

**Informe final\* del Proyecto B131  
Copépodos pelágicos del Pacífico norte mexicano**

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**Resumen:**

Los resultados de la presente investigación constituyen parte de los resultados de más de 15 años de investigación oceanográfica del Centro Interdisciplinario de Ciencias Marinas (CICIMAR) y comprenden el análisis de 820 recolectas de plancton, provenientes de tres grandes áreas del Pacífico mexicano; la costa occidental de la Península de Baja California, El Golfo de California y las costas de Sinaloa, Jalisco y Guerrero. En esta iniciativa se aborda el estudio de los copépodos, considerado como el grupo de organismos multicelulares más abundante de la tierra, ya que usualmente representan entre un 60 y un 80% del zooplancton en las diferentes áreas.

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- \* El presente documento no necesariamente contiene los principales resultados del proyecto correspondiente o la descripción de los mismos. Los proyectos apoyados por la CONABIO así como información adicional sobre ellos, pueden consultarse en [www.conabio.gob.mx](http://www.conabio.gob.mx)
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## INFORME FINAL

PROYECTO: B131 . COPEPODOS PELAGICOS DEL PACIFICO NORTE MEXICANO

De acuerdo con el convenio firmado, se presenta a continuación una relación de los resultados alcanzados en el desarrollo del presente proyecto:

1.- Se actualizó la lista sistemática de los copépodos pelágicos del Pacífico norte mexicano, añadiendo varios nuevos registros para el área, que serán publicados próximamente. Se describió una especie nueva (se anexa sobretiro) y actualmente se trabaja en la descripción de otras dos.

2.- Se sistematizó y reorganizó la colección de referencia del Departamento de Plancton y Ecología Marina, dándola de alta en la base de datos que comprende las colecciones Nacionales, en la CONABIO. Esta colección se complementó también con una serie de preparaciones permanentes de las principales especies de la región, que facilitarán la consulta sin poner en riesgo los ejemplares de la colección de referencia (se anexa el listado).

3.- Junto con el presente informe, se entrega el disket que contiene la base de datos corregida y actualizada, de acuerdo con los lineamientos establecidos por la CONABIO.

4.- Se realizó también un manuscrito que contiene la información taxonómica, distribución y algunos datos ecológicos de las especies que se integraron a la colección de referencia y a la base de datos. Se anexa la parte referente a las descripciones de las especies y los dibujos originales, realizados durante la vigencia del proyecto. Actualmente se trabaja en la edición de una monografía que integre toda la información anterior y se espera conseguir un apoyo de la CONABIO para la impresión del mismo.

## INFORME FINAL

PROYECTO: B131 . COPEPODOS PELAGICOS DEL PACIFICO NORTE MEXICANO

A continuación se hace una reseña de las observaciones hechas a los informes parciales, por los revisores de la Subdirección de Inventarios Bióticos, a través de la Dirección Técnica de Evaluación de Proyectos. Esta información se presenta de acuerdo al orden en que fueron hechas las observaciones, para cada informe en particular.

### PRIMER INFORME

- Los datos del autor de la especie y el año de la descripción, que estaban en un mismo campo, se separaron en dos campos independientes quedando como; *nombre del autor y año*. Los datos que no se encuentran disponibles, se codificaron con las letras ND, tal como lo sugieren en las recomendaciones generales.
- Se completaron los campos vacíos que correspondían al método de georreferenciación (*Aparato*).
- Se aclara que los campos correspondientes al *municipio* y el *estado*, se encuentran codificados de acuerdo con la clave de INEGI.
- Se completaron los datos faltantes en los campos *Aparato* y *Estado*.
- Se eliminaron de la base de datos los campos correspondientes a la categoría y autor infraespecífico, debido a que no son aplicables en este grupo.
- En el campo *Estadio*, la información se da utilizando una clave, que consiste en designar con una letra y un número la fase de desarrollo en la que se encuentra el ejemplar, a saber;
  - C6 = que corresponde al copepodito 6 ó adulto maduro
  - C5 = que corresponde al penúltimo estadio o juvenilCabe hacer la aclaración de que el desarrollo de los Copépodos se divide en dos etapas; nauplio y copepodito, cada una con 6 estadios, y en nuestro caso únicamente se consideran ejemplares en su fase adulta o juvenil.
- Por último se realizó una revisión minuciosa de los campos correspondientes a la latitud y longitud de los sitios de colecta, para corregir los datos incongruentes.

Con respecto al uso de la información, no se tiene pensado restringir el acceso a la base de datos y se considera que no hay información de uso restringido.

## SEGUNDO INFORME

En lo que respecta a este segundo informe, se aclara que en la impresión de la base de datos, en algunos casos no aparece completo el campo de Colección, sin embargo en la base original contenida en el disquette si esta disponible la información completa.

Debido a que el acopio de bibliografía ha sido constante, la revisión de la nomenclatura ha estado sujeta a cambios constantes, por lo que en este segundo informe se tienen algunas variantes a este respecto. Las tablas de curación de las diferentes zonas, se hicieron considerando el número de especies registradas para cada zona por diferentes autores y conforme avance el proyecto es susceptible de modificarse.

En hojas anexas se presentan las tablas de curación, en donde se aprecia el estado que guarda la colección para cada zona de estudio. Comparativamente con el informe anterior, es claro que el avance que se tiene a la fecha es más homogéneo en las 4 zonas que comprende el presente estudio y se espera que se complete al final del presente año.

Cada zona de estudio Costa Occidental, Golfo de California, Bahía Magdalena y Bahía Concepción, se separaron de acuerdo a la clave CUR de forma tal que de la clave CUR 1 a 250 corresponden a las especies registradas en la Costa Occidental de la Península de Baja California; de la 251 a la 370 corresponden a Bahía Magdalena; de la 371 a la 490 a Bahía Concepción y de la 490 en adelante corresponden a las especies registradas en el Golfo de California.

También es conveniente aclarar que la clave CUR de hembras y machos de la misma especie es distinta, de forma tal que si la hembra de la especie Euchaeta diegensis tiene la clave CUR 79, los ejemplares machos de la misma especie se designaron con la clave CUR 7901. Esto es aplicable para todas las especies en las diferentes zonas, salvo para la especie Acartia clausi que tiene la clave CUR 1 como hembra y la clave CUR 10001 como macho, esto para evitar la confusión con la clave CUR 100.

A continuación se enumeran y detallan las correcciones hechas en el segundo informe:

33.- Se eliminaron los espacios en cada uno de los registros, en el campo ANIO\_AUTOR.

37.- La información contenida en el campo COLECCION, se cambio al campo MUESTREO. Las claves están conformadas por el nombre de la zona y un número que indica el año y el mes en que se realizaron los muestreos, V.gr. BAMA 8902 indica que fue un muestreo realizado en Bahía Magdalena durante el mes de febrero del año de 1992. La clave CICIMAR, se refiere a la Costa Occidental de la Península de Baja California. La clave GOLCA indica que el muestreo se realizó en el Golfo de California. La clave BACO indica Bahía Concepción. Topolobampo se refiere a un

solo muestro hecho en Topolobampo, Sinaloa. La clave ALTAIR identifica a los muestreos realizados en el Pacífico mexicano, de la boca del Golfo de California, hasta las costas de Oaxaca. Y finalmente los muestreos denominados SIMSUP4, SIMSUP5 etc. se refieren a muestreos realizados en los últimos 3 años, en tres áreas de surgencia de la península de Baja California.

39.- Se creó un campo específico que contiene la información correspondiente a los nombres de los muestreos (Muestreo). Cabe hacer la aclaración de que aquellos muestreos realizados durante un ciclo de 24 horas continuas de muestreo, tienen una notación particular; de esta forma, si el muestreo se hizo en la Bahía Concepción en el mes de febrero de 1994, se pone la clave BACO 9402 (24 HRS).

42.- Se corrigió la información contenida en los campos LAT\_SEG Y LONG-SEG.

46.- Se corrigieron los errores de el campo CLASE.

47.- Se depuró el campo APARATO, designando con ND a los registros cartográficos.

48.- Se corrigió y homogenizó en lo posible, la información contenida en los campos COLECTORES y DESCRIP\_L.

50.- Se realizó una revisión de la nomenclatura y se corrigieron los registros correspondientes.

51.- Este campo se completo, gracias a la información obtenida durante la estancia de investigación realizada en el museo Smithsonian de Washington D.C.

Finalmente se adicionó un campo denominado PREC\_LL, para describir la escala del mapa en donde se realizó la lectura cartográfica.

#### TERCER INFORME PARCIAL

Aquí se detallan las correcciones realizadas, a partir de la revisión de un tercer informe parcial, entregado en enero de 1996.

20.- Se corrigió el campo ANIOAUTOR, codificando los registros no disponibles como datos de tipo numérico.

29.- El campo PROFUND fue renombrado como PROFUN, en la base de datos.

33.- Se eliminaron los espacios en blanco del campo MUNICIPIO.

36.- Se corrigió el dato con valor 0, del campo EJEMPLARES. En el campo MICRAS, los valores de 0 corresponden a datos no aplicables y se cambiaron de acuerdo a la recomendación dada para la "Información no disponible", de tipo numérico.

48.- En el campo especie no se detectó ningún error, debido a

que existen dos especies distintas denominadas como *Corycaeus latus* y *Corycaeus lautus*, y fueron descritas por el mismo autor, en el mismo año.

55.- En este caso, efectivamente se trata de especies nuevas. Actualmente se esta trabajando para publicar su descripción, por lo tanto al igual que el registro de la especie *Cephalophanes tectus*, se solicita que se restrinja el acceso a esta información, durante un plazo de 2 años, (Esto considerando el proceso completo desde la generación de la publicación hasta su edición).

Con respecto a la duda en las escalas de los mapas donde se realizó la lectura cartográfica, estos corresponden a Cartas Náuticas editadas por la secretaria de marina. Todas a excepción de la correspondiente a la zona de Bahía Concepción, que se tomó de la carta de INEGI denominada "El Coyote" No. G12A67 en escala de 1:50 000.

La cartas náuticas utilizadas fueron: SM 604 en escala 1:667 680 para Bahía Magdalena; SM 010 en escala 1:1 601 538 para La Costa Occidental y el Golfo de California; y SM 020 en escala 1:175 000 para los cruceros denominados Altair, realizados al sur del Golfo de California.

Con respecto a las diferencias encontradas en la clave CUR de hembras y machos de una misma especie, se corrigieron todas las claves homogenizando toda la información. De esta forma, si la hembra de la especie *Euchaeta diegensis* tiene la clave CUR 79, los ejemplares machos de la misma especie se designaron con la clave CUR 7901. Esto es aplicable para todas las especies en las diferentes zonas, salvo para la especie *Acartia clausi* que tiene la clave CUR 1 como hembra y la clave CUR 10001 como macho, esto para evitar la confusión con la clave CUR 100.

Por último, la cita bibliográfica completa del trabajo en el cual se basa la clasificación utilizada en el presente trabajo es la siguiente:

Huys, R. & G. Boxshall, 1991. *Copepod Evolution*. The Ray Society. London. Vol. 159: 468 pp.

## Lista de Especies Teñidas y/o Montadas

Acartia clausi	Farranula gibbula
Acartia danae	Labidocera acuta
Acartia tonsa	Labidocera acutifrons
Acartia lilljeborgii	Labidocera diandra
Calanus pacificus	Labidocera trispinosa
Candacia pacifica	Lucicutia flavicornis
Canthocalanus pauper	Microsetella rosea
Centropages furcatus	Nannocalanus minor
Centropages gracilis	Oithona plumifera
Clausocalanus furcatus	Oithona rigida
Clausocalanus jobei	Oncaea conifera
Clausocalanus mastigophorus	Oncaea venusta
Clytemnestra scutellata	Paracalanus parvus
Copilia mirabilis	Pareucalanus sewelli
Corycaeus affinis	Pleuromamma abdominalis
Corycaeus catus	Pseudocalanus elongatus
Corycaeus crassiusculus	Pseudodiaptomus culebrensis
Corycaeus latus	Pseudodiaptomus wrighti
Corycaeus speciosus	Rhincalanus nasutus
Corycaeus trukicus	Sapphirina gastrica
Cosmocalanus darwini	Sapphirina nigromaculata
Euaetideus bradyi	Scolecithrix bradyi
Euchaeta marina	Subeucalanus mucronatus
Euchaeta media	Subeucalanus subcrassus
Euchaeta wolfendeni	Temora discaudata
Euterpina acutifrons	Undinula vulgaris

**CATÁLOGO DE LOS COPÉPODOS PELÁGICOS DEL  
PACÍFICO MEXICANO**

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## ARREGLO SISTEMÁTICO

Se identificaron un total de 176 especies de copépodos pelágicos, pertenecientes a 4 órdenes, 29 familias y 61 géneros. El arreglo sistemático utilizado en este trabajo es derivado del propuesto por Huys y Boxshall (1991).

