL PRESENTATION

RELATIONSHIP OF BEAKS MEASUREMENTS AND BODY SIZE OF *ENTEROCTOPUS MEGALOCYATHUS* (CEPHALOPODA: OCTOPODA)

Nicolás Ortiz [1,2], Giannina Voglino [4] and Augusto C. Crespi-Abril [1,3,4]

[1]Centro Nacional Patagónico (CONICET), Boulevard Brown 2915, Puerto Madryn (9120), Chubut, Argentina. crespi@cenpat.edu.ar, nicortiz@cenpat.edu.ar

[2]Universidad Tecnológica Nacional- Facultad Regional Chubut (UTN-FRCH). Av. del Trabajo 1536, Puerto Madryn (9120), Chubut, Argentina

[3]Universidad Nacional de la Patagonia San Juan Bosco. Facultad de Ciencias Naturales. Boulevard Brown 3010, Puerto Madryn (9120), Chubut, Argentina; giannina_777@hotmail.com

[4]Escuela Superior de Ciencias Marinas, Universidad Nacional del Comahue, San Martin 247, San Antonio Oeste (8529), Rio Negro, Argentina

Cephalopods are important fishing resource and represent a valuable prey for higher predators. They are mainly muscular animals and very little of their body mass is indigestible. Between the indigestible body parts, the beaks are the most useful for determining the species and the biomass of cephalopods consumed by predators. *Enteroctopus megalocyatus* is an endemic species of the southern tip of South America and is part of the diet of several species, including seabirds, marine mammals and elasmobranchs. Besides it is also an important fishing resource targeted by artisanal fisheries. In Argentina, this fishery is unmanaged, in part because fisheries often takes place in remote locations which present difficult access for fishery managers. The aim of this work, is to study the relationship between body size and beaks of *E. megalocyathus* that can be used in ecological and fishery studies. From each individual total and eviscerated weight and sex were recorded and the following measures of superior and inferior beaks were registered: crest, rostrum, hook and wing lengths. A simple regression analysis was performed between different beak measurements and total and eviscerated weights. The exponential model was the best model fitted to data in all regressions between beaks length and total weight. The relationship between total weight and eviscerated weight was linear. No differences were found between males and females in all cases. The best measure of inferior and superior beaks to estimate total weight was the crest length , whilst rostrum length was the worst. Thus, the biomass of *E. megalocyathus* consumed by predators could be estimated accurately by using crest length. Also, we propose that beak size would be a useful tool to estimate octopus captures of *E. megalocyathus*, particularly when it is difficult to access to fishing catches.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

DESAFÍOS TECNOLÓGICOS PARA EL CULTIVO DEL MOLUSCO BIVALVO CULENGUE *(GARI SOLIDA)*

E. Pacheco [1], C. Puebla [1] y R. Contreras [1]

[1]Instituto de Ciencia y Tecnología, Universidad Arturo Prat, Puerto Montt, Chile; elisa.pacheco@unap.cl

El estado actual de las pesquerías en Chile, ha llevado a las instituciones de investigación a trabajar en el desarrollo de tecnologías de cultivo para diferentes recursos hidrobiológicos. En este sentido la Universidad Arturo Prat, desde hace algunos años investiga técnicas y desarrolla tecnología que permita cultivar al molusco bivalvo *Gari solida*, conocido comúnmente como culengue. Esta especie, muy apreciada en los mercados asiáticos, ha sido sometida a una fuerte explotación de sus bancos naturales.
Entre las investigaciones que se han realizado con respecto a esta especie se encuentran: caracterizaciones de los bancos naturales, acondicionamiento de reproductores, inducciones a desove, cultivo de larvas, post larvas y semillas.
Los principales resultados consisten en protocolos de: mantención de reproductores en cautiverio (tiempo de acondicionamiento 90 días), inducción a desove (shock térmico + emersión), alimentación de todas sus etapas de desarrollo y mantención de larvas y presemillas.
Los principales desafíos propuestos, se refieren principalmente a desarrollar estudios que aborden en profundidad los aspectos reproductivos de esta especie. Un tema relevante en este aspecto es la gran asincronía en la maduración (entre machos y hembras) y la presencia de una cubierta gelatinosa que se mantiene hasta el estado de larva D, lo que dificulta su manejo en el hatchery.
En general se puede concluir que las tecnologías de cultivo utilizadas para otras almejas, no son aplicables a esta especie y se debe trabajar aún más en conocer aspectos biológicos, de comportamiento y de ecología de *G. solida*, para poder cultivar a nivel piloto esta especie.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

TRANSCRIPTOMES UNCOVER UNPRECEDENTED DIVERSITY IN OPSIN PROTEINS USED IN MOLLUSCAN PHOTORECEPTION AND VISION

Autum N. Pairett and Jeanne M. Serb
Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, Iowa 50011, USA; serb@iastate.edu; apairett@iastate.edu

Molluscs possess a diversity of structures to sense environmental light. In the phylum, eyes have evolved up to 13 times independently and are used for both visual and non-visual photoreception, while dermal photosensitivity is widespread in eyed and eyeless taxa. Regardless of the sensing organ, the underlying molecular mechanism of photosensitivity is limited to a common signal transduction pathway mediated by a single protein, opsin. Together with a light-sensitive chromophore, opsin regulates the molecular pathway that converts an environmental light signal to an electrical signal in photosensitive cells. To understand the connection between photoreceptor systems, we compared phototransduction genes sequences from tissue-specific transcriptomes of the scallop (Pectinidae). We identified 12 different opsin genes expressed primarily in eyes. In an attempt to classify these opsins and determine if this observed diversity in opsin is unique to the scallop lineage, common within bivalves and other molluscs, or unique to eyed molluscs, we identified opsin sequences from five available molluscan genomes (pacific oyster, pearl oyster, limpet, sea hare, *Biomphalaria*) and performed a phylogenetic analysis of

these opsins along with a sample of opsins from across eumetazoans. From this analysis, we found that the scallop opsins belong to three major opsin clades, including a putatively larval-specific clade that is unique to molluscs. Surprisingly, we discovered a novel opsin lineage that consists primarily of molluscan opsins, which we have called the Gx-opsins. Our results suggest that the Gx-opsins are most similar to the cnidarian opsin and may couple with a Gs-protein. Further work on this new opsin group will be required to determine their function within molluscs.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

COMPUESTOS FOTOPROTECTORES EN EMBRIONES DEL GÉNERO *CREPIPATELLA*: IMPLICANCIAS DE LOS MODOS DE DESARROLLO

Francisco J. Paredes, Víctor M. Cubillos y Oscar R. Chaparro
Instituto de Ciencias Marinas y Limnologicas, Universidad Austral de Chile, Valdivia, Chile;
paredesfco91@gmail.com

Los estadios tempranos de invertebrados marinos, deben lidiar con la radiación UV-R, y hacen uso de compuestos fotoprotectores. Los gastropodos *Crepipatella fecunda y C. dilatata* poseen distintos modos de desarrollo embrionario. La primera tiene desarrollo mixto (encapsulado-pelágico) y libera una larva pelágica (15 días). La segunda, presenta desarrollo directo, liberando juveniles desde las capsulas. Ambas especies encierran sus embriones en capsulas que son incubadas por la madre. La radiación ultravioleta (UV-R; 280-400 nm) impacta en la viabilidad de los estadios temprano. Sin embargo, el secuestro y asimilación de compuestos fotoprotectores como las micosporinas del tipo aminoácido (MAAs), es un mecanismo utilizado como estrategia para aminorar el daño celular causado por UV-R. Normalmente, las MAAs son adquiridas por el adulto desde las algas y transferidas a los embriones. Mediante HPLC se cuantifico los niveles de MAAs en embriones, fluido intracapsular, paredes capsulares, y huevos nutricios (en *C. dilatata*) y se asociaron a los modos de desarrollo. Las hembras y embriones encapsulados de ambas especies presentan 3 tipos de MAAs (Shinorine, Porphyra-334, Asterina 330). Los embriones de *C. fecunda* (desarrollo mixto) poseen mayores niveles de MAAs que embriones de *C. dilatata* con desarrollo directo. Esto sugiere mayor protección para el periodo pelágico debido a la mayor exposición al UV-R. La presencia de MAAs en los embriones de *C. fecunda*, correspondería al aporte materno a través del vitelo y en menor medida al aporte del fluido intracapsular. En *C. dilatata,* el incremento en MAAs durante el desarrollo encapsulado, se debe a la ingesta de huevos nutricios (también poseen MAAs). Las paredes capsulares de ambas especies poseen MAAs, pero con reducidos niveles. Así, la mayor protección vía MAAs, estaría dada en la especia *C. fecunda* con desarrollo mixto, y en menor medida para *C. dilatata* con desarrollo directo. Fondecyt-Chile 1100335.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

DECLINE OF THE LAND SNAIL *ANGUISPIRA ALTERNATA* (PULMONATA: DISCIDAE) IN PENNSYLVANIA, USA

Timothy A. Pearce and Chelsea D. Arnold
Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, Pennsylvania 15213, USA
pearcet@carnegiemnh.org; cdarnold47@gmail.com

Population declines of species are occurring throughout the world. Although museum specimens record species occurrences in space and time, documenting declines can be difficult when historical information is sparse. The land snail *Anguispira alternata* is relatively large and common, resulting in numerous museum specimens. Corroborating anecdotes, recent surveys in Pennsylvania, northeastern USA, compared with museum specimens, indicate that *A. alternata* is now known in fewer than half the counties where it occurred before 1960. However, we do not know the search effort of past snail surveyors, so can we be sure that modern surveyors are searching hard enough? To address this question, we examined over time (1) the accumulation curve of new species records in counties, (2) the proportion of collecting events containing *A. alternata*, and (3) the sizes of snails in collecting events. We conclude that modern surveyors are searching hard enough and that the decline of *A. alternata* is real. We discuss preliminary results that explore possible causes of the decline.

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

MOLUSCOS MARINOS INVASORES EN LA COSTA DE VENEZUELA

Ana Carolina Peralta, **Patricia Miloslavich**
Laboratorio de Biología Marina, Departamento de Estudios Ambientales, Universidad Simon Bolivar, Caracas 1080, Venezuela; aperalta@usb.ve

Las especies invasoras suelen generar problemas en el ecosistema desde varias persepectivas: pérdida de la biodiversidad, pérdidas ecónomicas por desplazamiento de especies nativas de importancia comercial, alteraciones del equilibrio ecológico por intervención en las tramas tróficas, propagación de enfermedades por incorporación de un nuevo hospedador de parásitos, etc. El presente trabajo intenta resumir las principales especies exóticas de moluscos que hasta los momentos se han registrado en el ecosistema marino de la costa de Venezuela. En base a la revisión de bibliografía y de bases de datos sobre la diversidad de moluscos en la costa de Venezuela se registraron 3 especies introducidas: 2 bivalvos de la familia Mytilidae y 1 gasterópodo de la familia Vermetidae. Potencialmente puede haber 5 species invasoras más que han sido reportadas en el Caribe pero no aún en Venezuela. En el caso de los mytílidos y esta especie de vermétido ambos comparten la característica de ser especies adaptadas a la vida sésil y tener una reproducción con estadíos larvales libres en el agua. Estas características les permiten colonizar nuevos ambientes ya sea por el traslado involuntario de las larvas en aguas de lastre o de los adultos adheridos a los cascos de embarcaciones. Bajo este escenario, se presenta un análisis de las formas de ingreso, los riesgos, impactos y medidas de control para cada una de las especies invasoras con el fin de evaluar y diagnosticar los retos a enfrentar desde el punto de vista económico y ecológico.

INVASIVE MARINE MOLLUSKS IN THE VENEZUELAN COAST

Invasive species can generate problems to ecosystems through: biodiversity loss, displacement of native species of commercial importance (economic losses), ecological alteration of the food webs, disease propagation by the incorporation of new host parasites, etc. This work summarizes the mollusk invasive species that have been identified in Venezuelan marine ecosystems. Based on literature review and databases, there are three invasive mollusk species registered for this country: two bivalves from the family Mytilidae and one gastropod from the family Vermetidae. There are potentially five more invasive species that have been reported in the Caribbean, but their presence in Venezuela has not been registered yet. In the case of Mytilidae and the vermetid species, they share the characteristic of a sessile life style and disperse through a larval stage. These characteristics allow them to colonize new environments either by larval transport in ballast water or as adults attached to the vessel's hull. Under

this scenario, an analysis of the way of entrance, the risks, impacts and control measures are presented for each species in order to evaluate and diagnose the challenges we have to confront from an economic and ecological point of view.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
DULCEACUÍCOLAS

ENVIRONMENTAL FACTORS INFLUENCING THE DISTRIBUTION AND COMPOSITION OF BIVALVE SPECIES IN FRESHWATER ECOREGIONS IN BRAZIL AND BORDERING COUNTRIES

Daniel Pereira [1], Maria C. D. Mansur [1], Maria T. R. Rodriguez [1] and Federico M. D. Rolón [1]
[1]UFRGS/ PPG-ECO/CENECO – Programa de Pós-Graduação em Ecologia, Centro de Ecologia, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves n. 9500, 91540-000, Porto Alegre, RS, Brazil, dani.mdourado@gmail.com; mcrismansur@gmail.com,

The species composition of the assemblies of bivalves in South American ecoregions, as well as environmental factors, was not known until now. Aiming to evaluate the environmental factors that influence the structure of bivalves assemblies of these biogeographical units, 24 ecoregions located in Brazil and part of neighboring countries were selected due to the greater availability of environmental data and greater number of mollusk material deposited in scientific collections. The presence and absence of species in each polygon area of each ecoregion was obtained through literature review and examination the scientific collections of renowned museums. Physiographic attributes, such as slope, elevation, polygons area, precipitation, air temperature, as well as indicators of water chemistry, especially pH and cationic contents, were evaluated through several univariate and multivariate methods. Index of species rarity was calculated for each region in order to quantify the endemicity of the areas. We observed greater species richness of bivalves in large areas of lower slope and high richness of fishes. The high richness of unionids with parasitic larval stage was also related to polygon area and high richness of fishes. Most environmental factors that explained the structure of the bivalve assemblies were physiographic attributes and the fish species richness. Moreover, geological events of the past that shaped the South American landscapes contributed to the present distribution and composition of bivalve species in the evaluated ecoregions. This one first step to understanding the structure of bivalve assemblages in macroscale is an important basis for the management and conservation of native species and the control of invasive species. (CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior / Brazil)

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

DESCRIPCIÓN HISTOLÓGICA DE LOS PRINCIPALES ÓRGANOS DEL OSTIÓN AMERICANO *CRASSOSTREA VIRGINICA* DEL ATLÁNTICO MEXICANO

Carlos Pérez [1], Cecilia Ramírez-Santiago [1], Erika S. Palacios-Ávila [2], Ma. Pilar Torres-García [2], Víctor M. Zárate-Noble[3] y Leobardo García-Solorio [3]
[1]Instituto Nacional de Pesca. Pitágoras 1320. Sta. Cruz Atoyac. CP: 03310 México, D.F.; carlos.perez@inapesca.sagarpa.gob.mx
[2]Laboratorio de Invertebrados, Facultad de Ciencias. UNAM. Av Universidad 3000. Circuito exterior. México, D.F.; pilar.torres@ciencias.unam.mx
[3]Centro Regional de Investigación Pesquera. Prolongación Altamiar s\n. Isleta Pérez.Tampico, Tamps.

El ostión americano *Crassostrea virginica* (Gmelin, 1791) pertenece a la familia Ostreidae de gran importancia comercial. Se distribuye desde el Golfo de San Lorenzo en Canadá hasta la Laguna de Términos, Campeche, México, encontrándose en zonas arrecifales de fondos firmes y duros de la zona intermareal y submareal. El ostión *Crassostrea* es un recurso de importancia comercial, cuya producción nacional en 2010 se estimó en 50,715 toneladas, alcanzando la producción en Veracruz las 26,328 ton, lo que representó un aporte al total nacional del 52% y en la producción del Golfo de México del 58%, representando el 90% del volumen total. La captura nacional de ostión en 2012 fue de 39,763 ton, ocupando el 6° lugar en la producción pesquera en México, sin embargo, por su valor económico se ubica en el 16°. La tasa media de crecimiento anual de producción en los últimos 10 años ha sido negativa de -0.40%, observando una gran disminución en sus poblaciones, conduciendo a una problemática mayor.
La importancia del ostión además de los volúmenes de producción, reside también en la dimensión socioeconómica, dada la característica de expansión de pesquería ribereña que se desarrolla en el Golfo de México, con 7'000 pescadores dedicados a esta actividad ostrícola, de los cuales existen en Veracruz 3'400 que ejercen esfuerzo en los 11 sistemas lagunares o costeros de la entidad. El objetivo del trabajo es contribuir al conocimiento histológico normal de los principales órganos que conforman la anatomía del ostión *Crassostrea virginica,* para determinar posteriormente los daños que provoquen patógenos o contaminantes, causantes de la disminución en su producción pesquera. Se colectaron 18 organismos en Tampico, Tamps, y 20 en Veracruz, fijados en formol al 10%, se disectaron longitudinalmente y se incluyeron en parafina. Se obtuvieron cortes a 5µm y se tiñeron con Hematoxilina-Eosina de Harris. Se describieron las estructuras histológicas normales de los órganos: hepatopáncreas, gónadas, branquias, glándula cerebral, tubo digestivo, corazón, manto, músculo aductor y palpos labiales Los beneficios de este trabajo servirán de referencia a otros posteriores.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-CARTEL/POSTER

TIGHT RELATIONSHIPS BETWEEN *STYLOCHEILUS STRIATUS,* SEAGRASS AND *LYNGBYA MAJUSCULA* IN CALETA BALANDRA, B.C.S. MEXICO

Claudia Jeannette Pérez-Estrada [1, 2], Ricardo Rodríguez-Estrella [1], Deneb Ortigosa [2], Ruth Ochoa-Díaz [1], Francisco Javier López-Rasgado [1]

[1]Centro de investigaciones biológicas del Noroeste, S.C., Av. Instituto Politécnico Nacional 195, Col. Playa Palo de Santa Rita Sur, 23096, La Paz, B.C.S. México; claudiap@cibnor.mx; estrella@cibnor.mx, rmochoa@cibnor.mx, dgs_9@hotmail.com

[2]Universidad de Cádiz, Facultad de Ciencias del Mar y Ambientales, Departamento de Biología, Polígono del Río San Pedro s/n, Apdo. 40, 11510 Puerto Real, Cádiz, España; jazmindeneb@hotmail.com

The sea hare *Stylocheilus striatus*, as other members of the Aplysiidae family, is a grazer specialist that feeds on the toxic cyanobacteria *Lyngbya majuscula*. *Stylocheilus striatus* often incorporates the active secondary metabolites produced by this cyanobacteria. Blooms of *L. majuscula* have been frequently occurring since 2010 in Caleta Balandra, B.C.S. Mexico. In October–November 2011 and August 2012 we observed both, blooms of *L. majuscula* and large aggregations of the sea hare in Caleta Balandra. *Stylocheilus striatus* were found in sand feeding on the bloom of *L. majuscula* and on the seagrass *Halodule wrightii*. The opistobranchs were in reproduction, and laid their eggs directly on *H. wrightii,* and also on the macroalge *Caulerpa sertularioides*, *Spyridia filamentosa* and *Acantophora spicifera*. Here, we present the density values and the structure of *S. striatus* population by size, and determined the trophic relationships of *S*. *striatus* using stable isotopes δ^{15}N and δ^{13}C. We recorded agglomerations of more than

64 organisms per site, but also individuals alone. The density was 38 ind/ m^2 and 40 ind/ m^2 for 2011 and 2012, in an area of 34 m^2 and 45 m^2 respectively, but both areas showed a different spatial aggregation pattern. Mean size of 300 organisms was 3.4 ± 6.0 (range: 2.0 - 5.0 cm) in 2011 and 5.2 ± 11.3 (range: 2.0 - 9.0 cm) in 2012. Most eggs were laid on the seagrass *H. wrightii*. The analyzes of $\delta^{15}N$ and $\delta^{13}C$ isotopes in muscle tissues of *S. striatus* indicate that *L. majuscula* and *H. wrightii* contributed to their diet. We discuss on the tight relationships of *S. striatus*, *H. wrightii* and *L. majuscula*.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

SPATIAL PATTERNS OF MOLLUSK SPECIES RICHNESS IN THE GULF OF CALIFORNIA, AND A PROPOSAL OF BIOGEOGRAPHIC ZONATION

David Petatán-Ramírez [1], Richard Brusca [2], Héctor Reyes-Bonilla [1] and José Luis García-Corona [1,3]
[1]Universidad Autónoma de Baja California Sur. Ciencias marinas. Departamento de Biología marina. Rd. Sur KM 5.5, ZIP. 2306019-B, La Paz B.C.S. 23080, Mexico. petatan@hotmail.com; hreyes@uabcs.mx
[2]University of Arizona, 1041 E. Lowell St. BioSciences West, Rm. 310. Tucson, Arizona, United States; rbrusca@desertmuseum.org
[3]Centro de Investigaciones Biológicas del Noroeste, S.C. (CIBNOR) Km. 1 Rd. San Juan de la Costa, El Comitán, La Paz B.C.S. ZIP. 23000, Mexico; cheliz.biolmar@gmail.com

Mollusks are one of the most important animal groups in the Gulf of California, given their economic and ecological importance, and high richness. This group represents 44% of the total invertebrate fauna of the region, which is why the aim of this work was to determine the distribution patterns of this phylum. The distribution of 1,750 species of mollusks was analyzed creating maps of species richness; also maps with 440 of the 463 endemic species were prepared to denote zones of greatest occurrence. Finally, the distribution data were used to build a biogeographical group zonation in the region through the Bray-Curtis index and Ward's method. The results show a latitudinal gradient such that species richness decreased in the northern Gulf of California. The highest concentration of species was found on the coast of Sinaloa (with more than 800 species number). The highest endemism is found in the north-central Gulf, especially to the south of the Tiburon Island (29 °N) with richness higher than 40 species. Finally, the biogeographic zonation shows a total of seven regions, differentiating the Upper Gulf (28 ° to 29 °N, where the highest endemism is concentrated) and the peninsular coast of San Lorenzo Archipelago to Cabo San Lucas, the continental region from Guaymas to Bahia de Banderas, and finally three regions including deep areas (>200 m) being the first from the entrance of the Gulf to the "El Pescadero" basin, followed by a region encompassing “El Farallon” watershed, and finally to the region encompassing the southern of the larger islands, including Guaymas and Carmen basins.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

TAXONOMIC REVISION OF THE MARINE CORBULIDAE (MOLLUSCA, BIVALVIA) FROM BRAZIL

Eliane Pintor de Arruda [1] and Sônia Godoy Bueno de Carvalho Lopes [2]
[1]Universidade Federal de São Carlos – *campus* Sorocaba. Departamento de Biologia, Departamento de Biologia, Centro de Ciências Humanas e Biológicas. Rodovia João Leme dos Santos, Km 110, Itinga-Sorocaba, São Paulo, Brasil; arruda@ufscar.br

[2]Universidade de São Paulo. Departamento de Zoologia, Instituto de Biociências. Rua do Matão, travessa 14, nº 321, Cidade Universitária, São Paulo, Brasil; sonialop@ib.usp.br

Corbulids are amongst the most abundant mollusks in eastern littoral environments of South America and nine extant species of this family have been registered for the Brazilian coast. However, this number could be underestimated, at least considering recent surveys of marine diversity in Brazil. In this study we performed a taxonomic revision of the living species of Corbulidae from Brazil based on shell characters, including examination of the type material and specimens from different collections of Brazil, USA and Europe. Our results show that there are four genera (*Corbula*, *Varicorbula*, *Caryocorbula* and *Tenuicorbula*) and thirteen species of Corbulidae in Brazil. Among then four species are new occurrences to Brazilian coast: *Caryocorbula chittyana* (C. B. Adams, 1852), *Caryocorbula marmorata* (Hinds, 1843), *Caryocorbula luteola* (Carpenter, 1854) and *Juliacorbula bicarinata* (G. B. Sowerby I, 1833), and one is a new species for the science, *Caryocorbula* sp. Some identified species have shell morphology identical to Corbulidae species from Eastern Pacific, indicating a possible phylogenetic relationship between species from Western Atlantic and Eastern Pacific; while others species are endemic from South America, such as *Corbula tryoni* Smith, 1880 and *Corbula patagonica* d'Orbigny, 1846. These latter species are similar to Corbulidae from Indo-Pacific, and shell morphology of *C. patagonica* is very similar to *Corbula tunicata* Hinds, 1843. Based on type material, the synonymies were indicated: *Corbula uruguayensis* Marshall, 1928, traditionally considered synonymy of *Caryocorbula caribaea* d'Orbigny, 1853, is in fact a juvenile form of *C. patagonica*; and the species *Corbula barratiana* C. B. Adams, 1852, *Corbula swftiana* C. B. Adams, 1852 and *C. kjoeriana* C. B. Adams, 1852 were confirmed as synonymies of *C. caribaea*. This latter species has many morphological variations along the Brazilian coast, and can be a complex of species that needs further phylogeographic studies.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

GENETIC EVIDENCE FOR THE PRESENCE OF *OCTOPUS MIMUS* IN THE ARTISANAL FISHERIES OF OCTOPUS IN A MARINE PROTECTED AREA OF ECUADOR

Ricardo Pliego-Cárdenas [1], Luis Flores [2,3], Unai Markaida [4,5], Irene de los Ángeles Barriga-Sosa [1], Elba Mora Sánchez [2,3], Evelyn Arias [6]

[1]Laboratorio de Genética y Biología Molecular, Planta Experimental de Producción Acuícola, Universidad Autónoma Metropolitana Unidad Iztapalapa, Av. San Rafael Atlixco 186. Col. Vicentina, Del. Iztapalapa, México, Distrito Federal, 09340. México; rip_rojo@hotmail.com; ibs@xanum.uam.mx

[2]Investigación de Recursos Bioacuáticos y su Ambiente, Instituto Nacional de Pesca, Letamendi 102 y La Ría, Guayaquil, Ecuador; lflores@institutopesca.gob.ec; emora@institutopesca.gob.ec

[3]Escuela de Biología, Facultad de Ciencias Naturales, Universidad de Guayaquil, Av. Raúl Gómez Lince s/n y Av. Juan Tanca Marengo, Guayaquil, Ecuador

[4]Laboratorio de Pesquerías Artesanales, El Colegio de La Frontera Sur, Unidad Campeche, 24500, Lerma, Campeche, México; umarkaida@ecosur.mx

[5]Proyecto Prometeo, Secretaria Nacional de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT), 9 de Octubre N22-48 y Ramírez Dávalos – Casa Patrimonial, Quito, Ecuador

[6]Investigación de Recursos Bioacuáticos y su Ambiente, Instituto Nacional de Pesca, Estación Multipropósito, Av. Malecón y Calle 36 Sr. Segundo Yagual O., Salinas, Ecuador; evelynariasc@gmail.com

The geographic distribution of *Octopus mimus* is unclear, most records are restricted to localities off coast Peru and Chile, and some references have pointed it is present off Central America; however, it is unknown if this octopus is found off Ecuador despite of previous unpublished records from two sites of

the country. The aim of the present study is to identify whether the principal octopus captured in a marine protected area known as Reserva de Produccion Faunistica Marino Costera Puntilla de Santa Elena (REMACOPSE) at South of Ecuador, is *O. mimus*. Samples collected based on a fishery-dependent sampling in Salinas, were used to test the presence of this species based on sequences of three mitochondrial markers and using a Bayesian approach. The phylogenetic analysis confirms that *O. mimus* inhabits the REMACOPSE and likely the border between Panamic and Peruvian provinces although this last statement still needs further studies. The results also indicate that the octopus specimens captured in the fishery from this marine protected area are closely related to *O. mimus* specimens from Central America than those from South America. The genetic identification of two groups of *O. mimus* could be associated to the different environmental conditions of the two biogeographic provinces. The finding in this study represents an important step for posterior research on the biology and fishery of the octopus in Ecuador.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
TAXONOMÍA, SISTEMÁTICA Y BIOGEOGRAFÍA

PHYLOGENETIC RELATIONSHIPS OF OCTOPUSES FROM THE PANAMIC PROVINCE

Ricardo Pliego-Cárdenas [1], Francisco García De León [2], Frederick G. Hochberg [3] and Irene de los Ángeles Barriga-Sosa [1]

[1]Laboratorio de Genética y Biología Molecular, Planta Experimental de Producción Acuícola, Universidad Autónoma Metropolitana Unidad Iztapalapa, Av. San Rafael Atlixco 186. Col. Vicentina, Del. Iztapalapa, México, Distrito Federal, 09340. México; rip_rojo@hotmail.com; ibs@xanum.uam.mx

[2]Laboratorio de Genética para la Conservación, Centro de Investigaciones Biológicas del Noroeste, Mar Bermejo 195, Col. Playa Palo de Santa Rita, La Paz, Baja California Sur, 23090, México; fgarciadl@cibnor.mx

[3]Department of Invertebrate Zoology, Santa Barbara Museum of Natural History, 2559 Puesta del Sol, Santa Barbara, CA 93105-2936, USA; fghochberg@sbnature2.org

The systematics of the family Octopodidae is controversial. Molecular studies have suggested the polyphyly of the family, naming new genera for several extant species, eliminating subfamilies, and splitting the taxon in more families. Most octopuses from the Panamic Province are uncertain with regard to their generic status and their evolutionary relationships are unknown. We present here a contribution to complement the systematics of the Octopodidae with the phylogeny of the Central American West Pacific octopuses. We use the Bayesian approach to resolve their relationships based on three mitochondrial (COI, COIII, and r16S) and one nuclear marker (Rhodopsine). The results revealed a clade conformed by species of *Octopus* s. str. (*O. bimaculatus*, *O. bimaculoides*, *O. insularis*, *O. maya*, *O. mimus*, *O*. cf. *oculifer* and *O. "vulgaris*") and suggest that the Pacific octopuses, *O. mimus* and *O.* cf. *oculifer* are more closely related to the Atlantic octopus species, *O. maya* and *O. insularis* than the ocellate species of Pacific octopuses, *O. bimaculatus* and *O. bimaculoides*. The octopuses with uncertain generic status, *"O."* cf. *fitchi*, "*O.*" cf. *chierchiae*, and "*O." tehuelchus* form a different clade along with *Paroctopus digueti*. The clustering of *"O." californicus* with *Enteroctopus* and *Benthoctopus* confirm that the former species should be placed in a genus distinct from *Octopus* and suggests a close relationship to the family Enteroctopodidae.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

DIFFERENCES IN MUSSEL BEDS OF NUEVO GULF (PATAGONIA, ARGENTINA) IN LOCATIONS WITH CONTRASTING WAVE ENERGY.

Julián Pontones [1], Mauro Carrasco [1,2], Augusto C. Crespi-Abril [1,2,3]

[1]Universidad Nacional de la Patagonia San Juan Bosco. Facultad de Ciencias Naturales. Boulevard Brown 3010, Puerto Madryn (9120), Chubut, Argentina; zotreta@hotmail.com
[2]Centro Nacional Patagónico (CONICET), Boulevard Brown 2915, Puerto Madryn (9120), Chubut, Argentina; crespi@cenpat.edu.ar; carrasco@cenpat.edu.ar
[3]Escuela Superior de Ciencias Marinas, Universidad Nacional del Comahue, San Martin 247, San Antonio Oeste (8529), Rio Negro, Argentina

Wave energy is an important factor that controls rocky intertidal communities in Northern Patagonian coasts. In this study, we selected three abrasion platform headlands in Nuevo Gulf, Punta Pardelas (PP), Punta Este (PE) and Cerro Avanzado (CA), based on the results of modeling the wave energy produced by winds. Wave energy was modeled using the WEMo software and the mean energy of each site was estimated from 10 points separate 100 from each one. In each rocky intertidal, six samples of mussel beds were collected from a 10 x 10 cm surface to estimate relative abundance and mean size of individuals. The mean wave energy was higher for PP (4950 J/m) followed by CA (1580 J/m) and PE (925 J/m). The mean size of individuals was significantly higher in PP (16.44mm) than in PE (12.93mm) and CA (12.37mm), whilst the relative abundance was significantly lower in PP (21800 ind/m^2) than in PE (38400 ind/m^2) and CA (47780 ind/m^2). The differences in size observed between the different sites reflects the phenotypic plasticity of mussels under the influence of environment. Sites with low densities may favor individual growth of mussels by releasing competition among them allowing that individuals in high energetic locations reach higher sizes.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

GASTERÓPODOS TERRESTRES DE BUCTZOTS, YUCATÁN, MÉXICO

Adrian Pool Canche, Mauricio de J. Herrera Góngora, Lorena V. León y Rosario Lizama
Departamento de Biología Marina, Campus de Ciencias Biológicas y Agropecuarias, Universidad Autónoma de Yucatán. Carretera Mérida-Xmatkuil Km. 15.5. Apdo. Postal: 4-116 Itzimná, C.P: 97100, México; lorena.leon@uady.mx

La clase Gastropoda es el grupo más diversificado de los moluscos. La característica principal del grupo Pulmonata es la aparición de un “pulmón“, producto de la vascularización del manto y carecen de opérculo; se distribuyen en regiones tropicales, subtropicales y templadas. En el caso de México se encuentran registradas un total de 41 familias de moluscos terrestres. Para el Estado de Yucatán, y zona sureste de la Republica, no se conocen estudios detallados de la malacofauna continental. Por ello el presente estudio tiene como propósito incrementar el conocimiento de la diversidad malacológica enfocándose a la zona de Buctzots, Yucatán. La recolecta de los macromoluscos fué por el método de colecta manual, modificado para zonas de vegentación densa, por lo cual se emplearon dos transectos

de 75 m, dentro de los cuales se delimitaron 5 cuadrantes de 7 x 7 m para cada uno, con una separación de 10 m entre cuadrantes, y 23 m de separación entre cada transecto. La superficie total de muestreo fue 1725 mts^2. Se realizó la identificación de 11 especies, agrupadas en cinco familias pertenecientes a 3 ordenes (Neotaenioglossa, Mesogastropoda, Stylommatophora). Con la información obtenida se realizó un listado taxonómico además del análisis de diversidad y riqueza para la zona de estudio. Los organismos más abundantes fueron los miembros del género *Chondropoma,* sin embargo el género *Orthalicus* presentó mayor número de organismos completos (organismo y concha). El estudio presente permitirá la realización de futuros trabajos ecológicos, así como la evaluación de especies invasoras, y un mayor acercamiento al estudio de los moluscos terrestres.

GENERAL-CARTEL/POSTER

THE EFFECT OF SPIRULINA ON THE EXPERIMENTAL BREEDING OF *LYMNAEA COLUMELLA* (SAY, 1817) (GASTROPODA: LYMNAEIDAE).

Lucila Prepelitchi, Julieta Pujadas, Darío Ferri and Cristina Wisnivesky
Unidad de Ecología de Reservorios y Vectores de Parásitos, Instituto IEGEBA (CONICET-UBA), Departamento de Ecología, Genética y Evolución, FCEN, UBA Ciudad Universitaria, Pab. 2, 4to piso, lab. 55 C1428EHA - Capital Federal Argentina; lucilap@ege.fcen.uba.ar; jpujadas@ege.fcen.uba.ar; dario_ferri@hotmail.com; criswi@ege.fcen.uba.ar

Snails of the family Lymnaeidae are the intermediate hosts of *Fasciola hepatica,* the causative agent of fasciolosis. A thorough knowledge of snail biology is essential for controlling this disease. An efficient culture technique is therefore necessary to study snail biological parameters. Commercial spirulina (*Arthrospira platensis*) has been recently employed as an animal feed supplement in some freshwater and marine species, but has never been tested on lymnaeid snails.
We evaluate the effect of spirulina on fitness parameters of *Lymnaea columella* the main intermediate host of *F. hepatica* in Northeastern Argentina.
A total of 20676 newly-laid F_2 eggs were used; half of them were fed with lettuce (treatment L) and the other half with lettuce plus spirulina (treatment L+S). Each treatment was replicated 6 times and each replicate contained 1723 eggs in recipients filled with aerated and dechlorinated filter water, under a 12:12 light:dark photoperiod and at 22.5°C. Food was added as per the treatment protocol. Hatching rate, number of living snails and their shell length were measured at different time intervals until all snails had died.
In comparison with *L. columella* snails fed only with lettuce, we found that *L. columella* fed with lettuce plus spirulina showed higher survival rates; grew faster and showed higher growth increments; attained sexual maturity earlier in time (L+S:60 days vs. L:120 days) and at a smaller size (L+S:4.8mm vs. L:8.2mm); had a longer reproductive period (L+S:150 days vs. L:90 days); produced a higher number of eggs/snail (L+S:29.6 vs. L:13.3) and showed a higher offspring hatching rate (L+S:70% vs. L:40%).
The supplementation of *L. columella* diet with spirulina enhances it fitness and provides large number of reproducing adults and a continuous production of offspring, which are essential for developing future experimental studies in order to improve our knowledge on *L. columella* biology.

GENERAL-CARTEL/POSTER

EVALUACIÓN HISTOPATOLOGICA DEL ESTADO DE SALUD DEL CULENGUE (*GARI SOLIDA* GRAY, 1828), EN EL SUR DE CHILE

C. Puebla [1] y F. Cremonte [2]

[1]Instituto de Ciencia y Tecnología. Universidad Arturo Prat. Ejercito 443, Puerto Montt, Chile.
[2]Laboratorio de Parasitología, Centro Nacional Patagónico (CONICET), Boulevard Brown 2915, Puerto Madryn, Chubut, Argentina; Claudia.puebla@unap.cl

El culengue (*Gari solida.* Gray, 1828), conocido como "almeja dulce" y "pacific clam", es un molusco bivalvo enterrador de importancia comercial, que se distribuye desde Callao (Perú) hasta el archipiélago de los Chonos (Chile).
El objetivo de este estudio fue evaluar el estado de salud de *G. solida* en el sur de Chile. Los ejemplares fueron colectados en época primavera/verano en la localidad de Carelmapu (41º 44' 27,38" S; 73º 41' 55,18"O). De los ejemplares colectados se evaluó la talla media, el mínimo y máximo, la proporción de sexos, el estadio gonadal predominante y la prevalencia e intensidad media, mínima y máxima de parásitos por corte histológico.
En los cortes se hallaron organismos similares a *Rickettsia* parasitando intracelularmente el epitelio de los túbulos digestivos; organismos similares a colonias de bacterias en branquias frecuentemente encapsuladas por hemocitos; ooquistes conteniendo hasta 8 esporozoítos similares a *Nematopsis* sp. en tejido conectivo de varios órganos, ocasionando una infiltración hemocitaria en caso de hallarse en alta intensidad; ciliados de dos especies diferentes principalmente localizados en branquias, una de ellas similar a *Trichodina* sp, células no identificadas, presumiblemente un protozoo, en el lumen de los túbulos digestivos y turbelarios similares a *Paravortex* sp. en el lumen del intestino. En el interior de las células del epitelio del intestino de un ejemplar se hallaron numerosas células con una morfología similar a esporas y esporas en formación.
No se encontró ninguna enfermedad de declaración obligatoria según la OIE (Organización Mundial de Sanidad Animal).