**Subclase Copepoda** Milne-Edwards, 1840

**Infraclase Neocopepoda** Huys & Boxshall, 1991

**Superorden Gymnoplea** Giesbrecht, 1882.

**Orden Calanoida** G.O. Sars, 1903.

**Familia Acartiidae** Sars, 1900

*Acartia* Dana, 1846

*A. clausi* Giesbrecht, 1892

*A. danae* Giesbrecht, 1889

*A. lilljeborgii* Giesbrecht, 1889

*A. tonsa* Dana, 1849

**Familia Aetideidae** Giesbrecht, 1892

*Aetideus* Brady, 1883

*A. armatus* (Boeck, 1872)

*A. bradyi* A. Scott, 1909

*A. giesbrechti* (Cleve, 1904)

*Chiridius* Giesbrecht, 1892

*Ch. poppei* Giesbrecht, 1892

*Chirundina* Giesbrecht, 1895

*Ch. streetsii* Giesbrecht, 1895

*Euchirella* Giesbrecht, 1888

*E. amoena* Giesbrecht, 1888

*E. bitumida* With, 1915

*E. curticauda* Giesbrecht, 1888

*E. pulchra* (Lubbock, 1856)

*E. rostrata* (Claus, 1866)

*Gaetanus* Giesbrecht, 1888

*G. armiger* Giesbrecht, 1888

*G. brevispinus* (Sars, 1900)

*G. miles* Giesbrecht, 1888

*G. minor* Farran, 1905

*G. pungens* Giesbrecht, 1895

*G. robustus* Sars, 1905

*Undeuchaeta* Giesbrecht, 1888

*U. intermedia* A. Scott, 1909

*U. major* Giesbrecht, 1888

**Familia Arietellidae** Sars, 1903

*Arietellus* Giesbrecht, 1892

*A. plumifer* Sars, 1905

*A. setosus* Giesbrecht, 1892

*Phyllopus* Brady, 1883

*P. bidentatus* Brady, 1883

**Familia Augaptilidae** Sars, 1905

*Augaptilus* Giesbrecht, 1889

*A. longicaudatus* (Claus, 1863)

*Haloptilus* Giesbrecht, 1898

*H. acutifrons* (Giesbrecht, 1892)

*H. ornatus* (Giesbrecht, 1892)

**Familia Calanidae** Dana, 1849

*Calanus* Leach, 1819

*C. pacificus* Brodsky, 1948

*C. minor* (Claus, 1863)

*Canthocalanus* A. Scott, 1909

*C. pauper* (Giesbrecht, 1888)

*Cosmocalanus* Bradford & Jillet, 1974

*C. darwini* (Lubbock, 1860)

*Mesocalanus* Bradford & Jillet, 1974

*M. tenuicornis* (Dana, 1849)

*Neocalanus* Sars, 1925

*N. cristatus* (Kroyer, 1845)

*Undinula* A. Scott, 1909

*U. vulgaris* (Dana, 1852)

**Familia Paracalanidae** Giesbrecht, 1892

*Acrocalanus* Giesbrecht, 1888

*A. gracilis* Giesbrecht, 1888

*A. monachus* Giesbrecht, 1888

*Calocalanus* Giesbrecht, 1888

*C. pavo* (Dana, 1849)

*Paracalanus* Boeck, 1864

*P. aculeatus* Giesbrecht, 1888

*P. parvus* (Claus, 1863)

**Familia Candaciidae** Giesbrecht, 1892

*Candacia* Dana, 1846

*C. aethiopica* Dana, 1849

*C. bipinnata* (Giesbrecht, 1889)

*C. catula* Giesbrecht, 1889

*C. columbiae* Campbell, 1929

*C. curta* (Dana, 1849)

*C. discaudata* A. Scott, 1909

*C. longimana* Claus, 1863

*C. pachydactyla* (Dana, 1849)

*C. pectinata* Giesbrecht, 1892

*C. pofi* Grice y Jones, 1960

*C. truncata* (Dana, 1849)

*Paracandacia* Grice, 1963b

*P. simplex* (Giesbrecht, 1889)

**Familia Centropagidae** Giesbrecht, 1892

*Centropages* Kroyer, 1848

*C. abdominalis* Sato, 1913

*C. bradyi* Wheeler, 1901

*C. calaninus* (Dana, 1849)

*C. elongatus* Giesbrecht, 1896

*C. furcatus* (Dana, 1849)

*C. gracilis* (Dana, 1849)

*C. longicornis* Mori, 1932

**Familia Clausocalanidae** Giesbrecht, 1892

*Clausocalanus* Giesbrecht, 1888

*C. arcuicornis* (Dana, 1849)

*C. furcatus* (Brady, 1883)

*C. jobei* Frost y Fleminger, 1968

*C. parapergens* Frost y Fleminger, 1968

*Pseudocalanus* Boeck, 1872

*P. elongatus* (Boeck, 1865)

**Familia Eucalanidae** Giesbrecht, 1892

*Eucalanus* Dana, 1852

*E. californicus* Johnson, 1938

*Eucalanus elongatus* (Dana, 1849)

*P. sewelli* (Fleminger, 1973)

*Rhincalanus* Dana, 1852

*R. nasutus* Giesbrecht, 1888

*Subeucalanus* Geletin, 1976

*S. mucronatus* (Giesbrecht, 1888)

*S. pileatus* (Giesbrecht, 1888)

*S. subcrassus* (Giesbrecht, 1888)

*S. subtenuis* (Giesbrecht, 1888)

**Familia Euchaetidae** Giesbrecht, 1892

*Euchaeta* Philippi, 1843

*E. indica* Wolfenden, 1905

*E. longicornis* Giesbrecht, 1888

*E. marina* (Prestandrea, 1833)

*E. media* Giesbrecht, 1888

*E. plana* Mori, 1973

**Familia Heterorhabdidae** Sars, 1903

*Heterorhabdus* Giesbrecht, 1892

*H. papilliger* Claus, 1863

*Heterostylites* Sars, 1920

*H. longicornis* (Giesbrecht, 1889)

**Familia Lucicutiidae** Sars, 1903

*Lucicutia* Giesbrecht y Schmeil, 1898

*L. flavicornis* (Claus, 1863)

*L. pacifica* Brodsky, 1950

**Familia Metridinidae** Sars, 1902

*Gaussia* Wolfenden, 1905

*G. princeps* (T. Scott, 1893)

*Metridia* Boeck, 1864

*M. pacifica* Brodsky, 1950

*M. princeps* Giesbrecht, 1889

*Pleuromamma* Giesbrecht, 1898

*P. abdominalis* (Lubbock, 1856)

*P. borealis* (Dahl, 1893)

*P. gracilis* (Claus, 1863)

*P. quadrungulata* (Dahl, 1893)

*P. xiphias* (Giesbrecht, 1889)

**Familia Mecynoceridae** Andronov, 1973

*E. hyalinus* (Claus, 1866)  
*Pareucalanus* Geletin, 1976

**Familia Phaennidae** Sars, 1902

*Cephalophanes* Sars, 1907  
*C. tectus* (Esterly, 1911)  
*Phaenna* Claus, 1863  
*P. spinifera* Claus, 1863

**Familia Pontellidae** Dana, 1852

*Lahidocera* Lubbock, 1853  
*L. acuta* (Dana, 1849)  
*L. acutifrons* (Dana, 1849)  
*L. detruncata* (Dana, 1849)  
*L. diandra* Fleminger, 1967  
*L. johnsoni* Fleminger, 1964  
*L. jollae* Esterly, 1906  
*L. kolpos* Fleminger, 1967  
*L. minuta* Giesbrecht, 1889  
*L. trispinosa* Esterly, 1905  
*Pontella* Dana, 1846  
*P. fera* Dana, 1849  
*P. securifer* Brady, 1883  
*P. spinicauda* Mori, 1937  
*P. agassizii* Giesbrecht, 1895  
*Pontellina* Dana, 1852  
*P. plumata* (Dana, 1849)  
*Pontellopsis* Brady, 1883  
*P. regalis* (Dana, 1849)  
*P. tenuicauda* (Giesbrecht, 1889)  
*P. armata* Giesbrecht, 1889  
*P. brevis* Giesbrecht, 1889  
*P. occidentalis* Esterly, 1906  
*P. yamadae* Mori, 1913

**Familia Pseudodiaptomidae** Sars, 1902

*Pseudodiaptomus* Herrick, 1884  
*P. culebrensis* Marsh, 1913  
*P. euryhalinus* Johnson, 1939  
*P. wrighti* Johnson, 1964

**Familia Scolecithricidae** Giesbrecht, 1892

*Lophothrix* Giesbrecht, 1895  
*L. frontalis* Giesbrecht, 1895

*Mecynocera* Thompson, 1888  
*M. clausi* Thompson, 1888

*Scolecithricella* Sars, 1902

*S. ctenopus* Giesbrecht, 1888  
*Scolecithrix* Brady, 1883  
*S. bradyi* Giesbrecht, 1888  
*S. danae* (Lubbock, 1856)  
*Scottocalanus* Sars, 1905  
*S. helenae* (Lubbock, 1856)  
*S. securifrons* (T. Scott, 1894)

**Familia Temoridae** Giesbrecht, 1892

*Temora* Baird, 1850  
*T. discaudata* Giesbrecht, 1889

**Superorden Podoplea** Giesbrecht, 1892

**Orden Cyclopoida** Burmeister, 1843

**Familia Oithonidae** Dana, 1853

*Oithona* Baird, 1843  
*O. attenuata* Farran, 1913  
*O. decipiens* Farran, 1913  
*O. fallax* Farran, 1913  
*O. nana* Giesbrecht, 1892  
*O. plumifera* Baird, 1843  
*O. rigida* Giesbrecht, 1896  
*O. robusta* Giesbrecht, 1891  
*O. setigera* (Dana, 1849)  
*O. similis* Claus, 1863  
*O. tenuis* Rosendorn, 1917

**Orden Harpacticoida** Sars, 1903

**Familia Clytemnestridae** A. Scott, 1909

*Clytemnestra* Dana, 1848  
*C. rostrata* (Brady, 1883)  
*C. scutellata* Dana, 1848

**Familia Ectinosomatidae** Oloffson, 1917

*Microsetella* Brady y Robertson, 1873  
*M. rosea* (Dana, 1848)

**Familia Miraciidae** Dana, 1846

*Macrosetella* A. Scott, 1909

*L. quadrispinosa* Wolfenden, 1911

*M. gracilis* (Dana, 1848)

**Familia Tachidiidae** Boeck, 1864

*Euterpina* Norman, 1903

*E. acutifrons* (Dana, 1848)

**Orden Poecilostomatoida** Thorell, 1859

**Familia Clausidiidae** Embleton, 1901

*Saphirella* T. Scott, 1894

*S. tropica* Wolfenden, 1906

**Familia Corycaeidae** Dana, 1849

*Corycaeus* Dana, 1846

Subgénero *Agetus* Kroyer, 1849

*C. (A.) flaccus* Giesbrecht, 1891

*C. (A.) typicus* (Kroyer, 1849)

Subgénero *Corycaeus* Dana, 1845

*C. (C.) affinis* McMurrich, 1916

*C. (C.) crassiusculus* Dana, 1848

*C. (C.) speciosus* Dana, 1849

Subgénero *Ditrichocorycaeus* M. Dahl, 1912

*C. (D.) amazonicus* F. Dahl, 1894

*C. (D.) trukicus* Mori, 1937

Subgénero *Monocorycaeus* M. Dahl, 1912

*C. (M.) robustus* Giesbrecht, 1891

Subgénero *Onychocorycaeus* M. Dahl, 1912

*C. (O.) catus* F. Dahl, 1894

*C. (O.) latus* Dana, 1848

*C. (O.) ovalis* Claus, 1863

*C. (O.) pacificus* F. Dahl, 1894

Subgénero *Urocorycaeus* M. Dahl, 1912

*C. (U) furcifer* Claus, 1863

*C. (U) lautus* Dana, 1848

*C. (U.) longistylis* Dana, 1848

*Farranula* Wilson, 1936

*F. gibbula* (Giesbrecht, 1891)

**Familia Oncaeidae** Giesbrecht, 1892

*Lubbockia* Claus, 1863

*L. aculeata* Giesbrecht, 1891

*L. squillimana* Claus, 1863

*Oncaea* Philippi, 1843

*O. conifera* Giesbrecht, 1891

*O. media* Giesbrecht, 1891

*O. venusta* Philippi, 1843

*Pachos* Stebbing, 1910

*P. punctatum* (Claus, 1863)

**Familia Sapphirinidae** Thorell, 1859

*Copilia* Dana, 1852

*C. longistylis* Mori, 1932

*C. mirabilis* Dana, 1849

*C. quadrata* Dana, 1852

*C. vitrea* (Haeckel, 1864)

*Sapphirina* Thompson, 1829

*S. augusta* Dana, 1849

*S. darwinii* Haeckel, 1864

*S. gastrica* Giesbrecht, 1891

*S. gemma* Dana, 1849

*S. intestinata* Giesbrecht, 1891

*S. metallina* Dana, 1849

*S. nigromaculata* Claus, 1863

*S. opalina* Dana, 1849

*S. scarlata* Giesbrecht, 1892

*S. stellata* Giesbrecht, 1891

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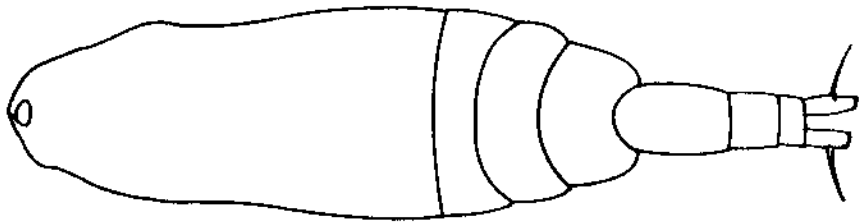
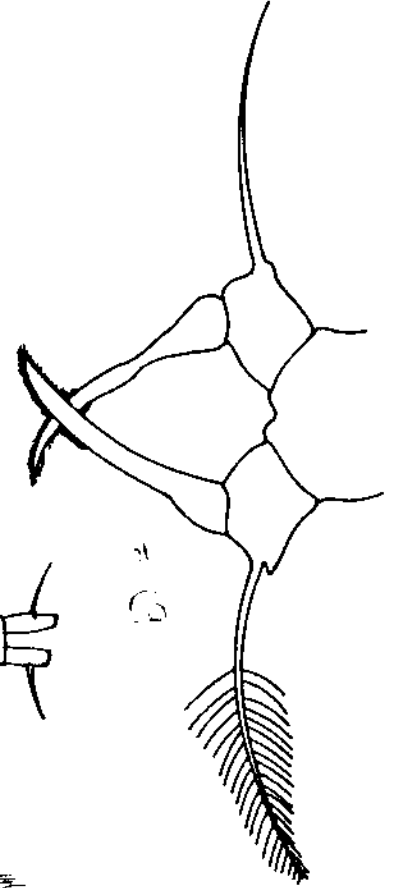


Fig. 1



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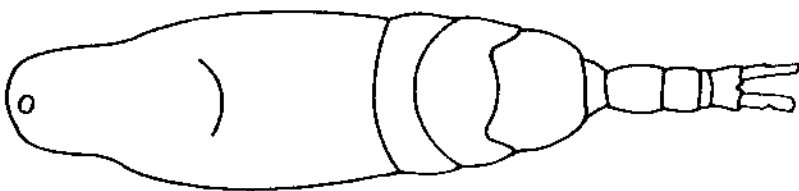
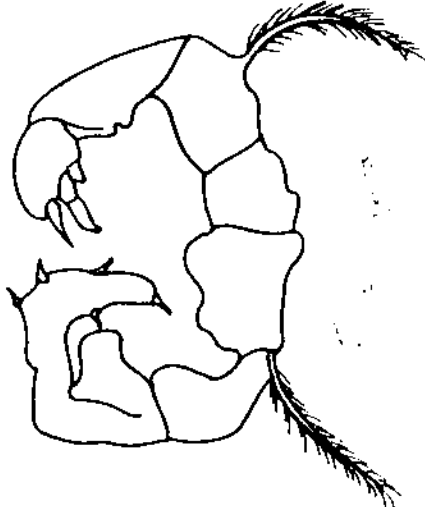
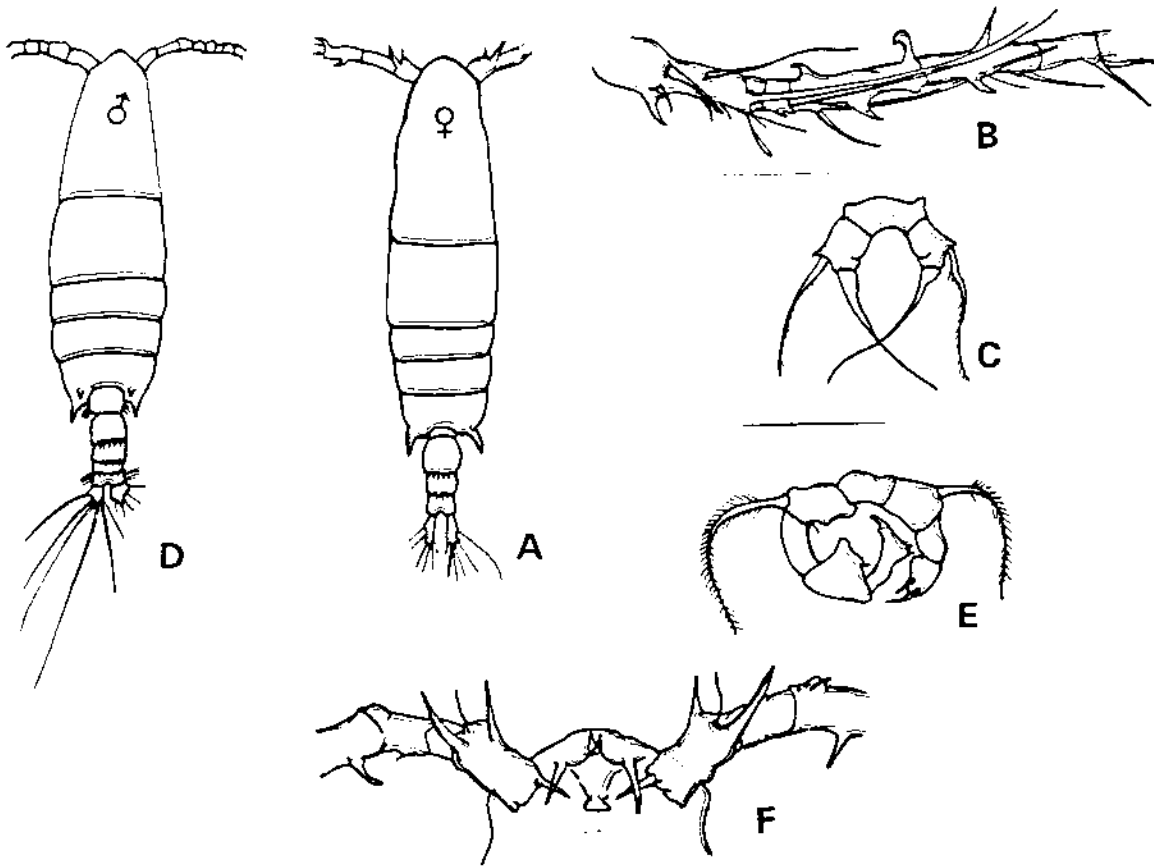
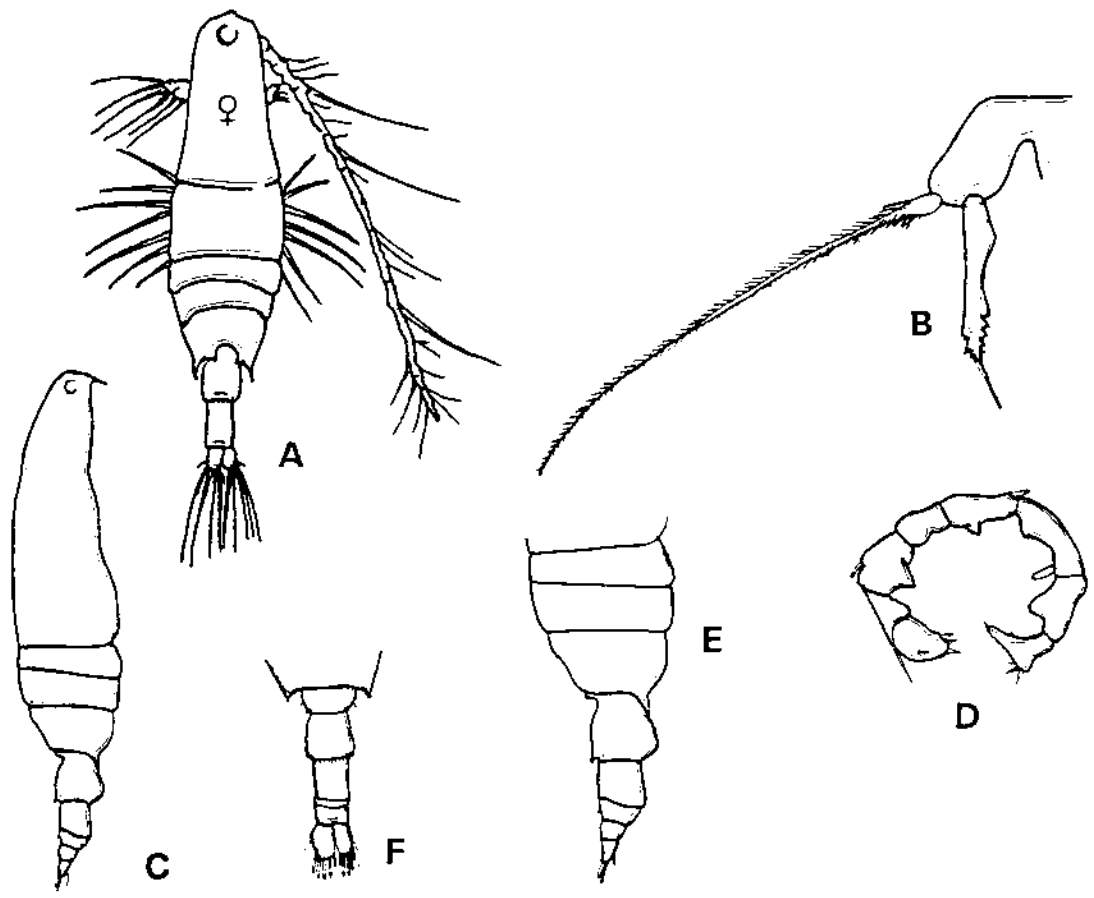
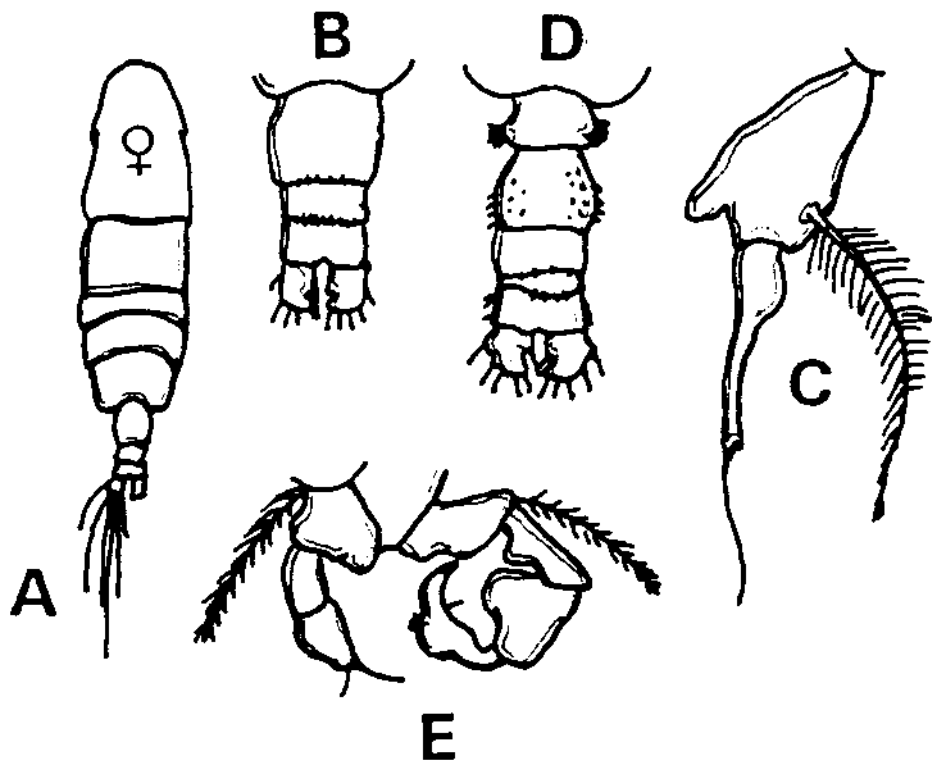