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-CARTEL/POSTER

FIRST REPORT OF *LYMNAEA NEOTROPICA* BARGUES, ARTIGAS, MERA Y SIERRA, POINTIER & MAS-COMA, 2007 IN NORTHEASTERN ARGENTINA: MORPHOLOGICAL AND MOLECULAR IDENTIFICATION

Julieta Pujadas [1], Cristina Wisnivesky [1], César Pruzzo [2] Rodrigo Sanabria [2], Marisa Farber [3] and Lucila Prepelitchi [1]

[1]Unidad de Ecología de Reservorios y Vectores de Parásitos, Instituto IEGEBA (CONICET-UBA), Departamento de Ecología, Genética y Evolución, FCEN, UBA Ciudad Universitaria, Pab. 2, 4to piso, lab. 55 (C1428EHA) Capital Federal, Argentina; jpujadas@ege.fcen.uba.ar; criswi@ege.fcen.uba.ar; lucilap@ege.fcen.uba.ar
[2]Centro de Diagnóstico e Investigaciones Veterinarias (CEDIVE), Facultad de Ciencias Veterinarias, Universidad Nacional de La Plata. Alvear y Salta (7130), Chascomus, Buenos Aires, Argentina; cesarpruzzo@gmail.com; sanabriarodrigo@hotmail.com
[3] Instituto de Biotecnología, Centro de Investigaciones en Ciencias Veterinarias y Agronómicas, INTA Castelar, Los Reseros y Nicolas Repetto, s/n, (1686) Hurlingham, Buenos Aires, Argentina; mfarber@cnia.inta.gov.ar

Lymnaea neotropica is a lymneid snail originally described from Lima, Peru. Up to date, in Argentina, it was found in southern (Mendoza province) and central region (Buenos Aires and Santa Fe provinces). In this study we report the first finding of *L. neotropica* in Entre Rios province, northeastern Argentina.
Snail samplings were carried out from April to October 2013 in 3 livestock farms. Snails were collected during 30 minutes and transported alive to the laboratory. Once there, they were measured and 20% of the adults (> 4mm) were relaxed in menthol and killed by immersion in hot water (70ºC). Shells were removed, foots were conserved in ethanol 70% for molecular analyses and soft tissues were preserved in Railliet-Henry fluid for morphological analyses. Shell length (SL) and width (SW), penis sheath length (ps), preputium length (pp) and prostate length and width were measured for taxonomic diagnosis. The pp/ps ratio and the SL/SW proportion were calculated.
DNA extraction was performed using a commercial kit and the ITS1 rDNA segment was amplified using previously published primers (Lym 1657 and ITS1-Rixo). Amplicons were purified and sequenced.
A total of 162 snails were collected. Morphometric features were as follows: SL=4,0mm-8,2mm ($\bar{X}$: 6,1mm ±1,1); SW=2,2mm- 4,7mm ($\bar{X}$: 3,5mm ±0,5); SL/SW=1,3-2,1 ($\bar{X}$: 1,8 ±0,1), pp/ps=0,9-1,7 ($\bar{X}$:1,2 ±0,2), prostate length =0,4mm-1,0mm ($\bar{X}$: 0,6mm ±0,2) and prostate width=0,2mm-0,7mm ($\bar{X}$:0,3mm ±0,1). These characteristics are in coincidence with the description of *L. neotropica*.
The ITS1 sequence (same for all snails) had 669pb and exhibited 100% nucleotide identity with the sequences of *L. neotropica* from Lima, Peru (ITS1:AM412228) and Buenos Aires, Argentina (ITS1:JF960165).
Future malacological surveys are needed to evaluate the current distribution of *L. neotropica* in Northeastern Argentina and the implications for the transmission of *Fasciola hepatica*, as this species act as intermediate host of this human and animal parasitosis.

INVASORES/INVASIVE-CARTEL/POSTER

INVASIVE MOLLUSKS IN MÉXICO

Montserrat Ramírez and Brian Urbano
Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; mont.rah1390@ciencias.unam.mx; maclen55@yahoo.com

Mollusks can cause biological invasions, defined as those organisms that are released intentionally or accidentally outside their natural geographic distribution and fill other habitats). In conjunction with climate change and the fragmentation of the different ecosystems, invasive species is one of the most important topic for the conservation of biodiversity threats. Actual reports to México of invasive mollusk species are few; the Commission for the Knowledge and Use of Biodiversity (CONABIO) has recorded 13 invasive species for the country, however the lack of malacological studies about, make this records doubtful. The aim of this study is to review the literature and databases of introduce species and built list and a map of exotic species found. We suggest to make a more extensive review about the species that have registered, and analyze the effects these are causing on the ecosystems.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

EVALUATION OF TWO TYPES OF TRAPS FOR CAPTURING *OCTOPUS* SP. AT THE SOUTHWEST AREA OF ESPIRITU SANTO ISLAND BAJA CALIFORNIA SUR, MÉXICO

Oscar Reséndiz Pacheco, Luis Manuel Zavalza Valdez, Marcos Cadena Roa, Jesús Fiol Ortiz y José Luis Cervantes Días

[1]Department of Fisheries Engineering, Autonomous University of Baja California Sur, La Paz, Apartado Postal 19-B, La Paz, B.C.S., CP 23080, México; resendiz@uabcs.mx

From April 30th to May 4th and May 25th to June 1st, two prospecting trips for *Octopus* sp, fishing were performed in the island El Gallo and La Gallina, located in the southwest part of Espiritu Santo Island, aboard a fiberglass boat with outboard 115 hp engine. This for evaluate two types of experimental octopus catching traps constructed at Centro Regional de Investigación Pesquera (CRIP), La Paz. Twelve sets and a total of 20 traps were conducted, 10 traps of square type design and 10 of rectangular type design, for a total catch of 100 octopus of the red octopus specie. Most of the catch was represented by octopus, with little presence of bycatch, indicating that the trap has a high selectivity of the objective catch.

EVALUACIÓN DE DOS TIPOS DE TRAMPAS PARA LA CAPTURA DE *PULPO SP* EN LA ZONA SUROESTE DE LA ISLA ESPÍRITU SANTO B.C.S.

Del 30 de abril al 4 de mayo y del 25 de mayo al 1 de junio se realizaron 2 viajes de prospección de caladeros para la pesca de *Pulpo Sp* a bordo de una embarcación ribereña de fibra de vidrio con motor fuera de borda de 115 hp en el islote del Gallo y la Gallina situados en la parte suroeste de La Isla espíritu santo. Esto para evaluar la captura de pulpo de dos tipos de trampas experimentales construidas en el C.R.I.P. La Paz.

Se realizaron 12 lances de un total de 20 trampas; 10 trampas del diseño tipo cuadrada y 10 del diseño tipo rectangular, obteniendo una captura total de 100 pulpos de la especie pulpo rojo. La mayor parte de la captura fue representada por pulpo, con poca presencia de fauna de acompañamiento, lo que hace indicar que la trampa tiene una gran selectividad de captura.

PLICOPURPURA-CARTEL/POSTER

DESCRIPCIÓN HISTOLÓGICA DE LA GÓNADA DEL CARACOL *PLICOPURPURA PANSA* (GOULD, 1853) DEL PARQUE NACIONAL HUATULCO, OAXACA, MÉXICO

Cindy N. Reyes-González [1], Pablo Torres-Hernández [2], María R. Cid-Rodríguez [2], José L. Villarruel-Ordaz J.L [3] y Noé Ruíz-García [4]

[1]Universidad del Mar, campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P.; nahxieli@hotmail.com,

[2]Instituto de Ecología. Universidad del Mar. Campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 70902; patohe@hotmail.com; cidr@angel.umar.mx

[3]Instituto de Genética. Universidad del Mar campus Puerto Escondido. Ciudad Universitaria, Puerto Escondido, Oaxaca, México. C.P 71980; josipetardo@hotmail.com

[4]Instituto de Ecología. Universidad del Mar. Campus Puerto Escondido. . Ciudad Universitaria, Puerto Escondido, Oaxaca, México. C.P 71980; nruizg@zicatela.umar.mx

La clase Gasterópoda se caracteriza por tener organismos asimétricos, que durante el desarrollo larval la masa visceral y el manto rotan de 90° a 180°. En la familia Muricidae se encuentran los llamados caracoles tintóreos, quienes producen, en la glándula hipobranquial, una sustancia incolora que al exponerse al aire y la luz toma una coloración lechosa hasta el color púrpura. Las especies del género *Plicopurpura* son carnívoros y presentan una rádula de tipo rachiglossa; en el ámbito reproductivo, son dioicos pero difíciles de diferenciar por la morfología externa de la concha, solo es posible observando el pene en machos y la coloración de la gónada en organismos adultos. A pesar que *Plicopurpura pansa* se distribuye desde Bahía Magdalena en Baja California Sur hasta Colombia e Islas Galápagos, particularmente en Oaxaca, dentro del Parque Nacional Huatulco, han sido utilizados por los indígenas mixtecos para teñir madejas de algodón. En el presente estudio se realizaron tres recolectas de enero a marzo del 2014, en el área rocosa de la zona mesolitoral de la Bahía Violín, Huatulco. Se obtuvieron un total de 90 organismos de tallas entre 21.97 a 57.31mm de longitud; en el laboratorio los organismos fueron fotografiados y fijados en formol al 10%. Utilizando la técnica histológica de rutina, las gónadas se incluyeron en parafina con punto de fusión de 56-58ºC para obtener cortes transversales de 7µ que se tiñeron con el medio de Hematoxilina-Eosina. Se obtuvo la descripción macroscópica que incluye la anatomía externa, posición y proporción de la gónada con respecto a la hepatopáncreas, y la coloración de dicho órgano de machos y hembras. En la descripción microscópica, se observaron algunas fases gamatogénicas de acuerdo a las diferenciaciones citológicas y la composición del tejido gonádico.

GONAD HISTOLOGICAL DESCRIPTION OF SNAIL *PLICOPURPURA PANSA* (GOULD, 1853) OF HUATULCO NATIONAL PARK, OAXACA, MEXICO

The Gasteropoda Class is characterized by asymmetrical organisms, which during larval development the visceral mass and mantle rotate 90 ° to 180 °. The family Muricidae are called dyeing snails, who produced, in the hipobranquial gland, a colorless substance that when its exposed to air and light takes a milky color to the color purple. Species of the genus *Plicopurpura* are carnivorous and have a radula of rachiglossa type; in the reproductive ambit, they are dioecious but hard to distinguish the external morphology of the shell and only possible by observing the penis in males and coloration of the gonad in adult organisms. Even that *Plicopurpura pansa* is distributed from Magdalena Bay in Baja California to Colombia and the Galapagos Islands, particularly in Oaxaca, in the Huatulco National Park, they have been used by the Mixtec Indians for dyeing hank of cotton. In the present study were three collections from January to March, 2014, in the rocky area of mesoliteral of Violin Bay, Huatulco. We obtained a total of 90 snails between 21.97 to 57.31mm in length; in the laboratory the organisms were photographed and fixed in formalin 10%. Using routine histological technique, the gonads were included in paraffin with melting point of 56 - 58 ° C for cross-sections of 7µ were stained with hematoxylin-eosin medium. Macroscopic description includes the external anatomy, position and proportion of the gonad with respect to the hepatopancreas, and the coloration of the body of males and females were obtained. Some stages were observed in the microscopic description, gamatogenicas according to the cytological differentiation and gonadal tissue composition.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-PONENCIA/ORAL PRESENTATION

NEW INFORMATIONS ABOUT FRESHWATER LIMPETS FROM SOUTH AMERICAN BASED ON MORPHOLOGICAL AND MOLECULAR DATA

Caroline S. Richau [1,3]; Luiz Eduardo M. de Lacerda [1,4]; Ximena Maria C. Ovando [3,5], Elizeu F. de Carvalho [2,6], Dayse A. da Silva [2,7] and Sonia B. dos Santos [1,8]

[1]Laboratório de Malacologia Límnica e Terrestre, Universidade do Estado do Rio de Janeiro, Instituto de Biologia Roberto Alcantara Gomes. Rua São Francisco Xavier, 524, Maracanã, Rio de Janeiro, RJ, Brasil. CEP: 20550-900; [3]crichau@uol.com.br; [4]lacerdauerjbio@yahoo.com.br; [8]gundlachia@yahoo.com.br

[2]Laboratório de Diagnóstico por DNA. Universidade do Estado do Rio de Janeiro, Instituto de Biologia Roberto Alcantara Gomes. Rua São Francisco Xavier, 524, Maracanã, Rio de Janeiro, RJ, Brasil. CEP: 20550-900: [6]elizeufc@hotmail.com; [7]dayse.a.silva@gmail.com

[3]Instituto de Biodiversidad Neotropical, Facultad de Ciencias Naturales e Instituto Miguel Lillo. Miguel Lillo 205, CP 4000 Tucumán, Argentina; [5]xco1303@hotmail

The freshwater limpets according to classic systematic belong to Ancylidae family, although previous suggestions of a paraphyletic status. Recent incorporation of molecular data, confirmed this family as paraphyletic, mainly because the *Burnupia* genus. The others genera were included in Ancylinae, inside Planorbidae. However, the absence of all Neotropical genera in molecular based phylogenies is still a matter of some controversy.

Our studies aim to help identification of cryptic species and to contribute to the phylogeny. The shell comparative morphology was carried out by optical and scanning microscope images; soft parts were studied by dissecting stained specimens under magnifying glass. Molecular studies used, so far, the COI and 16S mitochondrial markers, using three different specimens of each population. After the procedures of extraction, amplification and sequencing, the news sequences obtained were aligned, edited and compared. The genetics distances between South American genera were built using *Neighbor-joining* test and based at Kimura Two Parameter (K2P). We used as out groups sequences downloaded from GenBank. Shell apex morphology, protoconch sculpture and muscles scar morphology are diagnostic characters useful to identify and characterize species and genera in Ancylinae. We sequenced species of *Anisancylus* Pilsbry, 1924; *Gundlachia* Pfeiffer, 1849; *Hebetancylus* Pilsbry, 1913; *Uncancylus* Pilsbry, 1913, *Burnupia* Walker, 1912; *Ferrissia* Walker, 1903 and *Laevapex* Walker, 1903.

Similar topologies were obtained to both molecular markers. The Ancylinae monophyly was retaking with the 16S molecular marker, with a support of 54%. At both topologies, *Burnupia* stayed out of the Ancylinae clade, with the highest genetic distance (19.7%) observed between the traditional ancylids. *Gundlachia* has the biggest number of species at South America and had like syster-group relationship: (*Hebetancylus* + (*Gundlachia +* (*Anisancylus* + *Uncancylus*)). The genetic distance between five species of *Gundlachia* was 5.1% and the divergences between *Gundlachia* and *Anisancylus* were 8.8%.

Financial support: CNPq, Faperj

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

TOWARDS THE COSTA RICAN CONTINENTAL MOLLUSCAN FAUNA

Ira Richling
Stuttgart State Museum of Natural History, Rosenstein 1, 70191 Stuttgart, Germany; ira@helicina.de

Up to date there exists no comprehensive work on the Costa Rican continental molluscan fauna despite its biogeographically interesting position as corridor between the North and South American faunas and as a hotspot area. After the epochal *Biologia Centrali-Americana* by MARTENS (1890-1901) mainly PILSBRY contributed in various publications to the fauna roughly between 1906 and 1948, but hereafter the interest faded. In 1993 with the foundation of the Instituto Nacional de Biodiversidad de Costa Rica (INBio) a new and highly motivated approach began to tackle the molluscan fauna, which resulted in a regional check-list (Barrientos 2003: Revista Biología Tropical, 51 [Suppl. 3]: 293-304) reviewing the literature from 1862 through 2001. Unfortunately, INBio had to focus its research goals and closed its malacological department about ten years ago resulting in a significantl interruption of these new efforts. The most recent compilation for Costa Rica is included in the elaborated check-list for México and Central America by Thompson (2011: Bulletin Florida Museum Natural History, 50: 1-299), but again without illustrations.
The current work in progress aims to study all accessible type material of the species reported and found in the area. In a second step the historical information shall be combined with recent collecting data (e.g. the former INBio collection and other sources) and available ecological information. Although clearly below the level of revisions, the goal is to provide for the first time an illustrated guide to the Costa Rican continental mollusc fauna which summarizes the current state of taxonomic knowledge, shows roughly distribution ranges and moreover exposes the limits of the exploration of the Costa Rican fauna.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA/ORAL PRESENTATION

BIOGEOGRAPHY OF *BOREOBERTHELLA AUGUSTA* MARTYNOV AND SCHRODL 2009 IN PRIBILOF CANYON AND ZHEMCHUG CANYON, BERING SEA

Michelle Ridgway, Nora R. Foster, Ángel Valdés, Angela Gravitt
[1]Alaska Deep Ocean, PO Box 211470, Auke Bay, Alaska 99821 USA; mishridgway@gmail.com
[2]NRF Taxonomic Services, 2998 Gold Hill Road, Fairbanks, Alaska 99709 USA; swamprat@mosquitonet.com
[3]Department of Biological Sciences, California State Polytechnic University, 3801 West Temple Avenue, Pomona, California 91768-4032; aavaldes@csupomona.edu
[4]Marine Biology Program, Alaska Pacific University, Anchorage, Alaska

A new genus and species of pleuobranchoidean opisthobranch*, Boreoberthella augusta* Martynov and Schrodl 2009 was described from specimens collected in the 1930's, 1971 and 1991 in the Sea of Japan and near the Komandorskyie Island in the northwestern Pacific. The species was described based on preserved animals, thus the morphology and coloration of live animals remained unknown. In 2007 live specimens and video images of an unidentified pleurobranch were collected during exploration of the Pribilof and Zhemchug canyons in the Bering Sea. Expert examination of the specimen, especially the radular and jaw morphology confirmed its identity as *Boreoberthella augusta*. The occurrences of the

species in the canyons, depth and distributional range as well as a description of the living animal are presented.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

LAND MOLLUSKS IN THE ECOLOGICAL RESERVE OF PEDREGAL DE SAN ANGEL, MÉXICO CITY

Arzu Rivera-García and Edna Naranjo-García
Instituto de Biología UNAM, México D.F. Coyoacán, Ciudad Universitaria 3000, México;
arzu173@hotmail.com; naranjo@unam.mx

The ecological reserve Pedregal de San Angel is a volcanic area produced by the eruption of the volcano Xitle about 1670 ±35 years ago. This reserve is situated 2,300 meters above sea level, creating subhumid temperate weather, with two marked seasons: dry and rainy season. The ecological reserve covers about 237 hectares, which have been protected for 30 years. In recent years, students of the UNAM (University National Autonomous of México) searched for land mollusks in this area. A total of 23 species were found. Only six species represent the 89.8% of the abundance, indicating low diversity. However, the ecological reserve represents only a shadow of the complex ecosystem that previously existed. Nowadays mollusks and other groups are under constant pressure for several reasons: for example, human disturbance, introduction of exotic organisms and ecological changes.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

DIVERSITY OF MARINE OPERCULATED GASTROPODS OF FOUR BEACHES IN THE REGION OF LOS TUXTLAS, VERACRUZ

Annette Adriana Rivera Santiago and María Fernanda Torres González
Facultad de Ciencias, Universidad Nacional Autónoma de México. Universidad 3000 Circuito Exterior S/N, C.P. 04510 Ciudad Universitaria, Ciudad de México; asuka_ettenna@ciencias.unam.mx;
ferchamenta@ciencias.unam.mx

The state of Veracruz is rich in mollusks, however there aren't many publications about this group. It is important to know the diversity of organisms for their conservation. This is an inventory of marine operculated gastropod species from 4 beaches (Montepío, Hermosa, Divina and Tortuguitas) near Los Tuxtlas, gathered by hand from interstitial and low tide. 33 different species were identified. Monitoring the status of the mollusks is relevant because it is a particularly vulnerable group to natural and artificial environmental changes.

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

THE INCREASING NUMBERS OF INVASIVE TERRESTRIAL MOLLUSKS IN THE USA AND THE EFFORTS TO CONTROL THEM

David G. Robinson
USDA National Malacology Laboratory, Academy of Natural Sciences, 1900 Ben Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; david.g.robinson@aphis.usda.gov; robinson@ansp.org

For the first few centuries of colonization of the United States, most of the invasive snails and slugs were of European origin. Most of these species have become widespread throughout the lower 48 states, and cause significant damage to agriculture and the environment. It is estimated that it the United States loses $120 billion to invasive species in general, but the proportion attributed to mollusks is increasing significantly. Over the last century, and especially with expanded globalization of trade in the last thirty years, the rate of introduction of invasive species from the world over passing through quarantine barriers has correspondingly increased.
Currently there are sixteen eradication, control, suppression or containment programs in the country for recently introduced mollusk species; a variety of integrated methods of control are being used, including public education, ongoing surveys, hand-collecting (for larger species), baiting, and canine units. But as resources are becoming increasingly strained, some programs may have to be cut back. There are over 350 airports, seaports, and border crossing into the country, and more being created to cope with increasing world trade.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

PRELIMINARY REPORT ON THE TERRESTIAL MALACOFAUNA OF PUERTO RICO AND ASSOCIATED ISLANDS

David G. Robinson [1] and Angela Fields [2]
[1]USDA National Malacology Laboratory, Academy of Natural Sciences, 1900 Ben Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; david.g.robinson@aphis.usda.gov; robinson@ansp.org
[2]The University of the West Indies, Cave Hill Campus, P.O. Box 64, Bridgetown, Barbados; angela.fields@cavehill.uwi.edu

There has been no comprehensive inventory of the malacofauna of the island of Puerto Rico since Henry van der Schalie's 1948 book, and none on the islands of Culebra, and Vieques. Carlos Aguayo created a checklist of Puerto Rican snails and slugs in 1966 with a number of undescribed species. The snails of the islands of Mona and Monito were inventoried by Fred Thompson in 1987. Little work has been done in the US Virgin Islands. Since van der Schalie's work, Puerto Rico has undergone considerable change, and many if not most of the area has been drastically altered by human activity, including deforestation, agriculture, and urbanization. Many of the native or endemic species' distributions have been greatly diminished, and the ranges of invasive and synanthropic species have expanded to replace them.
Since the discovery of the giant African snail (*Lissachatina fulica*) in Guadeloupe in 1984, it became necessary to make an inventory of native species throughout the West Indies before the inevitable spread of this serious pest.

Currently we can document some 185 species and subspecies in 28 families in Puerto Rico and its associated islands, including a number of invasive species from Africa, southeastern Asia, Florida, South America and the Lesser Antilles. Puerto Rico can be divided into 3 distinct zoogeographic zones, the Central Mountain chain, El Yunque massif, and the coastal karstic regions, and its malacofauna shows strong affinities with that of Hispaniola, with very few affinities with the Lesser Antilles.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

BOUYANCY BEHAVIOR OF VELIGER LARVAE OF *ATRINA MAURA* (SOWERBY, 1835) DURING LARVAL CULTURE

Eloisa Robles-Rocha [1,2] Miguel Robles-Mungaray [2], Ma. Carmen Rodriguez-Jaramillo [3], Ana I. Beltran-Lugo [1] and César A. Ruiz-Verdugo [1]

[1] Departamento de Ingeniería en Pesquerías, Universidad Autónoma de Baja California Sur, Ap. Postal 19-B, 23080. La Paz, Baja California Sur. MÉXICO; anabel@uabcs.mx, cruiz@uabcs.mx.

[2] Acuacultura Robles, Privada Quintana Roo Número 4120, 23098, La Paz, Baja California Sur, México; mrobles54@hotmail.com

[3] Centro de Investigaciones Biológicas del Noroeste, Mar Bermejo 195, Playa Palo de Santa Rita, La Paz, Baja California Sur, MÉXICO; jaramilo04@cibnor.mx

The veliger larvae *Atrina maura* have buoyancy behavior on the water surface, which causes high mortality on larval culture, this does not happen with any other species of native bivalve. To study this behavior, the veliger larvae of *Atrina maura* in larval cultures were evaluated in laboratory; histochemical composition of the larvae in the surface, column and tank bottom culture was determined. The main component of the larvae in all four cultures were the lipids, surface larvae have a higher concentration of lipids than the rest on the culture tank. The lipid percentages between different larval cultures were from 52.58 ± 1.22 % to 73.15 ± 1.21 %. Pediveliger larvae were not reached due to larval mortality, the best survival was obtained in the fourth culture, the larvae survived to day 21 and histochemical composition was determined until day 19, at this day lipid content between the three sampling levels were no different. The range of protein content was 11.71 ± 0.49 % in the third day of culture and increased as growing larvae to 19.54 ± 0.69% on day 19. Carbohydrates increased as larvae grew (9.65 ± 0.34 to 13.37 ± 0.69 %). Histochemical composition and morphology of larvae were compared with larvae of species that do not exhibit buoyancy behavior such as *Crassostrea corteziensis*, C*rassostrea gigas* and *Nodipecten subnodosus*.

GENERAL-CARTEL/POSTER

PROTOZOÁRIOS CILIADOS PERITRÍQUEOS (CILIOPHORA, PERITRICHIA) EPIBIONTES EM MOLUSCOS LÍMNICOS NA ZONA DA MATA MINEIRA, BRASIL

Ana Carolina Rocha Lamego [1], Roberto de Oliveira Marchesini [1], Roberto Júnio Pedroso Dias [2] e Sthefane D'Ávila [1]

[1]Programa de Pós-graduação em Ciências Biológicas – Comportamento e Biologia Animal, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora, Juiz de Fora, Minas Gerais, Brasil; anacarolina.lamego@gmail.com; r.oliveiramarchesini@gmail.com; sthefanedavila@hotmail.com.

[2]Instituto de Recursos Naturais, Universidade Federal de Itajubá, Itajubá, Minas Gerais, Brasil; rjuniodias@hotmail.com.

Os protozoários ciliados peritríqueos epibiontes colonizam a superfície de ampla gama de metazoários aquáticos, entretanto estudos investigando moluscos como hospedeiros são escassos na literatura. A epibiose é uma associação facultativa e interespecífica entre o epibionte e basibionte. O objetivo do estudo foi realizar um inventário das espécies de ciliados peritríqueos epibiontes de moluscos límnicos na microrregião de Juiz de Fora, Minas Gerais. Os moluscos, coletados entre agosto de 2013 e fevereiro de 2014, foram analisados em laboratório sob microscópio estereoscópico para registro dos ciliados epibiontes. Os ciliados foram raspados das conchas, fotografados *in vivo* sob microscópio fotônico e impregnados pela técnica de carbonato de prata para identificação dos mesmos. Dentre os cinco táxons de moluscos encontrados (n=504) nos ecossistemas límnicos analisados (Ancylidae, *Biomphalaria* sp., *Lymnaea* sp., *Physa* sp. e *Aplexa* sp.), 13,89% estavam colonizados por peritríqueos epibiontes. Foram registradas 19 morfoespécies de ciliados nos hospedeiros examinados: *Carchesium polypinum*, *Epistylis chrysemydis*, *E. plicatilis, Epistylis* sp. 1, *Epistylis* sp. 2, *Opercularia articulata, O. nutans, Opercularia* sp. 3, *Platycola* sp. 1, *Scyphidia* sp. 1, *Thuricolla* sp. 1, *Vorticella campanula, V. convallaria* e *Vorticella* spp. (6 morfoespécies). Os moluscos límnicos investigados constituem microambiente relativamente protegido e com suprimento alimentar favorável à colonização por ciliados peritríqueos. As possíveis vantagens para os ciliados epibiontes podem estar relacionadas com a proteção contra predadores, acúmulo de matéria orgânica sobre concha e consequente aumento na densidade bacteriana, e maior possibilidade de mobilidade dos ciliados. Os dados de prevalência e abundância dos ciliados epibiontes de moluscos podem ser importantes métricas no monitoramento da poluição orgânica em ecossistemas dulcícolas, sendo necessário, portanto, estudos iniciais de inventário de espécies, tal como a presente proposta. Estudos posteriores que abordem os aspectos quantitativos desta relação poderão investigar o papel dos ciliados epibiontes de moluscos nos ecossistemas límnicos bem como seu potencial no biomonitoramento.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/ORAL PRESENTATION

FEEDING BEHAVIOUR OF *NASSARIUS VIBEX* IN THE ESTUARY OF CEARÁ RIVER, NORTHEAST BRAZIL

Valesca P. Rocha [1,3]; S. Jeyce Rocha V. [1]; Deyse B. Azevedo [2]; Helena Matthews-Cascon [1]
[1]Universidade Federal do Ceará, Departamento de Biologia, Laboratório de Invertebrados Marinhos do Ceará (LIMCE), Fortaleza, Ceará, Brasil
[2]Instituto de Ciências do Mar (LABOMAR)/UFC, Laboratório de Zoobentos, Fortaleza, Ceará, Brasil
[3]walewiska@hotmail.com

The gastropod family Nassariidae, which is found mainly in soft substrate environments, presents many adaptive variations in feeding behavior. Nassariidae species can be herbivorous, carnivorous and scavengers and *Nassarius vibex* is a common species throughout Northeastern Brazil that reaches an adult size of about 15 mm of shell length.
This study aimed to determine the feeding behavior of *N. vibex* in the estuary of Ceará River (Ceará, Brazil), an environment that suffers the impact of anthropogenic activities. Field experiments involved the setting up of ten traps with fish bait - five on a wet site and five others on a drier site. We recorded the reaction time and, after five minutes, the number of animals in each trap was counted. The individuals from the wet site reach the baits in less time and in a large number than those from the drier site. This behavior is similar to others already described in the literature, where chemical cues indicating the presence of food, were transmitted via water currents. Other studies suggest also that the anthropogenic influences are responsible not only for maintaining but, in some cases, increasing nassariid population numbers because of more readily available food provided as a by-product of human activities.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

MOLUSCOS COMERCIALIZADOS CON FINES DE ORNATO Y COMPAÑÍA EN LOS MERCADOS DE NUEVO SAN LÁZARO Y SONORA DE LA CIUDAD DE MÉXICO

Nelli Rodríguez Hernández [1], Rocío Asunción Luna Plascencia [1], Graciela Gómez Álvarez [2] y Noé Pacheco Coronel [2]

[1] Instituto de Ciencias del Mar y Limnología, UNAM. Circuito Exterior S/N, Ciudad Universitaria. Delegación Coyoacán. C.P. 04510. Ciudad de México, Distrito Federal; nellirodhez@gmail.com rooluna@gmail.com,

[2]Laboratorio de Vertebrados, Facultad de Ciencias, UNAM, Circuito Exterior S/N Delegación Coyoacán, C.P. 04510. Ciudad Universitaria, D.F., ggal@hp.fciencias.unam.mx, smilodonnee2000@yahoo.com.mx

Los moluscos han causado un particular interés en muchas de las culturas antiguas. En el caso de las culturas mesoamericanas este grupo de invertebrados fue un importante recurso alimenticio. También formaban parte de la vestimenta, se usaban para teñir telas, para fabricar joyería, artes de pesca así como para la fabricación de instrumentos musicales. Se les asociaba con el agua, fuente de la vida, con Dioses, fenómenos naturales y el inframundo.

En este estudio se realizaron dos visitas a los mercados de Nuevo San Lázaro y Sonora ubicados en el centro de la Ciudad de México con el fin de obtener un listado de las especies comercializadas con fines de ornato y compañía. Se encontró que de la mayoría de las especies identificadas se comercializan solo las valvas y se les da un uso únicamente de ornato como *Strombus gigas, Turbinella angulata* y *Muricanthus nigritus*. Otras especies como *Elysia diomodea, Lima scabra, Glossodoris sedna* y *Pomacea bridgesii* cumplen la función de ornato y compañía a la vez, estos moluscos se comercializan vivos y se mantienen en peceras.

Es urgente que se realicen más estudios acerca de los animales que se comercializan de forma ilegal pues se tiene poca información acerca del tema y el comercio de estas especies representa un riesgo para los ecosistemas de los cuales se extraen.

Mollusks have caused a particular interest in many ancient cultures. In the case of Mesoamerican cultures this group of invertebrates was an important food resource. Also were parts of the dress, used to dye fabrics, to manufacture jewelry, fishing gear, as well as for making musical instruments. They are associated with water, source of life, with Gods, natural phenomena and the underworld.

In this study two visits to the markets of Sonora and Nuevo San Lázaro located in central México City in order to obtain a list of species traded with ornamental and company purposes, were made. It was found that most of the identified species are traded only the valves and are given an ornamental use only, as such *Strombus gigas*, and *Muricanthus nigritus, Turbinella angulata*. Other species such as *Elysia diomodea, Lima scabra, Glossodoris sedna* and *Pomacea bridgesii* play the role of ornament and company at a time, and these molluscs are sold alive and remain in aquariums.

It is urgent that more studies about animals sold illegally are made because there is little information about the issue and trade of these species represents a risk to the ecosystems of which are extracted.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

THE POLYPLACOPHORANS FROM TUXPAN REEF, VERACRUZ, MÉXICO: PRELIMINARY RESULTS WITH AN ECOLOGICAL APPROACH

Rodrigo Adrián Rodríguez-Vázquez [1], Adriana Gaytán-Caballero [2] and Margarita Hermoso [3]
[1]Facultad de Ciencias, UNAM; rod1519@ciencias.unam.mx
[2]Posgrado de Ciencias del Mar y Limnología, UNAM; adriana.gaytan@gmail.com
[3]Instituto de Ciencias del Mar y Limnología, UNAM; margaritahermoso@hotmail.com

The polyplacophorans mollusks (Mollusca: Polyplacophora) are marine organisms with a wide geographic distribution. Their records ranging from tropical to polar regions. México has recorded a total of 139 species and subspecies belonging to 10 Families: 109 species and one subspecies for the Pacific region, and 30 species for the Gulf of México and Caribbean Sea. In particular, chitons´ knowledge from Veracruz reefs is incipient, with only three species already recorded. This study presents the preliminary results of specimens collected in the eastern zone of Tuxpan reef (Veracruz Reef System), whose average depth is 0.66m, and a substrate of coarse calcareous sands and coral rubbles. The recognized habitats on the reef were: calcareous algae (Halimedaceae) and disturbed coral (Acroporidae). The largest chitons abundance was recorded from calcareous algae habitat. It is intended to analyze the descriptive ecology when the specimens identification is completed. The relevance of this study is based on the low diversity of chitons known for the study site with remarks on their ecology in the Tuxpan reef ecosystem.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

RESEARCH PROPOSAL: TRACE ELEMENTS IN STATOLITHS OF THE HUMBOLDT SQUID, *DOSIDICUS GIGAS* AND THEIR RELATION TO THE SURROUNDING ENVIRONMENT

Griselda M. Rodríguez-Figueroa [1], Mariana Díaz Santana-Iturríos [1] and Mariana I. Garrido-Sandoval [2]
[1]Instituto Politécnico Nacional. Centro Interdisciplinario de Ciencias Marinas. Departamento de Pesquerías y Biología Marina. Av. Instituto Politécnico Nacional s/n. Col. Playa Palo de Santa Rita. Apdo. Postal 592. Código Postal 23096. La Paz, B.C.S. México; grodriguezf@ipn.mx; mariana_dsi86@hotmail.com
[2]Av. Universidad, Coyoacan, Ciudad Universitaria. Código Postal 04510. Ciudad de México, D.F.; hexe_beldam@hotmail.com

The applicability of trace elements composition of 204 left statoliths of the Humboldt squid*, Dosidicus gigas* from the Gulf of California will be analyzed. The aim of this study is to identify chemical differences related to biogeochemical processes, characteristic of this highly productive marginal sea in the squid statoliths. In the Gulf, a distinctive enrichement of Eu, U, Cu, Zn, Cd, and other trace elements have been found mainly in marine sediments, but also in marine algae and molluscs, and some distintive signals in zooplancton have also been reported. These fingerprints related to past hydrothermal activity, as it occurs in the anomalous enrichments of Eu in marine sediments. These fingerprints could also accumulate in squid statoliths from the Guaymas Basin, which is a hydrothermally active zone. Moreover, the anomaly of U in Santa Rosalia area has as well proven to be associated with the oxigen minimum zone in the water column, which is a zone related to the Humboldt squid distribution. Hence, it is possible to determine the relationship between element composition in statoliths with biogeochemical cycles of the elements from specific zones in the Gulf of California. Statolith composition will be

determined using an inductively coupled plasma-mass spectrometer (ICP-MS) to detect levels of the characteristic elements of marine sediments including others such as Sr, Ba, Mn, Pb, As.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

SEA CONCH *STROMBUS COSTATUS* (GMELIN, 1791) EGG MASS PRODUCTION USING ENCLOSED AREAS IN CONTOY ISLAND NATIONAL PARK, Q. ROO, MÉXICO

Luis Alfonso Rodríguez Gil [1], Carlos F. Reyes Sosa [1], Sara Nahuat Dzib [1], José L. Giorgana Figueroa [1] and Daniel Blanqueto Córdova [1]

[1]Instituto Tecnológico de Mérida, Km 5 Carretera a Progreso, Mérida, Yucatán, México. C.P. 97118; luis_rdzgil@hotmail.com; carlos.reyes.sosa@hotmail.com; snauhat@hotmail.com; jlgiorgana@hotmail.com; dblanquetoc@hotmail.com

Research on egg-laying stations or seasons related to copulation observances and egg-mass production are scarce. Copulation for the sea conch *Strombus* requires a huge investment of time and energy in locating a suitable partner, even more in over exploited populations, and adding the fact that this procedure is repeated several times during the mating season. The development of tourism and the rise of sea conch commercial consumption have generated illegal fisheries, therefore diminishing natural populations along the Caribbean area. México is not the exception, and due to over fishing and the danger for species survival, the Mexican authorities prohibited or banned most of conch fisheries starting in 1987 to the current day. A permanent prohibition is still under carried solely in the Yucatan state. Even though fishing regulations are one of the few resources currently used to assist in conch recovery, aquaculture is a serious and viable alternative to be considered, with enclosed seasonal-reproduction areas as a functional and effective method. The purpose of this work was to examine the egg-mass production in enclosed underwater areas using the marine conch species *Strombus costatus.* The experimental design consisted of two independent variables; area, and male:female ratio. The area consisted of two levels, 20 and 40 m^2 and male:female ratio was designed in three levels, being 2:5, 2:10 and 2:15 respectively. With two replicates each and 12 experimental units (enclosed areas) for a total area of 400 m^2. The male:female ratio of 2:15 within the area of 20 m^2 resulted in the best and most viable combination, with a total of 134 layed egg-masses and an rough estimate of 25 million hatched larvae's. Total productivity for this enclosed area from the May-August season was of 492 total layed egg-masses and an estimated 89 million hatched larvae's.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA-ORAL PRESENTATION
SISTEMÁTICA

A COMPARISON OF GENETIC DIVERSITY BETWEEN SYMPATRIC POPULATIONS OF THE ENDANGERED WINGED-MAPLELEAF (*QUADRULA FRAGOSA*) AND ITS COMMON CONGENER THE PIMPLEBACK (*QUADRULA PUSTULOSA*) IN THE ST. CROIX RIVER, USA

Kevin J. Roe [1] and Sarah L. Boyer [2]

[1]Department of Natural Resource Ecology and Management, Iowa State University, Ames, IA, 50011. USA; kjroe@iastate.edu

[2]Biology Department, Macalester College, Saint Paul, MN 55105, USA; boyer@macalester.edu

Assessing genetic variation in species of conservation concern is critical for developing sound recovery strategies. In this study, we compared sympatric populations of two related species, the endangered

Quadrula fragosa and its widespread congener *Q. pustulosa*, using standard genetic parameters such as allelic richness, heterozygosity, and effective population size. Our primary aim was to determine if small population size and isolation from conspecifics had negatively affected the genetic diversity in *Q. fragosa*. By comparing the endangered species to a closely-related and sympatric, common species we can assess the rare species for genetic effects associated with reduced population size, and in addition, develop management targets for what a recovered *Q. fragosa* population looks like genetically. Examination of eight microsatellite loci indicated that *Quadrula fragosa* exhibited reduced genetic variation when compared to *Q. pustulosa* at all measures, however, no evidence of a genetic bottleneck or inbreeding was discovered for either species. A comparison of known fish hosts and reproductive period for these two species point to competition for fish hosts as a possible explanation for the smaller population size of *Q. fragosa*. We discuss the implications of our findings for the conservation and management of freshwater mussels.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

VARIACIÓN DE LOS ÍNDICES MORFOFISIOLÓGICOS EN RELACIÓN A LA MADURACIÓN GONÁDICA DEL PULPO *OCTOPUS HUBBSORUM* BERRY, 1953 (CEPHALOPODA: OCTOPODIDAE) EN BAHÍA DE LA PAZ, BCS, MÉXICO

Nefertiti Taydé Roldán-Wong [1], Marcial Arellano-Martínez [2], Bertha Patricia Ceballos-Vázquez [2] y José F. Domínguez-Contreras [2]

[1]Universidad Autónoma de Baja California Sur. Carretera al Sur km 5.5. Apdo. Postal 19-B. Código Postal 23080. La Paz, B.C.S. México; ntrw88@gmail.com

[2]Centro Interdisciplinario de Ciencias del Mar. Av. Instituto Politécnico Nacional s/n Col. Playa Palo de Santa Rita Apdo. Postal 592. Código Postal 23096. La Paz, B.C.S. México; arellano.marcial@gmail.com; bceballo@ipn.mx; fradoco@gmail.com

Octopus hubbsorum es la especie más importante para la pesquería de pulpo en el Pacífico mexicano. Se conoce poco sobre su biología y ecología, siendo la reproducción uno de los procesos más importantes para su entendimiento, cultivo y manejo como recurso. En este aspecto, la dinámica energética del evento reproductivo es de suma importancia, pues representa la mayor inversión energética durante el ciclo de vida de los octópodos, particularmente hembras. El presente trabajo analiza la variación de los índices morfofisiológicos para inferir la dinámica energética durante la maduración gonádica de *O. hubbsorum*. Para ello se recolectaron hembras en Bahía de La Paz y Santa Rosalía, BCS., de agosto a noviembre de 2013. Para establecer las fases de madurez gonádica, se realizó un análisis histológico de las gónadas. La dinámica energética se infirió mediante la variación de los índices gonadosomático, de la glándula digestiva y del músculo (IGS, IGD, IM). Adicionalmente, se compararon los pesos de órganos reproductivos y somáticos, agrupando los datos por fases de madurez gonádica. En un total de 118 hembras, se reconocieron seis fases: inmadurez I y II, maduración, pre-desove, desove y post-desove. Los pesos y tallas generales fueron significativamente más grandes en hembras en pre-desove y desove. La glándula digestiva fue más grande en hembras inmaduras y fue el órgano que perdió más peso después del desove. El IGS mostró una correlación negativa con el IGD y el IM, debido al incremento significativo del IGS y la disminución de los otros índices durante el pre-desove. La relación entre el peso de la gónada y de la glándula digestiva sugiere una estrategia de desarrollo gonadal, donde la glándula aporta los sustratos requeridos para la vitelogénesis durante el pre-desove, para después recuperar su peso, probablemente como reserva para el periodo de inanición durante y después de las puestas.