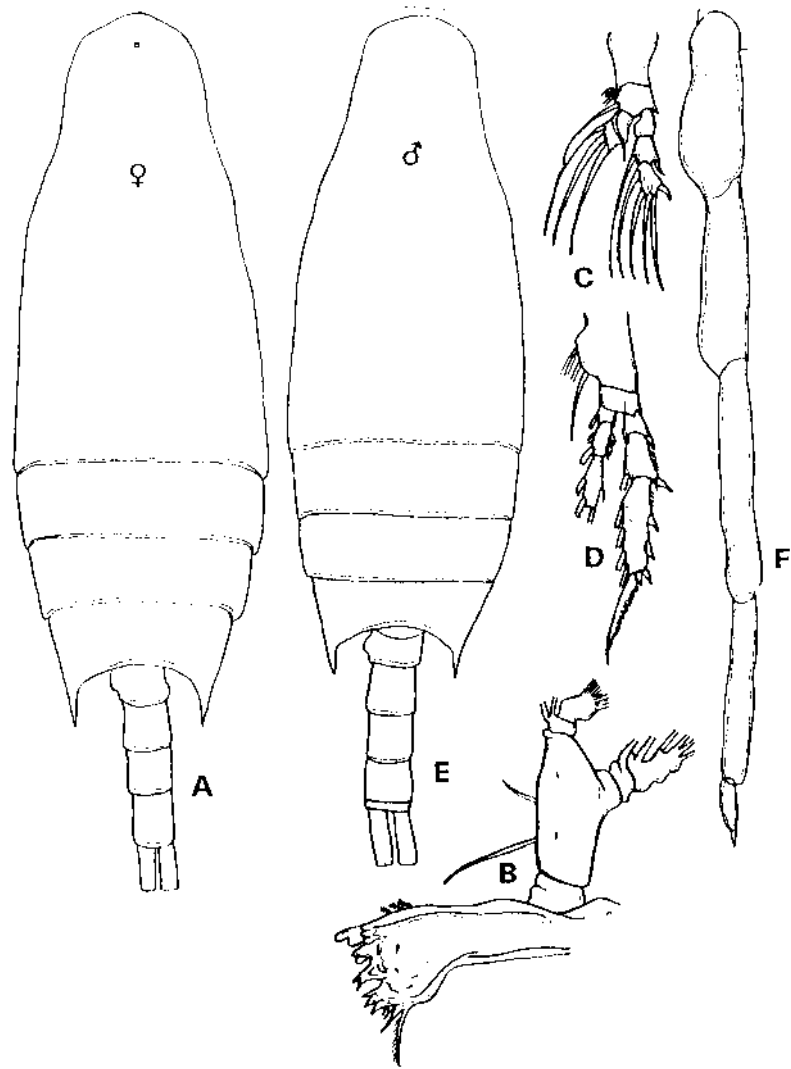
Fig. 2



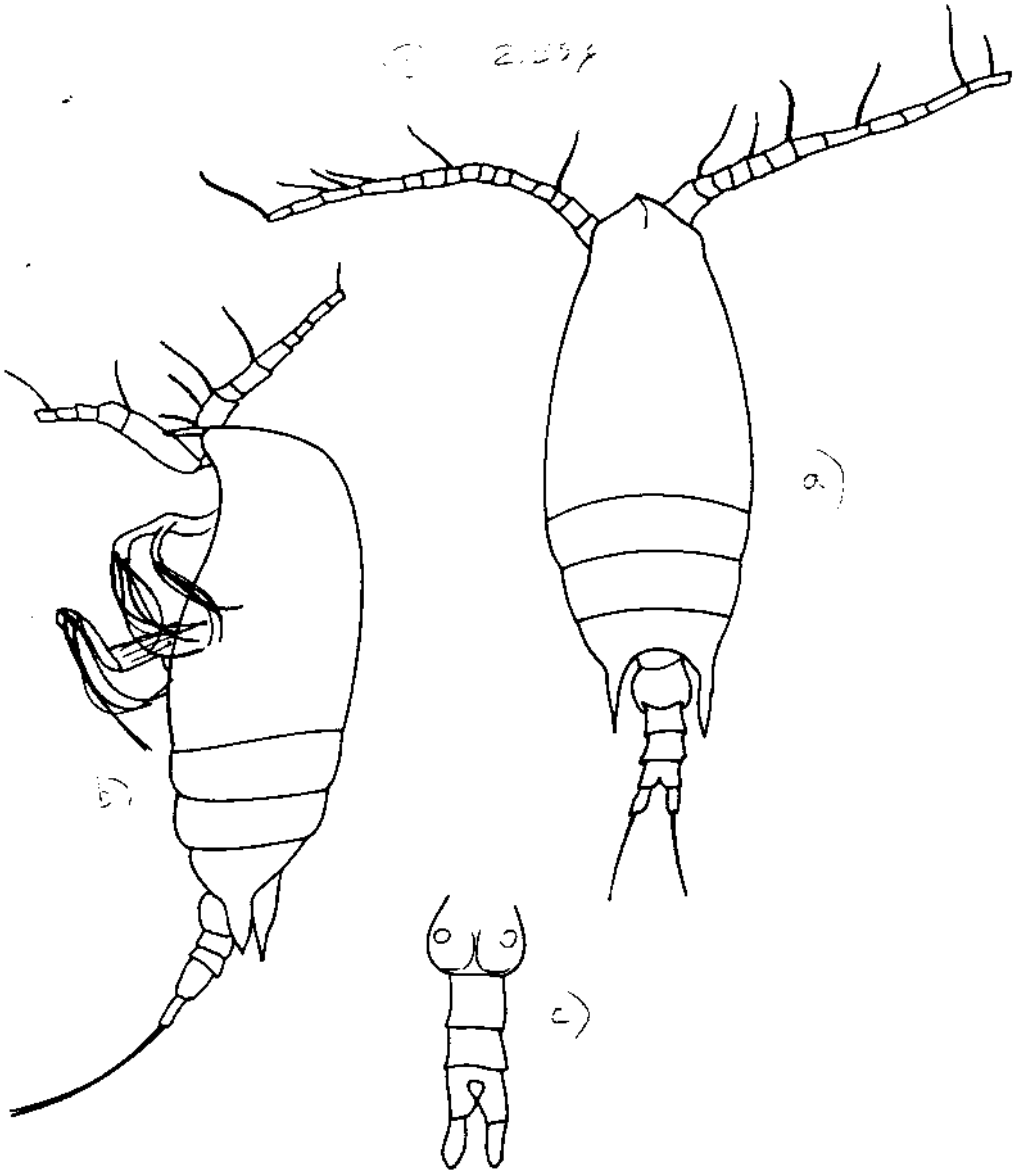


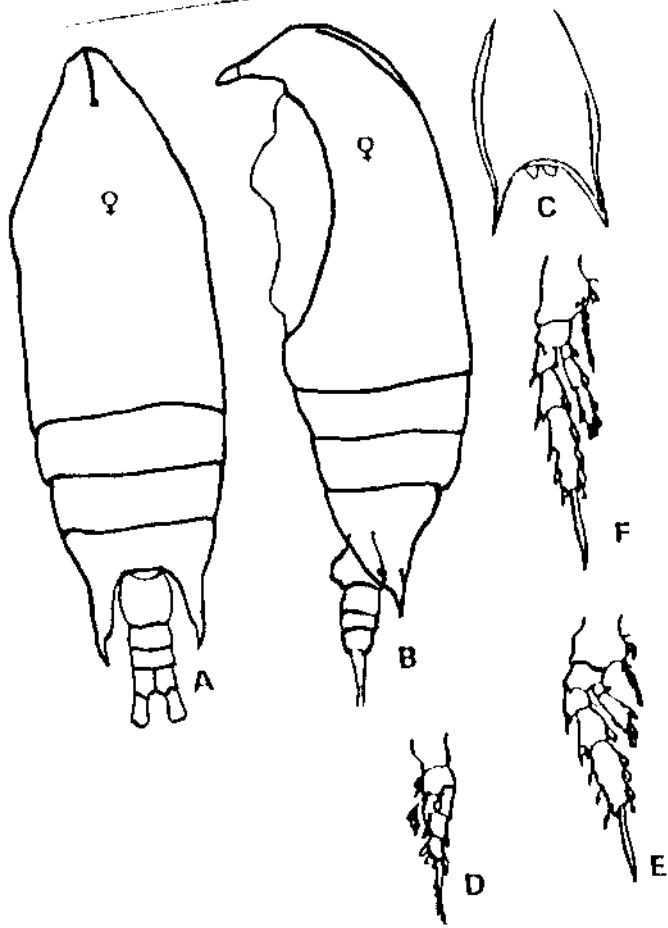


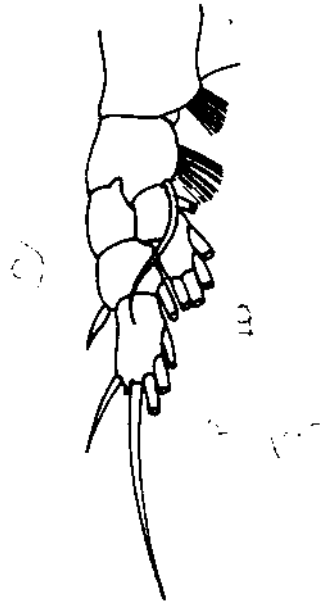
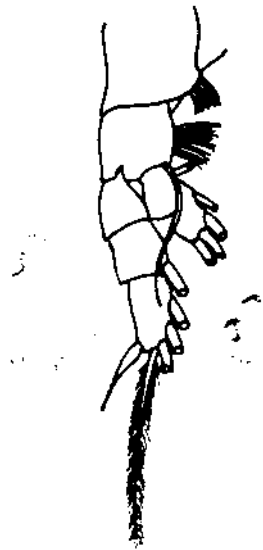
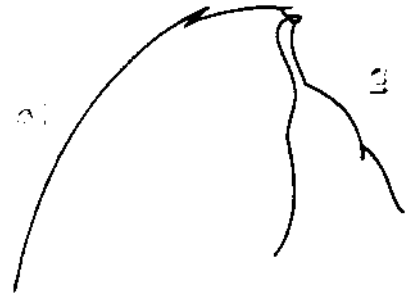
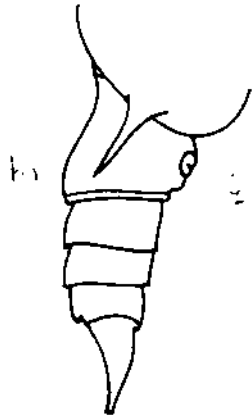
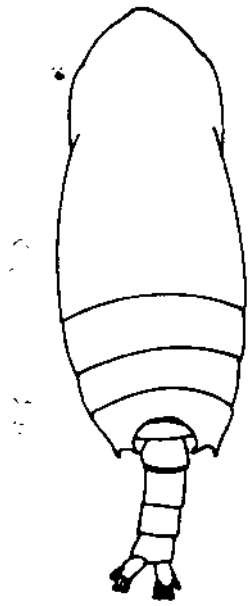


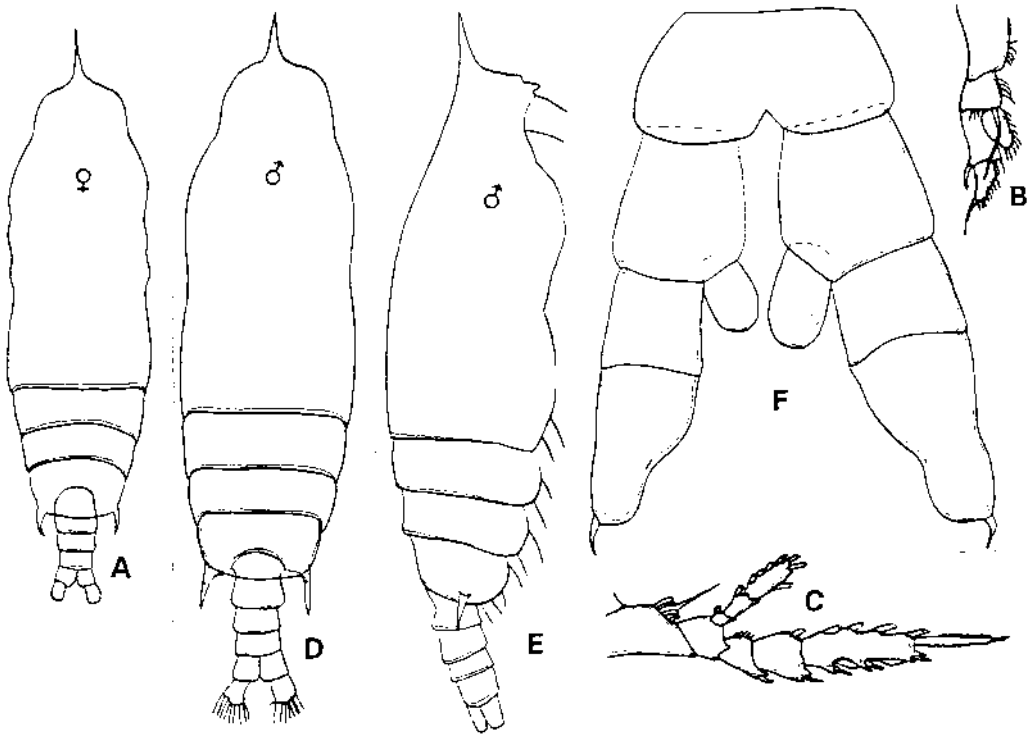


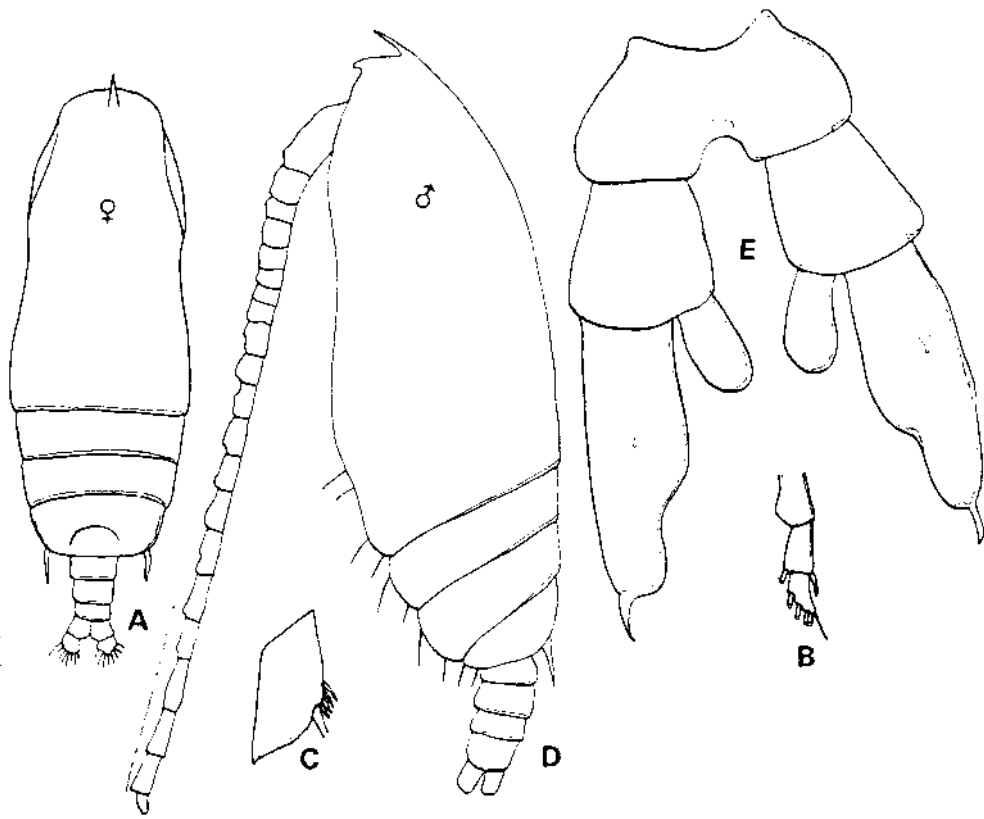
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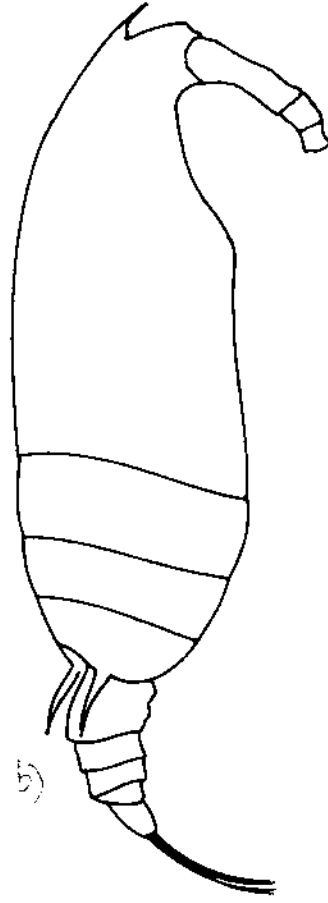
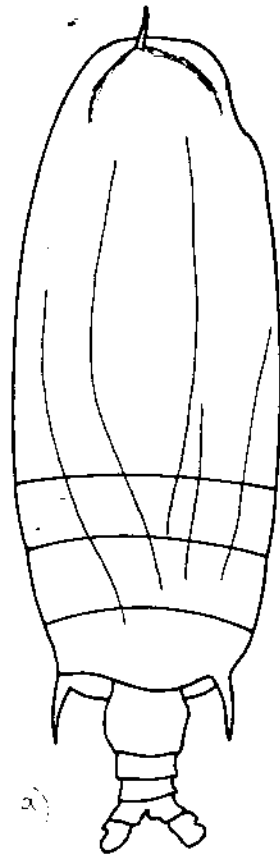


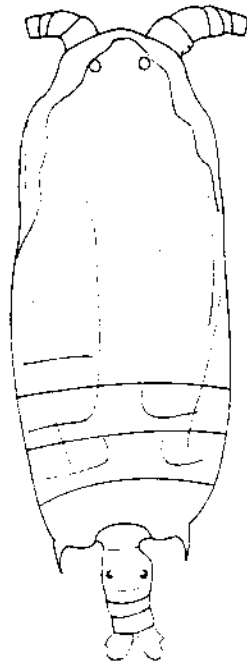
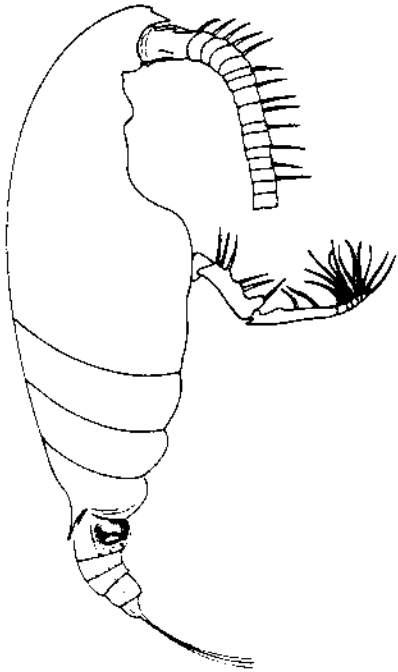




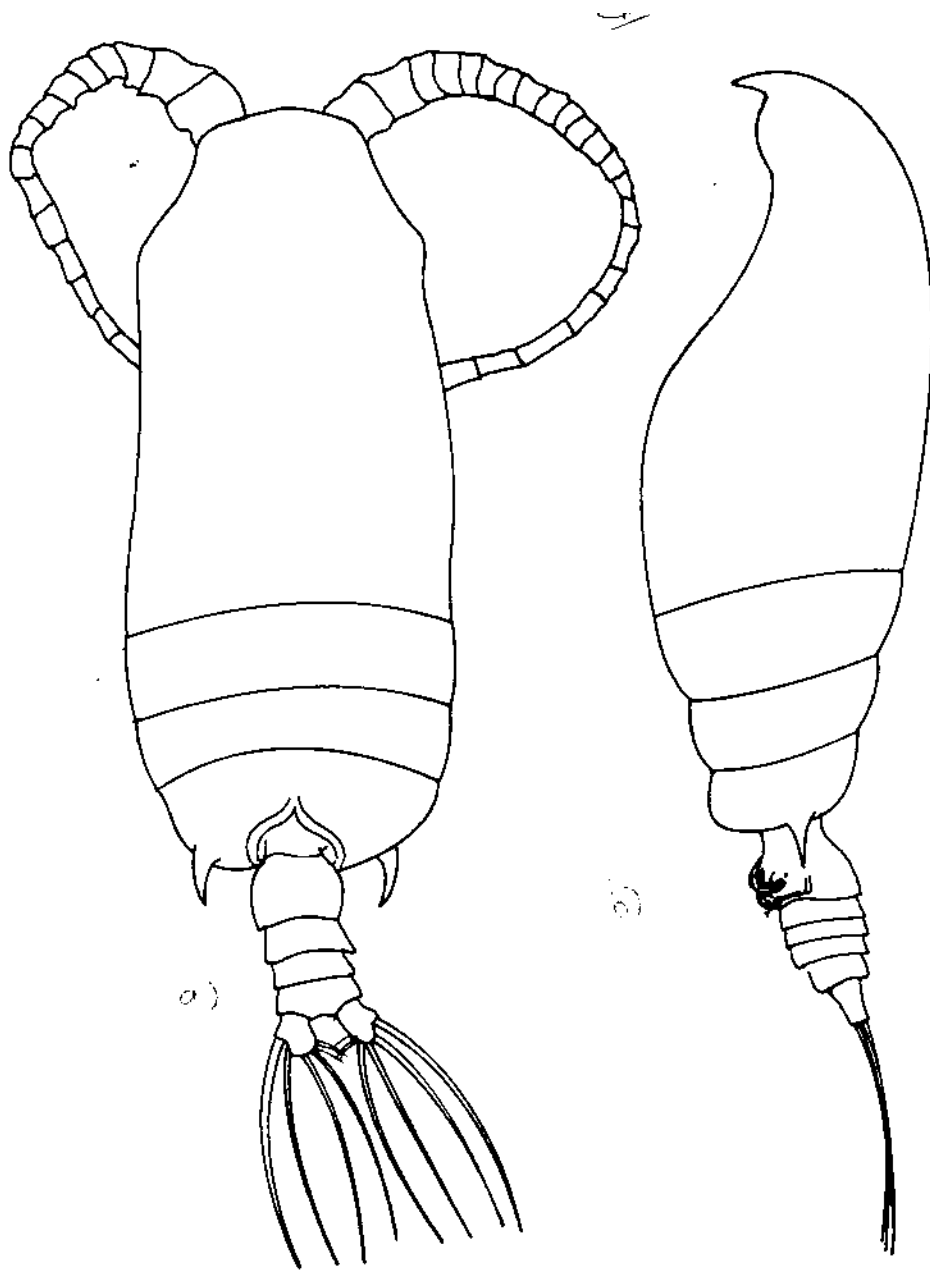


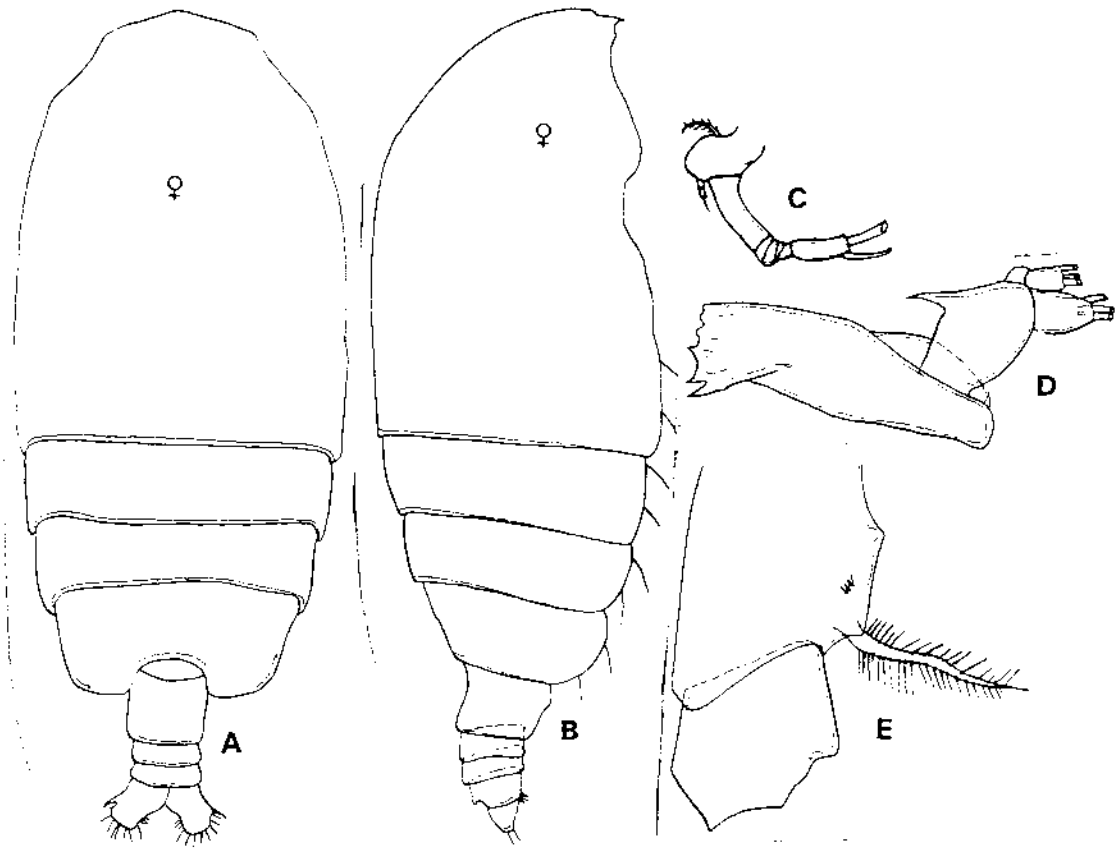


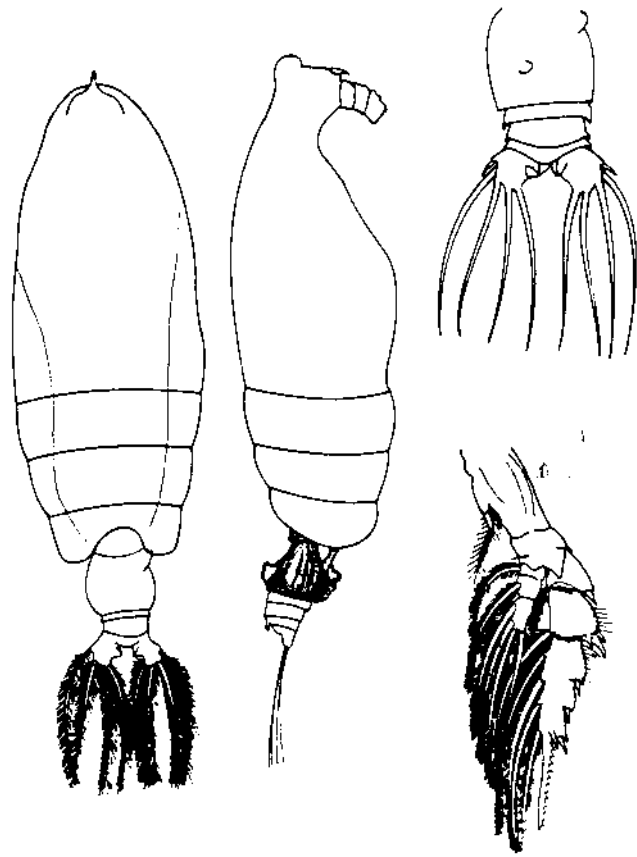


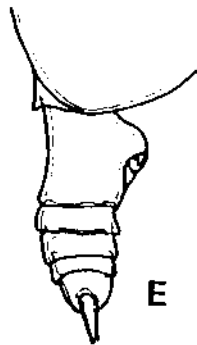
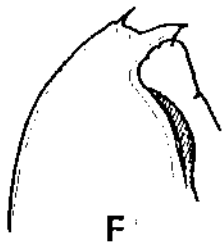
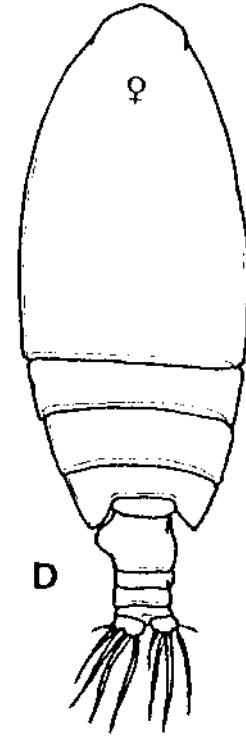
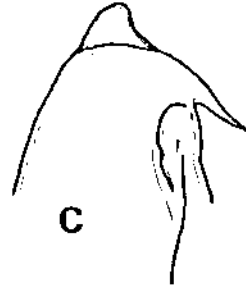
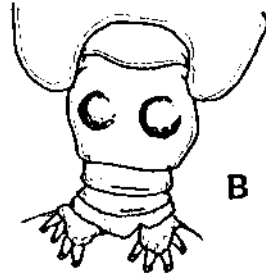
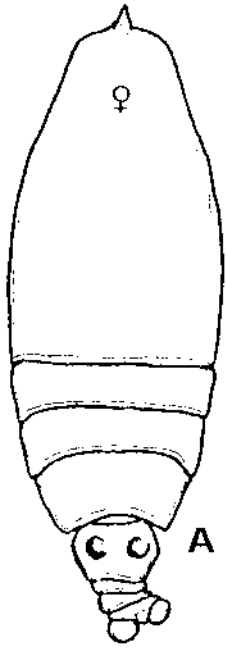












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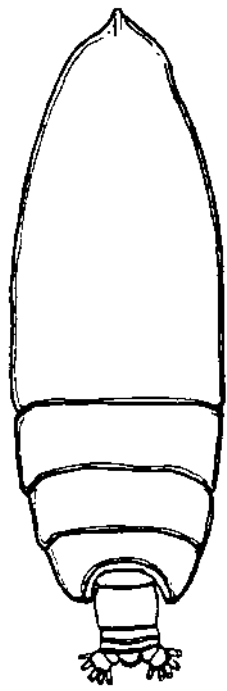
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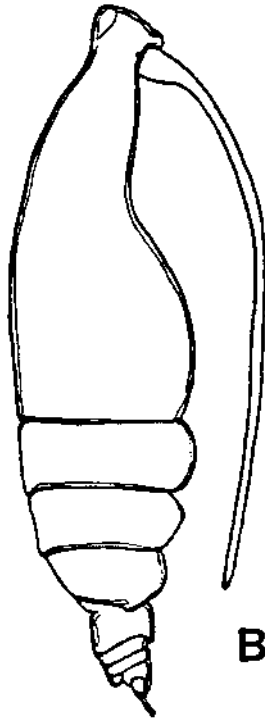
A

B

C



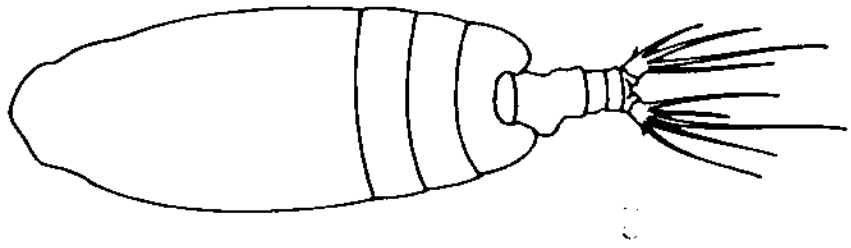
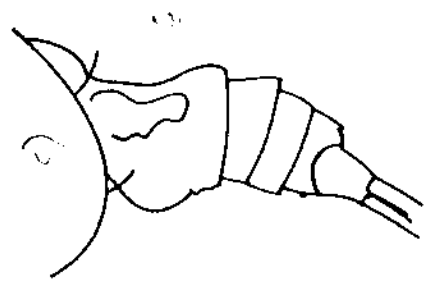
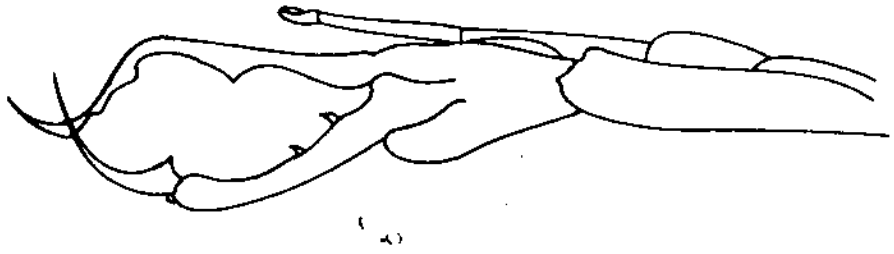
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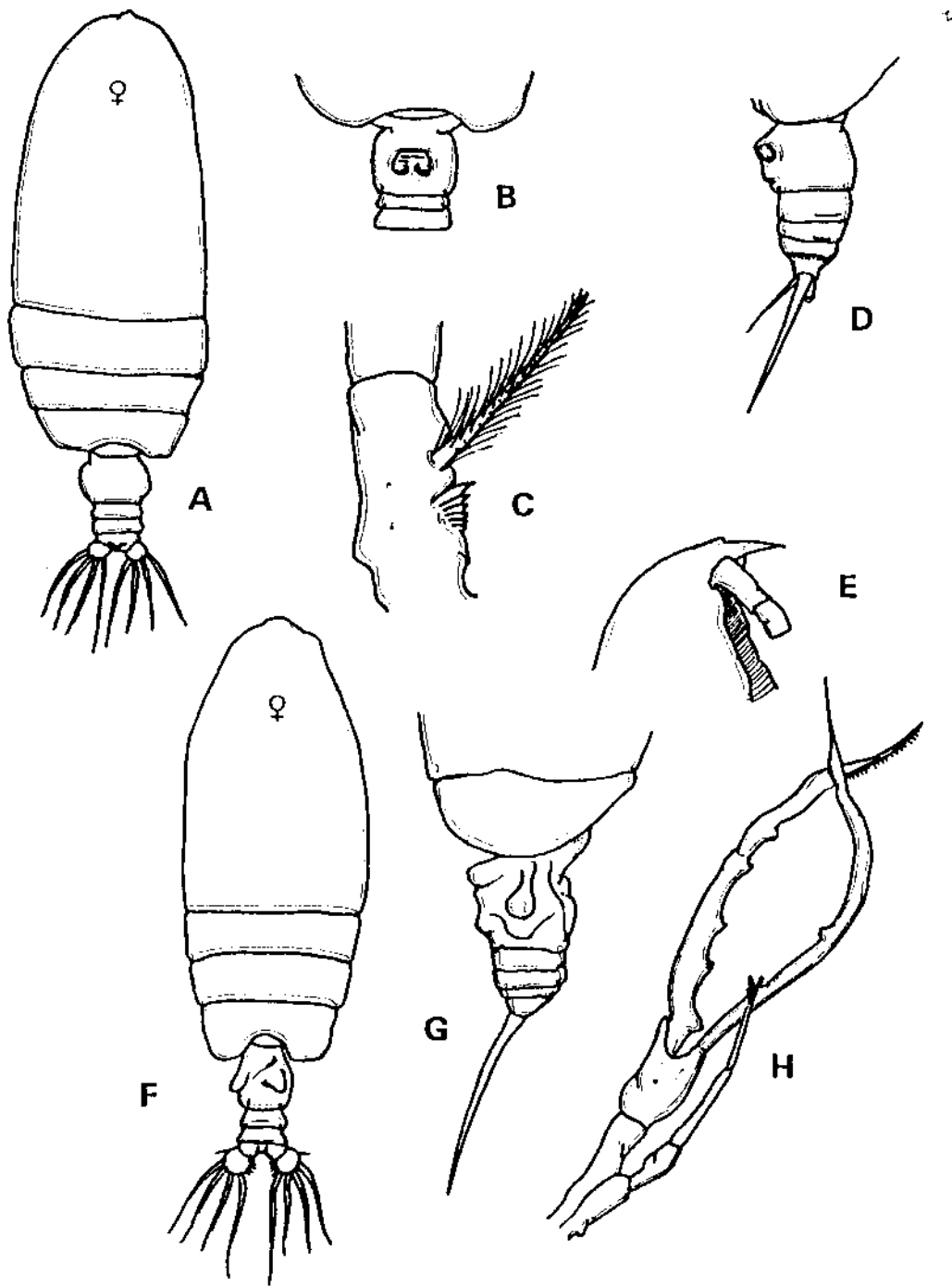