VARIATION IN MORPHOPHYSIOLOGICAL INDEX IN RELATION TO THE GONADIC MATURATION OF THE OCTOPUS *HUBBSORUM* BERRY, 1953 (CEPHALOPODA: OCTOPODIDAE) IN BAHÍA DE LA PAZ, BCS, MEXICO

Octopus hubbsorum is the most important species within the Mexican Pacific octopus fishery. There is scant information about the biology and ecology of *O. hubbsorum* and examination of the reproduction process is essential in understanding the cultivation and management of this resource. In this respect, the energy dynamic of the reproductive event is important because it represents the largest energy investment over the lifespan of octopuses, particularly females. This work analyzes the morphophysiological index variation to infer the energy dynamics during gonadal maturation in *O. hubbsorum*. Females were collected in Bahía La Paz and Santa Rosalía, BCS, between August and November of 2013. Histological analysis of the gonads was performed to determine the gonadal maturity phases. Energy dynamics was inferred by varying gonadosomatic, digestive gland index, and muscular index (GSI, DGI, MI). Additionally, the weight of the reproductive and somatic organs was compared, grouping the data by the phases of gonadal maturity. In a total of 118 females, six phases of development were recognized: immaturity I and II, maturation, pre-spawning, spawning, and post-spawning. General weight and size were significantly greater in pre-spawning and spawning females. The digestive gland had the biggest decrease in weight out of all the organs during the pre-spawning stage and the immature females presented the largest digestive gland. The GSI showed a negative correlation with the DGI and the MI, due to the significant increase of the GSI and decrease of the other indices during the pre-spawning phase. The relationship between gonad and digestive gland weight suggests a strategy of gonadal development, where the gland provides the substrates required for vitellogenesis during the pre-spawn, and then regains their weight, presumably as a reserve for the period of starvation during and after egg deposition.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

MOLUSCOS BENTÓNICOS EN LA ZONA INTERMAREAL DE DOS PLAYAS ARENOSAS EN LA BAHÍA DE LA PAZ, BAJA CALIFORNIA SUR EN FEBRERO 2012

Astrid Carolina Romero González [1] y G. Minerva Torres Alfaro [2]

[1]Universidad Autónoma de Baja California Sur. Carretera al sur km 5.5. Apartado Postal 19-B, Código Postal 23080, La Paz, Baja California Sur, México; romglez@hotmail.com

[2]Centro Interdisciplinario de Ciencias Marinas – Instituto Politécnico Nacional. Av. IPN s/n. Colonia Playa Palo de Santa Rita. Apartado Postal 592, Código Postal 23096, La Paz, Baja California Sur, México; gmtorres@ipn.mx

En este trabajo se reportan los moluscos bentónicos encontrados en el mes de febrero 2012 en la zona intermareal de las playas arenosas Balandra y Conchalito. Estas playas se ubican al interior de la Bahía de La Paz, dentro del Golfo de California. Los moluscos se recolectaron a través de un muestreo sistemático durante la marea baja. Para ello se empleó un nucleador de arena de 15 cm de diámetro, cavando a una profundidad de 20 cm. Además, se estimaron indicadores del ambiente como: tamaño del oleaje, tipo de sedimento y estado morfodinámico de la playa utilizando los índices de Dean, pendiente y playa (BI). Los moluscos encontrados pertenecen a las clases Bivalvia y Gastropoda. Las familias de moluscos que habitan ambas playas fueron: Epitnoniidae, Hydrobidae, Naticidae y Olivellidae. Las dos clases encontradas en este trabajo se presentaron en Balandra (68 organismos), aunque la especie más numerosa fue *Megapitaria squalida* (40 organismos). Balandra además, mostró un estado morfodinámico disipativo (según el índice de pendiente y BI), con sedimentos gruesos de origen

biogénico y menor retención de humedad. Conchalito, presentó únicamente moluscos Gaterópodos (19 organismos) de los cuales la especie más abundante fue *Hydrobia sp* (4 organismos). En esta playa se observó una mayor pendiente con un estado morfodinámico reflectivo (según el índice de pendiente), sedimentos finos de mixtos.

GENERAL-CARTEL/POSTER

IDENTIFICACIÓN DE PARÁSITOS CILIADOS (CILIOPHORA) ASOCIADOS A LA CAVIDAD DEL MANTO DE *CRASSOSTREA* SP. (BIVALVIA, OSTREIDAE) DEL MANGLAR EN EL ESTERO TAMPAMACHOCO, TUXPAN, VERACRUZ

Víctor Romero-Niembro, Rosaura Mayén-Estrada, Margarita Reyes-Santos, Carlos González-Palma
Laboratorio de Protozoología, Facultad de Ciencias, Universidad Nacional Autónoma de México, Ciudad Universitaria 04510, México

Asociados a la cavidad del manto y distintos órganos de moluscos podemos encontrar diferentes grupos de ciliados comprendidos en los siguientes órdenes: Thigmotrichida, Rhynchodida y Pleuronematida. Para el Golfo de México solo existen los trabajos de Madrazo-Garibay y López-Ochoterena en la Laguna de Términos, Campeche en *Crassotrea rizophorae* y *C. virginica*.
Se recolectó una raíz de *Rizophora mangle* en Tampamachoco, Tuxpan, Veracruz en octubre del 2013(abril 2014). Los bivalvos asociados a esta fueron abiertos y con una jeringa se extrajo el líquido celómico, el cual fue fijado y almacenado para su posterior revisión. Se realizaron técnicas de hematoxilina de Harris, NMF (nigrosina-formol-metanol) e impregnación de plata en húmedo Chatton & Lwoff. Se realizaron mediciones con microscopia óptica y se diferenciaron caracteres importantes útiles para su identificación.
Posterior a la realización de técnicas de impregnación y tinción se identificaron organismos de los órdenes Thigmotrichida y Rhynchodida en el líquido celómico.
El presente trabajo aumenta el registro de ciliados parásitos en México, principalmente asociados a moluscos del Golfo de México, los que nos permite conocer el estado de estos organismos y del sistema.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

SIGNS OF MOLECULAR ADAPTATION RELATED TO LAND INVASION IN THE MITOCHONDRIAL GENOMES OF EUTHYNEURA

Pedro Romero [1], Annette Klussmann-Kolb [2] and Markus Pfenninger [1]
[1]Biodiversity and Climate Research Centre (BiK-F) – Senckenberg Gesellschaft für Naturforschung and Goethe University. Georg-Voig Str. 14-16, 60325 Frankfurt am Main, Germany;
quipu.romero@gmail.com; pfenninger@bio.uni-frankfurt.de
[2]Zoologisches Forschungsmuseum Koenig, Adenauerallee 160, 53113 Bonn; a.klussmann-kolb@zfmk.de

Euthyneura is one of the most diverse groups of gastropods considering ecological adaptations and species richness. One key innovation within this group was the evolution of air-breathing in pulmonate snails and slugs which allowed the radiation into terrestrial and freshwater niches. We consider that the adaptations to these new niches left a trace in the euthyneuran genomes. Thus, our main objective was to find out possible signs of Darwinian selection related to land transitions. We used data from mitochondrial genomes as a first step to test this hypothesis. We sequenced three new mitogenomes from eupulmonates (two from Stylommatophora: *Arion* and *Helicella*, and one from an Ellobiidae:

Carychium). We annotated each mt-genome using the MITOS web server, and then performed phylogenetic analyses using the thirteen mitochondrial coding sequences: *cox1*, *cox2*, *cox3*, *cytb*, *nad1*, *nad2*, *nad3*, *nad4*, *nad4l*, *nad5*, *nad6*, *atp6*, and *atp8*. Then, we used the tree topology as a framework to test positive selection (PS) events using site or branch models. Tests of PS were performed in PAML 4.7, models M1a vs. M2a (sites) and Model A vs. Model A1 (branches) were compared using the Likelihood Ratio Test (LRT). Our results support the Panpulmonata / Euopistobranchia hypotheses in concordance with previous multi-loci nuclear and mitochondrial topologies. The comparison of site-specific models showed that *nad2*, *nad5*, and *nad6* presented positions affected by PS, these proteins belong to the OXPHOS Complex I. Aminoacid changes in these proteins related to proton pump could have influenced the fitness during the radiation to land. For branch-specific models, we found PS comparing Stylommatophora (land snails) with other marine and intertidal taxa. However, we did not find significant differences in other fully terrestrial adapted snails (*Carychium*, Ellobiidae) or slugs (*Rhopalocaulis*, Veronicellidae). Future analyses considering complete transcriptomes would shed light into more regions related to the land transition.

PLICOPURPURA-PONENCIA/ORAL PRESENTATION

CICLO GONÁDICO DEL CARACOL DE TINTE *PLICOPURPURA PANSA* (GOULD, 1853) Y SU RELACIÓN CON LOS PARÁMETROS AMBIENTALES REGISTRADOS EN LAS COSTAS DE IXTAPA, ZIHUATANEJO, GUERRERO.

Ma. Guadalupe Romero-Rosales [1], Ma. del Pilar Torres-García [1], Erika S. Palacios-Ávila [1] y Carlos F. Candelaria-Silva [2]

[1] Laboratorio de Invertebrados, Facultad de Ciencias, Av. Universidad No. 3000, Universidad Nacional Autónoma de México, Coyoacán, D. F., CP. 04510, México; marydalumx2000@yahoo.com.mx; pilar.torres@ciencias.unam.mx; erisa2313@yahoo.com.

[2] Unidad Multidisciplinaria de Docencia e Investigación-Zihuatanejo. Facultad de Ciencias, UNAM

El caracol *Plicopurpura pansa* también conocido como caracol de tinte es un recurso cultural y económicamente importante, debido a que produce una sustancia como mecanismo de defensa contra sus depredadores y para la protección de sus huevecillos, la cual ha sido utilizada desde épocas prehispánicas en la tinción de hilos de algodón con tonalidades púrpura para la elaboración de vestimenta típica de grupos étnicos que habitan en las costas del Pacífico Mexicano, como es el caso de los mixtecos de la región de Pinotepa de Don Luis, Oaxaca. Registrando en la década de los 80´ una sobreexplotación por parte de una compañía japonesa denominada Púrpura Imperial, provocando altas tasas de mortandad en la población del caracol.

El estudio se realizó en la bahía el Palmar en Ixtapa de marzo del 2010 a mayo del 2011, con colectas mensuales apoyadas por el M. en C. Carlos Candelaria Silva, colectando en promedio 5 hembras y 5 machos de diferentes tallas, fijando las gónadas con formol al 10% en agua marina y registrando los parámetros ambientales de pH, salinidad y temperatura. Los ejemplares fueron transportados al Laboratorio de Invertebrados de la Facultad de Ciencias, UNAM, para el procesamiento histológico de las gónadas, utilizando la técnica de inclusión en parafina y empleando la tinción de hematoxilina-eosina.

En los caracoles que han alcanzado la edad reproductiva, la gónada muestra una coloración característica, en hembras se observa de color amarillo, mientras que en machos de color naranja, dicha coloración cambia de tonalidad de acuerdo a la fase gonádica en la que se encuentre. En base a las características histológicas y a la bibliografía se determinaron cuatro fases gonádicas en hembras: reposo, proliferación, maduración y desove, y en machos: reposo, proliferación, maduración y expulsión.

Coincidiendo las condiciones óptimas de pH (7), salinidad (35‰) y temperatura (28-30°C) con las fases gonádicas de maduración y desove - expulsión.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ECOFISIOLOGÍA

THERMAL LIMITS FOR *OCTOPUS MAYA* ALONG ITS LIFE CYCLE

C. Rosas [1], O. Juárez [2], C. Enríquez [1], M. Mascaró, Pedro Gallardo [1], C. Caamal-Monsreal [1], C. Pascual Jiménez[1], D. Re [3], F. Díaz [3]

[1]Unidad Multidisciplinaria de Docencia e Investigación, Fac. de Ciencias, UNAM. Puerto de Abrigo s/n, Sisal, Yucatán; crv@ciencias.unam.mx

[2] Posgrado en Biotecnología, CICESE, Ensenada BC.

[3]Departamento de Biotecnología Marina, Centro de Investigación Científica y de Educación Superior de Ensenada, Carretera Ensenada-Tijuana # 3918, Baja California, Ensenada B.C., México

Campeche Bank has two well-divided regions based on the different oceanographic processes occurring close to the coast at the north and western sides of the Yucatán Peninsula (YP). The difference is determined by the cold and nutrient rich water in the western side of the YP resulting from upwelling events, which are known to occur during spring and summer. The cold water upwelled from the Caribbean Sea does not reach the western side of the YP, where the water temperature directly reflects the seasonal variability of the atmospheric temperature.

Although the YP is located in a tropical zone, thanks to the upwelling phenomena, *O. maya's* niche is characterized by temperatures that fluctuate between 21 to 26°C in the eastern and between 21 to 30°C in the western side of the YP. Previous studies seem to indicate a maximum reproductive activity of *O. maya* during winter in the western side of the YP while in eastern side two reproduction peaks has been observed suggesting that high temperatures could inhibit the reproduction of this species. A question arises: How temperature modulates the biology of octopus maya along the life cycle?

In the present study we shows data related with the effects of temperature on the female spawns, embryo development, and juveniles in attempt to obtain the temperature limits along life cycle, putting emphasis in upper limits. Results indicate that the upper limits of temperature for spawns and embryo development is around 27°C, while the upper limit for juveniles acclimated at 22 and 26°C resulted, 32-34°C and 33-35°C respectively. Additionally we observed that the final preferendum for juveniles was 24.3°C, suggesting that *O. maya* is well adapted to live and growth in coolest waters than observed in tropical coastal ecosystems without summer upwelling.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

FEEDING HABITS OF SPAWNING FEMALES OF *ILLEX COINDETII*

Rigoberto Rosas-Luis, Pilar Sánchez, Daniel Quintana and Roger Villanueva

Institut de Ciències del Mar-CSIC, P. Marítim de la Barceloneta 37-45, 08003 Barcelona Spain; rigoberto@yahoo.com.mx; pilar@icm.csic.es; roger@icm.csic.es

Results of the marine cultivation have demonstrate several favorable aquaculture characteristics of cephalopods, i. e., high growth rates, short life cycle, and high fecundity. However, there are also several obstacles particularly in squid species. Some squids such those of the Ommastrephidae family have been considered as good resources for this activity. *Illex coindetii* in the western Mediterranean Sea was used

as a model for the culture of squids and we analyzed the stomach contents of 99 mature females, of which the eggs were removed and used for *in vitro* fertilization. Mature females were ranged between 167 and 205 mm mantle length and with a weight ranged between 113.5 and 227.63 grams. The results of the stomach analysis showed that the mature females fed mainly on the crustacean *Phasiphaena sivado* 57% IRI, unidentified fish 27% IRI, and myctophid fish 3% IRI. The presence and importance of *P. sivado* in the feeding habits of *I. coindetii* can be related to the good quality of the eggs used in the *in vitro* fertilization, due to the lipid composition of this crustacean increases energetic reserves of squid eggs.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ECOLOGÍA TRÓFICA

ASSESSING THE FEEDING ECOLOGY OF THREE SYMPATRIC SQUIDS *ILLEX ARGENTINUS*, *DORYTEUTHIS GAHI* AND *ONYKIA INGENS* OFF THE PATAGONIAN BY COMBINING STOMACH CONTENT AND STABLE ISOTOPIC ANALYSIS

Rigoberto Rosas-Luis [1], Joan Navarro [1], Pilar Sánchez [1], José Luis del Rio [2]
[1]Institut de Ciències del Mar-CSIC, P. Marítim de la Barceloneta 37-45, 08003 Barcelona Spain; rigoberto@yahoo.com.mx; joan@icm.csic.es; isabel@icm.csic.es; pilar@icm.csic.es
[2]Instituto Español de Oceanografía, Centro Oceanográfico Vigo, Subida a Radio Faro, 50. 36390 Vigo Spain; joseluis.delrio@vi.ieo.es

The Ommastrephidae *Illex argentinus*, the Loliginidae *Doryteuthis gahi* and the Onychoteuthidae *Onikya ingens* are squid species coexisting in the south part of the Patagonian Shelf, interacting for similar feeding resources. In the present study, we analyzed the feeding ecology, trophic position and trophic relationships of these three species by combining stomach content and stable isotopic approximations. In particular, stomach content and isotopic analysis were carried out on 20 *D. gahi*, 20 *I. argentinus* and 21 *O. ingens* collected from May 6th and 8th 2013 at depths between 147 and 220 m. The results indicated that the feeding habits of small and larger squids were different in the three species. The two main prey species for small *D. gahi* individuals were the euphausid *Euphausia* sp. and the amphipod *Eutemisto gaudichaudi*, and the main prey for larger *D. gahi* individuals were a fish and the Munididae *Munida subrugosa*. The main prey group of small *I. argentinus* individuals was the amphipod *E. gaudichaudi* and the myctophid fish, and the main prey for larger size *I. argentinus* individuals were the paralepididae *Arctozenus risso* and the Notothenidae *Patagonotothen ramsayi*, secondly by the squid group. Small *O. ingens* individuals fed on *Micromesistius australis* and *Notophysis marginata* while larger *O. ingens* individuals fed on *Lampanyctus australis* and *Notoscopelus* sp. *D. gahi* showed higher $\delta^{15}N$ values than the other two species and small and larger *D. gahi* individuals showed similar isotopic values. The $\delta^{15}N$ values of *I. argentinus* and *O. ingens* were higher for larger individuals. Finally, *D. gahi* differed in its $\delta^{13}C$ values from *I. argentinus* and *O. ingens* and the less depleted $\delta^{13}C$ values were found in the larger in *D. gahi* individuals. The results indicate that the three squid species preyed on organisms with similar trophic position, but due to their voracity and their active predation on similar trophic resources, small size individuals segregate their trophic niche from the larger ones. It is important to note that the $\delta^{13}C$ values revealed that larger *D. gahi* individuals had a different distribution in the water column, which probably is a response of the reproductive activity of mature squid near to the surface water.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

METHODS FOR STATISTICALLY SAMPLING BIODIVERSITY DATABASES, WITH A REVISED CRITICAL ESTIMATE OF RECENT MOLLUSCAN DIVERSITY

Gary Rosenberg
Academy of Natural Sciences, Drexel University, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; rosenberg.ansp@drexel.edu

Modern estimates of species level diversity in the recent Mollusca range from 50,000 to 120,000 described species, with estimated total diversity including undescribed species often cited as 200,000 species. Most estimates are unverifiable, lacking reproducible methods. Ultimately the best way to gauge diversity is explicit enumeration: actual listing of known species. Such comprehensive lists are valued for providing the basis for systematic revisions and for comparing diversity across taxa, but it is less appreciated that they also provide a means for statistical sampling of biodiversity databases. I assessed the completeness of molluscan species listings in the World Register of Marine Species (WoRMS) by comparing it to a standardized inventory of the species represented in the malacology collection of the Academy of Natural Sciences of Philadelphia (ANSP). Random samples of names were scored for presence or absence in WoRMS, with standard errors calculated from the binomial distribution. The WoRMS database has about 1200 ± 350 duplicate or extraneous listings for mollusks, and is missing a similar number, 1200 ± 450. Overall marine molluscan diversity is estimated at 43,500 ± 900 species, where 900 is a 95% confidence interval. The validity of this confidence interval depends on the WoRMS database and the ANSP collection not having correlated weaknesses. Lack of relatively complete overall species lists prevents similar assessments for terrestrial and freshwater mollusks, but using less rigorous methods, I estimate that there are 69,000 to 75,000 described species of recent Mollusca.

This research was supported in part by NIH grant IU01TW008163-01, Philippines Mollusk Symbiont International Cooperative Biodiversity Group (PI Margo Haygood, Oregon Health Sciences University) through a subaward to ANSP.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-CARTEL/POSTER

MOLUSCOS LITORALES DE ISLAS DIEGO RAMÍREZ, PASO DRAKE

Sebastián Rosenfeld [1,2], Cristian Aldea [3,4], Jesús Troncoso [5]
[1]Laboratorio de Macroalgas Antárticas y Subantárticas, Universidad de Magallanes, Casilla 113-D, Punta Arenas, Chile; rosenfeld.sebastian@yahoo.com
[2]Instituto de Ecología y Biodiversidad (IEB), Santiago, Chile. rosenfeld.sebastian@yahoo.com
[3]Laboratorio de Ecología y Medio Ambiente, Instituto de la Patagonia, Universidad de Magallanes, Avenida Bulnes 01890, Punta Arenas, Chile; cristian.aldea@umag.cl
[4]Programa GAIA-Antártica, Universidad de Magallanes, Punta Arenas, Chile.
[5]Departamento de Ecología y Biología Animal, Facultad de Ciencias del Mar, Universidad de Vigo, E-36310, ESPAÑA; troncoso@uvigo.es

Las Islas Diego Ramírez corresponden a un archipiélago situado en el Paso Drake, a 112 Km al SW del Cabo de Hornos y aproximadamente a 440 Km, al NW de las Shetland del Sur y la Península Antártica. Están conformadas por varias islas e islotes rocosos, entre los cuales sobresalen por su tamaño la Isla Bartolomé, Isla Gonzalo, Islote Santander e Islote Ester. Las costas del archipiélago son escarpadas, de

difícil acceso, solo posible en condiciones meteorológicas favorables. La inaccesibilidad y el hecho de estar fuera de las rutas usuales de navegación, no han permitido visitas frecuentes de investigadores. Por lo tanto, el conocimiento sobre la biodiversidad marina bentónica aún es muy escasa. El objetivo de este trabajo es reportar el primer listado de moluscos litorales de Islas Diego Ramírez. El sitio concreto de estudio correspondió a la Isla Gonzalo (56º30'S y 68º42'O). En primavera de 2012 se realizó una exhaustiva inspección visual en un transecto perpendicular a la línea de costa, desde la sección intermareal superior hasta el submareal somero (~1 m de profundidad), realizando una colecta *in situ* de organismos vivos mediante extracción manual y espátulas. Se identificaron un total de 18 especies, correspondientes a 15 familias. La clase Gastropoda fue la más representativa, con 12 especies, seguido de Bivalvia, con 4, y Polyplacophora, con 2 especies. Las especies *Plaxiphora aurata*, *Nacella magellanica*, *N. deaurata*, *Mytilus edulis platensis* y *Perumytilus purpuratus* han sido registradas previamente para las Islas Diego Ramírez. El resto de las especies constituye un nuevo registro. Del total de especies, cinco han sido registradas en Antártica y ocho presentan una ampliación de su límite de distribución sur hasta los 56°S. Este trabajo contribuye al conocimiento de la biodiversidad de este remoto lugar, en función de las conexiones Antártica-Magallanes.

Agradecimiento: Beca de Magíster del Proyecto ICM (código P05-002) otorgada por el Instituto de Ecología y Biodiversidad, III Zona Naval de la Armada de Chile y tripulación ATF-67 "Lautaro".

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-CARTEL/POSTER

DISTRIBUCIÓN Y ABUNDANCIA DE LA MALACOFAUNA ASOCIADA A PRADERAS NATURALES DEL ALGA ROJA *GIGARTINA SKOTTSBERGII* EN ISLAS SHETLAND DEL SUR, ANTÁRTICA

Sebastián Rosenfeld [1,2], Cristian Aldea [3,4], Jaime Ojeda [1], Johanna Marambio [1], Jesús Troncoso [5], Andrés Mansilla [1,2]

[1]Laboratorio de Macroalgas Antárticas y Subantárticas, Universidad de Magallanes, Casilla 113-D, Punta Arenas, Chile; rosenfeld.sebastian@yahoo.com; jaimeojedav@gmail.com; johanna.marambio@yahoo.com; andres.mansilla@umag.cl

[2]Instituto de Ecología y Biodiversidad (IEB), Santiago, Chile. rosenfeld.sebastian@yahoo.com; andres.mansilla@umag.cl

[3]Laboratorio de Ecología y Medio Ambiente, Instituto de la Patagonia, Universidad de Magallanes, Avenida Bulnes 01890, Punta Arenas, Chile; cristian.aldea@umag.cl

[4]Programa GAIA-Antártica, Universidad de Magallanes, Punta Arenas, Chile.

[5]Departamento de Ecología y Biología Animal, Facultad de Ciencias del Mar, Universidad de Vigo, E-36310, ESPAÑA; troncoso@uvigo.es

El conocimiento de la biodiversidad de la malacofauna marina de la región de Magallanes y Antártica se debe en gran parte a expediciones científicas realizadas desde el siglo XIX. No obstante, a pesar de la información que se tiene sobre los moluscos en la península Antártica, principalmente de aguas profundas, existen pocos estudios sobre asociaciones entre ensambles de moluscos y macroalgas de aguas someras. Teniendo en cuenta el amplio espectro trófico que presentan los moluscos, la caracterización de la diversidad y análisis de sus ensambles bentónicos son pertinentes para contribuir a entender la estructura e interacciones dentro de ensambles más complejos en los cuales estos moluscos interactúan con otros organismos bentónicos. En este trabajo se evalúa la distribución de los moluscos asociados a dos praderas del alga roja comercial, *Gigartina skottsbergii*, ubicadas en Islas Shetland del Sur, Antártica. Los sitios de estudio corresponden a Bahía Fildes (62º 12' S; 58º 54' O) y a Punta Hanna (62° 39' S; 60° 36' O). Durante la estación de verano del 2013, las muestras fueron obtenidas mediante

buceo autónomo utilizando cuadrantes de 0,25m^2, dispuestos al azar dentro de la pradera. En total se extrajeron espacialmente 12 cuadrantes por sitio. Se identificaron un total de 537 especimenes, correspondientes a 10 especies de 6 familias distintas. La clase Gastropoda estuvo representada por 6 especies, Bivalvia por 3 y Polyplacophora por 1. En términos de abundancia, la clase Bivalvia representó el 64% de los moluscos colectados. La especie más abundante fue el bivalvo *Lissarca miliaris* (338 individuos), seguido del gasterópodo *Laevilacunaria antarctica* (93 individuos). De las dos praderas evaluadas, Punta Hanna, con 10 especies, presentó una mayor riqueza que Bahía Fildes, con 7 especies. Este trabajo corresponde al primer reporte de ensambles de moluscos asociados a praderas naturales de *Gigaritina skottsbergii* en la Antártica.

Agradecimiento Proyecto FONDECYT 1110875 y beca de Magíster del Proyecto ICM, código P05-002 otorgada por el Instituto de Ecología y Biodiversidad.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS
-PONENCIA/ORAL PRESENTATION

DISTRIBUCIÓN Y ABUNDANCIA DE LA FAMILIA CAVOLINIIDAE (GASTROPODA) EN EL SUR DEL CARIBE MEXICANO

Karla Rubio-Sandoval, Elia Lemus-Santana y Laura Sanvicente-Añorve
Laboratorio de Ecología de Sistemas Pelágicos, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Cuidad Universitaria, 04510, México D.F. karla_zrsdz@hotmail.com; lesael01@yahoo.com.mx; sanvi@cmarl.unam.mx

Se analizó la composición y abundancia de los moluscos holoplanctónicos de la familia Cavoliniidae y los factores ambientales que influyen en su distribución, en la costa sur del Caribe mexicano. Las muestras de zooplancton se tomaron mediante arrastres superficiales en 34 estaciones utilizando dos redes cónicas con aperturas de malla de 333 y 505 µm. En cada estación se registró la temperatura y salinidad. En el laboratorio, se cuantificó la biomasa de zooplancton mediante el método de peso húmedo y se contabilizó el total de cavolínidos. Se identificaron cuatro géneros y cinco especies, entre las cuales *Creseis clava* y *Limacina inflata* fueron las especies dominantes, lo cual concuerda con registros anteriores. Para evaluar los factores ambientales que determinan la distribución de los cavolínidos, se aplicó un Análisis de Regresión por Árboles, usando la densidad de moluscos como variable de respuesta. Este procedimiento reveló que la temperatura y la biomasa de zooplancton, tomada como una medida de la disponibilidad de alimento, son los factores que más influyeron sobre la distribución de cavolínidos. Así, la zona cercana a la línea de costa registró la densidad más alta de moluscos, en donde se observaron también la mayor biomasa y una temperatura menor a 27.6°C.

DISTRIBUTION AND ABUNDANCE OF THE FAMILY CAVOLINIIDAE GASTROPODA) IN THE SOUTHERN MEXICAN CARIBBEAN SEA

The composition and abundance of holoplanktonic mollusks of the family Cavoliniidae, as well as the environmental factors influencing their distribution in the southern Mexican Caribbean coast, were analyzed. Zooplankton samples were collected by surface trawls at 34 stations using two conical nets of 333 and 505 µm mesh sizes. Temperature and salinity were recorded at each sampling station. In the laboratory, zooplankton biomass was quantified by the method of wet weight and the total of cavoliniids was also quantified. Four genera and five species were identified, from which *Creseis clava* and *Limacina trochiformis* were the dominant species in the region, in accordance with previous records. To asses the environmental factors determining the distribution of cavoliniids, a Regression Tree Analysis was applied, using the mollusc's density as the response variable. This procedure revealed that the temperature and

the zooplankton biomass, viewed as a measure of food availability, were the most important factors influencing the cavoliniids distribution. Thus, the shoreline area recorded the highest mollusk's density, an area where we also recorded the highest zooplankton biomass and temperatures lower than 27.6 °C.

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-PONENCIA/ORAL PRESENTATION

CONSERVATION THREATS AND ASSESSMENT IN A WESTERN PACIFIC ARCHIPELAGO: THE LAND SNAILS OF BELAU (REPUBLIC OF PALAU, OCEANIA)

Rebecca J. Rundell and Jesse E. Czekanski-Moir

State University of New York College of Environmental Science and Forestry (SUNY-ESF), Department of Environmental and Forest Biology, 1 Forestry Drive, Syracuse, New York 13210 USA; rundell@esf.edu; jesse.emrys@gmail.com

Belau's land snail biota comprises about 200 species, most of which are endemic and undescribed and all of which are poorly known. Compared to many other Pacific archipelagos Belau's land snail biota has been considered relatively "intact," perhaps owing to the remaining lowland rainforest (particularly among the Rock Islands of Koror and Airai States), and apparent restricted distributions of some major Pacific snail pests. However recent species conservation status assessments using IUCN criteria reveal an imperiled biota that at once has every hope of being conserved, but that also requires significant conservation attention, particularly considering the increased rate of urbanization (especially in Koror and Airai States), and limestone quarrying activities. We discuss the conservation of Belau's land snail biota against the backdrop of extraordinary evolution of these animals within and among the islands of Belau. Focal taxa include endemic Partulidae, Diplommatinidae, Helicarionidae and endodontoids.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
MORFOLOGÍA, MORFOMETRÍA Y ANATOMÍA

A MORPHOLOGY OF RAZOR CLAMS (BIVALVIA: SOLENIDAE) ANATOMY

Hanieh Saeedi and Mark J. Costello
Institute of Marine Science, University of Auckland, Auckland, New Zealand; hanieh.saeedi@auckland.ac.nz; m.costello@auckland.ac.nz

Deep-burrowing razor clams (Solenidae and Pharidae) inhabit coastal waters of tropical and temperate seas excluding some oceanic islands. Morphological characters such as anterior shell furrows and pallial tentacles are restricted to Solenidae. Scientists recently proposed a possible relationship between the presence of anterior shell furrows and pallial tentacles. This study thus examines this hypothesis by studying 1,188 dry shells of 51 species of *Solen* and *Solena rudis*, and 84 wet specimens of 21 species of *Solen* and *Solena*. Large Species such as *Solen marginatus* were distributed mostly in higher latitudes. Small species of *Solen* were distributed mostly in western Asia except latitudes more than 40°. There was a significant positive relationship between all biometrical parameters except for the relationship between the shell length and furrow length. Although 70% of *Solen* species had anterior shell furrows only 67% had anterior pallial tentacles. Also about 25% of *Solen* species either did not have anterior tentacles or lost their tentacles due to poor sample preservations. Most species with anterior tentacles

were reported in Asia from a small *S. cylindraceus* in Mozambique to a larger species, *Solen dactylus*, in Iran. Anterior pallial tentacles were reported in specimens of *Solen regularis* and *S. marginatus* from Thailand and Portugal, respectively. However, *S. regularis* from Malaysia and *S. marginatus* did not have anterior tentacles. It is still unclear that species without anterior pallial tentacles could evolve before those species with anterior tentacles (nascent organ) or opposite (vestigial organ). Molecular studies and DNA-Barcoding techniques would be necessary to study the phylogeny and evolution of Solenidae regarding the presence or absence of the tentacles.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

GLOBAL BIODIVERSITY AND BIOGEOGRAPHY OF RAZOR CLAMS (SOLENIDAE)

Hanieh Saeedi[1], Mark J. Costello[1], Todd Dennis[2]
[1]Institute of Marine Science, University of Auckland, Auckland, New Zealand;
hanieh.saeedi@auckland.ac.nz**;** m.costello@auckland.ac.nz
[2]School of Biological Sciences, University of Auckland, New Zealand; t.dennis@auckland.ac.nz

Razor clams (Solenidae and Pharidae) are ecologically and economically important bivalve molluscs. Solenidae are deep-burrowing bivalves that inhabit intertidal and shallow sub-tidal soft-bottom sediments of tropical and sub-tropical areas. Here we used combined data published in the literature and open-access databases including the Global Biodiversity Information Facility (GBIF) and the Ocean Biogeographic Information System (OBIS) to map the global geographic distribution of Solenidae species. Species nomenclature and synonyms were reconciled using the World Register of Marine Species (WoRMS). Environmental data were obtained at a spatial resolution of 0.083º from Bio-Oracle. We applied a species distribution modeling program 'Maximum Entropy' (Maxent) to predict suitable habitats for Solenidae species. The geographic distribution of species in 5° latitudinal bands showed a distinct bimodal pattern, and global patterns of richness decreased markedly from the equator to the poles. Eastern and southern parts of Asia exhibited the greatest diversity; there were no distribution records for this family in Antarctica and some large oceanic islands such as New Zealand. Model outputs indicated the majority of suitable Solenidae habitats are likely to occur in the shallow waters of the Indo-Pacific area and the North Atlantic Ocean. The most important environmental factors in determining Solenidae habitat suitability were land distance, depth, sea surface temperature, and chlorophyll A concentration. Knowledge of the biogeographical patterns of Solenidae on a global scale will help identify factors such as geological and climatological phenomena that are known to influence the diversity patterns of ecologically and environmentally important marine organisms such as razor clams.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-CARTEL/POSTER

AGE AND GROWTH OF THE SNAIL *ASTRAEA UNDOSA* (WOOD, 1828) (GASTROPODA: TURBINIDAE) FROM "LA BOCANA", BAJA CALIFORNIA SUR, MEXICO

Verónica Mitsui Saito-Quezada [1], Isaías Hazarmabeth Salgado-Ugarte [1], María Georgina Gluyas-Millán [2] and José Luis Gómez-Márquez [3]
[1] Laboratorio de Biometría y Biología Pesquera [3] Laboratorio de Limnología, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq.

Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F.; mitsuisaito@gmail.com; isalgado@unam.mx; lgomez@unam.mx
[2] Departamento Central de Investigación, Universidad Laica Eloy Alfaro de Manabi, Manabi, Ecuador; maria.gluyas@uleam.edu.ec

To estimate age and to model growth of the snail *Astraea undosa*, we compared unpolished and polished opercula to read periodical growth marks. From the commercial catch at "La Bocana" Baja California Sur 287 specimens (individuals and opercula) were measured in basal diameter (BD), operculum length (OL) and weighted in total (TW) and abductor muscle weights (MW). Fix and variable bandwidth kernel (Gaussian) density estimations (with half of the "optimal" bandwidth) for the BD showed a negatively skewed multimodal distribution indicating a target over the larger individuals with some size grouping. Morphometrical relationships indicated negative allometric growth between TW and MW and positive allometric growth between TW and MW with BD. Taking into account the annual periodicity previously registered, unpolished opercula (147) showed from 0 to 11 annulli. The most frequent estimated age was 5, and two models; von Bertalanffy growth function (vBGF) and Logistic were fitted. These opercula were polished afterwards and they permitted to more easily observe the growth marks and therefore they were considered to provide more precise counts and measurements. Most frequent ages were 5 and 6 (58 and 34 individuals respectively). Ages two and 11 were represented by a single individual each one. With these data it was possible to fit the three growth models considered (including the Gompertz equation). Both, Hotelling´s T^2 and likelihood ratio tests indicated a significant difference between vBGF from unpolished with polished opercula. These results lead to recommend operculum polishing to better age estimation and growth modelling of *Astraea undosa*.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-CARTEL/POSTER

PRELIMINARY STUDY ON THE BIOLOGY OF *MURICANTHUS PRINCEPS* (BRODERIP 1833) SNAIL FROM THE LITORAL COAST NEAR PUERTO ANGEL, OAXACA, MÉXICO

Verónica Mitsui Saito-Quezada, Isaías Hazarmabeth Salgado-Ugarte, Edgar Omar Guzmán-Urieta and Mariana Evelyn Meléndez-Contreras
Laboratorio de Biometría y Biología Pesquera, Campus II, Facultad de Estudios Superiores Zaragoza, Universidad Nacional Autónoma de México, Batalla 5 de mayo S/N esq. Fuerte de Loreto, Ejército de Oriente, Iztapalapa, 09230, México, D.F.; mitsuisaito@gmail.com; isalgado@unam.mx

The catch of the *Muricanthus princeps* snail provides an important source for food and economic benefits mainly for the local population. However, there are few previous studies on the biology of this species in particular for the central part of the Southern Coast of the Oaxaca State. Currently, the artisanal exploitation makes it necessary to study the biological aspects that serve as the basis for a sustainable fishery management. In this report we present some preliminary results on some morphometric relationships and morpho-physiological indices for reproduction and condition of the individuals. Periodic (monthly as possible) samples taken from March 2012 to January 2014 provided a total of 490 individuals. They were measured (total and opercular lengths) and weighed (total, soft biomass, foot, digestive gland, gonad and operculum weights). To date we have found that total length is negative isometrically related to total and foot weights, and isometrically related to opercular, soft biomass, digestive gland and gonad weights. A preliminary reproductive index showed low values for winter months and high values during autumn. The initial relative condition varied from one year to other. Additional analysis is required.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

REVISIÓN SISTEMÁTICA DE LA CLASE SCAPHOPODA EN MÉXICO

Francisco Enrique Saldaña Monroy y Brian Urbano
Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; f.saldana@rocketmail.com; maclen55@yahoo.com

Este trabajo analizó la taxonomía de los moluscos de la clase Scaphopoda en México, tomando en cuenta los ejemplares de cuatro colecciones malacológicas nacionales, donde se hizo además la clasificación taxonómica de cada ejemplar. Fueron consultados los registros de la clase de cinco colecciones extranjeras y la literatura particular encontrada; se aplicó un análisis de diversidad, una curva de acumulación y una prueba de correlación, para buscar un patrón de distribución de los escafópodos en México. Se encontraron los dos órdenes de este grupo, siete de las doce familias, 16 géneros de los 46 existentes y hasta ahora 37 especies. Queda de manifiesto la necesidad de hacer más estudios sobre esta clase.

SYSTEMATIC REVIEW OF THE CLASS SCAPHOPODA IN MÉXICO

The present work represents the latest taxonomic analysis of the class Scaphopoda in México. It takes into account the number of individuals and the data present in four Mexican collections, where the taxonomic classification of each individual belonging to the Scaphopoda was made. The records of the class were consulted in five North American collections and specific literature searched. We have made a diversity analysis, a species accumulation curve, and a correlation test to determine if there is a distributional pattern of the scaphopods in Mexican oceans. This work records both orders of Scaphopoda, seven of the 12 families, 16 of the 46 extant genera in the world. To date 37 species have been found in México.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ECOFISIOLOGÍA

HOW TEMPERATURA MODULATES THE EMBRYONIC DEVELOPMENT AND PHYSIOLOGICAL CONDITION OF *OCTOPUS MAYA*?

A. M. Sánchez-García [1], O. Juárez [2], F. Morales [3], C. Caamal-Monsreal [4], E. López-Ripoll [1], F. Díaz [5], C. Rosas [4]
[1]Posgrado en Ciencias del Mar y LimnologíaUNAM; ariadnamsg@gmail.com
[2]Posgrado en Biotecnología Marina CICESE
[3]Instituto Tecnológico de Tizimín, Yucatán
[4]Unidad Multidisciplinaria de Docencia e Investigación, Facultad de Ciencias, UNAM Puerto de Abrigo s/n, C.P. 97356, Sisal, Yucatán, México; crv@ciencias.unam.mx
[5] CICESE, Ensenada, BC

Octopus maya is a highly temperature sensitive species. Previous studies have been reported that females cannot spawn in temperatures higher than 28°C. Several hypotheses suggest that temperature tolerance of embryos could be similar or higher than observed in females. Oxygen consumption joint with morphological characteristics is commonly used as a tool to known how embryos use yolk nutrients and in consequence how environmental factors modulate the embryonic development. The present

study was designed to know how temperature modulates the growth rate and development of *O. maya* embryos. We used the oxygen consumption measurements as a tool for monitoring the physiological condition of embryos and at the same to explain how this species is highly sensible to temperature changes. Results obtained suggest that temperatures higher than 28°C provoke an uncontrolled increment of metabolic rate that provokes the prematurely depletion of yolk before the embryos end its development. Without yolk and in consequence without energy the embryonic development is stopped, driving embryo to death.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

DIVERSIDAD DE MOLUSCOS TERRESTRES EN LA ESTACIÓN BIOLÓGICA DE LOS TUXTLAS VERACRUZ

E. Sánchez-Méndez y J. L. Garcés-Salazar
Facultad de Ciencias, UNAM, Circuito interior s/n, Ciudad Universitaria, C. P. 04510, México D. F.;
etelsanme@yahoo.com.mx; jgarcessalazar@yahoo.com.mx

En el presente estudio se da a conocer la diversidad de moluscos terrestres de la Reserva de los Tuxtlas, en el estado de Veracruz, además se resalta su importancia ecológica en la selva como parte importante de los descomponedores de materia orgánica del suelo y su papel en la remoción de sustrato que beneficia a otras especies de invertebrados terrestres y de plantas. Para la realización de este trabajo, se hizo una salida a campo en el mes de abril de 2014 (correspondiente al período de secas) a la Estación Biológica de los Tuxtlas, donde se realizaron los muestreos en tres senderos establecidos (Lyell, Darwin y Circuito 1), en cada uno de ellos se recorrió una distancia de 200 m. En los tres senderos se utilizó el método de búsqueda directa, donde participaron cuatro personas y el tiempo en cada sendero fue de tres horas. Se encontraron 11 morfoespecies de organismos vivos y 24 morfoespecies de conchas vacías.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS E IMPORTANCIA ECONÓMICA

MOLUSCOS DE IMPORTANCIA ALIMENTARIA, ORNAMENTAL Y/O ECONÓMICA EN EL SISTEMA LAGUNAR CHACAHUA, OAXACA

E. Sánchez-Méndez, Jorge L. Garcés-Salazar, B. Urbano, S. Sierra-Hernández
Facultad de Ciencias, UNAM, Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C. P. 04510, Ciudad Universitaria, D. F., México; etelsanme@yahoo.com.mx; jgarcessalazar@yahoo.com.mx; maclen55@yahoo.com; delfin_0709@hotmail.com

El Parque Nacional Lagunas de Chacahua es un importante sistema lagunar, intercomunicado por una serie de canales que hacen de este ecosistema un lugar complejo y sumamente diverso. Alberga una gran cantidad de especies acuáticas que resultan benéficas para la población de este lugar, donde su principal actividad es la pesca de peces, sin embargo los moluscos fungen como organismos de gran importancia para los pobladores. Para conocer las especies de importancia alimentaria, ornamental y/o económica se aplicaron encuestas a pescadores, buceadores y comerciantes de tres localidades dentro del Parque: Chacahua, El Corral y Zapotalito, logrando identificar 13 especies de moluscos con susceptibilidad de explotación; de los cuales, siete pertenecen a la clase Bivalvia, cinco a la clase

Gastropoda y una a la clase Cephalopoda. Todos los moluscos encontrados son de importancia alimentaria y económica, solo cuatro tienen importancia ornamental siendo utilizadas en bisutería y adornos caseros.

MOLLUSC USED AS FOOD, ORNAMENTS OR WITH ECONOMICAL IMPORTANCE INSIDE THE LAGOON SYSTEM CACAHUA, OAXACA, MÉXICO

The national park "Lagunas de Chacahua" is an important lagoon system intercommunicated by channels, making this region a complex and diverse locality. This park has a large amount of species that are used by the local population, where the main economic activity is the fisheries. We surveyed the fishermen and divers in order to learn of the target mollusc species inside the park Lagunas de Chacahua. We went to the three main villages in the park (Chacahua, El Corral and Zapotalito) and identified 13 species of mollusc that are traded; seven Bivalvia, five Gastropoda class specimens, and one Cephalopoda. All the species found were important for nutrition and economic value, as well as handicrafts, for the people in the villages.

GENERAL-CARTEL/POSTER

DESOVE DEL CARACOL ROSA *STROMBUS GIGAS*: SU RELACIÓN CON LA VARIACIÓN AMBIENTAL EN LA CALETA DE XEL-HÁ, QUINTANA ROO, MÉXICO.

Pablo Alberto Santana Flores y Dalila Aldana Aranda

[1]Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional. Km 6 Antigua Carretera a Progreso, Mérida, Yucatán, México. C.P. 97310; pablo.santana@mda.cinvestav.mx

El Caracol rosa, *Strombus gigas* es una especie endémica del Caribe y su pesquería está sobre explotada por lo que desde el año 1992 se le indexo en el apéndice II de CITES y en la lista roja de especies amenazadas. Su reproducción ha sido estudiada a nivel histológico y nivel observacional en campo. Sin embargo las observaciones reproductivas en campo sólo indican el período de desove, sin detallar el esfuerzo de muestreo ni la correlación a variables ambientales. Así, con la finalidad de estudiar la relación entre los parámetros ambientales y la reproducción de *Strombus gigas,* particularmente el desove, se realizaron monitoreos utilizando el método de transecto lineal, registrándose abundancia y desove de *S. gigas* en la caleta de Xel-Há, Quintana Roo. Simultáneamente se registraron temperatura, salinidad, oxígeno disuelto y nivel de marea. Los muestreos se realizaron semanalmente de febrero a diciembre de 2013. Con los datos registrados se calcularon media y análisis de varianza para la abundancia de caracoles y desove de *S.gigas* y un análisis de correlación de Spearman entre parámetros medioambientales, con la abundancia y el desove. Se observó una media de abundancia por transecto de 13.59±7.80 individuos/100m^2(n=800) y un total de 432 desoves. Los meses con mayor número de desoves fueron julio y agosto ($\bar{x}$=15.35 y 21.20, respectivamente). La asociación del desove con: la temperatura es 50%, salinidad 39%, oxígeno disuelto 44% y marea 5%. Con base a estos resultados, se puede determinar que *S. gigas* tiene una estrecha relación entre la variación de los parámetros ambientales y la reproducción.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

ON THE OCURRENCE OF *MELANELLA CONOIDEA* (EULIMIDAE, GASTROPODA) IN CAMPOS BASIN, SOUTHEAST BRAZIL

Leonardo Santos de Souza and Alexandre Dias Pimenta
Museu Nacional - Universidade Federal do Rio de Janeiro, Quinta da Boa Vista S/N, São Cristovão, Rio de Janeiro, RJ, 20940-040, Brasil; leosouza2301@gmail.com; alexpim@mn.ufrj.br

The Family Eulimidae comprises minute gastropods that parasitizes echinoderms and this family is considered as one of the richness families of marine gastropods. This group possess a better knowledge on Pacific, Europe and Caribbean regions. In Brazil, a few descriptions of species exists and the eulimids had never been subject of a taxonomical revision.
The genus *Melanella* Bowdich, 1822 occurs worldwide comprising around 200 species and is the richness genus of the family. Regarding the shell morphology is treated as a diverse group. Despite that, the knowledge of this genus in Brazil still poor. According with the literature, only nine species of *Melanella* occur in Brazil, but preliminary results indicate that exists many other morphospecies and the species previously reported need confirmation, such as *M. conoidea* Kurtz and Stimpson, 1851. Oceanographic expeditions on Campos Basin (20.5°-24°S; 40°-41°W), Southeast Brazil, discovered the occurrence of two morphospecies that fit with some aspects of the original description of *M. conoidea*. These two morphospecies are here treated as *M.* cf. *conoidea* 1 and *M.* cf. *conoidea* 2. The main difference are the microscopic axial lines present in *M.* cf. *conoidea* 1 and absent in *M.* cf. *conoidea* 2. Young specimens of *M.* cf. *conoidea* 1 possess a carination on the body whorl, but when becoming adult this species loss the carination, while *M.* cf. *conoidea* 2 presents a carinated body whorl from juveniles to adults. Based on this feature, *M.* cf. *conoidea* 1 fits better with the descriptions and illustrations of *M. conoidea* in the literature. Since the type material of *M. conoidea* is probably lost, centered on searches in collections databases and personal communication with curators, examination of topotypes are needed to confirm the taxonomic status of the two taxa here studied.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

THE GENERA *FUSCEULIMA* AND *HALIELLOIDES* (GASTROPODA, EULIMIDAE) IN BRAZIL

Leonardo Santos de Souza and Alexandre Dias Pimenta
Museu Nacional - Universidade Federal do Rio de Janeiro, Quinta da Boa Vista S/N, São Cristovão, Rio de Janeiro, RJ, 20940-040, Brasil; leosouza2301@gmail.com; alexpim@mn.ufrj.br

The family Eulimidae is one of the richest families of marine gastropods, with around 1000 species described, mainly represented in Indo-Pacific Oceans. In the Atlantic Ocean, the knowledge of the family is concentrated in the North and at the Caribbean region, while in Brazil, studies on taxonomy and distribution of this family are scarce, with many species still undescribed.
As part of a large project on the taxonomy of Eulimidae from Campos Basin, southeast Brazil, this work presents the first confirmed records of the genera *Fusceulima* Laseron, 1955 and *Haliellloides* Bouchet and Warén, 1986 from southeastern Atlantic. The material was collected mainly by the projects HABITATS and REVIZEE on the continental shelf and continental slope of Campos Basin (20.5°-24°S; 40°-41°W). The species treated here were found at depths of 50 to 120 meters. The genus *Fusceulima* is represented in Campos Basin by four taxa, potentially new species, differing specially in the general shape of the shell, presence of umbilicus and shell coloration. The genus *Haliellloides*, although previously

recorded from Campos Basin, based on misidentifications, is actually present in the region by *Halielloides ingolfiana* Bouchet and Warén, 1986. This species is originally described from North Atlantic (Off Iceland – 64º 45' N 29º 06' W) and latter synonymized under *Eulimella nitida* Verril, 1884; however, examination of the type specimen of the latter revealed that *H. ingolfiana* is a valid species, differing from *Eulimella nitida* by the presence of an umbilicus, a typical feature of the genus *Halielloides*.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

CONSERVATION OF TERRESTRIAL MOLLUSKS IN BRAZIL: A VACUUM OF INFORMATION

Sonia B. Santos
Laboratório de Malacologia Límnica e Terrestre, Universidade do Estado do Rio de Janeiro, Instituto de Biologia Roberto Alcantara Gomes. Rua São Francisco Xavier, 524, Maracanã, Rio de Janeiro, RJ, Brasil. CEP: 20550-900

Brazil is a country of continental dimensions, harboring high diversity of biomes that support a huge species richness, deserving the status of one of the megadiverse countries. However, current knowledge about our biota is still scarce and heterogeneous, focused on just a few groups, especially when talking about invertebrates. Despite the advanced process of deforestation, it is surprising the small number of terrestrial mollusks that are listed as threatened with extinction, totalizing 17 species, considering federal and regional lists. This ignorance is an impediment to conservation actions. It will be presented the story of mollusks in the Red Book of Brasilian Fauna Threatened with Extinction, in the States regional listings and, status of species according to the IUCN criteria. A revision of the Red List of Brazilian mollusks is being prepared by Federal Government to this year, under organization of Chico Mendes Institute for the Conservation of Biodiversity (ICMBio), headquartered in Brasilia, through its "Coordination Assessment of the Status of Biodiversity Conservation - COABIO", that is responsible for leading the process of analyzing and assessing the risk of extinction of species of the Brasilian fauna.
Financial support: UERJ, Capes

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-CARTEL/POSTER

THE RAPELD (RAPID SURVEYS IN LONG-TERM ECOLOGICAL RESEARCH) IN THE STUDY OF TERRESTRIAL MOLLUSCS: AN EFFORT TO OPTIMIZE DATA

Sonia B. Santos, Jaqueline L. de Oliveira and Mariana C. Vasconcelos
Laboratório de Malacologia Límnica e Terrestre, Instituto de Biologia Roberto Alcantara Gomes, Universidade do Estado do Rio de Janeiro. Rua São Francisco Xavier 524, PHLC, sala 525/2, CEP: 20550-900, Maracanã, Rio de Janeiro; gundlachia@yahoo.com.br; jaquelopes28@yahoo.com.br; marianacastrov@yahoo.com.br

The RAPELD program is integrated into PPBio (Biodiversity Research Program), coordinated and funded by the Brazilian Ministry of Science and Technology. It was first designed by Dr. Magnusson team for use in the Amazon region and subsequently adopted by PPBio to develop biodiversity monitoring programs that allow comparison of the same biological group among different Brazilian regions and of different

groups in the same region. The great advantage of using the RAPELD methodology is the rapid inventories of the flora and fauna, standardization of data, integration of different studies (soil, topography, etc.), costs reduction and rapid availability of data. Integrated studies performed by this methodology will provide more accurate information about biological communities, providing support for better management of Conservation Units. Several RAPELD study sites (totalizing 70 collecting sites) are already established in almost all Brazilian biomes generating many publications, which mostly focus on plants, fungi, fish, amphibians, reptiles, birds, mammals and invertebrates, especially arthropods; none of them addresses land or freshwater snails. We are developing pioneering studies addressing ecology and distribution of terrestrial molluscs in Brazil using the RAPELD methodology in Ilha Grande, Rio de Janeiro, one of the most important remnants of Atlantic Forest in Southeast Brazil, where two modules were established. Ten regularly spaced plots were marked out in each module. The plots have a 250 m central transect line that follows the elevational contour. We use a collecting protocol based on previous studies, collecting litter down to the soil surface from ten regularly spaced quadrats of 25 × 75 cm, for subsequent screening of snails. We will show the obtained preliminary data and hope this presentation encourage other researchers to deploy the RAPELD methodology in their countries, in order to obtain integrated data that contribute to the conservation of terrestrial molluscs.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

COLD, WARM, TEMPERATE AND BRACKISH: BIVALVIA DIVERSITY OF A COMPLEX AREA OF THE SOUTHWESTERN ATLANTIC (URUGUAY)

Fabrizio Scarabino [1,2], Juan Carlos Zaffaroni [2], Diego Zelaya [3], J.M. (Lobo) Orensanz [4], Alvar Carranza [2,5], Leonardo Ortega [1] and Felipe García-Rodríguez [6]

[1]Dirección Nacional de Recursos Acuáticos, Constituyente 1497, Montevideo (11200), Uruguay; fscara@gmail.com; leogortega@gmail.com

[2]Museo Nacional de Historia Natural, CC 399, Montevideo (11000), Uruguay; juancarloszaffaroni@hotmail.com

[3]Dpto. Biodiversidad y Biología Experimental Facultad de Ciencias Exactas y Naturales – UBA Ciudad Universitaria, Pab. 2, 4to piso, lab. 31 C1428EHA - Capital Federal Argentina; dzelaya@bg.fcen.uba.ar

[4]Centro Nacional Patagónico, CONICET, Bv. Almirante Brown 2915, Puerto Madryn, Chubut, Argentina; lobo@cenpat.edu.ar

[5]Centro Universitario Regional Este – CURE, Sede Maldonado, Universidad de la República, Maldonado, Uruguay; alvar.carranza@gmail.com

[6]Sección Oceanografía y Ecología Marina, Facultad de Ciencias, Universidad de la República, Iguá 4225, Montevideo (11400), Uruguay; felipegr@fcien.edu.uy

The Uruguayan marine and estuarine coastlines (ca. 500 km) include sandy beaches interrupted by coastal lagoons (without mangroves) and rocky outcrops, often associated with islands. The extended inner shelf (ca.60 nautic miles wide) is sedimentologically heterogeneous. Uruguayan waters concentrate critical biogeographical and ecological boundaries created by the interaction between the Río de la Plata estuary and subtropical and subantarctic waters. In fact, 24 % of the total (110 spp.) bivalve species reported from the shelf have their northernmost or southernmost records there. This is well exemplified with the distribution patterns of lucinid clams, until now very poorly documented in the region: outer shelf and slope influenced either by subtropical (*Dulcina* cf. *lens*) or by subantarctic waters ("*Epicodakia*" *falklandica* and *Lucinoma* sp.). Additionally, coastal waters appear to have been colonized intermittently by *Ctena* cf. *pectinella*.

The cold-temperate mytilid *Aulacomya atra* exemplifies northwards dispersion via rafting on kelp holdfasts adrift, and unusual recruitments associated with cold oceanographic events. The venerids *Tawera* and *Anomalocardia*, which no longer live in Uruguayan waters, are respectively indicative of colder and warmer Quaternary thermal regimes. These cases illustrate the need of well dated records to establish current distribution ranges.

Other noticeable features of the Uruguayan bivalve biodiversity include: (a) poor diversity but high biomasses of estuarine species including the phylogenetically singular genus *Erodona*, (b) a marine soft bottom warm-temperate inner shelf fauna represented by large biomasses of tellinoids (*Donax*, *Psammacoma*), mactroids (*Mactra, Mesodesma*), veneroids (*Pitar*, *Amiantis*), corbulids (*Corbula.*) and even protobranchs (*Ennucula*), (c) high degree of deep sea endemism, still to be tested, and (d) methane/sulfide rich environments mostly represented by the first records of *Acharax*, *Lucinoma* and "*Vesicomya*".

Future challenges include the detailed analysis of the whole fauna using integrative taxonomy in order to test purportedly broad latitudinal ranges of distribution in the western Atlantic.

SIMPOSIO MOLUSCOS TERRESTRES DE LAS AMÉRICAS: DIVERSIDAD Y RELACIONES EN HÁBITATS EN PROCESO DE DESAPARECER/TERRESTRIAL MOLLUSKS OF THE AMERICAS: DIVERSITY AND RELATIONSHIPS IN VANISHING HABITATS-PONENCIA/ORAL PRESENTATION

PHYLOGENETICS AND EVOLUTION OF PLEURODONTIDAE AND SAGDIDAE: JAMAICA AND BEYOND

Makiri Sei [1,2], Gary Rosenberg [1], Frank Köhler [3], Luisa Teasdale [4,5] and Adnan Moussalli [4]

[1]Academy of Natural Sciences of Drexel University, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania 19103, USA; sei@ansp.org; rosenberg@ansp.org

[2]Biology Department, Arcadia University, 450 S. Easton Road, Glenside, Pennsylvania 19038, USA

[3]Australian Museum, 6 College Street, Sydney, NSW, Australia 2010; Frank.Koehler@austmus.gov.au

[4]Sciences Department, Museum Victoria, Carlton, Victoria, Australia 3053; amoussalli@museum.vic.gov.au; lteasdale@museum.vic.gov.au

[5]Department of Zoology, University of Melbourne, Parkville, Victoria, Australia 3010

Pulmonate families Pleurodontidae (formerly placed in Camaenidae) and Sagdidae are among the eight endemic-rich families of land snails in Jamaica. Evolutionary histories of Jamaican genera within their respective families have not been rigorously examined, and placement of Sagdidae at a superfamily level has been subject to debate. We obtained partial sequences of mitochondrial cytochrome *c* oxydase subunit II (COII) gene, 16S ribosomal RNA (rRNA) gene, and nuclear 28S rRNA gene from 113 pleurodontid individuals (71 from Jamaica and 42 from elsewhere), 20 sagdid individuals (11 from Jamaica and nine from elsewhere), 38 individuals representing 14 helicoid families (Hygromiidae, Cepolidae, Monadeniidae, Camaenidae, Xanthonychidae, Helminthoglyptidae, Epiphragmophoridae, Humboldtianidae, Helicidae, Bradybaenidae, Polygyridae, Sphincterochilidae, Thysanophoridae and Helicodontidae), and two outgroups (Systrophiidae and Oreohelicidae). Using targeted enrichment and the Illumina platform, we also obtained more than 200 exon fragment sequences for a subset of taxa to resolve deeper nodes, using an exon capture technique based on 'Next Generation' Sequencing technology. The results suggest that Pleurodontidae in the dataset includes only Lesser Antillean and Jamaican genera, groups with Trichodiscinini and nests in the New World xanthonychoids (sensu Schileyko). Other supposed Pleurodontidae including *Caracolus*, *Solaropsis*, *Zachrysia*, and *Polydontes s.l*. group with Sagdidae, with *Polydontes s.l*. and *Zachrysia* forming clades within Sagdidae. *Labyrinthus* and

Isomeria group with Thysanophoridae and Cepolidae. The exon capture results also suggest a New World origin of Helicoidea with Eurasian and Australian families at a more derived position.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

UNMASKING BIOLOGICAL DIVERSITY OF SCALLOPS (PECTINIDAE) WHILE IDENTIFYING SHELL SHAPE CONVERGENCE: A PHYLOMORPHOSPACE APPROACH

Jeanne M. Serb, Emma Sherratt, Alvin Alejandrino and Dean C. Adams
Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, IA 50011, USA; serb@iastate.edu; sherratt@iastate.edu; aalejand@iastate.edu; dcadams@iastate.edu

Scallops (Pectinidae) exhibit a tight association between shell morphology and ecological niche or 'life habit' *sensu* Stanley. In instances where there is a correlation between shell shape and functional performance, the morphology of that organism is predicted to be under strong selection, resulting in a narrow area of morphospace available to that life habit. As many as eight species exhibit long-distance swimming, or gliding, a life habit with strict biomechanical requirements that must generate lift and reduce drag during locomotive events. Since gliding scallops have shell shape that is qualitatively similar, these species may have converged on a single morphological solution to a common ecological problem. As a consequence, the highly similar conchology of gliders may mask biological diversity. To test this hypothesis, we first generated a four-gene phylogeny for 115 species of the scallops, representing over 75% of the recognized genera. For the same taxa, we quantified shell shape using three-dimensional, landmark-based geometric morphometric methods. To identify morphological convergence, these datasets were combined using a phylomorphospace approach, a phylogenetic comparative method to infer evolutionary change along branches of a phylogeny. We evaluated predictions that the shell morphospace is partitioned according to the five life habits, which requires substantial convergent evolution. Our results determined that the shell shape used for gliding is both convergent and divergent. Furthermore, gliding evolved at least five times in different scallop lineages. Despite the convergence in shell shape, we demonstrate that a combination of molecular and morphological characters effectively differentiates gliding scallop clades. We describe a new genus from the Indo-Pacific to more accurately reflect this biological diversity.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-CARTEL/POSTER
BIODIVERSIDAD

THE TERRESTRIAL AND FRESHWATER GASTROPODS OF MONTSERRAT: AN UNPRECEDENTED SURVEY OF MONTSERRATIAN NEOTROPICAL SNAILS

Nathaniel F. Shoobs and Thomas W. Coote
Department of Biology, Bard College at Simon's Rock, 84 Alford Road, Great Barrington, Massachusetts 01230, USA; nshoobs12@simons-rock.edu; tcoote@simons-rock.edu

Montserrat is a small, volcanic island in the Caribbean Lesser Antilles, which is home to an unknown number of Neotropical gastropod taxa. We conducted the most extensive survey of the island to date, sampling over 30 sites across most of the inhabited portion of the island, and collecting specimens in order to better understand the biodiversity and ecology of its terrestrial and freshwater gastropod

fauna. We have identified at least 21 different species of land and freshwater snails, compared to a total of 15 previously reported. Two of the freshwater snail species, (*Biomphalaria glabrata* Say, *Potamopyrgus* sp.) previously thought to have been present on the island were not present at any of our survey sites, and we believe that recent volcanic activity on the island has either eradicated them or substantially limited their range, if they were ever truly present on the island.
Of the 20 species we collected, one is a poorly understood Montserrat endemic species (*Amphibulima rawsonis* Bland), which had been overlooked for more than a century before we identified and collected specimens; one is a land snail (*Amphibulima browni* Pilsbry) previously thought to have been endemic to the island of Dominica; two are currently unidentified potentially novel species, three (*Veronicellidae* spp., *Megalobulimus oblongus* Müller) are economically important invasive pests; and one (Neritilia succinea Récluz) is a rediscovered freshwater snail previously thought to have been a potentially extinct Montserrat endemic.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-CARTEL/POSTER

MOLLUSK ABUNDANCES AND DIVERSITY IN SANDY BEACHES (TUMBES, PERU)

Chira Siadén L.E. and Helena Fortunato
Department of Natural History Sciences, Faculty of Science, Hokkaido University, N10 W8 Kita-ku, Sapporo 060-0810, Japan; lechs8@yahoo.com; helenaf@mail.sci.hokudai.ac.jp

Sandy coastal areas are among the most frequently found ecosystems in both tropical and temperate shores. These are diverse ecosystems where abundance and diversity increase from micro tidal reflective to macro tidal dissipative types. They are also highly impacted and in need of more research and better management plans.
From February through October 2007 three sandy beaches (El Bendito, Peña Redonda, Nueva Esperanza) located in the Tumbes region, Perú, were monthly sampled and the macro-zoobenthics analyzed. A total of 33 species were found. Mollusks were the most diverse group (11 species) as well as the most abundant. El Bendito and Nueva Esperanza sites showed the highest Shannon Wiener index (H'=1.78 and H'=1.72 respectively). Concerning abundances, the highest was found in El Bendito (6459 ind/m^2) followed by Peña Redonda (4359 ind/m^2). Mollusks also constituted the major biomass component in these two sites (1276.5 g/m^2 and 224.7 g/m^2, respectively). *Excirolana braziliensis*, *Emerita rathbunae*, *Olivella columellaris*, *Mazatlania fulgurata*, *Donax mancorensis*, *Lumbrineris biuncinata* and *Hemipodus triannulatus* were among the most common species found.

PLICOPURPURA-CARTEL/POSTER

WILDLIFE MOLLUSC'S LIST ASSOCIATED TO THE PURPLE SNAIL IN HUATULCO NATIONAL PARK, OAXACA, MÉXICO

J.E. Silva-Cruz [1], Citlali Guadalupe Garrido-Abreu [2], María R. Cid-Rodríguez [3], José L. Villarruel-Ordaz [4], Noé Ruíz-García [5], Eduardo Ramírez-Chávez [3]
[1]Universidad del Mar, campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P.70902; silva-cruz@outlook.com
[2]Universidad de Campeche. Calle 56- 4 esq. Av. Concordia. Campeche. México. C.P. 24180; citgarrido@gmail.com
[3]Instituto de Ecología. Universidad del Mar. Campus Puerto Ángel. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 70902 cidr@angel.umar.mx; bmeduardo@msn.com

[4]Instituto de Genética. Universidad del Mar campus Puerto Escondido. Ciudad Universitaria, Puerto Escondido, Oaxaca, México. C.P.; josipetardo@hotmail.com
[5]Instituto de Ecología. Universidad del Mar. Campus Puerto Escondido. Ciudad Universitaria, Puerto Ángel, Pochutla, Oaxaca, México. C.P 71980; nruizg@zicatela.umar.mx

The marine mollusk fauna of rocky coastline is poorly known, one of the most abundant taxa among the invertebrates is the group of molluscs, being in the Gastropoda type that forms the most diversified group of these. This paper, presents the taxonomic identification of the shell (Conchology) of the mollusk associated to the purple snail Plicopurpura pansa, whose ink has been long used by the Mixteco indigenous group of Pinotepa of Don Luis, Oaxaca, as a fertility symbol.
In the rocky coastline exposed to the waves of Huatulco National Park in Santa Cruz, Huatulco , Oaxaca, México , in the study zone of violin bay on the rocky intertidal zone of the Mexican Pacific; a copy of each mollusk organism found is collected for further taxonomic identification, its expected to find an estimate of a total of four classes of molluscs: Gasteropoda, Bivalve, Cephalopoda, Polyplacophora; Here is presented a list of the species with the family characteristics, Neritidae, Fissurellidae, Littorinidae, Acmeidae, Planaxidae, Trochidae, Chitonidae Thaidae representatives of the range of rocky coastline

LISTADO FAUNISTICO DE MOLUSCOS ASOCIADOS AL CARACOL MORADO EN EL PARQUE NACIONAL HUATULCO, OAXACA, MÉXICO

La malacofauna marina del litoral rocoso es poco conocida, uno de los taxa mas abundantes entre los invertebrados es el grupo de los moluscos, siendo la clase Gasterópoda la que conforma el grupo más diversificado de éstos. En este trabajo, se presenta la identificación taxonómica por la concha (Conquiliología) de los moluscos asociados al caracol morado *Plicopurpura pansa*, especie que desde la antigüedad ha sido utilizada la tinta del organismo como símbolo de fertilidad por el grupo indígena Mixteco, de Pinotepa de Don Luis, Oaxaca.
En el litoral rocoso expuesto al oleaje del Parque Nacional Huatulco, en Santa Cruz, Bahías de Huatulco, Oaxaca, México, en la zona de estudio de bahía violín en la zona intermareal rocosa del Pacífico mexicano; se recolectara un ejemplar de cada organismo encontrado de moluscos, para su posterior identificación taxonómica, se espera encontrar un estimado de un total de cuatro clases de moluscos: Gasteropoda, Bivalva, Cephalopoda, Polyplacophora; se presentaran en un listado de las especies con las características de las familias Neritidae, Fissurellidae, Littorinidae, Acmeidae, Planaxidae, Trochidae, Chitonidae y Thaidae representativas de la franja del litoral rocoso.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
SISTEMÁTICA

SHELL VARIATION IN THE FAMILY SPONDYLIDAE OF NORTHEASTERN BRAZIL

Ilana O. Silveira [*]; Valesca P. Rocha; Helena Matthews-Cascon
Universidade Federal do Ceará, Departamento de Biologia, Laboratório de Invertebrados Marinhos do Ceará (LIMCE), Fortaleza, Ceará, Brasil; [*]ilana_silveira@gmail.com

Bivalves constitute the second most species-rich taxon of Mollusca and probably present the highest economic and ecological importance among all Mollusca classes. The absence of a well-researched and agreed-upon taxonomic list for bivalves often causes the most basic problems, like the difficult to determine the valid name for a taxon. Spondylidae is a bivalve family that includes large and notable members of coral fauna, occurring also, rarely, in estuarine areas. The species of this family have

orbicular or oval, inequivalve shell, with central umbones. For the Brazilian coast, it is registered five species for the genus *Spondylus*.
This study aimed to analyze the variation in size and ornamentation in the shells of *Spondylus* species of the Northeastern coast of Brazil. For that, 33 *Spondylus americanus* and 12 *Spondylus erinaceus* valves were analyzed, obtaining, in average, 4,33cm width, 4,0 cm height and 6 morphotypes for the first species and 5,19 cm width, 4,51 cm height and 2 morphotypes for the second. Because of this great variability within the same species, diagnoses based solely on shell's characteristics are hampered.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
REPRODUCCIÓN

DISPERSAL AND RETENTION POTENTIAL FOR LOLIGINID PARALARVAE IN THE SOUTHEASTERN BRAZILIAN BIGHT (23–29°S), BRAZIL, AND THE AGULHAS BANK (18–27°E), SOUTH AFRICA, ON THE BASIS OF PASSIVE LAGRANGIAN TRANSPORT

Rodrigo Silvestre Martins [1], Ricardo de Camargo [2] and Maria de los Angeles Gasalla [3]
[1]Universidade Federal de São Paulo, Departamento de Ciências do Mar, Av. Almirante Saldanha da Gama 89, 11030-490 Santos, SP, Brazil; rodrigo.plei@gmail.com; rsmartins@unifesp.br
[2]Universidade de São Paulo, Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Rua do Matão, 1226, 05508-090, Brazil
[3]Universidade de São Paulo, Instituto Oceanográfico, Laboratório de Ecossistemas Pesqueiros, Praça do Oceanográfico, 191, São Paulo, 05508-900, Brazil

Loliginid squid inhabit coastal and neritic waters all over the world, excluding the polar latitudes. As such, they face variable environmental conditions, and have evolved life cycle strategies to deal with such habitat variability. In order to understand such strategies, we developed two Lagrangian particle-tracking Individual Based Models for two very contrasting loliginid squid habitats: the highly retentive Southeastern Brazilian Bight (SBB) (Brazil) and the highly dispersive Agulhas Bank (AB) (South Africa). We quantified the percentage of particles ("virtual paralarvae" hatched near bottom) lost from those ecosystems as (1) "offshore losses" (i.e. particles that crossed the 200 m isobath) and (2) "inshore losses" (particles beached) at an age of 20 d. In addition, we also quantified the percentage of particles exchanged within the two areas (latitudinal at SBB and longitudinal at AB) to get a proxy of population connectivity throughout passive larval drift. Simulations results showed that, overall, the SBB is highly retentive whereas the Agulhas Bank is highly dispersive, confirming the predictions. Accordingly, if circulation-driven dispersion and retention alone are considered, the SBB was found to be a "nearly perfect" spawning and nursery ground for loliginid paralarvae because the negligible risk of removal from the shelf environment on which their survival depends. In contrast, the risk of ecosystem removal for loliginid paralarvae on the AB is very high. Those results endorse early predictions that loliginid squid may deal with the risks of ecosystem removal by currents by evolving paralarvae of different sizes.

GENERAL-CARTEL/POSTER

EFECTO TÓXICO DE CONTAMINANTES EMERGENTES EN EL GASTERÓPODO *LYMNEA* SP.

Alma Sobrino-Figueroa
Lab. Alejandro Villalobos, Universidad Autónoma Metropolitana-Iztapalapa. Av. San. Rafael Atlixco #186 Col. Vicentina C.P. 09340 D.F.; coco@xanum.uam.mx

Los contaminantes emergentes son productos que se utilizan de manera cotidiana, como los detergentes enjuagues bucales y pastas de dientes. Debido a que no existe información del efecto de estos productos en los organismos acuáticos el objetivo de este estudio fue evaluar la toxicidad de 9 productos (3 detergentes, 3 enjuagues y 3 pastas de dientes) sobre el gasterópodo *Lymnea* sp. Se llevaron a cabo bioensayos exponiendo a los organismos a 5 concentraciones de cada producto además de un grupo control, durante 96 horas, para determinar la CL_{50} (concentración letal 50) por medio del método Probit. La sensibilidad de los gasterópodos a los diferentes productos se determinó comparando sus valores de CL_{50}, por medio de una prueba de "t". Los valores de CL_{50} obtenidos en las pruebas con los productos variaron de 214 a 0.12 mg/L. Los compuestos más tóxicos fueron los enjuagues bucales. Debido a la escasa información existente sobre la presencia de los componentes de los productos probados en los sistemas acuáticos en nuestro país es importante continuar realizando investigaciones y monitoreo para detectar respuestas que indiquen el posible daño en las poblaciones por la acción de estos compuestos y diferentes tensores, para evitar un deterioro irreversible de las poblaciones a mediano y largo plazo.

TOXIC EFFECT OF EMERGING CONTAMINANTS IN *LYMNAEA* SP. GASTROPOD

Emerging contaminants are products that are used on a daily basis, such as detergents, mouthwashes and toothpastes. Because there is no information on the effect of these products on aquatic organisms The aim of this study was to evaluate the toxicity of 9 products (3 detergents 3 mouthwashes and 3 Toothpastes) on the gastropod *Lymnaea* sp. Bioassays were conducted, the organisms were exposed to 5 concentrations of each product for 96 hours, to determine the LC_{50} (lethal concentration 50) by the Probit method. . The sensitivity of gastropods to the different products was determined by comparing the values of LC_{50}, through "t"test. LC_{50} values obtained in the tests with the products ranged from 214 to 0.12 mg/L. The most toxic compounds were mouthwash. Due to the scarce information about the presence of the components of the products tested in aquatic systems in our country is important to continue research and monitoring to detect responses indicating possible damage in populations by the action of these compounds and different tensioners to prevent irreversible deterioration in the medium and long term.