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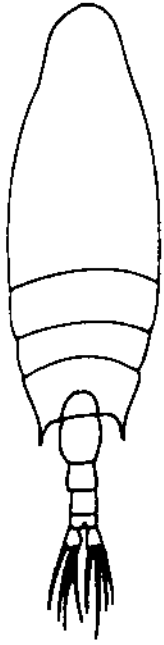


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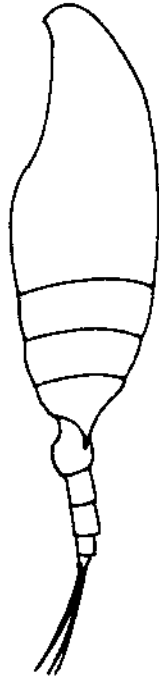




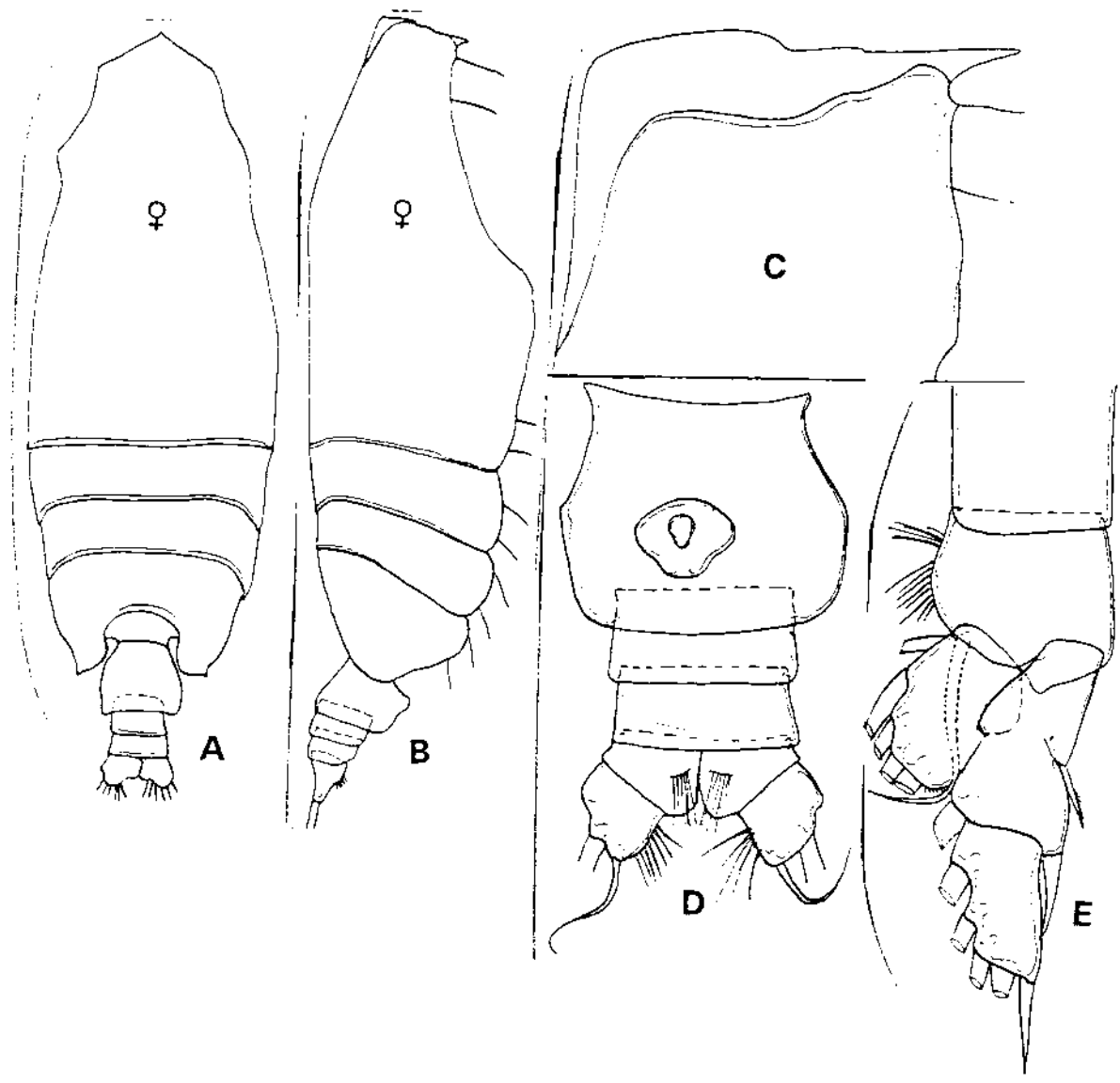
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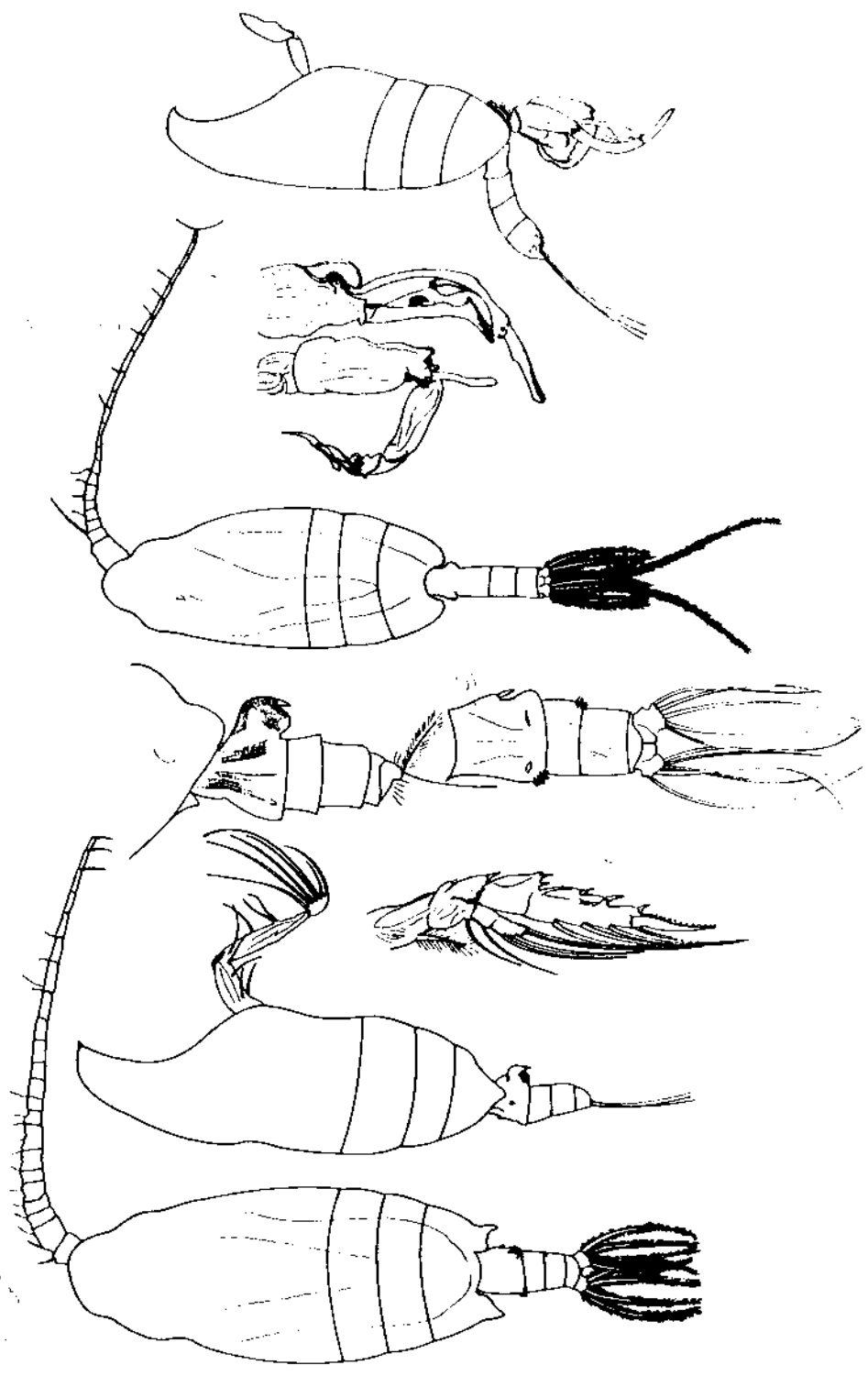


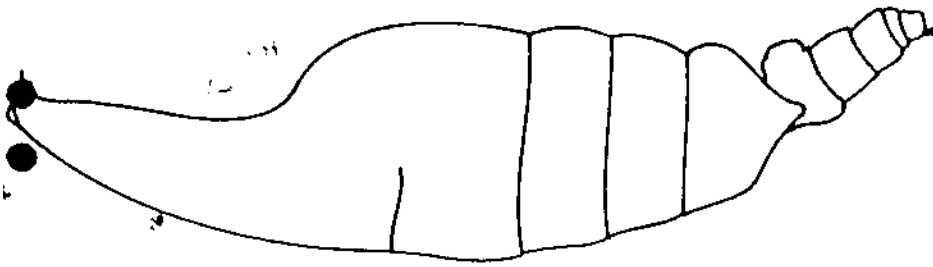
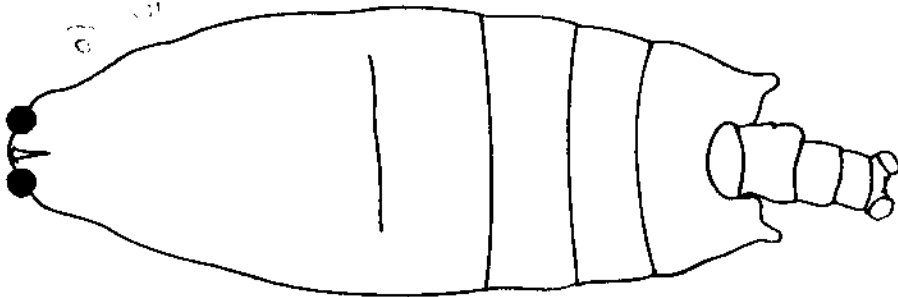
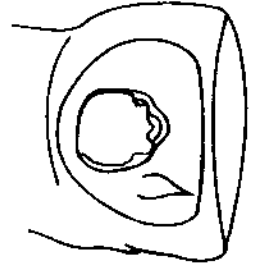
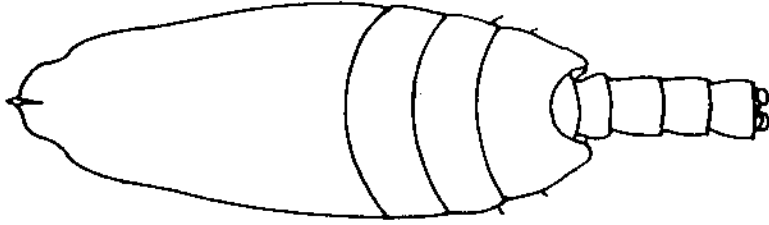
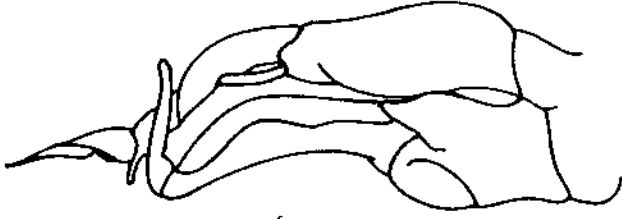
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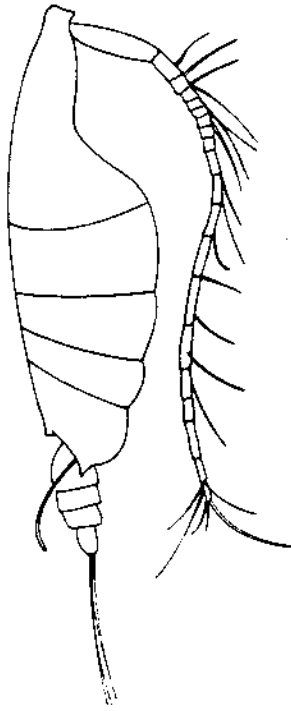
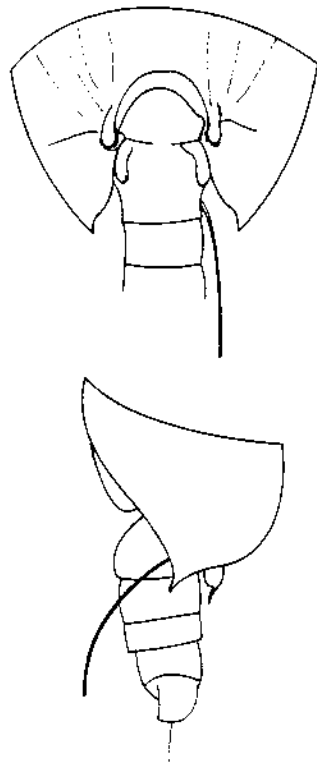
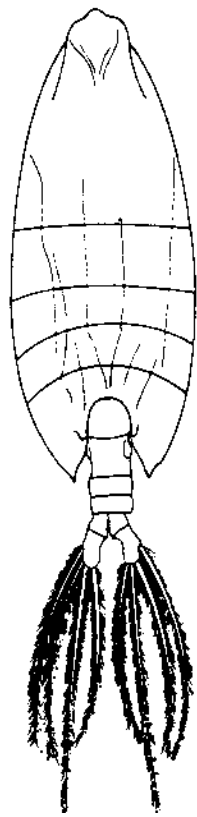