GENERAL-CARTEL/POSTER

EVALUACION DEL EFECTO TÓXICO DE DOS MEDICAMENTOS EN EL GASTEROPODO *LYMNEA* SP.

Alma Sobrino-Figueroa
Lab. Alejandro Villalobos, Universidad Autónoma Metropolitana-Iztapalapa. Av. San. Rafael Atlixco #186 Col. Vicentina C.P. 09340 D.F.; coco@xanum.uam.mx

En este trabajo se realizó una evaluación de la toxicidad de dos medicamentos usados contra el dolor: el Ácido acetilsalicílico y el Paracetamol sobre el gasterópodo *Lymnea* sp., debido a que estos fármacos son productos que se venden libremente y son sustancias que con más frecuencia se eliminan a los sistemas acuáticos. Estos medicamentos pueden causar efectos nocivos sobre los organismos, ya que se han diseñado para tener un efecto fisiológico en concentraciones muy bajas. Se realizaron bioensayos estáticos con una duración de 96 horas, donde se probaron 5 concentraciones de los fármacos, para determinar la CL_{50} (concentración letal 50). Además se evaluó el grado de lipoperoxidación en los tejidos de los gasterópodos midiendo la concentración de MDA (malondialdehído). Los valores de LC_{50} obtenidos demostraron que el compuesto más tóxico fue el Ácido. Acetilsalicílico. Además el grado de lipoperoxidación en los tejidos fue más alto en los organismos expuestos a este fármaco. Debido a que en México solo en 14% de las aguas residuales generadas reciben algún tipo de tratamiento, y no se ha evaluado las concentraciones de éstos medicamentos en ellas, es importante seguir realizando

evaluaciones de los efectos de estos fármacos con el propósito de proponer medidas adecuadas de manejo para reducir el riesgo por la presencia de estos compuestos en sistemas acuáticos.

ASSESSMENT OF TOXIC EFFECTS OF TWO DRUGS IN *LYMNAEA* SP. GASTROPOD

In this work an evaluation of the toxicity of two drugs: Acetylsalicylic acid and Paracetamol was performed on the gastropod *Lymnaea* sp. because these drugs are products that are sold freely and and these are more often substances eliminated aquatic systems. These drugs can cause adverse effects on organisms, as they are designed to have a physiological effect at very low concentrations. Static bioassays were conducted with a duration of 96 hours, 5 concentrations of the drugs were tested to determine the LC_{50} (lethal concentration 50). Also the degree of lipid peroxidation was assessed in gastropods tissues by measuring the concentration MDA (malondialdehyde). LC_{50} values obtained showed that the most toxic compound was Acetylsalicylic acid. Also the degree of lipid peroxidation in tissues was higher in organisms exposed to this drug. Because in México only 14% of the wastewater generated receive some type of treatment, and has not been evaluated concentrations of these drugs in them, it is important to continue to carry out assessments of the effects of these drugs in order to propose measures appropriate management to reduce the risk by the presence of these compounds in aquatic systems.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-CARTEL/POSTER

EFECTO DE LOS METALES CD, CR, PB Y SU MEZCLA SOBRE EL CRECIMIENTO DE LA ALMEJA CATARINA *ARGOPECTEN VENTRICOSUS*

Alma Sobrino-Figueroa [1] and C. Cáceres-Martínez [2]

[1]Laboratorio Alejandro Villalobos. UAM-Iztapalapa. Av. San Rafael Atlixco # 186 Col. Vicentina. C. P. 09340 Mexico D.F.; coco@xanum.uam.mx

[2]Universidad Autónoma de Baja California Sur, Km 5.5 Carretera al Sur, Col. El Mezquitito, 23080, La Paz, B.C.S. México; ccaceres@uabcs.mx

Los metales Cd, Cr y Pb se encuentran en concentraciones elevadas en sistemas localizados en el Pacífico Mexicano. Por esta razón el objetivo de este trabajo fue evaluar el efecto de estos metales en la tasa de crecimiento de juveniles de la Almeja Catarina. Se realizaron bioensayos con juveniles (3 ± 0.5 mm) expuestos a 4 concentraciones de los metales Cd, Cr, Pb y la mezcla Cd + Cr + Pb, durante 30 días. Con los datos obtenidos se determinó la tasa de crecimiento y la CE_{50} (Concentración Efectiva 50), que es la concentración de metal que causa una disminución del 50% en la tasa de crecimiento. Se observó una reducción significativa ($p < 0.05$) en la tasa de crecimiento y peso en los organismos expuestos a los metales, en concentraciones agudas (10 y 1 mg/l) se obtuvo una reducción del 98% al 60% y en concentraciones subletales (0.1 y 0.01 mg/l) se detectó una disminución del 71% al 35%. Las CE_{50} fueron de 0.047 mg/l, 0.525 mg/l, 0.650 mg/l y 0.165 mg/l para los ensayos con Cadmio, Cromo, Plomo y la mezcla Cd + Cr + Pb respectivamente. El grado de efecto observado (de mayor a menor efecto) con los diferentes metales probados, sobre el crecimiento de los juveniles de *A. ventricosus* fue: Cd > Cd + Cr + Pb > Cr > Pb.

EFFECT OF METALS CD, CR, PB AND MIX ON GROWTH OF CATARINA CLAM *ARGOPECTEN VENTRICOSUS*

The metals Cd, Cr and Pb are found in high concentrations in systems localized in the Mexican Pacific. For this reason the aim of this study was to evaluate the effect of these metals on the growth rate of Catarina clam juvenile. Bioassays were conducted with juvenile (3 ± 0.5 mm) exposed to 4 concentrations of Cd, Cr, Pb and Cd + Cr + Pb metal mixture for 30 days. With the data obtained the rate

of growth and the Effective concentration 50, (EC_{50}, which is the concentration of metal in which causes a decrease of 50% in the growth rate) were determined. A significant reduction ($p < 0.05$) was observed in the rate of growth and weight in organisms exposed to metals, in acute concentrations (10 and 1 mg/l), a reduction of 98% at 60% was obtained and at sublethal concentrations (0.1 and 0.01 mg/l) a decrease of 71% to 35% was detected. The EC_{50} were 0.047 mg/l, 0.525 mg/l, 0.650 mg/l and 0.165 mg/l for tests with Cadmium, Chromium, Lead and Cd + Cr + Pb mixture respectively. The effect degree on the growth of juvenile *A. ventricosus* (high to low effect) was: Cd > Cd + Cr + Pb > Cr > Pb.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

POPULATION DENSITY OF *ECHINOLITTORINA ZICZAC* IN A TROPICAL ROCKY SHORE NORTHEAST BRAZIL

Alisson Sousa Matos and Erminda da Conceição Guerreiro Couto
Universidade Estadual de Santa Cruz – Programa de Pós-Graduação em Sistemas Aquáticos Tropicais – Campus Prof. Soane Nazaré de Andrade, km 16, Rodovia Jorge Amado, Sala 01EA, 1°Andar, Pav. Max de Menezes - Cep: 45662900. Ilhéus, Bahia, Brasil.; alimatos1@gmail.com; minda@uesc.br

The density is a factor of importance to the understanding of population processes, it is related to the number of individuals present per unit area. Vertical shell size gradients along the intertidal zone are common in many species of marine gastropods. The distribution of density and size *Echinolittorina ziczac* in rocky shore of Morro de Pernambuco (Ilhéus – BA, Brazil) was observed. The densities were evaluated in three areas: upper (bare rock zone), intermediate (zone with barnacles) and bottom (zone with bivalves) the sheltered shore. 20 squares of 400 cm ² were arranged in each zone. Individuals were recorded in the field and the first 40 individuals of different sizes, subsampled for biometrics. In the laboratory the specimens were photographed in stereoscopic microscope and measured the height of the shells with the aid of the program ImageJ. An ANOVA was performed to identify significant differences between the sizes and densities in the different areas. The mean density in the upper zone (0.07 ± 0.03 ind/400cm ²) was lower than that recorded in intermediate areas (0.45 ± 0.23 ind/400cm ²) and lower (0.47 ± 0.14 ind/400cm ²). There was no significant difference between the densities in the middle and lower zones. The average size of fish found in the upper zone (3.58 ± 0.83 mm) was significantly higher than that recorded in the intermediate zones (2.40 ± 0.83 mm) and lower (2.33 ± 0.44 mm) ($p < 0.05$). There was no significant difference between the mean size of individuals of intermediate and lower ($p > 0.05$) areas.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

VERTICAL ZONATION *ECHINOLITTORINA ZICZAC* IN A TROPICAL ROCKY SHORE (SUL DA BAHIA, BRAZIL)

Alisson Sousa Matos and Erminda da Conceição Guerreiro Couto
Universidade Estadual de Santa Cruz – Programa de Pós-Graduação em Sistemas Aquáticos Tropicais – Campus Prof. Soane Nazaré de Andrade, km 16, Rodovia Jorge Amado, Sala 01EA, 1°Andar, Pav. Max de Menezes - CEP: 45662900. Ilhéus, Bahia, Brasil.; alimatos1@gmail.com; minda@uesc.br.

Vertical distribution is characterized by the distribution of organisms or associations of organisms in areas allocated according to a vertical gradient. Species of the genus *Echinolittorina* are dominant in the supralittoral rocky shores along the tropics. The distribution of gastropod *Echinolittorina ziczac* in

sheltered shore of Morro de Pernambuco was verified (Ilheus - BA, Brazil), August 2013. Five zones were visually classified between the above and subtidal: bare rock, bare with scattered barnacles, dominated by barnacles, dominated by guild and dominated by macroalgae, within which rock were sampled 0.06m². All specimens present in the plot, in each zone were counted and a subsample of individuals of different sizes were manually collected for biometrics. In the laboratory the specimens were photographed in stereoscopic microscope and were measured the height and width of the shells, with the aid of ImageJ software. The linear correlation between the variables was calculated. An ANOVA was performed to identify significant differences between sizes in different areas. The species has been distributed throughout the profile. The zones 1 and 2 were grouped as upper range, characterized by bare rock. Zone 3 was classed as band 4 as barnacles and range guild (*Brachidontes exustus*). Zone 5, which begins in the subtidal zone, was characterized by the presence of macroalgae, barnacles and few *B. exustus*. 606 individuals were recorded in the field and subsampled 228, and Zone 3 (162) and Zone 4 (308) had a greater number of individuals. Individuals Zone 1 showed larger size (average 4.74 ± 0.77 mm) with significant differences. There was no significant difference in size between individuals Zones 2-5. The linear relationship between the height and width of the shells was positive (r = 0.97).

SIMPOSIO GASTERÓPODOS TERRESTRES Y DE AGUA DULCE/SYSTEMATICS AND TAXONOMY OF FRESHWATER AND TERRESTRIAL GASTROPODS-PONENCIA/ORAL PRESENTATION

A MORPHOLOGICAL COMPARISON OF *HOLOSPIRA MONCLOVANA* AND *HOLOSPIRA PICTA* (GASTROPODA: UROCOPTIDAE) FROM COAHUILA, MEXICO USING X-RAY COMPUTED TOMOGRAPHY

Ned E. Strenth [1], Rigel K. Rilling [1] and Alfonso Correa-Sandoval [2]

Angelo State University[1], San Angelo, Texas and Instituto Technológica de Ciudad Victoria[2], Tamaulipas, Mexico; ned.strenth@angelo.edu; rigel.rilling@angelo.edu; agutierr@uat.edu.mx

Analyses of similarities (ANOSIM) were conducted on morphological measurements derived from X-ray CT scans of two species of holospirids which were described from near Monclova in Coahuila, México by Paul Bartsch in 1925.

These included the type and paratypic series of both Holospira *monclovana* (N=25) and *Holospira picta* (N=25) as well as a series of specimens assigned to *H. picta* (USNM 361966: N=24) from south of Monclova. X-ray CT scanning allows for a non-invasive re-examination of the internal shell morphology that was not available at the time of the original descriptions in 1926. Images of external and internal morphology of specimens were measured using the program ImageJ. An ANOSIM conducted using the program R compared specimens of all three populations and revealed that dissimilarities between groups were greater than dissimilarities within groups ($R=0.3977$, $p<0.001$).

Pairwise post-hoc ANOSIM tests revealed that dissimilarities between groups were greater than within groups for each pair of populations; thus *H. monclovana* is distinct from both *H. picta* ($R=0.612$, $p<0.001$) and USNM 361966 ($R=0.466$, $p<0.001$), and *H. picta* and USNM 361966 are themselves distinct ($R=0.098$, $p<0.006$).

Bartsch's 1926 assignment of *Holospira monclovana* to the subgenus *Holospira* was found to be supported, while Thompson's 2011 designation of the Mexican "*Eudistemma*" as a synonym for *Holospira s.s* was not. Both *Holospira picta* and USNM 361966 were found to belong to the subgenus *Bostrichocentrum*. The results of this analysis does not justify elevating USNM 361966 to its own species, but does support its elevation to at least a subspecies of *H. picta*.

INVASORES/INVASIVE-PONENCIA/ORAL PRESENTATION

MARINE INVASIVE MOLLUSKS IN COLOMBIA: AN OVERVIEW

Nancy Suarez Mozo and Adriana Gracia C.
Coastal and Marine Research Institute – INVEMAR, Calle 25 #2 - 55, Playa Salguero - Santa Marta, Colombia. nancy-yolimar@hotmail.com, adriana.gracia@invemar.org.co

Invasive species are considered the second cause for biodiversity loss worldwide, which makes them a determinant factor that pushes countries to generate research over the threatened native fauna and the affection it creates over the ecosystems. In Colombia, governmental institutions have been in charge of performing research related to invasive mollusks, such as INVEMAR, Humboldt, CIOH and some universities, furthermore international entities like Globallast have done efforts to spread information related to invasive and introduced species via ballast water. Nevertheless, it is necessary to unify efforts that generate more significant research. Currently in Colombia there are four species of invasive mollusks registered, proceeding from a variety of ecosystems and marine coastal habitats; *Corbicula fluminea*, *Perna perna, Perna viridis* and *Electroma* sp. For these species exists the basic information about their location and propagation strategies that involve waterways, aquiculture and international marine transportation (ballast water and biofouling). In contrast to these, the characterization of the species found in ballast water started only since 2002 in the harbor with of Cartagena de Indias; in 2010 in this harbor a very detailed research was done regarding mollusks associated to different types of substrate available there and its relation to marine traffic. Since 2007 the research and effort on the characterization of the mayor harbors in the Caribbean coast of Colombia has expanded. For the next years it is estimated that, with the increasing on size of the vessels, there will be an expansion of the harbors, which implies an increase in volume of ballast water and a bigger risk regarding introduce species. Under this context it is expected for priorities to be established, in order to prevent and control these threat, because in other countries the impacts caused by invasive mollusks has affected aspects like the economical, ecological and public health.

INVASORES/INVASIVE-CARTEL/ORAL PRESENTATIONS

MOLLUSCS GUIDE FROM THE CARTAGENA BAY, COLOMBIAN CARIBBEAN: UPDATE OF INVENTORIES AND DISTRIBUTION IN HIGH MARINE TRAFFIC AREAS

Nancy Suarez Mozo [1] and Mary Cañón Paez [2]
[1] Coastal and Marine Research Institute - INVEMAR, Calle 25 # 2 - 55, Playa Salguero - Santa Marta, Colombia; nancy-yolimar@hotmail.com
[2] General Maritime Direction - DIMAR, Carrera 54 # 26 - 50 Of. 102 CAN, Bogotá, D.C., Colombia; marlucpez@gmail.com

Since 2007 Colombia has been considered as the lead country for the south-east Pacific basin within the project association GloBallast, international compromise in which the General Maritime Direction - DIMAR was designated as the national focal point. One of the commitments under the guidelines of the project is focused on the creation of a port base line and the environmental monitoring of the affected areas by port activity. This is the reason why data gathering took place in Cartagena´s Bay, located in the Caribbean of Colombia, in 2010. As a result of the research, a guide was created in order to give the biologist in the field and the general public information regarding port terminals, identification and characterization of the mollusks found in Cartagena´s Bay. The results also showed that the molluscs are

distributed in areas near by the harbors, a situation that is a potential threat for other coastal areas in the world, since every time ballast water is taken and dumped without following the guidelines of the International Maritime Organization (IMO), these species could be transferred. The guide includes a total of 13 families, 18 genera and 23 species, in which the presence of *Perna viridis* is highlighted and considered as an invasive species for the country. The species where found in hard artificial (buoy, pier pile) and natural (mangrove roots) surfaces. The research constitutes an update of the species found in Cartagena´s Bay, and a tool helpful for the development of field research in marine bio-invasion

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-PONENCIA/ORAL PRESENTATION

FRESHWATER GASTROPODS AS A TOOL FOR ECOTOXICOLOGY ASSESSMENTS

Lenita de Freitas Tallarico [1,2]

[1]Department of Structural and Functional Biology, Institute of Biology, Charles Darwin St, State University of Campinas, 13083-863, Campinas, SP, Brazil

[2]Parasitology Laboratory, Butantan Institute, Vital Brazil Avenue, 1500, 05503-900, São Paulo, SP, Brazil; letallarico@gmail.com

Despite the fact that mollusks are the second largest group in the Kingdom Animalia, they have not been considered in environmental risk assessment so far, mainly due to the lack of standardized protocols. In this sense, gastropods, the most abundant mollusks and with great importance in food webs, widely distributed in the aquatic environment, have been employed in water and sediment quality assessments due the positive response of sensitivity to chemical compounds, as pollution indicators by different substances classes, for example, metals, pesticides, endocrine disruptors. Acute and chronic toxicity tests have been mostly used in ecotoxicological protocols to evaluate the potential effects of environmental contaminants to natural populations. However, with the need to assess the potential sublethal hazards to ecosystems of pollutants at low concentrations, environmental monitoring programs have encouraged the analysis of effects on gametes, fertilization, reproduction and embryo-larval development. Furthermore, among the myriad of chemicals reaching the environment, some compounds classes can directly affect the reproductive potential through the induction of mutations in germ cells and several effects on reproduction are still unknown. In this work will be discussed some studies and standardization assays with the freshwater snails, especially with the *Biomphalaria* genus, as chronic and acute assays, dominant lethal test, comet assay, embryo-larval development tests and perspectives in use of the freshwater snails as a good tool for laboratory and monitoring environmental studies, as well as contextualize the prospects for use of the gastropods in the monitoring of limnic environments in Latin America.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION

PHYLOGENY OF THE SUPERFAMILY TELLINOIDEA (MOLLUSCA: BIVALVIA) BASED ON SPERM MORPHOLOGY AND MOLECULAR DATA

Lenita de Freitas Tallarico [1], Gisele Orlandi Introíni [1], Flávio Dias Passos [2], Fabrizio Marcondes Machado [3], Luciana Bolsoni Lourenço [1] and Shirlei Maria Recco-Pimentel [1]

[1]Departamento de Biologia Estrutural e Funcional, Instituto de Biologia, Universidade Estadual de Campinas, São Paulo, Brazil; letallarico@gmail.com, giseleorlandi@gmail.com, shirlei@unicamp.br

[2]Departamento de Biologia Animal, Instituto de Biologia, Universidade Estadual de Campinas, São Paulo, Brazil; flaviodp@unicamp.br
[3] Programas de Pós-Graduação em Ecologia e Biologia Animal, Instituto de Biologia Universidade Estadual de Campinas, São Paulo, Brazil; fabriziomarcondes@yahoo.com.br

Constructions of phylogenetic relationships for the superfamily Tellinoidea using molecular and/or conchological tools correspond to controversial issues and a unanimous agreement has not been reached yet. However, the sperm ultrastructure characters commonly provide valuable taxonomic features for systematic reviews and phylogenetic analyses of Bivalvia. Aiming to evaluate the relationships of Tellinoidea lineages, sequences of mitochondrial/nuclear genes and sperm morphology have been investigated in specimens of Donacidae, Psammobiidae, Semelidae, Solecutidae and Tellinidae. Cardiidae was chosen as outgroup. Families were collected from São Sebastião and Ilhabela counties, on the north coast of São Paulo State (southeast Brazil). Fragments of mitochondrial (a ~ 480 bp of 16S rRNA) and nuclear ribosomal genes (a ~1.3 bp of 28S rRNA) have been sequenced. Phylogenetic inferences were made by using the maximum parsimony analysis. Preliminarily, results on sperm morphology suggest proximity between *Tellina*, *Strigilla* and *Sanguinolaria* genera. The spermatozoan ultrastructure of species of Tellinoidea indicates that there are two clearly and well defined patterns of sperm morphologies among Tellinidae species. Tellininae and Psammobiidae produce *modified* spermatozoa whereas Donacidae, Macominae and Semelidae produce *primitive* spermatozoa. The helical nuclei, overlapped in its base by mitochondria, could be a synapomorphy of all examined genera belonging to the subfamily Tellininae, but interestingly also occurs in at least two Psammobiidae (*S. sanguinolenta* and *Nuttalia japonica*). This similarity could correspond to phylogenetic proximity between Psammobiidae and Tellininae species or represent an adaptive convergence. Inferences based on the analysis of combined data (sperm ultrastructure and molecular) suggest that Donacidae is basal to Semelidae and Tellinidae. Semelidae, Psammobiidae and Tellinidae families seem to be paraphyletic groups. Facing this scenario, a revision of Tellinoidea and a re-evaluation of its constituent taxa appear to be necessary. Financial Support: PNPD/CAPES 1106/2010 and FAPESP 2010/15486-8

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-CARTEL/POSTER

GASTERÓPODOS ASOCIADOS AL ARRECIFE TUXPAN, VERACRUZ: RESULTADOS PRELIMINARES, INDAGANDO SOBRE PERTURVACIÓN EN CORAL

Pamela Tapia-Díaz [1], Adriana Gaytán-Caballero [2] y Margarita Hermoso [3]
[1]Facultad de Ciencias, UNAM; pame1915@ciencias.unam.mx
[2]Posgrado de Ciencias del Mar y Limnología, UNAM; adriana.gaytan@gmail.com
[3]Instituto de Ciencias del Mar y Limnología, UNAM; margaritahermoso@hotmail.com

Los moluscos Gasterópodos (Mollusca: Gasterópoda) son los representantes con mayor riqueza del phyllum Mollusca incluyendo cerca de 130,000 especies actuales. México ha registrado un total de 3,127 especies marinas: 1,712 para el Pacífico y 1,415 para el Golfo de México y Caribe, lo cual representa cerca del 2.7% de especies registradas a nivel mundial. La diversidad del grupo puede jugar un papel relevante en ecosistemas de deterioro ambiental, reconociendo el recambio entre especies. Este trabajo presenta los resultados preliminares que permitirán reconocer el posible recambio de la comunidad de gasterópodos en dos sitios del Sistema Arrecifal Veracuzano. El sector este del arrecife Tuxpan, funge como representante de un sitio con deterioro ambiental y caracterizado por el hábitat de fragmentos de coral (Acroporidae, con algunos ejemplares vivos) y manchones de alga calcárea (Halimedaceae). Los

registros bibliográficos del arrecife de Isla Lobos reconocerán a la comunidad de gasterópodos en un sitio con un nivel de conservación mayor y por lo tanto con un menor grado de deterioro. Se propone que la comparación en composición de las especies en el arrecife de Tuxpan y las pertenecientes a Isla Lobos nos dará un indicador del grado de perturbación presente. Siendo pocos los trabajos que involucran este tipo de análisis se espera encontrar posibles especies bioindicadoras que en un futuro sean consideradas para estudios ambientales.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

GENE FLOW AND DISPERSAL PATTERNS IN A MARINE SNAIL THAT EXHIBTS VARIATION IN DEVELOPMENTAL MODE

Paula Teichholtz
University of Michigan Museum of Zoology, 1109 Geddes Ave, Ann Arbor, Michigan 48109, USA; pteich@umich.edu

Developmental mode has important consequences for dispersal, speciation rates, and rates of molecular evolution of marine invertebrates. While most species exhibit one developmental mode, some species display intraspecific variation in characteristics such as hatching time, and duration of larval planktonic period, resulting in differences in dispersal potential between populations. This uneven dispersal can significantly impact population structure and may result in reproductive isolation of populations with limited dispersal, possibly leading to speciation. Here I investigated a putative case of variable developmental mode in the marine Pyramidellid snail *Boonea impress*a, which has been reported as exhibiting planktotrophy, lecithotrophy, and intracapsular metamorphosis in different areas of its range. To determine whether this variation was due to cryptic speciation, I utilized population genetic and molecular phylogenetic approaches based on analyses of mitochondrial COI sequences to assess genetic diversity, population structure, and gene flow in *B. impressa* along the Gulf of Mexico and Atlantic coast of North America. I discovered closely related haplotypes populations displaying different developmental modes and no reciprocal monophyly based on location or developmental mode. This suggests that all North American *B. impressa* sampled thus far are members of the same species and that differences in developmental mode are not due to cryptic speciation.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-CARTEL/POSTER

CONCHEROS ARQUEOLÓGICOS Y GEODIVERSIDAD: UNA ESTRATEGIA PARA LA CONSERVACIÓN DEL PATRIMONIO CULTURAL DE BAJA CALIFORNIA.

Miguel Agustín Téllez Duarte and Ivonne Aidé Posada Ayala
Facultad de Ciencias Marinas, Universidad Autónoma de Baja California, Km. 103 Carretera Tijuana-Ensenada, C.P. 22860, Ensenada, B.C., México; mtellez@uabc.edu.mx; ivonnehaide@gmail.com

Los campamentos conchero son el rasgo más distintivo de la arqueología del Estado de Baja California, y en general de toda la península. Estos depósitos formados por la acumulación de conchas de moluscos están ampliamente distribuidos en la zona costera tanto del Pacífico como del Golfo de California, y en menor número hacia tierras interiores. Su localización ha contribuido a un notable deterioro por el impacto tanto humano como natural, de tal forma que muchos de ellos se han perdido ante la presión de desarrollo costero, junto con la valiosa información ecológica, ambiental y cultural que puede derivar de su estudio formal, como se ha mostrado en estudios recientes, mayormente de salvamento. El

concepto de Geodiversidad incluye todos los rasgos geológicos del paisaje, que a su vez determinan la distribución de la biodiversidad y la actividad humana, y por tanto conlleva una apreciación y valoración holística tanto del patrimonio natural como cultural. Así, este concepto constituye una estrategia que puede ser integrada a los planes de manejo de la zona costera para el aprovechamiento y conservación del patrimonio arqueológico, y muy particularmente de los concheros, ya que estos al carecer de la monumentalidad de los sitios arqueológicos típicos de Mesoamérica han sido prácticamente ignorados. En este trabajo se presenta una propuesta de como la protección del patrimonio cultural costero, principalmente los concheros, puede lograrse al considerarlos como parte integral del paisaje a través del análisis de la Geodiversidad, y como esta debe implementarse como un instrumento de gestión del Patrimonio natural y cultural.

ARCHAEOLOGICAL SHELL INDIAN MIDDENS AND GEODIVERSITY: AN STRATEGY FOR THE BAJA CALIFORNIA CULTURAL HERITAGE CONSERVATION

Shell indian middens are the most important archaeological feature in the State of Baja California, and the whole península. These deposits formed by the accumulation of molluscan shells are widely distributed in the coastal zone of the Pacific and Gulf of California, and are less abundant inland. Its location has contributed to a remarkable deterioration by both, the human and natural impact, so many of them have been lost under the coastal development pressure, along with the valuable environmental, ecological and cultural information that can be derived from his formal study, as shown in recent studies, mostly from salvage. The concept of geodiversity includes all the geological the landscape features, which in turn determines the distribution of biodiversity and human activity, and therefore brings an holistic appreciation and appraisal of both natural and cultural heritage. Thus, this concept is a key strategy that can be integrated to the management plans for the coastal zone for the use and conservation of the archaeological heritage, especially shell indian middens, which given the lack of monumentality, typical of the archaeological sites of Mesoamerica, have been virtually ignored. This paper presents a proposal for the protection of the coastal heritage, mainly shell indian middens, which can be done by considering them as an integral part of the landscape throughout the geodiversity analysis, and how this it must be implemented as a tool for the the natural and cultural heritage management.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

EFECTO DE DIETAS ARTIFICIALES DIRIGIDAS AL ACONDICIONAMIENTO Y DESEMPEÑO REPRODUCTIVO DEL PULPO ROJO *OCTOPUS MAYA*.

J. Tercero-Iglesias [1], C. Rosas [2], Gaspar Poot [1], Estephanie Bernal [1], Claudia Caamal [2], Maite Mascaró [2], Elsa Noreña [3], Pedro Gallardo [2]

[1]Campus de Ciencias Biológicas y Agropecuarias de la Universidad Autónoma de Yucatán, Mérida, Yucatán, México; jtercero10@hotmail.com; gaspar.poot@uady.mx

[2]Unidad Multidisciplinaria de Docencia e Investigación, Facultad de Ciencias, Universidad Nacional Autónoma de México (UNAM) Sisal, Yucatán, México; crv@ciencias.unam.mx; safan7@hotmail.com; cpcm@ciencias.unam.mx; mmm@ciencias.unam.mx; ppge@ciencias.unam.mx

[3]Unidad de Química - Sisal. Facultad de Química, Universidad Nacional Autónoma de México (UNAM) Sisal, Yucatán, México; enorena@unam.mx

En los cefalópodos, la condición nutricional de las hembras es un factor importante para la producción y sobrevivencia de las crías. En este estudio se evaluaron los efectos del uso de dietas artificiales en el desempeño reproductivo del pulpo *Octopus maya,* a través de la calidad de su progenie (huevos y crías)

en condiciones de cautiverio. Para ello 3 dietas artificiales en forma de pastas semihúmedas con diferentes fuentes lipídicas fueron evaluadas: pasta jaiba: calamar (JC), pasta JC con adición de ojos y cerebros de pescado mero (*Epinephelus morio*) (JCP) y pasta JC con adición de PUFAS de un producto comercial SELCO (JCS) y comparadas con pulpos alimentados con jaiba fresca *Callinectes sapidus* (tratamiento control). En cada tratamiento, se utilizó un total de 10 hembras distribuidas al azar, colocadas en tanques independientes con agua de mar en recirculación y mantenidas a 24 ºC. Las dietas fueron evaluadas a través del número de racimos, numero de huevos y resistencia al ayuno de las crías producidas en cada tratamiento. Así también, el perfil de ácidos grasos de la progenie fue evaluado (huevos y crías). El mayor número de racimos se encontró en las hembras alimentadas con Jaiba y un menor número de racimos las alimentadas con la dieta JCP. En cuanto al número de huevos por racimos fue mayor para las hembras sometidas con la dieta control. El mayor peso de las crías recién eclosionadas se obtuvo en la dieta Control. El mayor porcentaje de sobrevivencia se obtuvo para la dieta JCS (97%) seguido por la dieta JCP (86%). Los ácidos grasos ARA y EPA se encontraron en concentraciones similares en el vitelo y crías recién eclosionadas de los cuatros tratamiento; sin embargo, el DHA fue mayor para la dieta JC y JCS en el vitelo y crías.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

IDENTIFICACIÓN DEL MATERIAL DE CONCHA DE SITIOS ARQUEOLÓGICOS DEL ESTADO DE QUERÉTARO

Nadja Edith Tlalolini Hernández [a], Ana Fabiola Guzmán [b] y María Teresa Olivera Carrasco [c]
Laboratorio de Arqueozoología "M. en C: Ticul Álvarez Solórzano", Subdirección de Laboratorios y Apoyo Académico, INAH; [a]kerochan_@msn.com; [b]ana_guzman@inah.gob.mx;
[c]materesaolivera@yahoo.com.mx

Los trabajos arqueozoológicos realizados en la Sierra Gorda de Querétaro son escasos y se ha dado más atención a los restos de vertebrados. Este trabajo se enfoca en el análisis de los moluscos recuperados en varios sitios (Ranas, Toluquilla, Camargo, La Paleta y Los Planes), con ocupación humana entre los años 400 al 1300 d.C. La identificación taxonómica se realizó con base en la morfología macroscópica y microscópica, verificándola por comparación con ejemplares de la Colección de Referencia del Laboratorio de Arqueozoología "M. en C. Ticul Álvarez Solórzano" y bibliografía especializada. Se analizaron 416 piezas en total, 415 de moluscos de las que 2% pertenece a la clase Gastropoda de los géneros *Oliva* (1 especie), *Polinices* (2) y *Turbo* (1); 90.5% corresponde a la clase Bivalvia con los géneros *Chama* (2 especies), *Spondylus* (3), *Glycymeris* (1), *Pinctada* (1), *Crassostrea* (2) y *Cyrtonaias* (1); y 7.5%, a piezas no identificadas; una pieza más pertenece a un pez (*Diodon* sp). Con excepción del género *Cyrtonaias*, de ambiente dulceacuícola, el resto de los moluscos se distribuyen en el Atlántico o el Pacífico. La mayor parte del material presenta alteraciones, principalmente causadas por el intemperismo (rotas, desgastadas, sin color); en un pequeño porcentaje se observan modificaciones culturales. Todos estos moluscos han sido registrados en varios sitios arqueológicos como elementos de ornato, utensilios o restos alimenticios, de donde se infiere que la adquisición y uso de estos moluscos fue una actividad común entre los pueblos prehispánicos.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-CARTEL/POSTER

RESTOS DE CONCHA DE LA ZONA ARQUEOLÓGICA EL LAGARTERO, CHIAPAS

Nadja Edith Tlalolini Hernández [a], Ana Fabiola Guzmán [b] y María Teresa Olivera Carrasco [c]
Laboratorio de Arqueozoología "M. en C: Ticul Álvarez Solórzano", Subdirección de Laboratorios y Apoyo Académico, INAH; [a]kerochan_@msn.com; [b]ana_guzman@inah.gob.mx; [c]materesaolivera@yahoo.com.mx

El sitio Lagartero está asentado en varias islas de la cuenca superior del río Grijalva, en el estado de Chiapas. Llegó a ser un importante centro cívico, religioso y cultural del área maya, especialmente del Clásico Temprano hasta el Postclásico Tardío (300 a 1400 d.C.).Durante la excavación de la Pirámide 2 de El Lagartero, se recuperaron trece restos de moluscos, la mayoría de ellos objetos altamente modificados por el hombre prehispánico, por lo que su identificación taxonómica se hizo integrando el análisis de la morfología macroscópica tradicional con el de la estructura microscópica; las observaciones obtenidas del material arqueológico fueron contrastadas con ejemplares de la Colección de Referencia del Laboratorio de Arqueozoología "M. en C. Ticul Álvarez Solórzano" y bibliografía especializada. De las trece piezas, seis corresponden a cuatro especies de bivalvos marinos (*Pinctada mazatlanica*, *Nodipecten subnodosus*, *Chama coralloides* y *Spondylus crassisquama*), seis son de dos especies de gasterópodos marinos (*Triplofusus giganteus* y *Semicassis granulatum*).y un resto es de tegogolo, gasterópodo dulceacuícola (*Pomacea flagellata*). Una parte de las especies marinas se distribuyen en la costa atlántica y otra parte en la costa pacífica, por lo que son recursos importados al sitio. El tegogolo se distribuye en México en las corrientes y cuerpos de agua dulce de la vertiente atlántica, por lo que es un recurso local. El procesamiento para obtener los objetos incluyó corte, desgaste y en la mayoría de los casos perforación del material, probablemente para obtener y ser utilizadas como aplicaciones o cuentas, dejando pocos elementos sin modificar para su identificación. La mayoría de las especies identificadas se conocen en contextos arqueológicos de otros sitios de México y en particular del área maya en donde también tuvieron uso ornamental, lo que refleja la continuidad en la tradición utilitaria de los moluscos.

GENERAL-CARTEL/POSTER

MOLLUSKS OF THE STATUES OF THE UNDERWATER MUSEUM OF ART "MUSA", (CANCÚN, QUINTANA ROO), PRELIMINARY RESULTS.

Arturo Toledano Granados [1], Vivianne Solís-Weiss [1], Dulce Alcaraz Espinosa [1], Paulo Guzmán Boizo [1] and Jaime González Cano [2]
[1]Lab. de Ecología y Biodiversidad de Invertebrados Marinos, Unidad Academica de Sistemas Arrecifales, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México. Apdo. Postal 1152, Cancún, Quintana Roo, México, 77500; solisw@cmarl.unam.mx; biopcdna@gmail.com; biodnapc@gmail.com
[2]Parque Marino Nacional, costa occidental de Isla Mujeres, Punta Cancún y Punta Nizuc, Quintana Roo. Cancún/CONANP/SEMARNAT, México; jagoz06@gmail.com

The malacological fauna which colonizes the statues of the Underwater Museum of Art (MUSA for its initials in spanish) sampled from February to august 2013 is presented here. The samples were taken with SCUBA diving, scrapping an area of 22x22cm covered with vegetation and sponges for each sample. Following separation from the substrate with a 0.5mm sieve, the mollusks were fixed and then preserved

in alcohol at 70%. The dominant algae used by this fauna as substrate are *Dictyota bartayresii, Lobophora variegata* and *Padina santaecrucis*.

In all, 71 samples collected in the seven months were analyzed and 73 species found. The Gasteropods dominate, followed by the Polyplacophora and finally the Bivalves. A total of 976 organisms were identified from which 909 are Gasteropods, represented by 23 families, 33 Genera and 44 species. From the 24 specimens of Polyplacophora collected, Chiton sp. 2? was the dominant with 22 organisms. Finally, 24 Bivalves (8 Families, 8 genera and 9 species) were recognized. *Cerithium litteratum* (Gasteropoda) was by far the dominant species, with 537 organisms (55.76% of the total) and was present in practically all the samples. It was followed by *Tricolia thalassicola* with 92 specimens (9.55%) and *Amphithalamus raulí* with 87 (9.03%). Together they represent 74.34% of all collected mollusks. From the 24 bivalves, *Ostrea equestris* with 5 organisms was the most abundant, followed by *Pinctada radiata* and *Lima lima* with three each. The highest mollusk density was obtained during the summer, when the vegetation reaches its peak.

Besides the quantitative samples mentioned above and studied accordingly, we have observed, photographed and sampled a few large mollusks scattered in the study area but that cannot be captured by the sampling method used here. Those are: *Fasciolaria tulipa, Cypraea* sp., *Pinna carnea* and even cephalopods.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION

ECOLOGÍA, SALUD Y BIOTECNOLOGÍA

NEW BIOTECHNOLOGICAL PRODUCTS FROM *PHYLLOCAULIS BORACEIENSIS* TO CONTROL OF MICROBIAL INFECTIONS

Ana Rita de Toledo-Piza [1a], Renan Lima de Araújo1 [b], Pedro Ismael da Silva Jr [2c] and Ronaldo Zucatelli Mendonça [1d]

[1]Laboratory of Parasitology; [2]Special Laboratory of Applied Toxinology, Butantan Institute – Av. Vital Brazil, 1500 – São Paulo – SP; [a]artpiza@uol.com.br; [b]renanlda@gmail.com; [c]peisjr@gmail.com; [d]ronaldo.mendonca@butantan.gov.br

The mucus of *Phyllocaulis boraceiensis*, a Brazilian terrestrial slug, has being studied as a natural compound with several biological activities. Fungus and viruses are related to a range of infectious diseases in humans and animals. The aim of this study is identify active antiviral and antifungal compounds in the *P. boraceiensis* mucus. Mucus fractions were obtained submitting total sample to "2D Clean up Kit (GE healthcare)" and to a size exclusion chromatography (Sephadex 75 GE healthcare) - followed resulting in three pools of protein. 96-wheel plates were used to perform microbial growth inhibition tests. Mucus and its fractions were tested in *Candida albicans*, *C. parapsilosis*, *C. tropicalis*, influenza, measles, herpes and *rubella virus*. All experiments were performed in duplicates and controlled positive and negatively. *C. albicans* and *C. tropicalis* have shown a partial grown inhibition when was assayed with total mucus and with pool 3. *C. parapsilosis* have shown partial growth inhibition when assayed only with pool 3. Rates of inhibition were led to 4-fold reduction. The results showed that mucus led to a 256-fold reduction of measles virus and a reduction of 128-fold in influenza virus production. When the mucus was used in a picornavirus, the reduction observed in virus replication was of 2187-fold. Assays using RT-PCR to determine viral mRNA present in infected cells showed that purified antiviral substance was able to reduce at 10^3 times the replication of herpes and rubella virus. Antifungal activity is observed in total and fractioned samples of *P. boraceiensis* mucus. Data suggest the presence of a potent antiviral substance in mucus which affects the innate antiviral immune response.

Supported by: FAPESP – 2012/22555-1 and 2012/22906-9

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-PONENCIA/ORAL PRESENTATION

NEW RECORDS FOR GASTROPODA FOUND IN THE ROCKY INTERTIDAL ZONE OF THE MARINE REGION PRIORITY NO. 32, GUERRERO, MÉXICO

Carmina Torreblanca-Ramírez [1], Rafael Flores-Garza [2], Pedro Flores-Rodríguez [2], Sergio García-Ibáñez [2], Jesús E. Michel-Morfin [3] y José L. Rosas-Acevedo [1]

[1]Unidad de Ciencias de Desarrollo Regional, Universidad Autónoma de Guerrero, Calle Pino s/n Colonia El Roble, Acapulco, Guerrero. C.P. 39640 México; carminatorreblanca@yahoo.com.mx

[2]Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero, Av. Gran Vía Tropical No. 20, Fraccionamiento Las Playas Acapulco, Guerrero. C.P. 39390, México; rfloresgarza@yahoo.com

[3]Universidad de Guadalajara, Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Av. Gómez Farías No. 82, San Patricio-Melaque Jalisco, C.P. 48980, México; michel@costera.melaque.udg.mx

The Gastropoda class, one of the best known of the marine environment, is formed by a large number of species and the shape of their shell structure varies greatly. These mollusks are distributed from the intertidal zone to the abyssal zone, and there are also swimming and floating species. This research was conducted at seven sites, located in the Marina Priority Region 32 (MPR 32), located in the State of Guerrero, México. The aim of this report is to document the scope of the geographic distribution of the 36 species of Gastropoda class.11263 total specimens were analyzed. 108 species were identified, of which four species are new records for México, 17 for the Transitional Mexican Pacific, seven for the state of Guerrero and seven for the MPR 32. Here we report a significant number of new records of species of class Gastropoda found on the rocky intertidal zone of the MPR 32. The reporting of these new records, demonstrates the need to focus research efforts on the study of marine diversity, since knowledge in this respect is quite incomplete, especially regarding marine mollusks, a fact that has been reported by the National Commission for the Management and Use of Biodiversity.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

SPERMATOZOA MORPHOLOGY ON *BRACHIDONTES RODRIGUEZII* (D'ORBIGNY, 1846) (BIVALVIA) FROM SOUTH WESTERN ATLANTIC OCEAN.

Maria E. Torroglosa [1] and Juliana Giménez [1,2]

[1]Biodiversidad y Biología Experimental. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires

[2]CONICET

Brachidontes rodriguezii have a wide geographic distribution along the Argentinean coast from 36º 32´S to Patagonia 42º45´S. Is the most abundant species in the intertidal benthic community associated to rocky shores. In the last years after the growth of the city's along the coast and the introduction of hard substrates as docks, the sandy beaches became a new habitat for this species.

Ultrastructural of spermatozoa are a useful tool to know about bivalve phylogeny. We used transmission electron microscopy to study the structure of mature spermatozoa from *Brachidontes rodriguezii* and compared them with those of other bivalves, particularly other mytilids.

The spermatozoa of *B. rodriguezii* contained a spherical nucleus capped by a conical acrosome with an anterior extension. The nuclei contained randomly distributed. The chromatin was electron-dense, homogenous and compact. The mid-piece region consisted of 4-5 spherical mitochondria grouped in a

ring around a pair of short cylindrical centrioles. The flagellum exhibited the typical 9+2 microtubule structure (9 double outer tubules + 2 single central tubules). Transmission electronic microscope confirm that the spermatozoa of *B. rodriguezii* can be classified as "aquasperm" type. Comparison with another *Brachidonte*s were done.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-CARTEL/POSTER

USE OF THE FLUOROCHROME CALCEIN AS AN IN SITU GROWTH MARKER IN *BRACHIDONTES RODRIGUEZII* (D'ORBIGNY, 1846)

Maria E. Torroglosa [1], Mariel Ojeda [2], and Juliana Gimenez [1]
[1]Depto Biodiversidad y Biologia Experimental, FCEN, IBBEA, CONICET-UBA,
Ciudad Universitaria, Pab. II, 4to piso, Lab 19, C1428EHA, Capital Federal, Buenos Aires, Argentina;
metorroglosa@bg.fcen.uba.ar; jgimenez@bg.fcen.uba.ar
[2]Depto Biodiversidad y Biologia Experimental, FCEN, UBA. Ciudad Universitaria, Pab. II, 4to piso, Lab 19,
C1428EHA, Capital Federal, Buenos Aires, Argentina; mojeda@bg.uba.ar

A capture- mark and recapture study was done in order to evaluate size increment in the nature. *B. rodriguezii* inhabits the intertidal zone with differentiated exposition into the water. The flourochrome calcein was used in situ experiment. Field experiment was carried out in Villa Gesell (56° 53´W -37º 16´S) a sandy beach with artificial substrates (fishing dock) during summer. Specimens were collected by hand and calcein solution was applied by immersion during four hours. Then small cages with the marked mussels inside were attached again to the artificial substrate. After one month, cages were removed. For growth estimations, marked valves were sectioned sagitally, polish and observed through a fluorescence microscope at 450 to 490 nm. Growth rates estimations indicated a differential growth along the substrate, related with the water exposition. Mussels exposed to the water only in high tide showed a less increment in length than mussels exposed to the water during the low and high tide. Relationship between growth rates and shell length was best described by a logarithmic function.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

COMPOSICIÓN Y ESTRUCTURA DE LA COMUNIDAD DE MOLUSCOS DE FONDOS BLANDOS DE LA ISLA ESPÍRITU SANTO, GOLFO DE CALIFORNIA, MÉXICO.

Arturo Tripp-Quezada, Arturo Tripp-Valdez, Marcial Villalejo-Fuerte, Federico García Domínguez y Norbeto Capetillo Piñar
Instituto Politécnico Nacional unidad Centro Interdisciplinario de Ciencias Marinas, La Paz, Baja California Sur, México. A.P.592., C.P.2300; atripp@ipn.mx

Para conocer y caracterizar la estructura comunitaria de los moluscos de fondos blandos presentes en la zona infralitoral de la isla Espíritu Santo y describir características asociadas a su hábitat, en la primavera del 2013 se emplazaron en la zona infralitoral 32 estaciones de muestreo ubicadas en 8 transectos perpendiculares a la zona de costa a intervalos de 50 m entre una y otra, desde el nivel más bajo de mareas hasta una distancia de 200 m (de menor a mayor profundidad) de donde se obtuvieron mediante buceo 64 muestras; 32 pertenecientes a muestras biológicas y 32 a sedimento. Se identificaron 10409 moluscos, el grupo mejor representado fue el de los bivalvos con 50 especies, seguido por los gasterópodos con 47 especies y una especie de la clase scaphopoda. Los moluscos más abundantes

fueron el gasterópodo *Siphonaria maura* y los bivalvos *Lucina prolongata* y *Tellina ebúrnea*. Las especie constantes fueron *Diodora inaequalis, Chama sordida, linga undatoides y Tellina coani.* Los valores máximos de riqueza por estación fueron de 38 especies, de diversidad 3.8 bits/ind^{-1} y 0.8 de equidad; el tipo de sedimento es de arenas medias a gruesas con abundancia de restos de conchas, coral y algas calcáreas (rodolitos). De los moluscos de importancia económica reportada para esta isla, en nuestro estudio, solo se encontraron juveniles de la almeja chocolata *Megapitaría squalida.* La isla E. Santo forma parte del Parque Nacional de la zona marina del Archipiélago Espíritu Santo y de acuerdo a sus objetivos se puede utilizar como un sitio para la recuperación de bancos almejeros.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

SPATIAL DISTRIBUTION OF MOLLUSKS IN THE SAND BOTTOM OF ISLA DEL COCO, COSTA RICA

Jesús S. Troncoso [1] and Jeffrey A. Sibaja-Cordero [1,2]
[1]Marine Science Faculty, University of Vigo, Spain; troncoso@uvigo.es
[2]CIMAR, Universidad de Costa Rica 11501-2060 San José; jeffro@costarricense.cr

Isla del Coco (5°32'N-87°04'W), a National Park and Human Heritage Site, is a Pacific oceanic island of Costa Rica. The island lies more than 500 km from the mainland, and the Galapagos. The number of species of mollusks reported is 545, with 180 species inhabiting sand bottoms. In the present study this malacofauna was sampled with five van Veen Dredge in 27 stations (3 to 75m depth) in April, 2010. The marine sediments of the island have 1.37 to 3.31% of organic matter and 74±17% of carbonates. A total number of 40 species and 434 individuals (density of 51 ind./m2) were found. The bivalves were the first in abundance (with 348 individuals) followed by gastropods (79), solenogasters (3), polyplacophorans (2), and 2 scaphopods (2). The most important mollusks were *Gouldia californica* Dall, 1917 (33 ind./m2), with more individuals outside the bays of the island; *Olivella* (*Olivella*) *cocosensis* Olsson, 1956 (3 ind./m2), that occurs mainly in the exposed stations and outside of the bays; and *Pristiterebra glauca* (Hinds, 1843), that was presented near the shore and in the middle of the bays. The rest of species has few specimens, and were found in a random geographical pattern around the island, but explain by the depth gradient. In this way, the species showed a gradual change (88%) in their identity with the depth ($Z= -5.72$, $p <0.0001$), sharing few species between depth's ranges, and with only three of the 40 species distributed throughout depth gradient. Also, the number of species in waters with less that 10m depth was higher (≥10) than in “deeper waters," with less that six species. The mollusks showed a high density between 40 to 50 m ($\chi 2$, $p <0.001$), although a few number of species at this depth. Deep sampling can result in new records for the Pacific.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

THE BATTLE OF THE (IBERIAN) ATLANTIC: BOREAL VS SUB-TROPICAL INTERTIDAL GASTROPODS IN THE GLOBAL WARMING ARENA

Jesús S. Troncoso [1], Marcos Rubal [1,2,3], Puri Veiga [2,3], Juan Moreira [4] and Isabel Sousa-Pinto [2,3]
[1]Departamento de Ecoloxía e Bioloxía Animal, Universidade de Vigo, Campus de As Lagoas, 36310 Vigo, Spain; troncoso@uvigo.es; marcos.garcia@fc.up.pt
[2]CIIMAR/CIMAR, Centro Interdisciplinar de Investigação Marinha e Ambiental, Rua dos Bragas, 289, 4050-123, Porto, Portugal; puri.veiga@fc.up.pt; ispinto@ciimar.up.pt

[3]Department of Biology, Faculty of Sciences, University of Porto, Rua do Campo Alegre s/n 4150-181 Porto, Portugal.
[4]Departamento de Biología (Zoología), Universidad Autónoma de Madrid, Cantoblanco, E-28049 Madrid, Spain; juan.moreira@uam.es

The Atlantic coast of the Iberian Peninsula due to its particular oceanographic conditions is the north and south range boundary of many intertidal sub-tropical and boreal species, respectively. These boundaries are constantly changing to fit with the shifting climatic conditions. These range expansions or contractions of boreal and sub-tropical intertidal species were firstly recorded by Fischer-Piette in the 1940s and 1950s along the north coast of the Iberian Peninsula. In the current global warming scenario many studies found similar range shifts of intertidal organisms (mainly macroalgae) in the Iberian Peninsula. In this study we explored changes on the distribution range of boreal and sub-tropical species of intertidal gastropods. Intertidal gastropods play a key role in shaping the structure of rocky intertidal assemblages and thus, changes in their diversity or abundance can have dramatic effects in rocky shore assemblages. Our results showed a significant range expansion of sub-tropical species (i.e. *Siphonaria pectinata*, *Phorcus sauciatus* and *Stramonita haemostoma*) while boreal species showed a range contraction (e.g. *Littorina saxatilis* and *Nucella lapillus*) and in some cases their presence was limited to some environments which seem to serve as refuge (e.g. *Littorina littorea*). Future research will explore the role of biotic and abiotic factors in these range shifts, ecological consequences in the rocky shore assemblages and changes in intra-specific diversity of boreal and sub-tropical gastropod species related to range shifts.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
TAXONOMÍA, SISTEMÁTICA Y BIOGEOGRAFÍA

DEEP-WATER CEPHALOPODS COLLECTED DURING THE TALUD EXPEDITIONS, PACIFIC MEXICO

Brian Urbano [1] and Michel Hendrickx [2]
[1]Facultad de Ciencias, Universidad Nacional Autónoma de México. Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F., Mexico; maclen55@yahoo.com; maclen55@yahoo.com
[2]Unidad Académica Mazatlán, ICMyL, UNAM, PO Box 811, Mazatlán, Sinaloa, 82000, Mexico; michel@ola.icmyl.unam.mx

The knowledge of a specific cephalopod fauna is a complicate issue. Populations of these organisms have a strong spatio-temporal fluctuation and they are very elusive. The TALUD project is an extensive and intensive sampling program aimed at increasing our knowledge on deep-water (>200 m) invertebrate fauna of the Mexican Pacific. As a part of this study, data related to the capture of cephalopods during the TALUD cruisers are analyzed.
Samples corresponding to eleven cruises from 1989 to 2012 were examined. A total of 128 stations were sampled with gears operating between 122 and 2,340 m depth. All the specimens were identified to the lowest taxonomic level. We found 27 species (98 individuals) with *Japetela heati* the most common member of the octopodiformes and *Abraliopsis affinis* the most common of the decapodiformes. Most of the material collected during this survey is deposited in the Regional Collection of Marine Invertebrates (EMU), ICMyL, UNAM, in Mazatlán, Mexico.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
ACUICULTURA

AVANCES EN EL CULTIVO CONTROLADO DEL PULPO ROJO PATAGÓNICO *ENTEROCTOPUS MEGALOCYATHUS*: OBTENCION DE EJEMPLARES ADULTOS A PARTIR DE JUVENILES PRODUCIDOS EN CRIADERO

Iker Uriarte [1], Viviana Espinoza [1], Jorge Hernández [1], C. Rosas [2] y Ana Farías [1]
[1]Hatchery de Invertebrados Marinos, Instituto de Acuicultura, Universidad Austral de Chile, P.O.Box 1327, Puerto Montt, Chile; iuriarte@uach.cl; afarias@uach.cl
[2]Unidad Multidisciplinaria de Docencia e Investigación de Sisal, Facultad de Ciencias, Universidad Nacional Autónoma de México; Mérida, México; crv@unam.mx

El pulpo rojo patagónico, *Enteroctopus megalocyathus* (Gould 1852), es una especie nativa de las costas de Chile y Argentina, y representa el 12,3 % del total de la pesquería de pulpo en Chile. Esta especie ha estado en veda entre los años 2008 y 2011 y actualmente se puede extraer en áreas de manejo autorizadas. Los estudios realizados en el laboratorio para lograr la reproducción y producción de juveniles bajo condiciones controladas han demostrado que tiene conductas reproductivas diferentes a la de especies bentónicas similares como *Octopus vulgaris* y *O.mimus*, y estrategias de vida diferentes durante el desarrollo embrionario y paralarvario, siendo más bien similar a *Enteroctopus doffleini*.
Hasta ahora los avances en el cultivo del pulpo rojo patagónico habían demostrado que los reproductores se pueden acondicionar entre 3 a 4 meses con manejo de la temperatura y la alimentación, obteniéndose una fecundidad absoluta de las hembras que puede variar desde 500 hasta 2500 huevos/kg, una incubación exitosa de los huevos fecundados en que el desarrollo embrionario es de 5 meses, seguido de un periodo de cultivo paralarvario de 4 meses hasta asentamiento, cuando pueden ser llamados juveniles con conducta bentónica. En este trabajo, se muestran los efectos del manejo de la temperatura de la incubación de huevos para acortar el periodo del desarrollo embrionario y el cultivo paralarvario, así como los primeros resultados en el cultivo de engorda desde juveniles producidos en criadero hasta alcanzar la talla de adulto. Se propone la estrategia de cultivo para esta especie de manera de lograr la sustentabilidad en un futuro de mediano plazo.
Agradecimientos: FONDECYT 1131094

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA /ORAL PRESENTATION

DARK SLUGS WITH DARK SECRETS: CRYPTIC INVASION(S) OF *MELANOCHLAMYS* (CEPHALASPIDEA: AGLAJIDAE) IN THE NORTH PACIFIC

Ángel Valdés [1], Samantha Cooke [1], Dieta Hanson [1,2], Elysse Ornelas-Gatdula [1], Yayoi Hirano [3], Terrence M. Gosliner [4] and Alexey V. Chernyshev [5]
[1]Department of Biological Sciences Department, California State Polytechnic University, 3801 West Temple Avenue, Pomona, California, USA; aavaldes@csupomona.edu; sacooke@csupomona.edu
[2]Redpath Museum and Department of Biology, McGill University, 859 Sherbrooke St. West. Montreal, QC, H3A 0C4, Canada
[3]Coastal Branch of Natural History Museum and Institute, Chiba, Yoshio, Katsuura, 299-5242, Japan
[4]Department of Invertebrate Zoology and Geology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, California 94118, USA
[5]A. V. Zhirmunsky Institute of Marine Biology, Palchevskogo St. 17, Vladivostok 690041, Far Eastern Federal University, Vladivostok 690600, Russia

Molecular and morphological data obtained from specimens of *Melanochlamys diomedea* collected across the North Pacific revealed an unexpected level of cryptic diversity. Instead of a single transpacific species, the data obtained revealed the existence of at least four distinct species. More importantly, new information suggests one, possibly two, cryptic invasion events in San Francisco and Tokyo Bay. Finally, we speculate that the different levels of species diversity in the eastern and western Pacific reflect different glacial and postglacial effects influencing the benthic biotas in the two regions.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
ECOLOGÍA, SALUD Y BIOTECNOLOGÍA

SNAILS AND ROTIFERS. AN ECOLOGICAL APPROACH TO SCHISTOSOMIASIS

José Manuel Valdez Caro
Facultad de Ciencias, UNAM, Av. Universidad 3000, Circuito Exterior S/N, Delegación Coyoacán, C.P. 04510, Ciudad Universitaria, D.F. México; rayo_de_luna@ciencias.unam.mx

Schistosoma mansoni is a well-known trematode parasite that uses *Biomphalaria* genus snails as intermediate hosts. In an ecological context, these snails share habitat with many other metazoa. Interactions between *Biomphalaria* and other invertebrates have been reported, among them rotifers and even copepods. The invasion of the rotifer *Philodina* into *B. alexandrina* has been proved to be detrimental to the development of *S. mansoni* cercariae. On the other hand, a study has found positive chemotaxis to freeze-killed females in rotifers of the genus *Brachionus*. Therefore, it would be interesting to evaluate whether it's possible to attract a higher number of rotifers to the snails using these freeze-killed females. To gather information on the interactions of *Biomphalaria* with other invertebrates, and on rotifer's chemotaxis, a review were performed, with the purpose of evaluating if it's possible to increase the damage to *S. mansoni* cercariae by rotifers.

SISTEMÁTICA Y BIOGEOGRAFÍA/SYSTEMATICS AND BIOGEOGRAPHY-PONENCIA/ORAL PRESENTATION

ESTUDIO PRELIMINAR DE LOS MOLUSCOS PLANCTÓNICOS DE ACAPULCO, GUERRERO, MÉXICO

F. Javier Valencia-Santana [1], J. Manuel Guerrero-Ruiz [1], Neysi Gálvez-Zeferino [1], María Ana Fernández-Álamo [2] y Agustín A. Rojas-Herrera [1]
[1] Laboratorio de Ecología Costera y Sustentabilidad, Unidad Académica de Ecología Marina; Universidad Autónoma de Guerrero. Gran Vía Tropical No. 20 Fraccionamiento Las Playas. C. P. 39390 Acapulco, Guerrero; pakiwiris_1@yahoo.com.mx
[2] Laboratorio de Invertebrados, Facultad de ciencias de la Universidad Nacional Autónoma de México. C.P. 04510, Ciudad de México, Distrito Federal

Los moluscos presentan algunos de los invertebrados más llamativos e incluyen especies conocidas y utilizadas por el hombre en su alimentación, por ejemplo las almejas, los pulpos y los caracoles. Las etapas larvarias de casi todos los moluscos marinos forman parte del zooplancton flotando y nadando con movimientos limitados en la columna de agua, antes de asentarse en el bentos, por lo tanto sólo pasan una parte de su ciclo de vida en el plancton (meroplancton), mientras que en varias especies todas las fases de su existencia se realizan en la columna del agua (holoplancton), representando un componente importante de la compleja comunidad planctónica, debido a que son depredadores activos

y sirven de alimento a otros organismos diversos. Con la finalidad de aportar más conocimientos de la comunidad del plancton se analizaron los moluscos meroplanctónicos y holoplanctónicos recolectados en 17 localidades de la Bahía de Acapulco, en mayo y diciembre de 2013. Las muestras fueron tomadas con una red de plancton de un metro de largo, 31 cm de diámetro de boca y 315 µm de apertura de malla, haciendo arrastres superficiales durante 5 minutos. El material filtrado se depositó en frascos previamente etiquetados, fijándose con Formaldehido al 5%, neutralizado con Borato de Sodio. En laboratorio se procedió a separar 6,998 ejemplares, que fueron determinados y cuantificados. De los meroplanctónicos se identifican 10 géneros de gasterópodos, (siendo el más representativo *Rissoina*), tres familias de bivalvos, dominados por Mytilidae y un cefalópodo sin determinar. En los holoplanctónicos se registran siete géneros de gasterópodos (Pteropoda y Heteropoda), siendo el más representativo *Limacina*. Estos resultados incrementan el conocimiento sobre la biodiversidad marina en el Pacifico Mexicano, particularmente en la Bahía de Acapulco.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

MOLLUSCA COLLECTIONS AT THE SANTA BARBARA MUSEUM OF NATURAL HISTORY

Paul Valentich-Scott; Daniel L. Geiger and Henry W. Chaney
Santa Barbara Museum of Natural History, Santa Barbara, CA, USA; pvscott@sbnature2.org; dgeiger@sbnature2.org; hchaney@sbnature2.org

With over 2 million mollusk specimens and 2,000 primary type lots, the Santa Barbara Museum of Natural History (SBMNH) houses one of the largest collections of mollusks in North America, with collections dating back to the mid-1800's. The collection is housed in a modern well-lit facility, with expansive space for visiting researchers.

The SBMNH Polyplacophora collection is one of the largest in the world, with 8,900 dry and 9,600 wet lots (62,000 specimens). The chiton collection is global, with strong emphasis on the Pacific. Included are 117 primary type lots (>10% of the known chiton species). The collection has been widely used and cited in current and historic eastern Pacific publications.

The Bivalvia collection includes over 80,000 dry and 3,200 wet lots; ~15% of dry, with >95% of the wet holdings digitized. The collection is global, with strong emphasis on the eastern Pacific Ocean and the Indo-West Pacific. The bivalve collection from Panamic Province (Baja California, México, to northern Perú) is among the most extensive available. The SBMNH bivalve collections voucher two recent definitive books on eastern Pacific Bivalvia.

The Cephalopoda collection is among the most diverse and largest in the world, with over 9,300 wet lots. The cephalopod collection is global in extent, with an emphasis on the Pacific Basin; it includes over 100 primary type lots, representing >10% of the known living taxa.

The largest and most diverse SBMNH mollusk collection is represented by the Gastropoda. SBMNH houses over 385,000 lots of gastropods, of which 5,000 are preserved in ethyl alcohol. The gastropods are represented by extensive holdings in marine, land and freshwater, all of which are global in extent.

EXPLORATION AND EVALUATION OF THE FEASIBILITY OF THE USE OF FISHING GEAR CALLED "JARRITOS" FOR CATCHING OCTOPUS IN SCAMMON LAGOON AND SOUTHERN PART OF THE LAGOON IN GUERRERO BLACK IN BLACK WARRIOR, BCS

Gabriela Valle- Meza and Rogelio Ramírez –Serrano
Centro de Investigaciones Biológicas del Noroeste- Unidad Guerrero Negro, Paseo Eucalipto S/N col. Centro 23940, Guerrero Negro, Baja California Sur, México; gvalle04@cibnor.mx; rramirez04@cibnor.mx

From March 2012 to February 2013 a technical investigation complement building permits for catching octopus on the use of fishing gear nominated " jarritos " in Scammon Lagoon , BCS was evaluated in terms of performed technical - economic feasibility of fishing. The gear has been assessed using the index capture or capture capability sampling units (100 jugs). The study showed a catch rate of 56 octopuses during the month of higher density. The only captured by the fishing gear was kind *Octopus bimaculoides.* Available resource abundance and density for males and females were evaluated. The average height for males was 7.058 cm dorsal length and 33,006 cm total length. The average total weight of males was 146,069 and gutted weight 124.650 g. The average height for females was 7.733 cm dorsal length and 35,969 cm total length. The average total weight of males was 168,635 and gutted weight 135 g . 443 g. There are two size classes (probably two populations) that breed at different times during the year, from May to September and another in December and January. The sex ratio of octopus caught throughout the study cycle remained approximately two males to one female. No females laid eggs in the jars were found during the depth of the gear (between 3-5 days). It is suggested that the current way of precautionary effort of 1000 jars / boat / 3-5 days keeps also the market of octopus Baja California Sur is promoted, that the activity is profitable for the sector. Were approximately 450 people who depended directly from the use of this gear.

PROSPECCIÓN Y EVALUACIÓN DE LA FACTIBILIDAD DEL USO DEL ARTE DE PESCA DENOMINADO “JARRITOS” PARA LA CAPTURA DE PULPO EN LAGUNA OJO DE LIEBRE Y PARTE SUR DE LA LAGUNA GUERRERO NEGRO EN GUERRERO NEGRO, B.C.S.

De marzo del 2012 a febrero del 2013 se realizó una investigación complemento a los permisos de fomento para la captura de pulpo para evaluar el uso del arte de pesca nominado “jarritos” en Laguna Ojo de Liebre, BCS. El arte de pesca se evaluó utilizando el índice de captura de las unidades de muestreo (100 Jarros). El estudio arrojo un índice de 56 pulpos durante el mes de mayor densidad. La única especie capturada por el arte de pesca fue *Octopus bimaculoides*. Se evaluó la abundancia disponible y densidad del recurso para machos y hembras. La talla promedio para los machos fue de 7.058 cm en la longitud dorsal y de 33.006 cm de longitud total. El peso promedio en machos total fue de 146.069 g y peso eviscerado 124.650 g. La talla promedio para las hembras fue de 7.733 cm en la longitud dorsal y de 35.969 cm de longitud total. El peso promedio en machos total fue de 168.635 g y peso eviscerado 135. 443 g. Existen dos clases de tallas (probablemente dos poblaciones) que se reproducen en tiempos distintos durante el año, una de mayo a septiembre y otra de diciembre a enero. La proporción sexual de los pulpos capturados durante todo el ciclo de estudio se mantuvo aproximadamente dos machos por una hembra. No se encontraron hembras con puestas de huevos dentro de los jarros durante el periodo de calado del arte de pesca (entre 3 a 5 días). Se sugiere que de manera precautoria se mantenga el esfuerzo actual de 1000 jarros /lancha/3 a 5 días, además que se promueva el mercado de pulpos de Baja California Sur, para que la actividad sea rentable para el sector. Fueron aproximadamente 450 personas las que dependieron directamente del uso de este arte de pesca.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

ARAGONITE SHELL MIDDENS INCREASE BIODIVERSITY IN BAJA CALIFORNIA

Sula Vanderplank [1], Exequiel Ezcurra [2] and Sergio Mata [3]
[1]Botanical Research Institute of Texas, 1700 University Drive, Fort Worth, Texas 76107 USA; svanderplank@brit.org
[2]University of California, Riverside, Department of Botany and Plant Sciences, Riverside, California 92507, USA; exequiel@ucr.edu
[3]Sociedad de Plantas Nativas de Baja California, Ensenada, Baja California, Mexico; mechanicof@gmail.edu

Indigenous peoples of Baja California spent winters on the coast avoiding the cold of the mountains, and taking advantage of the protein-rich resources of the ocean and adjacent areas. Their activities resulted in the deposition of large quantities of mollusk shells in their frequented fishing grounds. In Baja California these 'middens' are visible along the coast. Midden composition varies with their position e.g., those adjacent to rocky shores are composed primarily of muscle and abalone shells, whereas those adjacent to sandy shores are composed predominantly of clam shells. These shell-rich soils have often show variation in plant species composition, and can harbor unique plant assemblages in NW Baja California. Over thousands of years, the predictable winter rains of have weathered calcium from shells which has changed soil properties, remediated sodic and saline soils, and resulted in a unique microhabitat. The impact of the shells on these plant communities varies considerably with shell composition and soil properties. Clam shells on clay or silt soils have the most significant impact on plant communities, presumably as a result of the additional calcium to the soil, which adjusts nutrient availability. These archeological sites (mostly ~ 5,000 years old) have become part of the landscape, and form islands of unique habitat within the heterogeneous matrix of the region. Native plant biodiversity and landscape heterogeneity are significantly increased on the anthropogenic soils of these shell middens. Conservation efforts in this region may be furthered by identifying the overlapping biological and archeological priorities to enable a multi-disciplinary approach to habitat preservation in these cultural landscapes.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION -TAXONOMÍA, SISTEMÁTICA Y BIOGEOGRAFÍA

DISTRIBUTION AND ABUNDANCE OF PARALARVAE (CEPHALOPODA: MOLLUSCA) COLLECTED IN THE PACIFIC OF COLOMBIA DURING FIVE OCEANOGRAPHIC JOURNEYS, 2001-2004

Eileén P. Vargas [1] and Raúl H. López [2]
[1,2] Programa de Biología Aplicada, Facultad de Ciencias Básicas y Aplicadas, Universidad Militar Nueva Granada. Campus Nueva Granada, Cajicá-Cundinamarca; [1]eileenpao@hotmail.com; [2]raul.lopez@unimilitar.edu.co, Colombia

Cephalopods are an ecological and economic important group around the world, but knowledge about adults and paralarvae in the Colombian Pacific Ocean (CPO) is extremely limited. Therefore, we wanted to evaluate the paralarvae catches obtained during five cruisers realized in June-July 2001, August-September 2001, September 2002, September 2003, and September-October 2004. At the surface, 98 mesozooplankton samples were collected by means of a conical 363 µm-pore net. All paralarvae were extracted. Abundances, temperature, salinity and light were considered within the analysis.

We identified eight families of which Ommastrephidae squids (perhaps a high proportion of *Sthenoteuthis oualaniensis* and *Dosidiscus gigas*) predominated (66.3%). Thermohaline influence and spawning in all periods were evident, since paralarval general abundances were significant (78-1655 orgs/1000 m^3). Mantle length indicated earlier hatching than in other regions of the American Pacific, possibly due to the higher temperatures in the CPO. We observed the usual heterogeneous distribution of plankton, but a lower abundance in southwestern waters of the study area, in September 2003. We believe this fact was perhaps due to the influence of the moderate-weak El Niño event detected only in that sector. The tendency to increase by night (1674 Pl/1000 m^3 *vs.* 338 Pl/1000 m^3 by day) and first quarter (51.79 %) was attributed to the vertical migration of paralarvae in response to light. We consider, the variability of these findings could be related with the reproductive behavior of cephalopods, environmental changes among periods framed in the high environmental complexity of the OPC, and other factors not weighed, affecting zooplankton communities, *e. g.*, movement of water bodies, food availability and predation.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

MOLLUSKS FROM TRAWLING COLLECTED DURING THE 2005 R/V URRACÁ- STRI EXPEDITION ALONG THE PACIFIC COAST OF COSTA RICA: PRELIMINARY ANALYSIS

Fiorella Vásquez-Fallas [1] and Yolanda E. Camacho-García [1,2]
[1]Escuela de Biología, Universidad de Costa Rica, Costa Rica, 11501-2060; f.vasquezfallas@gmail.com
[2]Museo de Zoología, Escuela de Biología, Universidad de Costa Rica, 11501-2060 San José, Costa Rica; ycamacho_99@yahoo.com

A few mollusk expeditions were carried out during the twentieth century along the Tropical Eastern Pacific. Despite these efforts, no checklists of mollusks based mainly on collected material from the continental slope of the Guanacaste Province, Pacific coast of Coast Rica, have been published. In this research, we partially studied the material collected during the expedition R/V Urracá-STRI, conducted in July 2005, along the Pacific coast of Costa Rica, from the Gulf of Santa Elena in the northern to the Gulf of Nicoya in the Central Pacific. The total sampling effort consisted of 55 trawls at depths ranging from 18 to 122 m. Of the collections, 20 have been sorted, catalogued, and identified. Here we report a total of 47 species of mollusks, with 40 gastropods and 7 bivalves belonging to 20 and 4 families, respectively.

SIMPOSIO ACUICULTURA DE MOLUSCOS/AQUACULTURE OF MOLLUSKS-PONENCIA/ORAL PRESENTATION

ENVIRONMENTAL FRAMEWORK OF THE GREEN ABALONE (*HALIOTIS FULGENS,* PHILIPPI 1845)

Himilce Velasco-Echavarría, Teresa Sicard-Gonzalez, Salvador Lluch Cota and Lucia Ocampo-Victoria
Centro de Investigaciones Biológicas del Noroeste, Instituto Politécnico Nacional 195, Playa Palo de Santa Rita Sur; La Paz, B.C.S. México; C.P. 23096; La Paz, BCS; himilce.velasco@gmail.com; tsicard04@cibnor.mx; locampo@cibnor.mx; slluch@cibnor.mx

The Abalone is one of the most important fishery resources in México. *Haliotis fulgens* as well-known as green abalone is the species which sustains the fishery. Recently the captures has been diminished, this problem is attributed to natural massive mortalities possibly associated to Climate Change, although there is not enough information to explain the actual causes. These modifications probably are related with exposing the benthic organisms to their tolerance limit, making them more vulnerable to diseases

and eventually death. The lack of biological or ecological information represents a problem to associate the causes of these mortalities. The establishment of the environmental framework (thermal tolerance and thermal optimum) provides an important physiological and ecological index. In the present study green abalone juveniles with a shell length of 31.8±1.4mm from Bahía Tortugas, B.C.S. were used, to determine the optimum temperature for growth (TOC) by means of scope for growth (PC) with different acclimation temperatures (11, 14, 17, 20, 23, 26 y 29°C); the thermal tolerance through incipient lethal temperature (TLi) and the capacity for recovery to thermal stress was evaluated by means of mortality (CR). A high relation between ingestion and wet weight was found (1.4%); high absorption efficiency (91-94%); a well day-night behavior marked by the differences in the respiratory rate (TR); the resulting nocturnal respiratory rate was 25.9% higher than the diurnal rate; ammonia excretion rate was low representing only the 0.0009% from the energy budget; temperature was positive related to ingestion, absorption, respiration and excretion. The optimum temperature for growth was found at 23°C, which corresponds to the latitude; the thermal tolerance were beneath 3°C to 33°C; the capacity of recovery was 0% at 3°C and 100% at 35°C.

DESARROLLO/DEVELOPMENT-CARTEL/POSTER

DESCRIPCIÓN DE LA OVOGÉNESIS DEL ABULÓN AZUL *HALIOTIS FULGENS* PHILIPPI, 1845

M. Nurenskaya Vélez-Arellano [1], Federico A.García-Domínguez [1], M. Shibayama [2], A. Silva-Olivares [2], Daniel B. Lluch Cota [3], José L. Gutiérrez-González [4]

[1]Centro Interdisciplinario de Ciencias Marinas–IPN.

[2]CINVESTAV-IPN, México, D.F.

[3]Centro de Investigaciones Biológicas del Noroeste

[4]Centro Regional de Investigación Pesquera, *Becario PIFI; nurens@hotmail.com

Los haliótidos son de los gasterópodos más cotizados en los mercados asiáticos en donde se comercializa aproximadamente el 50% de las 56 especies conocidas. En México una de las principales especies explotadas es H. fulgens. Sin embargo, aún no se ha descrito su gametogénesis, por lo que en el presente trabajo se describe la ovogénesis de esta especie, lo que aportará información importante para el conocimiento de la biología reproductiva de H. fulgens. Se recolectaron ejemplares hembras en La Bocana, Baja California Sur en octubre, noviembre y diciembre de 2012, y en marzo, abril y mayo de 2013. Una parte de la gónada se fijó en glutaraldehído al 3% para aplicar las técnicas de microscopía electrónica de barrido y transmisión, y otra se fijó en formol al 10% para procesar con la técnica histológica. Las laminillas histológicas fueron digitalizadas y mediante un programa de cómputo (Sigma Scan Pro Versión 5), se midieron los ovocitos a los que se les observó el nucléolo. De acuerdo a los resultados de las técnicas utilizadas se describen cuatro tipos celulares de acuerdo al tamaño, forma y contenido citoplásmico: Ovogonias (35.38 ± 10.22 mm), ovocitos previtelogénicos (71.9 ± 32.27 mm), ovocitos vitelogénicos (200 mm) y ovocitos atrésicos (147.97 ± 20.98 mm). Estos tipos celulares pueden estar presentes en la misma gónada, aunque en diferentes proporciones, de acuerdo al estadío de madurez gonádica.

SIMPOSIO INDICADORES AMBIENTALES: UNA SÍNTESIS/MOLLUSKS AS ENVIRONMENTAL INDICATORS: A SYNTHESIS-CARTEL/POSTER

INVENTORY AND DIAGNOSIS OF THE MOLLUSCS BENTHIC COMMUNITY AT ITUPARARANGA RESERVOIR– SÃO PAULO, BRAZIL

Bianca de Medeiros Vendramini and Eliane Pintor de Arruda
Universidade Federal de São Carlos – campus Sorocaba. Departamento de Biologia, Centro de Ciências e Tecnologias para Sustentabilidade. Rodovia João Leme dos Santos, Km 110, Itinga- Sorocaba, São Paulo, Brasil; bianca_vendramini@hotmail.com; arrudaep@yahoo.com.br

Brazilian freshwater mollusk communities present high species richness. These communities have wide distribution and include native and invasive species of Bivalvia and Gastropoda, occurring in all the biomes of the country. These animals are well adapted to fresh water and are able to grow and spread fast in rivers and reservoirs, such as in our study site: Itupararanga Reservoir. Located in São Paulo state, the reservoir is responsible for the water supply of four cities (Sorocaba, Votorantim, Ibiúna and São Roque), it is also included in a protected area (similar to IUCN VI Category in USA). Accordingly, knowledge on the local malacofauna is important as an initial parameter to establish environmental characterization, using mollusks as bioindicators of water quality. Therefore, it contributes to assess the conservation status of an area.