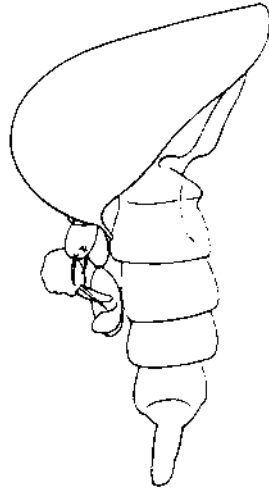
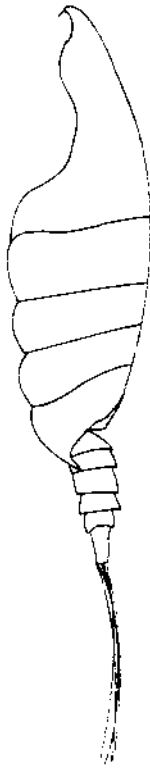
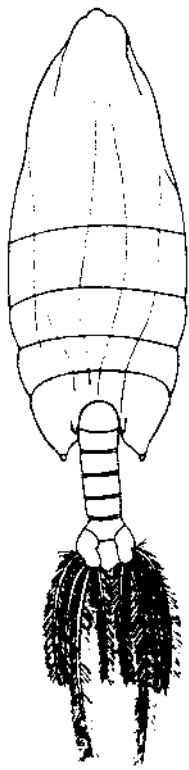


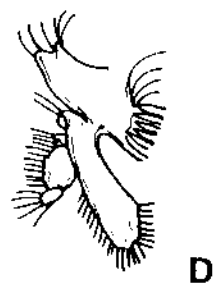
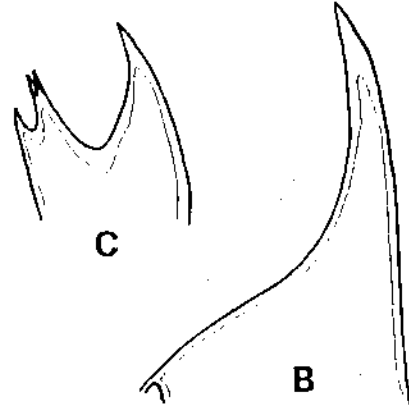
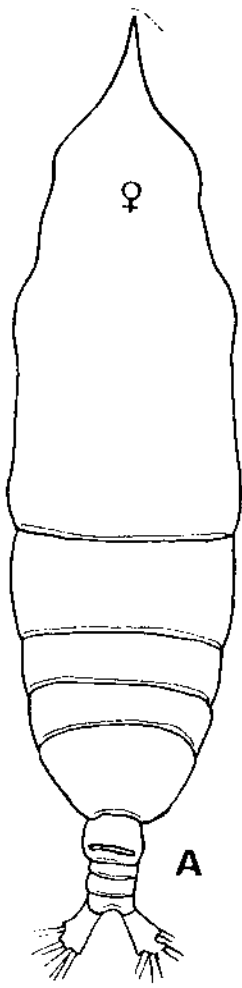


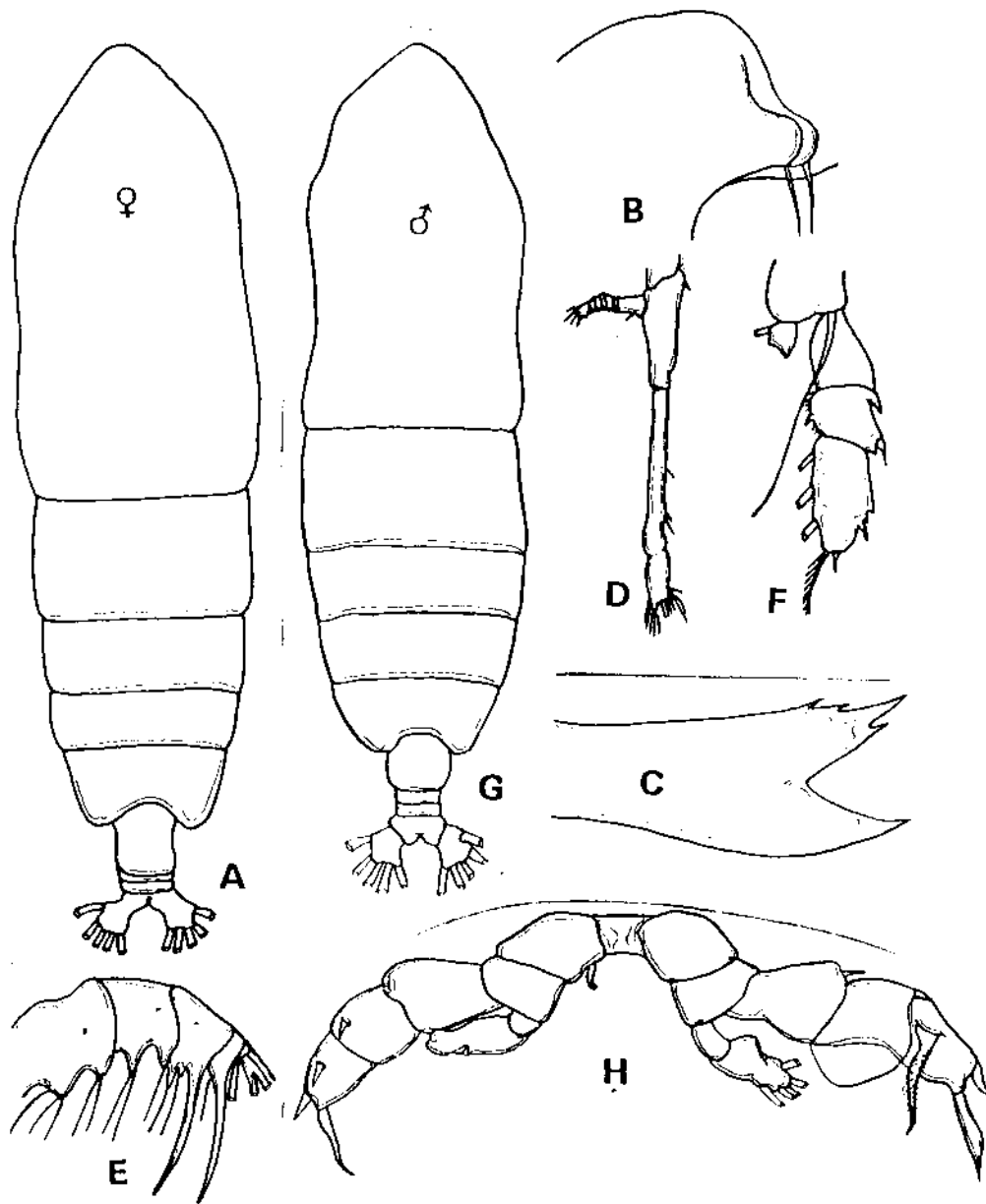


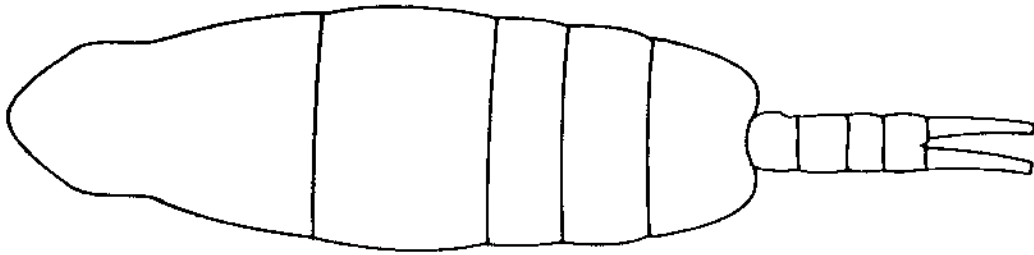
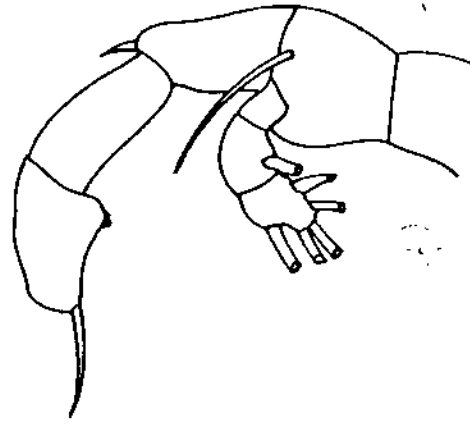
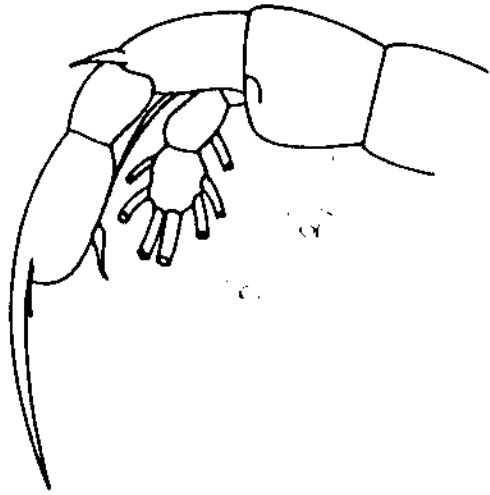




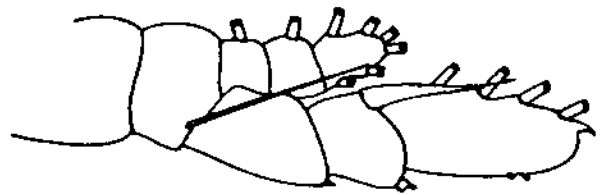




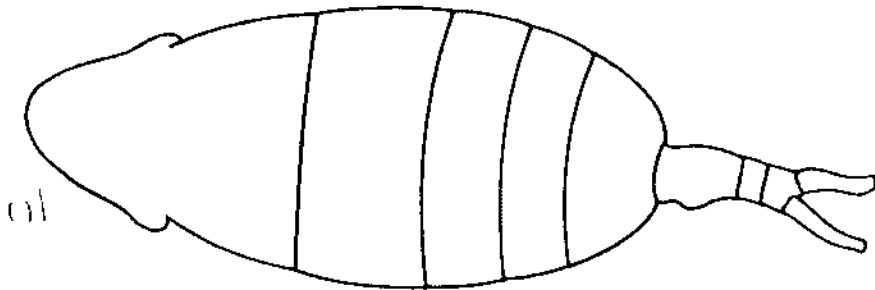
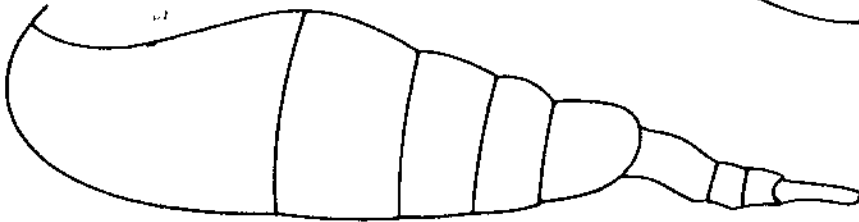




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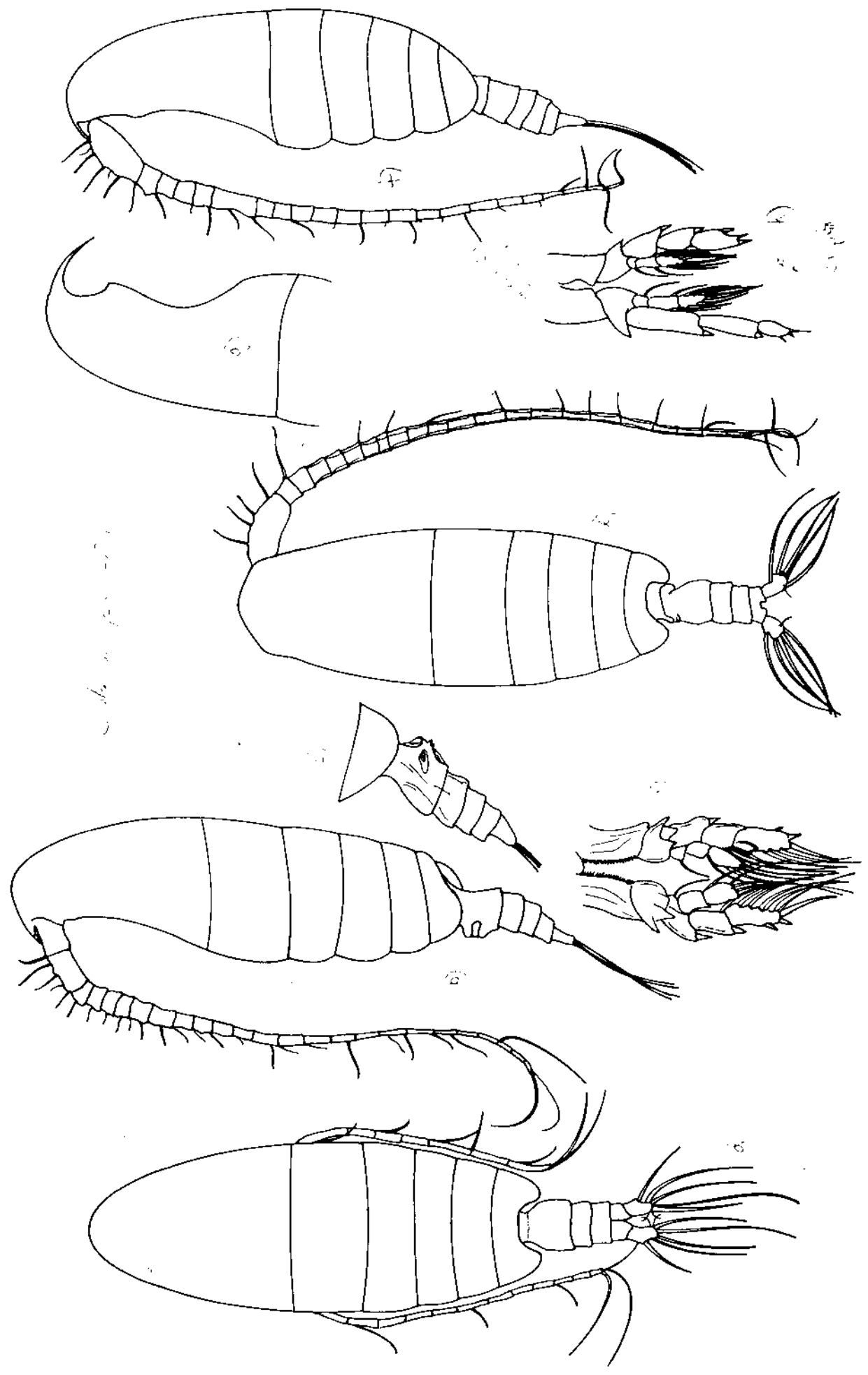