We collected mollusks using different methodologies according to the microhabitat they were part of (i.e. associated to macrophytes or buried in the silt). Samples were collected monthly from September 2013 until February 2014. Using shell characteristics and internal morphology, we identified 12 species in the reservoir, including invasive *Melanoides tuberculatus* (Müller, 1774) and *Corbicula fluminea* (Müller, 1774), besides native clams *Diplodon expansus* (Küster, 1856) and *Anodontites trapesialis* (Lamarck, 1819), the latter is considered in vulnerable status by the Brazilian red list of threatened species. Other abundant species of special interest are *Pomacea lineata* (Spix, 1827) and *Biomphalaria tenagophila* (Orbigny, 1835). With these data, we will produce a species identification guide for Itupararanga Reservoir with descriptions and morphology of each species, with the aim of facilitating identification process for the local dwellers and researchers. This study emphasizes the need of further research in the control of invasive species, their epidemiological potential in the area, and use of the described fauna in monitoring the reservoir and its quality along time.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -CARTEL/POSTER

ESTUDIO COMPARATIVO DE MOLUSCOS EN DOS LAGUNAS COSTERAS DEL ORIENTE DE VENEZUELA.

Sioliz Villafranca [1], Mayré Jiménez Prieto [2], Jennellis Cedeño [2], Thays Allen [2], Johanna Fernández [3] y Samuel Narciso [4]
[1]Escuela de Humanidades y Educación, Núcleo de Sucre, Venezuela; svillafranca@yahoo.com
[2]Instituto Oceanográfico de Venezuela, Departamento de Biología Marina, Núcleo de Sucre, Universidad de Oriente; mayrej@gmail.com; thayscor@yahoo.com
[3]Museo del Mar, Universidad de Oriente; johnannafer@hotmail.com
[4]FUDENA; samuelnarciso@gmail.com

Las lagunas costeras son ambientes muy dinámicos debido a las condiciones físico-químicas dominantes, lo que condiciona el tipo de comunidades presentes. Un grupo bien representado en estos ecosistemas,

son los moluscos. En este trabajo se determinaron las comunidades de moluscos en dos lagunas costeras del oriente de Venezuela, la laguna de Bocaripo (10º 34' y 10º 36') y laguna grande del Obispo (1° 25' y 10° 35' N y 63° 40' y 64° 13' O). La toma de muestras se realizó en raíces del mangle rojo *Rhizophora mangle* durante un año y para cada área se consideraron cinco estaciones. Al azar, se escogieron dos raíces en cada estación, se colocaron en bolsas de polietileno, se desprendieron los organismos y se identificaron con claves específicas. Se revisaron 120 raíces en cada área y se colectaron un total de 8018 organismos, los cuales estuvieron representados en tres clases Bivalvia, Gasteropoda y Polyplacophora, 32 familias, y 59 especies. En laguna grande del Obispo se registró el mayor número de organismos y especies (6925 y 39). La clase Bivalvia fue la más destacada por número de organismos y especies en ambas áreas; siendo las más representativas *Crassostrea rhizophorae*, *Ostrea equestris*, *Brachidontes exustus*, *Isognomom alatus*, *Brachidontes recurvus*, *Musculus lateralis* y *Pinctada imbricata*. Para los Gasterópodos fueron *Crepidula plana, Melongena melongena*, *Littorina angulifera* y *Crepidula glauca*. La clase Polyplacophora sólo se registró en laguna grande del Obispo, estando representada por 4 especies de la familia Chitonidae. Se registraron especies atípicas del manglar lo que evidencia la transitoriedad, relación y uso que hacen los organismos de los ecosistemas vecinos. Las diferencias encontradas en la estructura de estas comunidades podrían estar relacionadas con una mayor variación en los parámetros ambientales condición más evidente en la laguna de Bocaripo.

PESQUERÍAS/FISHERIES-PONENCIA/ORAL PRESENTATION

MOLLUSKS ASSOCIATED TO THE DEEPWATER SHRIMP FISHERY ALONG THE PACIFIC COAST OF COSTA RICA, CENTRAL AMERICA

Fresia Villalobos-Rojas [1], Yolanda E. Camacho-García [2,3], Juan Carlos Azofeifa-Solano [3] and Ingo S. Wehrtmann [1,2,3]

[1]Unidad de Investigación Pesquera y Acuicultura (UNIP) of Centro de Investigación en Ciencias del Mar y Limnología (CIMAR), Universidad de Costa Rica, 11501-2060 San José, Costa Rica; v.fresia@gmail.com; ingowehrtmann@gmx.de

[2]Museo de Zoología, Escuela de Biología, Universidad de Costa Rica, 11501-2060 San José, Costa Rica; ycamacho_99@yahoo.com

[3]Escuela de Biología, Universidad de Costa Rica, 11501-2060 San José, Costa Rica; eazofeifa2@gmail.com

The overfishing of coastal zones, technological development and market demands have led the fishing fleet to explore deeper waters and new resources. Despite the fact that deepwater species exhibit life history traits, which make them especially vulnerable to overexploitation and extinction, many of the deepwater fisheries use non-selective fishing gear, such as bottom trawls. Deepwater fisheries in Latin America target mainly demersal and benthic species. However, there is a lack of information about the by-catch composition of deepwater catches in the region. Mollusks are a scant by-catch component, and detailed information about species composition is practically absent. Our knowledge on the biodiversity of marine mollusks in Costa Rica refers mainly to shallow coastal habitats, while collections from waters deeper than 100 m are scarce. However, mollusks collected by shrimp trawlers provide an opportunity to obtain information about species diversity and distribution, along the Pacific coast of Costa Rica.

The specimens were collected between 100 and 350 m depth, in the Costa Rican Pacific during 2011-2012, using commercial shrimp trawlers. From a total of 154 performed trawls, most of them (56.5%) obtained at least one mollusk. A total of 527 mollusks were analyzed. Here we report 24 species of mollusks, representing 17 families (23 gastropods and 1 bivalve), which represents 9.8% of species currently reported for these depths from the Pacific coast of Costa Rica. Nevertheless, this is the first record of *Homalopoma* cf. *gripii* for the Pacific of Costa Rica. *Fusinus spectrum* was the most abundant

species followed by *Polystira nobilis* and *Solenosteira gatesi*. The highest number of species and abundance were found in the 150-200 m depth range, decreasing towards greater depths. The catch per unit effort of mollusks ranged between 0-25% of the total catch. Finally, we discuss the possible impact of bottom trawling on mollusk biodiversity.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA /ORAL PRESENTATION

DIVERSITY, SEASONALITY AND DISTRIBUTION OF BENTHIC OPISTHOBRANCHS FROM A ROCKY SHORE IN VERACRUZ, MÉXICO

Xochitl G. Vital y F. Álvarez
Colección Nacional de Crustáceos, Instituto de Biología, UNAM, Apartado Postal 70-153, C.P. 04510, D.F., México; vital@ciencias.unam.mx; falvarez@unam.mx

For two years we analyzed the opisthobranch species composition and seasonality in a rocky shore in Veracruz, México and compared the distribution of the species found with previous records. We found a total of 165 organisms belonging to 11 species, three of which are new records for the State of Veracruz and two for the Mexican East coast. The community presented a diversity of 2.997 bits/ind and an evenness of 0.866. Through rarefaction curves, a total of 14 species was estimated for the study area; hence, the diversity found is similar to the maximum expected. The highest abundances were recorded for *Aplysia fasciata*, *Aplysia dactylomela,* and *Bulla occidentalis*, and more than 50% of the species were considered rare in terms of frequency of occurrences as well as abundance. The highest species richness was found during the "nortes" season and the highest abundance was recorded during the rainy season, while during the dry season both values were the lowest. The distribution patterns of the species show that they are mainly of Caribbean affinity, however, most occur from the southern portion of the Carolinian region (except *Berghia* cf. *rissodominguezi*) to the Brazilian province (except *Elysia crispata*).

DIVERSIDAD, ESTACIONALIDAD Y DISTRIBUCIÓN DE OPISTOBRANQUIOS BÉNTICOS DE UNA PLAYA ROCOSA EN VERACRUZ, MÉXICO

Analizamos durante dos años la composición y estacionalidad de opistobranquios de una playa rocosa en el estado de Veracruz, México, y comparamos la distribución de las especies encontradas con registros previos. Encontramos un total de 165 individuos y 11 especies, tres de las cuales son registros nuevos para Veracruz y dos para la costa Este de México. La comunidad presentó una diversidad de 2.997 bits/ind y una equidad de 0.866. A través de curvas de rarefacción, un total de 14 especies fue estimado para la zona de estudio; por lo tanto, la diversidad encontrada es parecida al máximo esperado. Las mayores abundancias fueron registradas para *Aplysia fasciata*, *Aplysia dactylomela* y *Bulla occidentalis*, y más del 50% de las especies encontradas fueron raras, en cuanto a frecuencia de aparición y abundancia. La mayor riqueza específica fue encontrada durante la temporada de "nortes" y la mayor abundancia fue registrada en la época de lluvias, mientras que en la época de secas ambos valores fueron los más bajos. Los patrones de distribución de las especies muestran que principalmente son de afinidad Caribeña, sin embargo, también se encuentran de la porción sur de la región Carolineana (excepto *Berghia* cf. *rissodominguezi*) hasta la provincia Brasileña (excepto *Elysia crispata*).

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-CARTEL /POSTER

OPISTHOBRANCHS FROM TWO CONTRASTING REEFS IN VERACRUZ, MÉXICO

Xochitl G. Vital y E. Naranjo-García
Colección Nacional de Moluscos, Instituto de Biología, UNAM, Apartado Postal 70-153, C.P. 04510, Distrito Federal, México; vital@ciencias.unam.mx; naranjo@unam.mx

Two contrasting reefs, La Gallega and El Rizo in the state of Veracruz, México, are compared through the analysis of opisthobranch diversity. La Gallega reef is damaged due to its closeness to the coast and therefore to human activities. On the other hand, El Rizo reef is less impacted and is located farther from the coast. These reefs are part of the Veracruz Reef System National Park (PNSAV), which is a protected area that has a huge importance to the inhabitants of the Port of Veracruz and the surrounding zone.
The species richness and other ecological parameters between the opisthobranch communities found in these two reefs will be examined during an annual cycle. Three seasons occur in the study area (dry season, rainy season, and "nortes" season with strong winds and heavy rain). Here we present the first results from the study, including the six species discovered in the first season and contracting the general differences between the reefs.

OPISTOBRANQUIOS DE DOS ARRECIFES CONTRASTANTES EN VERACRUZ, MÉXICO

Dos arrecifes contrastantes, La Gallega y El Rizo en el estado de Veracruz, México se comparan a través del análisis de la diversidad de opistobranquios. La Gallega es un arrecife dañado debido a su cercanía a la costa y, por lo tanto, a las actividades humanas. Por otro lado, El Rizo está menos impactado y se encuentra más lejos de la costa. Estos arrecifes son parte del Parque Nacional Sistema Arrecifal Veracruzano (PNSAV), que es un área protegida y tiene una enorme importancia para los habitantes del Puerto de Veracruz y la zona circundante.
La riqueza de especies y otros parámetros ecológicos entre las comunidades de opistobranquios que habitan en estos dos arrecifes se examinarán durante un ciclo anual. Tres temporadas presenta el área de estudio (temporada de secas, de lluvias y de "nortes", con fuertes vientos y fuerte lluvia). Aquí presentamos los primeros resultados del estudio, incluyendo las seis especies que encontramos en la primera temporada y las diferencias generales que ambos arrecifes presentan.

SIMPOSIO ¿HACIA DÓNDE VA LA MALACOLOGÍA?: LA VISIÓN DE LOS ESTUDIANTES/THE FUTURE OF MALACOLOGY: A PERSPECTIVE FROM MALACOLOGY STUDENTS-PONENCIA/ORAL PRESENTATION
ECOLOGÍA, SALUD Y BIOTECNOLOGÍA

TEMPERATURE TOLERANCE IN TWO GASTROPOD SPECIES FROM THE INTERTIDAL ZONE IN CHACAHUA, OAXACA, MÉXICO

Xochitl G. Vital [1], T. V. Omaña-Guzmán [2], R. A. Castillo-Díaz [3] y Brian Urbano [3]
[1]Colección Nacional de Moluscos, Instituto de Biología, UNAM, Apartado Postal 70-153, C.P. 04510, D.F., México; vital@ciencias.unam.mx
[2]Laboratorio de Biología Molecular y Biotecnología, Instituto de Investigaciones Biomédicas, Tercer circuito exterior S/N. C.P. 04510. Distrito Federal, México; tanis_truchis@hotmail.com
[3]Facultad de Ciencias, Universidad Nacional Autónoma de México, Circuito exterior S/N. C.P. 04510. Distrito Federal, México; alfonso_pro85@hotmail.com; maclen55@yahoo.com

---

During the past century, the mean global temperature increased 0.6° C; this change will probably affect the ecosystems and all the organisms that inhabit them. Some mollusks species that live in the intertidal zone do not tolerate temperatures higher than 39° C. The aim of our study was to assess the critical temperature (the temperature at which the "acclimatization" of an organism fails and causes its death) of two gastropod species from the rocky intertidal zone from Chacahua, Oaxaca. A total of 62 individuals of the species *Nerita scabricosta* and *Littorina aspera* were exposed to treatment with temperatures ranging from 30° to 55° C. We found that the critical temperatures of *N. scabricosta* and *L. aspera* were 52° and 53° C, respectively. This suggests that these species have adaptations, which allow them to have a stress tolerance to high temperatures. It is possible that the species from this study have a response to the thermal stress mediated by heat shock proteins, and that this is related to the habitat where they exist (rocky intertidal zone) where temperature can be very variable. These results suggest that the two gastropod species can tolerate a dramatic increase in global temperature, thus it recommends further studies that analyze the effects of this parameter on their survival and reproduction.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

EFFECTS OF PREDATOR-PREY INTERACTIONS ON GENETIC AND PHENOTYPIC DIVERGENCE

David Weese [1] and Thomas F. Duda, Jr. [1,2]
[1]Museum of Zoology and Department of Ecology and Evolutionary Biology, University of Michigan, 1109 Geddes Avenue, Ann Arbor, Michigan 48109, USA; weeseda@umich.edu; tfduda@umich.edu
[2]Smithsonian Tropical Research Institute, Balboa, Ancón, Republic of Panama

Predator-prey interactions represent a tremendous source of selection, yet how these interactions contribute to genetic and phenotypic divergence is largely unknown. Members of the predatory marine gastropod family Conidae show considerable variation in venom composition, a phenomenon that may be due to the evolution of venoms in response to predator-prey interactions. To test if differences in predatory-prey interactions are associated with differences in venom composition, we sequenced and compared venom duct transcriptomes of individuals of *Conus miliaris* from populations with different diets. We recovered and annotated over 27,000 sets of sequences, including several hundred sets that represent transcripts of known or suspected venom peptides. Members of each population exhibit greater similarity in expression levels of venom peptide transcripts than non-venom peptide ones. Differences in expression levels of venom peptide transcripts likely equates to functional differences in the venoms of these populations.

SIMPOSIO GENÓMICA DE MOLUSCOS/MOLLUSCAN GENOMICS-PONENCIA/ORAL PRESENTATION

GENE TREES CONSTRUCTED FROM 28S SEQUENCES NEST *BRACHIDONTES SOLISIANUS* WITHIN THE *BRACHIDONTES EXUSTUS* CRYPTIC SPECIES COMPLEX

Amanda H. Wright [1], Theresinha M. Absher [2] and Kyle F. Bennett [1]
[1]Department of Biology, Elmhurst College, 190 Prospect Ave., Elmhurst, Il 60126, USA; wrighta1489@net.elmhurst.edu; kfbennett@elmhurst.edu
[2]Laboratorio de Moluscos Marinhos, Centro de Estudos do Mar, UFPR Pontal do Sul, Paraná, Brazil; tmabsher@ufpr.br

Along the southern coast of Brazil there are two species of *Brachidontes* mussel, *B. exustus* and *B. solisianus*. In an effort to understand *B. solisianus'* relationship to other species of the genus, specimens

from Copacabana Beach, Rio de Janeiro, Brazil and Ilha do Mel, Paraná, Brazil, were sequenced at the 28S ribosomal RNA locus. Newly generated sequences were aligned in Clustal X with all available *Brachidontes* 28s sequences accessed from the NCBI database. Gene trees were constructed using neighbor joining and Bayesian methods. The *B. solisianus* specimens appear nested within the *B. exustus* cryptic species complex, sister to the Western Caribbean clade. *B. solisianus* are morphologically distinct from the *B. exustus* morphospecies, lacking prominent ribbed shell sculpture, but nonetheless appear to be another linage in the *B. exustus* species complex.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-CARTEL/POSTER

HOLE DRILLING IN GASTROPOD SHELLS BY *OCTOPUS INSULARIS* (MOLLUSCA: CEPHALOPODA) IN THE COAST OF CEARÁ, NORTHEAST BRAZIL

Cristiane Xerez Barroso [1] and Helena Matthews-Cascon [1,2]
[1]Universidade Federal do Ceará, Centro de Ciências, Departamento de Biologia, Laboratório de Invertebrados Marinhos do Ceará. Campus do Pici, Bloco 909. CEP: 60455 -760. Fortaleza, CE, Brazil; hmc@ufc.br; cristianexb@gmail.com
[2]Universidade Federal do Ceará, Instituto de Ciências do Mar. Av. Abolição, 3207, Meireles. CEP: 60.165-081. Fortaleza, CE, Brazil; helenamc@gmail.com

A predator has to make decisions about what, where and when to eat. Feeding strategies may also differ with relation to the number of prey items eaten. *Octopus insularis* foraging behavior varies with local environmental conditions, but usually shows long pauses and short distance moves. *Octopus insularis* has small and strong arms and deep webs that can be used to catch more than one prey simultaneously. This species usually preys gastropods by drilling a small hole in their shells and injecting a secretion that relaxes or kills the prey and then, removing and eating its entire body. The objective of this study was to investigate the predation strategy of *Octopus insularis* on gastropods through the analysis of the location of hole drills in their shells. The gastropod shells were collected inside pots used in the octopus fishery in Itarema beach, Ceará State, Northeast Brazil at 30 meters depth.
In the octopus pots were found shells of 33 species of gastropods (21 families and 76 individuals). Among the gastropods, 72.37% (55 specimens) had a borehole, the majority on the spire in the ventral side of the shell (50.90%, 28 individuals). Eight specimens (14.56%) had a borehole on the spire in the dorsal or lateral side of the shell, thirteen (23.64%) on the inner lip and 10.90% on the body whorl in the ventral or dorsal side of the shell. Thirteen species exhibited incomplete holes (predation attempts) on the spire and body whorl. The position of the boreholes on the spire in the ventral side of the shell close to or over the site of attachment of the columelar muscle probably is to make possible the injection of the poisoning from the salivary gland to relax the animal and then to pull the soft body from the aperture.

INVASORES/INVASIVE-CARTEL/ORAL PRESENTATION

REPRODUCTION AND PARASITISM OF *MELANOIDES TUBERCULATA* (MÜLLER, 1774) (GASTROPODA, THIARIDAE) FROM VILA DO ABRAÃO, ILHA GRANDE, ANGRA DOS REIS, RJ.

Renata de F. Ximenes, Igor C. Miyahira and Sonia B. dos Santos
Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier, 524, Pav. Haroldo Lisboa da Cunha, Laboratório de Malacologia Límnica e Terrestre, sala 525/2, Maracanã, Rio de Janeiro, RJ, 20550-900, Brasil; renatafximenes@yahoo.com.br; icmiyahira@yahoo.com.br; gundlachia@yahoo.com.br

Melanoides tuberculata (Müller, 1774), an exotic freshwater snail, was first recorded to Vila do Abraão, Ilha Grande, RJ, in 2005. The populations are mostly composed by parthenogenetic females. The objectives were: to check if there are fluctuations in the production of eggs and juveniles along time; to determine when sexual maturity is reached; to check for parasites and relate their presence with the number of eggs and juveniles. We used females collected bimonthly from September/07 to October 07/10, classified into classes according to the diameter of shell: C1: <3mm; C2: 3 to 5.99mm; C3: 6 to 8.99mm; C4: >9mm. We selected around five females/class, approximately 20 females/collect, totaling 348 females. The mollusks had the roof of the palial cavity and brood-pouch dissected. We count 24.694 eggs and 31.474 juveniles, showing the following averages: C1: 0 eggs and 0.31 juveniles, C2: 24.19 eggs and 47.56 juveniles, C3: 114.84 eggs and 155.78 juveniles, C4: 146.76 eggs and 158.41 juveniles. The Kruskal-Wallis test showed a significant variation in the number of eggs and juveniles along the collects (p<0.01). It was found a significant difference between the number of eggs and juveniles according to different shell size classes (p<0.01). We found 111 females parasitized by Pleurolophocercous cercariae out of 348 females (32%). The Mann-Whitney test showed that the parasitized females presented a smaller number of eggs and juveniles compared to the non-parasitized (p<0.01) and, excluding females from C1, show the same result. We conclude that the females reproduce during all the year, because eggs and juveniles were found in all the field surveys, and larger females have more eggs and, on average, more juveniles in the brood-pouch; the reproductive maturity should begin with approximately 3mm shell diameter and that parasitism affects negatively *M. tuberculata*, reducing the number of eggs and juveniles formed.

PLICOPURPURA-CARTEL/POSTER

ANTIMICROBIAL ACTIVITY OF TYRIAN PURPLE PRECURSORS OF THE AMERICAN MURICID *PLICOPURPURA PATULA*

Samantha J. Yarmis and Nathaniel F. Shoobs
Bard College at Simon's Rock, 84 Alford Road, Great Barrington, MA 01230, USA;
sam.yarmis@gmail.com, nshoobs12@simons-rock.edu

Gastropods in the Muricidae family secrete a white fluid from their hypobranchial glands, which becomes the Tyrian purple dye upon exposure to sunlight and air. This dye and its precursors may play a defensive role in both adult snails and egg masses. One muricid species, *Plicopurpura patula* (Linnaeus, 1758), is found along the Atlantic coast from Florida to Trinidad. Hypobranchial gland secretions were collected from living adult *P. patula* snails found in Montserrat. Concentrated and diluted crude extracts were tested for in vitro antimicrobial activities using the Kirby-Bauer disk diffusion method. The extracts showed some inhibitory effect on *Staphylococcus aureus*, minimal inhibitory effect on *Pseudomonas aeruginosa*, and no inhibitory effect on *Escherichia coli.* These results suggest a possible defensive role for the precursors of Tyrian purple.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIOLOGÍA Y ECOLOGÍA

PARÁSITOS EN LA GÓNADA DE LA ALMEJA CHOCOLATA *MEGAPITARIA SQUALIDA* (BIVALVIA: VENERIDAE)

Josué A. Yee-Duarte, Marcial Arellano-Martínez, Bertha Patricia Ceballos-Vázquez y Alma R. Rivera-Camacho

Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas, Departamento de Biología Marina y Pesquerías. Av. Instituto Politécnico Nacional s/n Col. Playa Palo de Santa Rita. C. P. 23096, La Paz, B.C.S. México; casa_yee@hotmail.com

Los moluscos bivalvos son vectores de diversos tipos de parásitos, los más comunes son los trematodos (digeneos), los cuales pueden presentarse en varias etapas de su ciclo de vida, como esporocistos, redias y cercarías. Durante su crecimiento y multiplicación, los parásitos suelen alojarse en distinto tejidos del bivalvo como la glándula digestiva, las branquias y la gónada, de los cuales obtienen nutrientes necesarios para su desarrollo. En la gónada se hospedan principalmente esporocistos, que causan reducción total o parcial del material gamético. Actualmente, no se ha reportado incidencia de parásitos en *Megapitaria squalida*, por lo tanto este corresponde al primer reporte. Para ello, se recolectaron un promedio de 30 organismos al mes, de mayo del 2012 a abril del 2013, en el Puerto de Santa Rosalía (27°20' N y 112°16' W). Mediante disección se obtuvo la masa visceral y se fijaron en formol al 10%. Las muestras de gónada fueron procesadas con la técnica histológica convencional y la tinción hematoxilina-eosina para las observaciones microscópicas. Se calculó el índice de prevalencia (% de organismos infectados) y el nivel de infección en la gónada (área ocupada por parásitos). De 370 almejas obtenidas, tres estuvieron parasitadas (0.83% de prevalencia), en tallas de 6 y 7 cm de longitud de concha. La incidencia se observó sólo en machos en fase de madurez gonádica y se presentaron principalmente esporocistos y células germinales dentro de los acinos, desplazando a las espermatogonias y espermatozoides. El nivel de infección en la gónada fue desde moderada (5-25% de área ocupada por esporocistos) hasta muy alta (> 50%). La alta intensidad de infección en el testículo puede causar el fenómeno de castración, en donde el parásito consume las células gaméticas para redistribuir los metabolitos a su cuerpo.

COLECCIONES/COLLECTIONS-CARTEL/POSTER

TYPE CATALOGUE OF HAWAIIAN LAND SNAILS AT THE SMITHSONIAN INSTITUTION, NATIONAL MUSEUM OF NATURAL HISTORY

Norine W. Yeung [1, 2], Robert H. Cowie [1], Dylan T.B. Ressler [1], Kenneth A. Hayes [2, 3] and Ellen E. Strong [2]

[1]Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Gilmore 408, Honolulu, Hawaii, 96822, USA; nyeung@hawaii.edu, resslerd@hawaii.edu, cowie@hawaii.edu

[2]Smithsonian Institution, National Museum of Natural History, PO Box 37012, MRC 163, Washington, DC, 20013, USA; stronge@si.edu

[3]Department of Biology, Howard University, 415 College St. NW, Washington, DC, 20059, USA; kenneth.hayes@howard.edu

The spectacular diversity of insular land snails has been dramatically reduced with many species already extinct and the remaining fauna under severe threat from habitat loss, invasive species and the potential impacts of climate change. Among the Pacific islands, the Hawaiian archipelago harbors one of the most

diverse radiations of land snails, with more than 750 recognized species. The land snail fauna of Hawaii exhibits 99% endemicity, with many species unique to single islands or even single mountain ranges. Unfortunately, estimated extinction rates are as high as 90% for some families. However, the actual number of remaining taxa is unknown since few studies and no taxonomic assessments have been conducted for the majority of Hawaiian land snails for more than 50 years hindering attempts to assess their conservation status and develop effective management plans. Among the first essential steps to filling these gaps in knowledge are comprehensive compilations of type material and documentation of the described diversity. These data are a critical foundation for any systematic revisions which form the basis for evolutionary and conservation studies. The vast majority of relevant type material is scattered among several museums in North America and Europe, including the Smithsonian Institution National Museum of Natural History (USNM). As a first step in documenting this immense and dispersed resource, we have completed an illustrated and fully annotated type catalogue of those specimens housed at the USNM. This is the first in a series of type catalogues documenting the location and status of type material of this diverse and highly threatened fauna.

MOLUSCOS TERRESTRES/LAND MOLLUSKS-PONENCIA/ORAL PRESENTATION

REMNANTS OF THE HAWAIIAN ACHATINELLIDAE: SYSTEMATICS OF A HIGHLY THREATENED FAMILY

Norine W. Yeung [1, 2], Ellen E. Strong [2], John Slapcinsky [3], Brenden S. Holland [1], Robert H. Cowie [1], and Kenneth A. Hayes [2, 4]

[1]Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Gilmore 408, Honolulu, Hawaii, 96822, USA; nyeung@hawaii.edu; bholland@hawaii.edu; cowie@hawaii.edu
[2]Smithsonian Institution, National Museum of Natural History, PO Box 37012, MRC 163, Washington, DC, 20013, USA; stronge@si.edu
[3]Malacology, Florida Museum of Natural History, 345 Dickinson Hall, Gainesville, FL 32611, USA; slapcin@flmnh.ufl.edu
[4]Department of Biology, Howard University, 415 College St. NW, Washington, DC, 20059, USA; kenneth.hayes@howard.edu

Habitat destruction and invasive species are the primary drivers of endemic species decline and extinction, particularly across the Pacific Islands, which harbor a diverse terrestrial malacofauna. The Hawaiian Islands are home to more than 750 species of land snails, with 99% endemicity. Unfortunately, their numbers have been drastically reduced, with extinction estimates of 50-90%. The second largest of the ten families in Hawaii, the Achatinellidae, includes members of five of the seven achatinellid subfamilies (Achatinellinae, Auriculellinae, Pacficellinae, Tornatellininae, Tornatellidinae). Of these, only the Achatinellinae, specifically *Achatinella* spp. and *Partulina* spp., have been studied in the past 30 years, producing extinction estimates of >70%. The remaining subfamilies are thought to have suffered similar losses. However, as little work has been done since the 1940s, the actual number of extant species, and their taxonomic and conservation status, is uncertain. To assess the remaining diversity, evolutionary relationships and geographic origin(s) of Hawaii achatinellids, an integrative approach incorporating morphological, molecular and biogeographic data from museum records and recently-collected specimens is being used. More than 500 sites have been surveyed across the main islands and ~600 achatinellids have been sampled from 253 of these locations to generate an updated family-level phylogeny using mitochondrial COI, 16S and nuclear 28S sequences. Preliminary results support the monophyly of the family and all constituent subfamilies. For those subfamilies that include taxa from other Pacific Islands, the Hawaiian species all form robustly-supported monophyletic clades. Radular

morphology and conchology are congruent with these results. Of the 299 recognized species, only 63 monophyletic lineages were recovered. Approximately 15% of these lineages are undescribed cryptic species. This indicates potentially a greater loss of a much higher diversity than originally estimated.

SIMPOSIO ECOLOGÍA DE LOS MOLUSCOS MARINOS/TALKING ABOUT ECOLOGY OF MARINE MOLLUSKS -PONENCIA/ORAL PRESENTATION

IF WE MAKE THEIR BED, THEY WILL LIE IN IT: RESTORATION OF OLYMPIA OYSTERS, *OSTREA LURIDA*, IN SOUTHERN CALIFORNIA

Danielle C. Zacherl, Shannon Crossen, Cristina M. Fuentes, Andrea Moreno, Thomas Parker
Department of Biological Science, California State University Fullerton, Fullerton, CA 92834 USA;
dzacherl@fullerton.edu; shannoncrossen@gmail.com; cmfuentes35@csu.fullerton.edu;
andreamoreno@csu.fullerton.edu; tparker@csu.fullerton.edu

The Olympia oyster, *Ostrea lurida* Carpenter, 1864, the only oyster native to the US west coast, has experienced significant population declines since the early 1900s due to overharvesting and habitat destruction. This once bed-forming species provides complex habitat for other organisms, but natural Olympia oyster beds in southern California are now functionally extinct, making this species the target of recent restoration efforts. We examined which of several restoration techniques would be most effective for restoring *Ostrea lurida* in Newport Bay, CA by constructing replicate (n=5) 2m X 2m shell beds of two thicknesses (4cm versus 12cm) and two levels of consolidation (bagged versus loose shell) in a full factorial design, along with 5 un-manipulated beds acting as controls. We also examined the effects of a constructed oyster bed on densities of native *Ostrea lurida* and non-native *Crassostrea gigas* at Jack Dunster Marine Reserve in Alamitos Bay, CA. In both locations, simple augmentation of the habitat with shell resulted in significant increases in oyster density; findings from Newport Bay further indicate that thick shell beds result in higher oyster recruitment, shell % cover and reduced sedimentation, but level of shell consolidation did not affect any measured response variable. More recent evidence suggests that placement of the shell beds at the correct tidal height may encourage native oyster density increases without concomitant increases in non-native oysters. We encourage scientific monitoring of future *O. lurida* restoration efforts, as this study only begins to provide insight into the efficacy of different restoration methods.

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-PONENCIA /ORAL PRESENTATION

DIET PREFERENCES IN AGLAJIDAE PILSBRY, 1895 (1847), A FAMILY OF PREDATOR SEA SLUGS WITH PANOCEANIC DISTRIBUTION IN TROPICAL AND TEMPERATE WATERS

Andrea Zamora Silva
Phylogenetic Systematics and Evolution Research Group, Natural History Collections, University Museum of Bergen, University of Bergen, PB 7800, 5020- Bergen, Norway; Andrea.Zamora@um.uib.no

The family Aglajidae is composed of approximately 70 species and eight recognized genera distributed in tropical and temperate panoceanic marine swallow-water habitats. Aglajid sea slugs have been regarded to be active predators of other opisthobranchs and small invertebrates, but studies about their diet preferences are limited to a few species, and very little has been published about the trophic preferences and foraging strategies in the Aglajidae as a whole. In this work, the feeding habits of all genera within the Aglajidae but *Noalda* are studied through the examination of gut contents and

evaluated whether there is a relation between the trophic selection and the anatomy of the digestive tract. Gut content analyses identified by optical and scanning electron microscopy confirmed carnivory as the main feeding mode in aglajid with some cases of cannibalism in *Chelidonura* and *Navanax*, and potential cases of random ingestion of foraminiferans in *Aglaja* and *Nakamigawaia*. Aglajids show a sharp preference for vagile mucus-secretor preys (87% of food items) including caenogastropods, cephalaspideans, sacoglosans, and polychaetes among other preys. The presence of sensorial cephalic organs for mucus trail detection, the buccal bulb anatomy, and the prey mobility skills and size seem to play an important role in the trophic selection of aglajid slugs.

MOLUSCOS DE ZONAS COSTERAS/INTERTIDIAL-PONENCIA/ORAL PRESENTATION

GASTROPODA ASSOCIATED TO REEF MACROALGAE IN ISLA LOBOS, VERACRUZ.

Sandra A. Zedillo-Avelleyra, Jessica R. Hernández-Pérez y Zaira López-Cabello
Laboratorio de Malacología, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, C. P. 04510, México D. F.; tippysandy@gmail.com; raquel.hdzp@ciencias.unam.mx; grenitascablop@live.com.mx

Coral reefs constitute ecosystems where a huge diversity of invertebrates and macroalgae live. The latter offer shelter and substratum for some gastropods that feed on them, and even some species are able to acquire the algae color. In this study were identified the associations between gastropods and macroalgae in Arrecife Lobos, Veracruz, México. Eight genera of macroalgae were collected (*Caulerpa, Amphiroa, Halimeda, Dictyota, Laurencia, Jania, Rhipocephalus, Sargassum*), where were found six species of gastropods herbivorous of the subclasses Caenogastropoda and Opisthobranchia, belonging to five genera (*Cerithium*, *Cyerce*, *Elysia*, *Aplysia* and *Scyllaea*). The opisthobranchs had more diversity (H'= 1.0389) in comparison to caenogastropods (H'= 0.0043). C*erithium litteratum* was the most abundant species, with 199 individuals, followed by *Cyerce antillensis,* featuring 12 organisms. The alga with more ramifications was *Amphiroa,* which was also the alga where most gastropod species were found (five species). The opisthobranchs showed a tighter association to the alga where they live, in contrast to caenogastropods which were located in most of the algae. The genera *Cyerce* and *Scyllaea,* and the species *Elysia ornata* were registrated for the first time in Veracruz.

SIMPOSIO BIVALVIA/BIVALVIA OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
BIODIVERSIDAD

MARINE BIVALVES FROM THE ARGENTINE COAST AND SHELF: A REASSESSMENT OF SPECIES DIVERSITY AND FAUNISTIC AFFINITIES

Diego G. Zelaya
[1]Depto. Biodiversidad y Biología Experimental Facultad de Ciencias Exactas y Naturales - UBA, Ciudad Universitaria, Pab. 2, 4to piso, lab. 31, C1428EHA, Capital Federal, Argentina; dzelaya@bg.fcen.uba.ar

The Argentine coast, with more than 6.800 Km length, is associated with an extensive continental shelf, that covers a total surface of *ca*. 1.000.000 Km^2 and is up to 850 Km wide at 50°S. Despite the large extension of this area of the southwestern Atlantic Ocean, current knowledge on its bivalve diversity remains scarcely studied and scattered in several publications, most of them issued before 1950. The aim of this contribution is to provide a synthesis of the present knowledge of the living species of marine bivalves occurring in the Argentine coast and shelf. The information for this study comes from a

compilation of all available published literature, considering the species described and reported for the area. The studied area was divided into a 1 square grid to determine the geographic distribution of the species; this analysis also allowed to determine the most and the least studied areas. The present study accounts for a total of 170 valid species, with 88 others currently regarded as synonyms or wrong identifications. Out of the 170 valid species, 67 species appear represented by only one or two records. The most studied area is the coast of Buenos Aires Province, and nearly one third of the total Argentine shelf surface completely lacks information about bivalves diversity. The significance of these results is discussed in the context of the new information obtained in the last years for some particular groups.

SIMPOSIO CEFALÓPODOS DE LAS AMÉRICAS/CEPHALOPODS OF THE AMERICAS-PONENCIA/ORAL PRESENTATION
PESQUERÍAS

CATCH-AT-AGE ANALYSIS FOR THE ESTIMATION OF ABUNDANCE OF THE JUMBO SQUID *DOSIDICUS GIGAS* FROM THE GULF OF CALIFORNIA

Viridiana Y. Zepeda-Benitez y Enrique Morales-Bojórquez
Centro de Investigaciones Biológicas del Noroeste, Instituto Politécnico Nacional 195 Col. Playa Palo de Santa Rita Sur, La Paz, B.C.S, 23096, México; vzepeda@cibnor.mx; emorales@cibnor.mx

Currently, the management evaluation for jumbo squid does not consider the historical variability that captures have presented through time; moreover, all the estimations of population parameters have been made based in only one part of its life cycle (adults). The models for evaluating such fluctuation most include parameters that describe its population dynamics; however models including all information and data available of jumbo squid fishery have not been used. Catch-at-age data observed for the 2001-2002 fisheries season in the central area of the Gulf of California were fitted to a catch-at-age model, which incorporates relative abundance indices such as CPUE by fleet and fishing ground, with the purpose of enhancing precision in estimations. With these analyses, reliable reconstructions of population abundance, exploitable stock of the jumbo squid from the Gulf of California can be done. The use of different methodologies will provide with new information for the optimum management of this resource, which in turn will contribute to obtain a better evaluation of the current status of jumbo squid stock.

SIMPOSIO MOLUSCOS Y ARQUEOLOGÍA/MOLLUSKS AND ARCHEOLOGY-PONENCIA/ORAL PRESENTATION

OFRENDA DE MOLUSCOS A TLALTECUHTLI LA DIOSA DE LA TIERRA EN EL *HUEY TEOCALLI*

Belem Zúñiga Arellano
Museo del Templo Mayor, Instituto Nacional de Antropología e Historia. Seminario 8, Centro Histórico, C.P. 06060. México, D. F.; belemzu@yahoo.com

En las excavaciones que realiza el Proyecto Templo Mayor bajo la dirección del Dr. Leonardo López Luján en el predio de Nava Chávez, ubicado en la esquina que forman las calles de Guatemala y Argentina, en el Centro Histórico de la Ciudad de México, se ha recuperado un número importante de moluscos procedentes de varias ofrendas. Dentro de estas oblaciones destaca la ofrenda 126, encontrada bajo la escultura monumental de la diosa de la tierra Tlaltecuhtli.
La totalidad de la muestra revisada comprendió 3 045 elementos; 2 944 de ellos (96.68%) corresponden a material orgánico sin modificar y 101 (3.31%) a los artefactos de concha. Estos 3 045 elementos fueron

asignados a 125 taxa, 111 de los cuales se reconocieron a nivel específico, 11 hasta género y tres a familia.
De las 111 especies, un conjunto de 40 (32%) proceden del Océano Atlántico, 66 (52%) de las costas del Pacífico y tres (2.4%) de ambos litorales. Finalmente, dos especies (1.6%) se distribuyen en aguas continentales.
La mayoría de las especies identificadas viven en ambientes marinos, otras son marinas, pero pueden invadir también aguas salobres de esteros, lagunas costeras, manglares y marismas. Finalmente, de cuerpo de agua dulce proceden dos almejas, siendo este el primer registro que se tiene para las oblaciones del *Huey Teocalli*. Un buen número de especies son habitantes de las zonas supralitoral y mesolitoral, por lo que su obtención no implica esfuerzo alguno.
El estudio de esta ofrenda contribuyo con 69 nuevos registros para la arqueomalacofauna del Templo Mayor, en los que se reporta por primera vez para las oblaciones del *HueyTeocalli* la presencia de dos bivalvos de agua dulce (*Nephronaias aztecorum* y *Psoronaias granosus*).

SIMPOSIO HABLEMOS SOBRE OPISTHOBRANCHIA/LET'S TALK ABOUT OPISTHOBRANCHIA-CARTEL /POSTER

FAUNISTIC REVISION OF OPISTHOBRANCHS SPECIES (MOLLUSCA: GASTROPODA) FROM OAXACA COAST

Jaime Zúñiga-Miguel, Sadot Ramos-Rodríguez and Oscar Illescas-Espinoza
Laboratorio de Sistemática de Invertebrados Marinos (LABSIM), Universidad del Mar, Ciudad Universitaria Puerto Ángel, Oaxaca, México. 70902; jimmyzml18@gmail.com; sadot27@mail.com; s.kar90@hotmail.com

Opisthobranchs are a group of mollusks widely distributed in the Mexican coasts. Although opisthobranchs are well studied, knowledge on these organisms is uneven in the Pacific of México, since in some areas are most studied than others, as occurs in Oaxaca State. Therefore it is necessary to conduct a faunistic revision of the species recorded to the Oaxaca coast, where ten species have been registered. Samples were taken between April-June 2012, in the beaches Camaron and Aguete and Puerto Ángel Bay and Corralero Lagoon, all in the intertidal zone. With specialized literature, 29 specimens were analyzed, of which 16 species were identified, belonging to 15 genera and 11 families. Between the characters useful to the identification are the: coloration, the presence or absence of shell, the rinophoral morphology, the shape of the branchial plume, the presence or absence of cerata, etc. Fourteen of the species are new records to the Oaxaca coast, highlighting the case of *Bornella sarape* which distribution was expanded 1,160 km to the south, from Banderas Bay, Jalisco to Puerto Ángel Bay, Oaxaca; the same way to *Elysia* sp. 2 which distribution was expanded 601 km to the south, from Ixtapa-Zihuatanejo, Guerrero, to Aguete Beach, Oaxaca. The richness of opisthobranchs from Oaxaca was increased to 24 species.

COLECCIONES/COLLECTIONS

EVALUATION OF THE DRY MALACOLOGY COLLECTION OF MUSEO DE LA PLATA. ARGENTINA

Gustavo Darrigran[1], María Ortiz Blanche[1] and Cristina Damborenea[1]
[1] División Zoología Invertebrados, Museo de La Plata (FCNyM-UNLP), Paseo del Bosq ue sin número, La Plata (1900), Argentina; invasion@fcnym.unlp.edu.ar

Biological collections are the primary source of knowledge and information on biodiversity, both spatially and temporally. They are used for scientific research, as an educational resource and environmental modelling by the state to define strategies for the conservation of resources of the country. The Malacological Collection of the Museo de La Plata, with a total of 13,228 lots, is one of the most important in Latin America and gathers molluscs' samples from different ecosystems (marine, terrestrial and freshwater). The lots are from all over the world, but mostly from South America and specially Argentina. The collection includes material collected since mid- 1800 and continues to grow. Several projects are undertaken in the Malacological Section. Between them, the evaluation of the 9,507 lots of the dry mollusc collection is performed. For this we consider four states: (1) conservation (2) storage, (3) identification, (4) documentation. The information obtained from this evaluation is necessary to establish work priorities. The aim of this paper is to present the methodology used and the results obtained so far. To date 30 % of the collection was analyzed. It takes into account 15 parameters, including: three levels in relation to conservation (environment, furniture, containers); catalog status; labels and digitalization; identification (level and quality), other information (*eg* historical data, geographic information, use, number of items per lot). The results of this partial evaluation show that the 53% is in an acceptable level. In 2013 there was performed a preliminary evaluation of a pool of items representing 20% of the collection. The results of both evaluations are compared. Currently, we continue with the evaluation in order to include all lots of dry collection. Through the overall evaluation, we will have the information needed to plan future activities in conservation, digitization and documentation.

INVASORES/INVASIVE

THE EXPANSION OF THE INVASIVE GOLDEN MUSSEL OR *LIMNOPERNA FORTUNEI* IN SOUTH AMERICA. AN UPDATE AFTER 23 YEARS OF INVASION

Gustavo Darrigran[1], Thomas Nalepa[2], Claudia T. Callil[3], Monica de C. S. Campos[4], Cristina Damborenea[1], Edmundo C. E. Drago[5], M. Cristina Dreher Mansur[6], Inés D. Ezcurra de Drago[5], Marcia D. de Oliveira[7]

[1] División Zoología Invertebrados-Museo de La Plata (FCNyM-UNLP). Paseo del Bosque sin/nº, La Plata (1900). Argentina; invasion@fcnym.unlp.edu.ar; cdambor@fcnym.unlp.edu.ar

[2] Great Lakes Environmental Reserach Laboratory. National Oceanic and Atmospheric; Administration. Ann Arbor, Michigan.USA; thomas.nalepa@noaa.gov

[3] Departamento de Biologia e Zoologia, UFMT. Brazil; callil@ufmt.br

[4] Fundação Centro Tecnológico de Minas Gerais – CETEC. Bello Horizonte, MG, Brazil; monicacetec@yahoo.com.br

[5] Instituto Nacional de Limnología, Paraje El Pozo, 3000 (Santa Fe) Argentina.

[6] Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul. Porto Alegre, Rio Grande do Sul, Brasil mcrismansur@gmail.com

[7] Embrapa Pantanal, Rua 21 de Setembro, 1880, CP 109, CEP 79320 900, Corumbá, MS, Brazil; marcia.divina@embrapa.br

As a consequence of the commerce globalization, natural environments are subject to unique dynamic transport of organisms because global conditions favor transport, settlement, and dispersal of invading species. The golden mussel, *Limnoperna fortunei*, was introduced into Argentina in 1991 and since then has been spreading through the Plata and Guaíba basins at a rate of 240 km.year^{-1}. To assess the ability of invasion, its current status and its relation to the abiotic parameters of the sites where it is present is evaluated. These data are compared with known tolerances and also, potential barriers to invasion are

identify (*e.g.* Andean tributaries of the Plata Basin/salinity and river flow intermittence in different sectors of the rivers, concentration of suspended sediments in the others rivers or in the Pantanal. In this last area, environmental variables vary over a broader range compared with other South American localities, enforcing *L. fortunei* to oxygen depletion, low calcium concentration, low pH, and high water velocity and suspended solids, associated with low chlorophyll a concentrations. The combined effect of several conditions may explain the relatively low densities in some Pantanal sites. The importance of these findings is discussed using environmental data to infer invasion probabilities and the utility of environmental data to better understand invasion patterns and processes. While in the state of Mato Grosso, the population of the golden mussel is not installed effectively, this has reached all basins in Rio Grande do Sul (RS) from Upper Uruguay river, Upper Jacuí river, lagoons coasts, etc. It is only missing in the basin of the Mampituba river, that divides the states of Santa Catarina and RS in the northeast, but is very close from there. Also, at the head of the Paraná, Grande and Paranaíba rivers and records to reservoirs in San Paulo, established populations are evident.

INVASORES/INVASIVE

STATE OF KNOWLEDGE OF MOLLUSCS BIOINVASIONS IN THE SOUTH OF SOUTHAMERICA

Darrigran, G.[1], Alvar Carranza[2], Carlos Belz[3], Walter Boeger[4], Patricia Borges[5], Cristina Damborenea[1], Diego E. Gutiérrez Gregoric[1], Betina Lomovasky[6], Sandra Ludwig[4], Otto Mäder[7], Lângia Montresor[8, 9] y Teofânia H.D.A. Vidigal[9]

[1] División Zoología Invertebrados-Museo de La Plata (FCNyM-UNLP). Paseo del Bosque sin/nº, La Plata (1900). Argentina; invasion@fcnym.unlp.edu.ar; cdambor@fcnym.unlp.edu.ar; dieguty@fcnym.unlp.edu.ar

[2] Centro Universitario Regional Este – CURE, Sede Maldonado, Universidad de la República, Uruguay; alvar.carranza@gmail.com

[3]Universidade Federal do Paraná - UFPR, Centro de Estudos do Mar - CEM, Pontal do Paraná, Paraná, Brasil. belzoceanos@gmail.com

[4] Laboratório de Ecologia Molecular e Parasitologia Evolutiva – LEMPE, UFPR. Curitiba, PR Brasil; sand.ludwig@gmail.com

[5] Institutos Lactec. BR-116, KM 98, nº 8813 - Centro Politécnico da UFPR, Jardim das Américas, Curitiba, Paraná, Brasil. patricia.borges@lactec.org.br

[6] Instituto de Investigaciones Marinas y Costeras (IIMyC), CONICET y UNMDP. CC 573 Correo Central (B7600WAG), Mar del Plata, Argentina E-mail: lomovask@mdp.edu.ar

[7] MaxClean Ambiental e Química. Rua Desembargador Jorge Fontana 80, Belo Horizonte, MG, CEP 30320-670. Brasil E-mail: ottomader@maxcleanambiental.com.br

[8] Laboratório de Malacologia, Instituto Oswaldo Cruz, Fiocruz, Rio de Janeiro, Brasil; lcmontresor@gmail.com

[9] Universidade Federal de Minas Gerais, Brasil; REALf: Rede de Estudos Avançados em *Limnoperna fortunei* Fapemig/ Vale; teofania.vidigal@gmail.com

At the light of the current global environmental crisis, it is critical to malacologists to be able to communicate scientific findings in an appropriate and accessible way to policy-makers, helping these stakeholders to make informed choices and to design well suited policies aiming at sustainable solutions. In particular, mollusk bio-invasions causes great ecological, economic and health impacts, and are thus a well suited group to reach the above outlined end. In order to identify key invasive mollusk species, both exotic and native to South America, we looked at the 12 species listed in the Global Invasive Species Database (DAISIE). Based on results from the Third Latin American Symposium on Molluscs invasives

(held during the 1st. Malacological Argentinean Congress, in September 2013, La Plata), this work aims to synthesis the current knowledge of molluscan invasions (Both terrestrial and aquatic) in the southern portion of South America , we identified three levels of analysis : (1) To determine the species of invasive molluscs or potential invaders in theregion and its current and potential distribution (eg Limnoperna fortunei , *Corbicula fluminea*, *Crassostrea* spp., *Rapana venosa*, *Achatina fulica*). (2) The degree of progress in methods of control over aggressive invasive species (e. g. biocidal applications, detecting larvae). (3) The degree of development of research in the region, in relation to the generation of three knowledge levels (description, prediction and risk of invasion) through detection of vector *Limnoperna fortunei* in Brazil, such as use of ecological niche models using GARP and other algorithms for forecasts of potential distributions, e. g. in *Achatina fulica*. Thus, directing research efforts to the species above mentioned, as well as a strong focus on knowledge dissemination, will maximize the likelihood of bridging the gap between scientist and policy makers.

Índice Temático

Introducción III
Reconocimientos IX
Organización Del Libro XI

Conferencia Magistral/Keynote Address 1, 2, 3, 4

Simposia

Acuicultura de moluscos/Aquaculture of mollusks 26, 47, 49, 50, 53, 55, 82, 90, 108, 141, 143, 144, 162, 180, 189, 209, 229

Bivalvia de las Américas/Bivalvia of the Americas 14, 21, 23, 37, 51, 55, 61, 62, 64, 65, 96, 97, 99, 115, 118, 122, 123, 125, 128, 133, 134, 135, 140, 145, 147, 156, 165, 167, 184, 202, 204, 206, 213, 220, 221, 238, 241

Cefalópodos de las Américas/Cephalopods of the Americas 9, 13, 32, 35, 43, 44, 52, 58, 60, 63, 66, 72, 84, 85, 92, 93, 105, 120, 126, 127, 137, 138, 153, 161, 168, 169, 174, 183, 185, 189, 190, 197, 207, 216, 223, 224, 227, 228, 236, 242

Ecología de los moluscos marinos/Talking about ecology of marine mollusks 5, 8, 12, 18, 19, 20, 21, 31, 32, 37, 39, 47, 67, 71, 93, 103, 105, 106, 108, 109, 124, 125, 137, 139, 152, 154, 155, 157, 167, 170, 178, 181, 183, 186, 192, 193, 210, 221, 222, 229, 231, 240

Gasterópodos terrestres y de agua dulce/Systematics and taxonomy of freshwater and terrestrial gastropods 34, 112, 121, 130, 142, 172, 176, 194, 211

Genómica de moluscos/Molluscan genomics 10, 23, 27, 28, 57, 58, 78, 95, 98, 116, 123, 127, 129, 138, 139, 148, 162, 187, 215, 235

Hablemos sobre opisthobranchia/Let´s talk about opisthobranchia 24, 88, 95, 101, 118, 132, 141, 142, 145, 158, 166, 177, 224, 233, 234, 240, 243

¿Hacia dónde va la malacología?: la visión de los Estudiantes/
The future of malacology: a perspective from malacology students 7, 12, 15, 82, 94, 101, 107, 136, 159, 194, 195, 198, 204, 219, 225, 234

Indicadores ambientales: Una síntesis/Mollusks as environmental indicators: A synthesis..... 16, 76, 114, 128, 213, 231

Moluscos y arqueología/Mollusks and archeology 24, 36, 46, 69, 100, 135, 182, 215, 217, 218, 228, 242

Moluscos terrestres de las Américas: Diversidad y relaciones en hábitats en proceso de desaparecer/Terrestrial mollusks of the Americas: Diversity and relationships in vanishing habitats 30, 39, 51, 54, 61, 63, 69, 79, 80, 120, 163, 170, 177, 178, 179, 198, 201, 203

Temas Diversos

Colecciones/Collections 30, 96, 109, 130, 151, 160, 226, 238, 243

Conidae 41, 85, 115, 117, 149, 157

Desarrollo/Development 4, 14, 16, 18, 48, 151, 163, 184, 230

General 71, 110, 171, 172, 180, 187, 199, 207, 208, 218

Invasores/Invasive 28, 29, 73, 122, 149, 164, 173, 179, 212, 236, 244, 245

Moluscos de zonas costeras/Intertidial 7, 74, 111, 191, 196, 205, 220, 241

Moluscos terrestres/Land mollusks 87, 104, 239

Morfometría/Morphometry 11, 59

Paleontología/Paleontology 33, 66, 81, 89, 90

Pesquerías/Fisheries 22, 42, 45, 73, 74, 232

Plicopurpura 77, 86, 131, 132, 174, 188, 205, 237

Polyplacophora 80, 83

Ramsar 102, 113

Sistemática y biogeografía/Systematics and biogeography 6, 10, 17, 25, 34, 38, 40, 45, 49, 56, 68, 75, 76, 87, 100, 111, 146, 153, 191, 197, 200, 214, 225

Índice de autores

A

Abadia-Chanona, 4
Abad-Rosales, 64
Abrantes, 93
Absher, 235
Aceves-Medina, 145, 146
Adams, 204
Aguilar-Espinoza, 116
Aguilar-Estrada, 5, 6
Aguirre-Macedo, 43
Ahumada-Martínez, 7, 45
Alarcón-Chavira, 7, 8, 107
Alatorre-Mendieta, 88
Albo-Puigserver, 137
Alcaraz Espinosa, 218
Alcaraz Zubeldia, 71
Aldana Aranda, 16, 49, 152, 199
Aldea, 191, 192
Alejandrino, 204
Alejo-Plata, 9, 84, 126, 153
Aliotta, 90
Allen, 10, 68, 111, 231
Alonso-Domínguez, 10, 11, 21
Álvarez, F, 106, 233
Álvarez-Cerrillo, 12, 105
Amezcua-Gómez, 13, 14
Amoroso, 32
Andrade Villagrán, 14
Angulo-Campillo, 145
Arciniega-Flores, 116, 139, 149
Arellano Díaz, 73
Arellano-Martínez, 4, 37, 60, 137, 141, 185, 238
Arias, 168
Aristeo Hernández, 15
Asencio Aguirre, 16
Arnold, 163
Arteaga, 16
Ávila-Poveda, 4
Ayala-Aguilar, 93
Ayala-Herrada, 98
Ayala Solís, 153
Ayón Parente, 110
Azevedo, 181
Azofeifa-Solano, 232

B

Backeljau, 109, 120
Báez R., 122
Báez Valenzuela, 17, 160
Baqueiro Cárdenas, 18
Barías, 14
Barón-Sevilla, 127
Barrientos-Luján, 18, 19, 20
Barriga-Sosa, 168, 169
Bastardo, 63
Bastida-Izaguirre, 21
Bastos, 29
Beck Carneiro, 21, 75
Beltrán-Lugo, 22, 180
Belz, 245
Bennett, 23, 235
Bernal, 216
Bertsch, 24
Betanzos Vega, 40
Bieler, 25, 98
Blanqueto Córdova, 184
Bluhm, 76
Boeger, 28, 129, 245
Boehs, 37
Bonett-Calzada, 26
Borda, 27
Borges, 28, 29, 129, 245
Borrero, 30
Botero-Cobo, 31
Boyer, 184
Brambert, 23
Braulino Batista, 32
Breugelmans, 109, 120
Briceño, 52
Briceño-Vera, 120

Brito Vera, 32
Brusca, 167
Bückle-Ramírez, 108
Buitrón, 32, 81, 89
Bullis, 34
Burdi, 34

C

Caamal-Monsreal, 35, 63, 105, 189, 197, 216
Cáceres Martínez, C., 22, 36, 90, 209
Cáceres-Martínez, J., 53, 108
Cadena Roa, 174
Calado, 158
Caldwell, 61
Callil, 133, 244
Callomon, 30
Camacho-García, 85, 229, 232
Camacho-Mondragón, 37
Camilo, 37
Campiolo, 37
Campos, 156
Canales-Gómez, 38, 39
Candelaria-Silva, 188
Cano-Santana, 39
Cantera-Kintz, 125
Cañón Paez, 212
Capetillo Piñar, 40, 157, 221
Carmona, 158
Carpizo, 39
Carranza, 102, 113, 202, 245
Carrasco, 170
Carvajal Uribe, 41
Castañeda-Fernández de Lara, 42
Castellanos-Cruz, 43, 92
Castellanos-Martínez, 43
Castillo, S., 108
Castillo Rodríguez, 149
Castillo Vargasmachuca, 116
Castillo-Díaz, 234
Castillo-Estrada, 44
Castrejón-Ríos, 7, 45
Castro-Mondragón, 45
Ceballos-Vázquez, 37, 60, 141, 185, 238
Cedeño, 231
Celis-Hernández, 46
Cerros-Cornelio, 47, 85
Cervantes Días, 174
Cervera, 158
Chacón-Ojeda, 47
Chaney, 226
Chaparro, 14, 48, 134, 163
Charqueño-Celis, 49
Chávez-Sánchez, 64
Chernyshev, 224
Chong Sánchez, 49
Cid-Rodríguez, 31, 77, 174, 205
Cisneros Gaytán, 13
Clavijo, 133
Collins, 25, 98
Contreras. F., 50
Contreras, R., 50, 162
Contreras, Y., 95, 96
Cooke, 224
Coote, 204
Cordero-Esquivel, 143
Corral-Avila, 57
Correa-Sandoval, 51, 112, 211
Cortez, 96
Costello, 194, 195
Cowie, 87, 104, 121, 238, 239
Cremonte, 172
Crespi-Abril, 52, 161, 170
Crossen, 240
Cruz-Agüero, 58
Cruz-Flores, 53
Cruz-Hernández, 148
Cruz-Medina, 57
Cubillos, 48, 163
Cuezzo, 54
Culver, 60
Cummings, 55, 97
Czekanski-Moir, 194

D

da Cruz Fernandes, 156
Damborenea, 243, 244, 245
da Silva, D., 176
da Silva, P., 219

Darrigran, 129, 133, 243, 244, 245
D'Ávila, 180
Dayrat, 100
de Camargo, 207
de Carvalho, 176
de C. S. Campos, 244
de Jesús-Carrillo, 55, 56, 153
de Jesús-Navarrete, 55, 56, 153
de Lacerda, 176
de Lima, 29
de Oliverra, J., 201
de Oliveira, M., 244
del Rio, J. L., 190
Del Río-Portilla, 53, 57, 58, 108, 116, 127
Del Rio-Zaragoza, 108
Delgado-Vega, 57
Dennis, 195
Dias Passos, 156, 213
Dias Pimenta, 200
Díaz, F., 63, 105, 189, 197
Díaz Santana-Iturríos, 58, 183
Díaz Viloria, 138, 139
Dillon, 59
Domínguez-Contreras, 60, 185
Dourson, 61
Duarte, 133
Duda, 117, 235
Dueñas, 96

E

Eernisse, 34, 61, 111, 123
Enright, 62
Enríquez, 189
Enríquez Díaz, 16, 49
Ermgassen, 102, 113
Escalante-Garnelo, 63
Escobar-Briones, 87
Espinosa J., 62
Espinosa Saenz, 40
Espinoza, 66, 224
Esqueda-González, 18, 21, 64, 65
Esquivel Macías, 66
Ezcurra, 228
Ezcurra de Drago, 244

F

Farber, 172
Farías, 66, 224
Farinati, 90
Félix Pico, 67
Ferhati, 23
Férnandez, J., 10, 68, 111, 231
Fernández-Álamo, 68, 124, 225
Fernández-García, 85
Ferri, 171
Fields, 69, 179
Figuera, 111
Figueroa-Beltrán, 24, 69, 100
Fiol Ortiz, 174
Flores, L., 72, 143, 168
Flores Aguirre, 71
Flores Castro, 66
Flores-Campaña, 4
Flores-Garza, 7, 45, 47, 73, 74, 80, 84, 85, 128, 153, 220
Flores-Leyva, 74
Flores-Rodríguez, 7, 45, 47, 73, 74, 80, 84, 85 128, 153, 220
Folger, 118
Fonseca-Ibarra, 69
Fontanella, 29
Fontoura-da-Silva, 21, 75
Fortunato, 76, 205
Foster, 76, 177
Freites, 151
Fuente-Cid, 77
Fuentes, 240
Fuenzalida, 78

G

Galeana-Rebolledo, 74, 80, 128
Galindo, 105
Gallardo, P., 35, 189, 216
Gallardo-Escárate, 58, 116, 127
Galván, 52
Galván-Villa, 21, 65, 110
Gálvez-Zeferino, 225
Garcés-Salazar, 81, 198
García Barrera, 1

García De León, 57, 169
García Guadarrama, 92
García-Cárdenas, 82
García-Corona, 82, 167
García-Domínguez, 58, 83, 221, 230
García-Guillen, 43
García-Ibáñez, 45, 73, 74, 80, 83, 84, 128, 153, 220
García-Méndez, 85
García-Moctezuma, 47, 85
García-Ríos, 1
García-Rodríguez, F., 200
García-Rodríguez, F. J., 58, 146
García-Sánchez, 68, 86
García-Solorio, 165
García-Tello, 85
Garduño-Franco, 26
Garrido, 134
Garrido-Abreu, 205
Garrido-Sandoval, 183
Gary, 87, 104
Gasalla, 207
Gaytán-Caballero, 183, 214
Geiger, 226
Giles-Pérez, 88
Giménez, 220, 221
Gío-Argaez, 33, 89
Giorgana Figueroa, 184
Gluyas-Millán, 144, 195
Godoy Bueno de Carvalho Lopes, 167
Golding, 25, 98
Gómez, C., 33, 89, 90
Gómez Álvarez, 182
Gómez-Hernández, 90
Gómez-Márquez, 195
Gómez-Ortega, 123
Gómez-Porras, 43, 92
Gómez-Silva, 92
González, V., 95
González Cano, 218
González de Zayas, 155
González Pardo, 160
González-Liano, 93
González-Palma, 187
González-Rodarte, 94
Gosliner, 95, 101, 224
Gracia C., 96, 211
Graf, 55, 97
Graham, 118
Granados-Amores, 58
Granados-Cifuentes, 98
Granados-Ramírez, 130
Gravitt, 177
Guerreiro Couto, 154, 155, 210
Guerrero-Arenas, 98
Guerrero-Ruiz, 225
Güller, 99, 100
Gutiérrez Gregoric, 245
Gutiérrez Ortiz, 69, 100
Gutiérrez-González, 42, 230
Guzmán, A. F., 217, 218
Guzmán Boizo, 218
Guzmán del Próo, 139
Guzmán-Urieta, 101, 196

H

Hallas, 101
Halloran, 95
Hancock, 102, 113
Hansen-Bernal, 103
Hanson, 224
Harasewych, 95
Hau, 105
Hayes, 87, 104, 121, 238, 239
Healy, 25
Heimer de la Cotera, 17, 41, 116, 139, 149, 157, 159
Hénaut, 57
Hendrickx, 19, 20, 105, 223
Hermoso, 49, 183, 214
Hernández, J., 224
Hernández-García, 85
Hernández-Pérez, 82, 106, 107, 241
Hernández-Rodíguez, 53, 108, 127
Herrera Góngora, 108, 170
Herrera-Uria, 109
Hirano, 224

Hochberg, 60, 169
Holguín Quiñones, 67
Holland, 239

I

Iken, 76
Illescas-Espinoza, 43, 92, 243
Ituarte, C., 100, 131

J

Jacobo Macías, 110
Jacquemin, 59, 97
James, 147
Janusic, 37
Jarquín-Ortíz, 98
Jiménez Prieto, 10, 68, 111, 231
Jiménez-Hidalgo, 98
Johnson, 111
Jones, 112
Juárez, 105, 189, 197

K

Karson, 23
Kasoar, 102, 113
Kayal, 95
Keller, 52
Kitting, 114
Klussmann-Kolb, 187
Köhler, 203
Kohn, 115
Koo, 115
Kosonoy-Muñoz, 139, 149
Kruesi Cortés, 71

L

Lafarga-De la Cruz, 26, 57, 116
Lafetá Furtado Mendonça, 78, 80
Lallier, 78
Landa Jaime, 116, 139, 149
Lara, 133
Lasso, 133
Lawler, 117
Lawless, 30
Leal, 3
Lee, Taebwan, 23
Lee II, 118
Lemus-Santana, 88, 118, 142, 193
Lenzi, 79, 80
León, J., 121
León, L., 108, 137, 170
Leon, S., 23
Léon, 26
Leonard, 120
León-Guzmán, 120
Lestayo González, 155
Letelier, 122
Leung, 104
Leyva-Valencia, 148
Li, 122
Lima de Araújo, 219
Linnenbrink, 123
Liñán-Cabello, 149
Lizama, 170
Lluch-Cota, D., 48, 230
Lluch Cota, S. 229
Lomovaasky, 245
Londoño-Cruz, 125
López, B., 123
López, M., 128
López, R., 228
López de Mesa-Agudelo, 125
López-Cabello, 124, 241
López-Coldivar, 125
López-Galán, 9, 126
López-Landavery, 55, 127
López-Peraza, 127
López-Pérez, 19, 20
López-Rasgado, 166
López-Ripoll, 197
López-Rojas, 128
Lopeztegui Castillo, 40
López-Uriarte, 19, 20, 74
López-Vera, 3
López-Villegas, 37, 136
Lourenço, L. B., 213
Lourenço, S., 52
Lozada, 128
Ludwig, 28, 129, 245
Luebke, 130
Luna Plascencia, 182

M

Machkour-M'Rabet, 57
Mäder, 245
Magaña Cubillo, 131, 132
Magaña-Amador, 130
Mahguib, 132
Mansilla, 192
Mansur, 133, 165, 244
Marambio, 192
Marcondes Machado, 156, 213
Mardones, 134
Marinho, 135
Markaida, 4, 72, 168
Marko, 118
Marlett, 135
Marrón-Becerra, 49
Martelo, 96
Martín, 137
Martínez, B., 33, 89
Martínez, D., 96
Martínez, E., 66
Martínez, F., 137
Martínez Morales, 16
Martínez-Alonzo, 136
Martínez-Lorenzo, 93
Mascaró, 63, 189, 216
Mata, 228
Matthews-Cascon, 32, 138, 181, 206, 236
Max Aguilar, 138, 139
Mayén-Estrada, 187
Mazón-Suasteguí, 82
Medina, 116
Medina-Vargas, 139, 149
Mejía M., 66
Mejía O., 123
Meléndez-Contreras, 140, 196
Merino Hernández, 73
Merlin-Hernández, 98
Meza-Buendia, 141
Michel-Morfín, 73, 85, 116, 131, 132, 139, 149, 159, 220
Miller, 141
Miloslavich, 151, 164
Minero Biciego, 160
Miyahira, 21, 133, 236
Mohamed, 142
Molina Garduño, 142
Montano, 39
Montes-Orozco, 143
Montory, 134
Montresor, 245
Moore, 57
Mora, 22, 72
Mora Sánchez, 145, 168
Morales, 197
Morales-Bojórquez, 242
Morales-Gómez, 144
Mora-Mayo, 22
Moreira, 222
Moreno, 240
Moreno-Alcántara, 145, 146
Moretzsohn, 147
Mota, 79, 80
Moussalli, 203
Munguía-Vega, 60, 138, 148
Muñíz, 116
Muñiz Castillo, 139, 149
Muñoz-Flores, 53
Murillo-Valenzuela, 108

N

Nahuat Dzib, 184
Nakayama, 29
Nalepa, 244
Naranjo-García, 130, 149, 178, 234
Narciso, 10, 68, 111, 151, 231
Nava-Gómez, 26
Navarro Joan, 137, 190
Navarro Jorge, 108
Nieves, 151
Noguez Núñez, 152
Noreña, 35, 216

O

Ó Foighil, 23, 122
Ocampo-Victoria, 229
Ocaña, 55, 56, 153
Ochoa-Díaz, 166

Ojeda, J., 192
Ojeda, M., 221
Ojeda-Arriaza, 26
Ojendiz Mancilla, 153
Olea-de la Cruz, 84
Oliva-Rivera, 56, 153
Oliveira, A., 133
Oliveira Marchesini, 180
Oliveira, Mauricio, 29
Oliveira da Luz, 154, 155
Olivera, 155
Olivera Carrasco, 149, 217, 218
Omaña-Guzmán, 234
Orensanz, 202
Orlandi Introíni, 156, 213
Ornelas-Gatdula, 224
Orozco García, 157, 160
Ortega, 202
Ortega Martínez, 157
Ortega-Ramírez, 120
Ortigosa, 5, 142, 158, 166
Ortíz Blanché, 243
Ortiz, N., 52, 61
Ortíz Arellano, 17, 41, 157, 159, 160
Osores, 48
Ovando, 176

P

Pacheco, E., 50, 162
Pacheco Coronel, 182
Padula, 158
Pairett, 162
Palacios-Ávila, 86, 165, 188
Palomera, 137
Parada, 133
Pardo, 48
Paredes, 163
Parker, 240
Pascual-Jiménez, 63, 189
Pearce, 163
Pearse, 120
Pechenik, 48
Pedroso Dias, 180
Peralta, 151, 164
Peredo, 133
Pereira, 133, 165
Pérez, 165
Pérez Enríquez, 138, 139
Pérez-Estrada, 166
Pérez-Pacheco, 43, 92
Pérez-Vivar, 42
Petatán-Ramírez, 167
Pfenninger, 187
Pignataro-de-Lima, 54
Pilgrim, 61
Pimpão, 133
Pino, 66
Pintor Arruda, 135, 167, 231
Pliego-Cárdenas, 168, 169
Pola, 158
Pontones, 170
Pool Canche, 170
Poot, 137, 216
Portillo-López, 127
Posada Ayala, 215
Prepelitchi, 171, 172
Pruzzo, 172
Puebla, 50, 162, 172
Pujadas, 171, 172

Q

Quintana, 189

R

Raith, 61
Ramírez, M., 173
Ramírez, R., 27
Ramírez Sánchez, 126
Ramírez-Valdéz, 69, 100
Ramírez-Álvarez, 83
Ramírez-Chávez, 31, 77, 205
Ramírez-Luna, 82
Ramírez-Santiago, 165
Ramírez-Serrano, 227
Ramos-Rodríguez, 243
Ramos-Sánchez, 31
Rawlings, 25, 98
Re, 105, 189
Rebolledo, 122

Recco-Pimentel, 156, 213
Reguero, 7, 8, 15
Reham, 142
Reséndiz Pacheco, 174
Ressler, 104, 238
Reusser, 118
Reyes Sosa, 184
Reyes-Bonilla, 167
Reyes-Chaparro, 136
Reyes-Espinoza, 139
Reyes-Gómez, 12, 80
Reyes-González, 31, 174
Reyes-Santos, 187
Richau, 176
Richling, 177
Ridgway, 177
Rilling, 211
Ríos-Jara, 10, 11, 18, 19, 20, 21, 64, 65, 110
Rivas-Lechuga, 103
Rivera, 131
Rivera Camacho, 141, 238
Rivera Santiago, 178
Rivera-García, 39, 178
Roa-Arce, 26
Robinson, 69, 179
Robles-Mungaray, 47, 180
Robles-Rocha, 180
Rocha Lamego, 180
Rocha, V., 181
Rocha V. P., 181, 206
Rocha-Olivares, 53, 108
Rocha-Tejeda, 9
Rodríguez, J., 51
Rodríguez, D., 6
Rodríguez, M., 133, 165
Rodríguez, S., 35
Rodríguez Gil, 184
Rodríguez Hernández, 182
Rodríguez-Estrella, 166
Rodríguez-Figueroa, 183
Rodríguez-Jaramillo, 82, 180
Rodríguez-Rodríguez, 47
Rodríguez-Vázquez, 183
Rodríguez-Zaragoza, 19, 20, 65
Roe, 184
Rojas-Herrera, 225
Roldán-Wong, 60, 185
Rolón, 165
Romani, 29
Romero González, 186
Romero-Mata, 39
Romero-Niembro, 187
Romero-Rosales, 188
Romero, P., 187
Rosales López, 36
Rosas, 35, 63, 105, 189, 197, 216, 224
Rosas-Acevedo, 45, 73, 220
Rosas-Luis, 52, 137, 189, 190
Rosenberg, 30, 191, 203
Rosenfeld, 191, 192
Rubal, 222
Rubio-Sandoval, 193
Ruíz, V., 93
Ruíz Boijseauneau, 6
Ruíz-García, 31, 77, 174, 205
Ruíz-Verdugo, 22, 47, 180
Rundell, 34, 194

S

Saavedra-Flores, 116
Saeedi, 194, 195
Saito-Quezada, 101, 140, 195, 196
Saldaña Monroy, 197
Salgado-Barragán, 105
Salgado-Ugarte, 92, 101, 140, 144, 195, 196
Salinas-Zavala, 58
Sanabria, 172
Sánchez A., 105,
Sánchez P., 189, 190
Sánchez-García, 197
Sánchez-Méndez, 198
Santana Flores, 199
Santos dos Carvallo, 79, 80
Santos, Luiz Eduardo, 29
Santos de Souza, 200
Santos, Sonia, 21, 54, 176, 201, 236

Sanvicente-Añorve, 88, 118, 193
Saucedo-Lozano, 116
Scarabino, 133, 202
Segura, 48
Sei, 203
Serb, 162, 204
Sharp, 98
Sherratt, 204
Shibayama, 230
Shoobs, 204, 237
Shrestha, 95
Siadén, 205
Sibaja-Cordero, 222
Sicard-Gonzalez, 229
Sierra-Hernández, 198
Silva Cardoso, 75
Silva-Cruz, 205
Silva-Olivares, 230
Silveira, 206
Silvestre Martins, 207
Slapcinsky, 87, 104, 239
Soares Caetano, 75
Sobrino-Figueroa, 90, 207, 208, 209
Solís-Weiss, 8, 49, 218
Sommer, 130
Sousa Matos, 210
Sousa-Pinto, 222
Souza Félix, 138
Spalding, 102, 113
Stein, 156
Strenth, 51, 112, 211
Strong, 238, 239
Suarez Mozo, 96, 212
Suástegui Zárate, 74

T

Tallarico, 156, 213
Tanguy, 78
Tapia-Díaz, 214
Tavera, 96
Teasdale, 203
Teichholtz, 215
Téllez Duarte, 46, 215
Tercero-Iglesias, 216
Thompson, 51
Tlalolini Hernández, 217, 218
Toledano-Granados, 8, 105, 218
Toledo-Piza, 219
Torralvo, 96
Torreblanca-Ramírez, 47, 73, 74, 85, 128, 219
Torres, 137
Torres Alfaro, 67, 186
Torres-García, 86, 165, 188
Torres González, 178
Torres-Hernández, 174
Torroglosa, 220, 221
Tripp-Quezada, 39, 157, 221
Tripp-Valdez, 221
Troncoso, 191, 192, 222

U

Urbano, 7, 15, 16, 44, 71, 93, 94, 103, 142, 173, 197, 198, 223, 234
Uría-Galicia, 37, 136, 144
Uriarte, 66, 224

V

Valdés, 132, 177, 222
Valdés-González, 45
Valdez Caro, 225
Valencia-Santana, 225
Valentich-Scott, 12, 96, 118, 226
Valenzuela-Buriel, 108
Valenzuela-Curiel, 26
Valenzuela-Espinoza, 26, 143
Valle-Meza, 227
Vanderplank, 228
Vargas, E., 228
Vargas-Espósitos, 56, 153
Vargas-Martínez, 9
Vargas-Peralta, 116
Vargas-Ponce, 10, 11
Vasconcelos, 201
Vásquez-Fallas, 229
Vásquez-Yeomans, 53, 108
Veiga, 222
Velasco-Echavarría, 229
Vélez-Arellano, 83, 230

Vendramini, 231
Vidigal, 245
Villafranca, 10, 68, 111, 231
Villalejo Fuerte, 40, 221
Villalobos-Rojas, 232
Villanueva, 189
Villarruel-Ordaz, 31, 77, 174, 205
Vital, 233, 234
Voglino, 161

W

Wadleigh, 23
Weese, 235
Wehrtmann, 233
Winquist-Bailey, 23
Wisnivesky, 171, 172
Wright, 23, 235

X

Xerez Barroso, 138, 236
Ximenes, 236

Y

Yarmis, 237
Yee-Duarte, 37, 238
Yeung, 87, 104, 238, 239

Z

Zacherl, 61, 123, 240
Zaffaroni, 202
Zamora Silva, 240
Zamorano, 105
Zárate-Noble, 165
Zattera, 29
Zavalza Valdez, 174
Zedillo-Avelleyra, 241
Zelaya, 99, 100, 202, 241
Zepeda-Benitez, 242
Zucatelli Mendonça, 219
Zúñiga Arellano, 242
Zúñiga-Miguel, 243

Mollusca 2014
El Encuentro de las Américas
The Meeting of the Americas
O Encontro das Américas

Se terminó de imprimir en los talleres
de Impretei, S.A. de C.V.
en el mes de junio de 2014
Almería # 17, Col. Postal, Del. Benito Juárez,
C.P. 03410, México, D.F.
Tel. 5696 2503
impreteisa@prodigy.net.mx