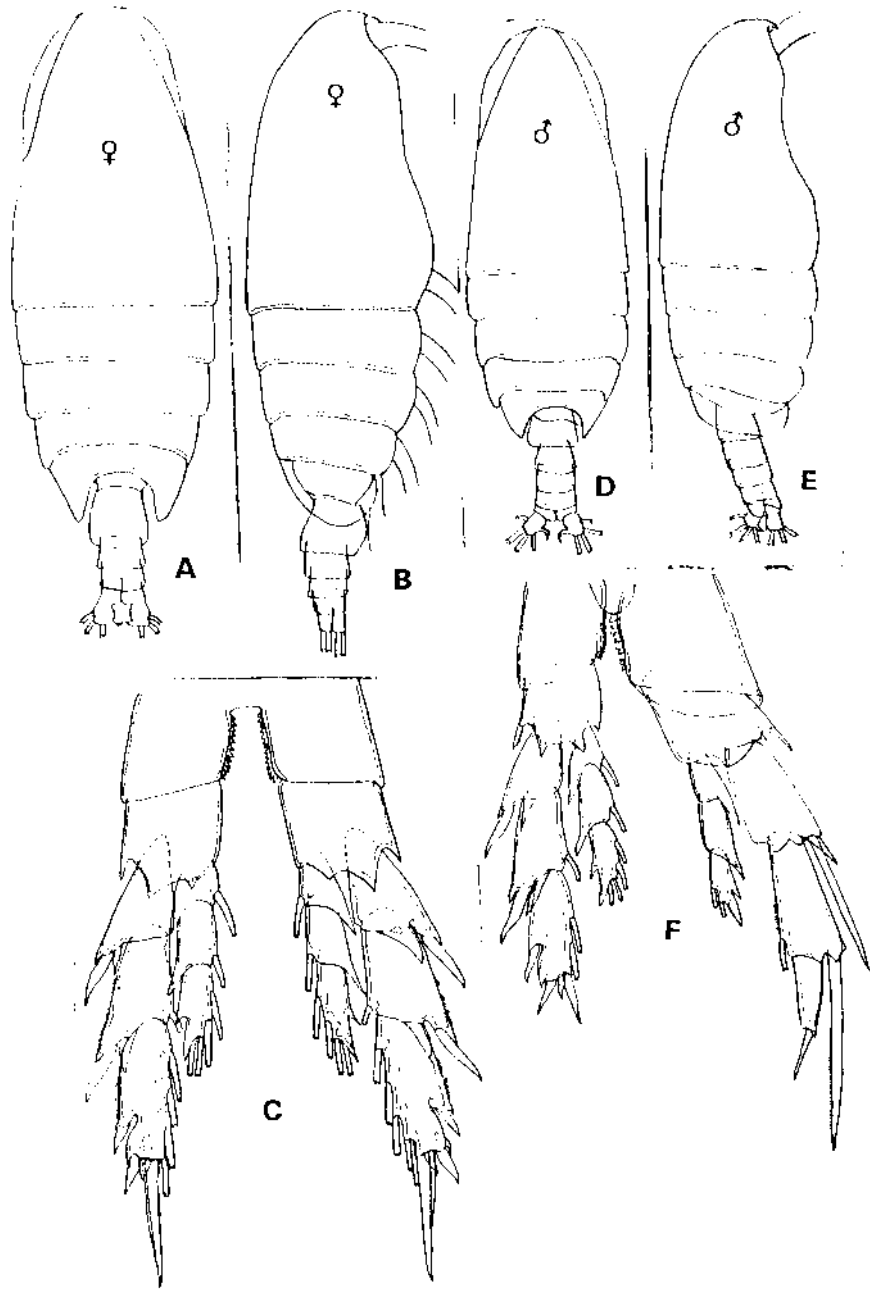
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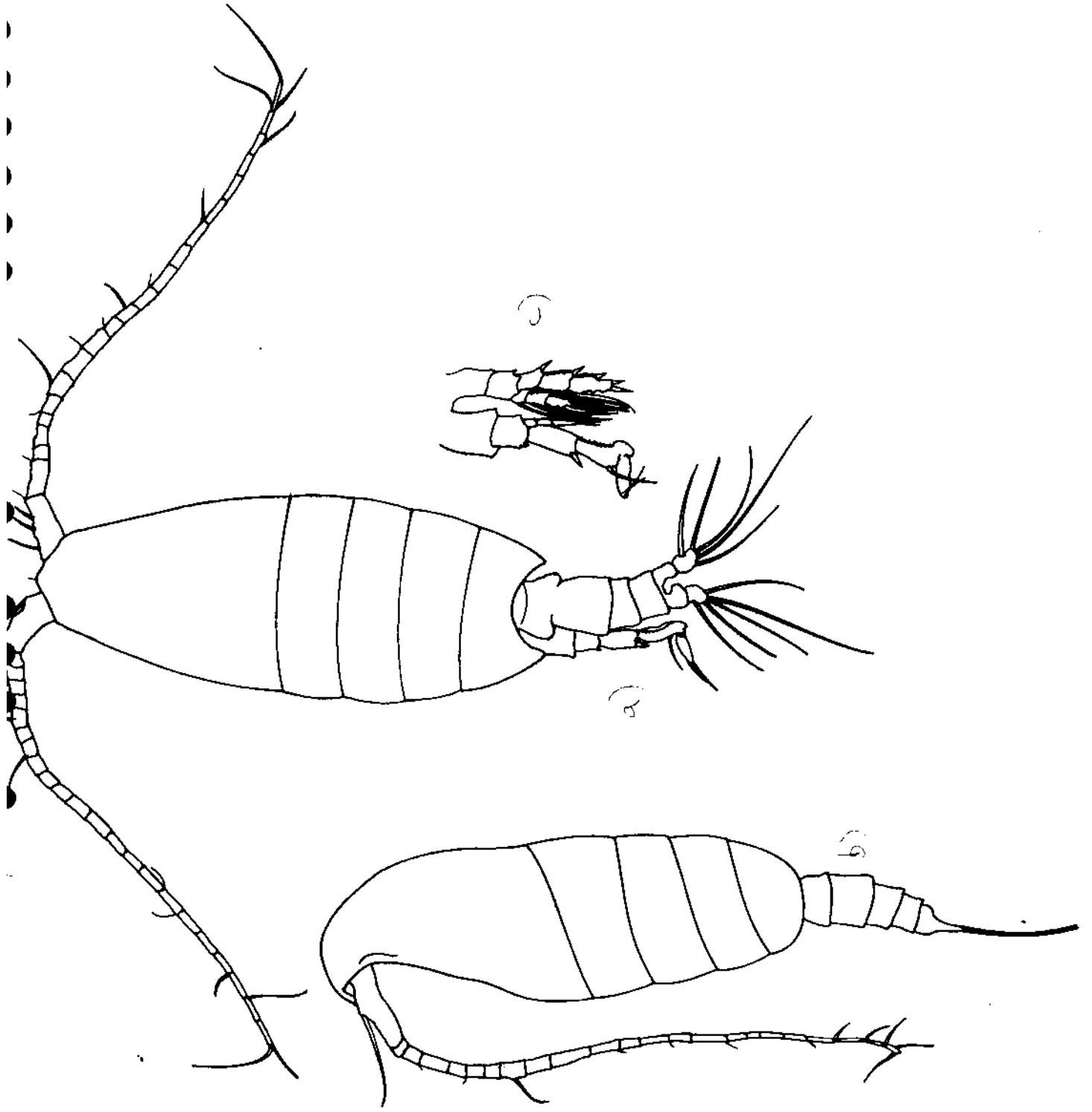


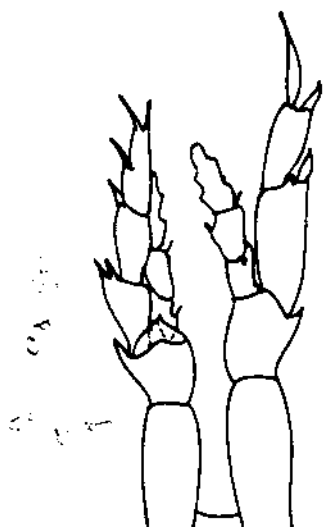
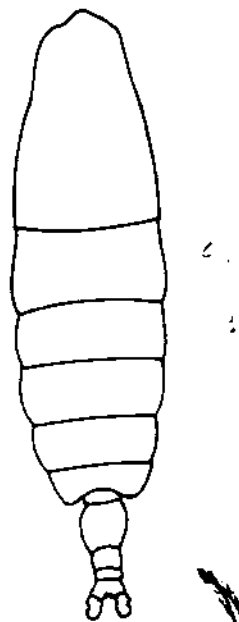
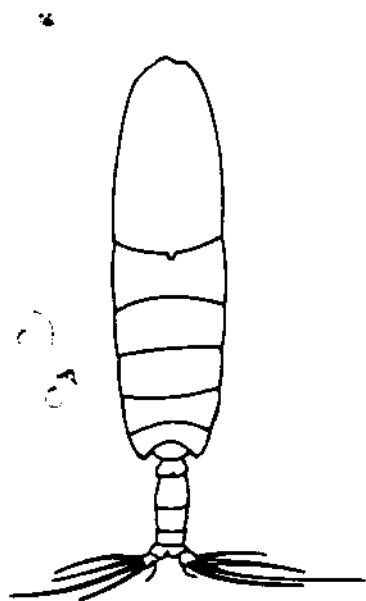
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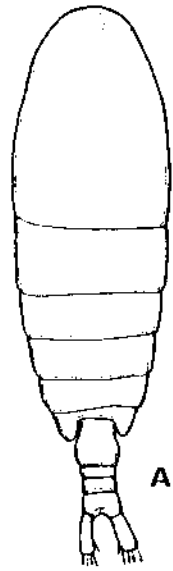




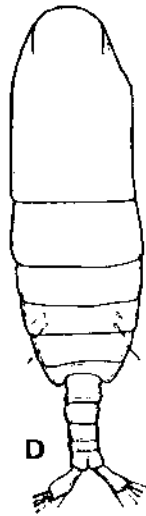




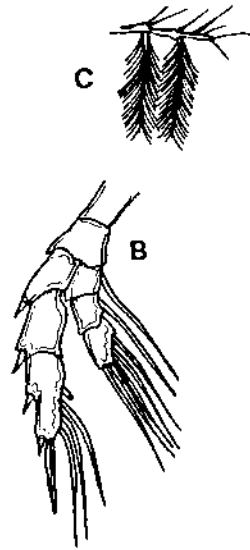
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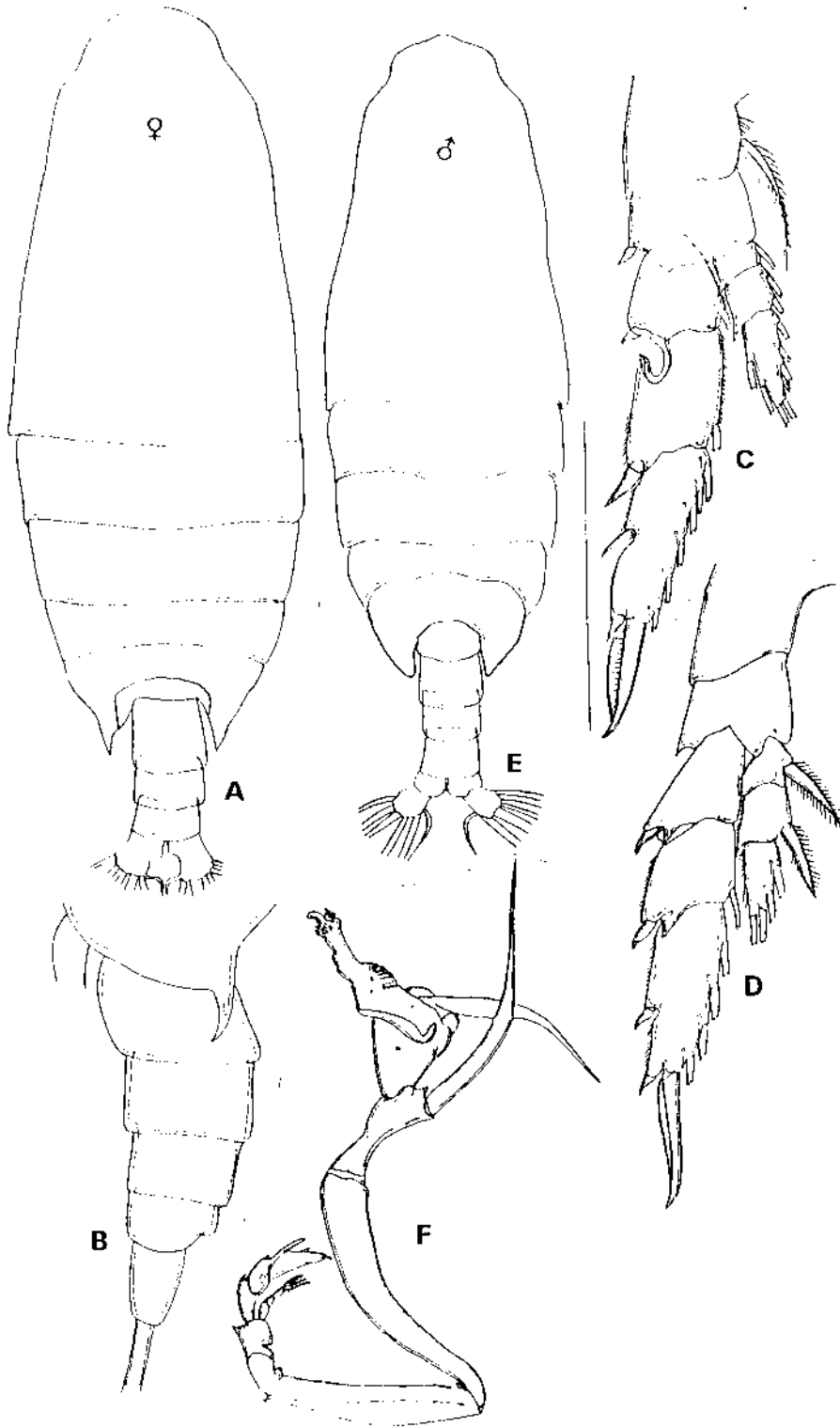


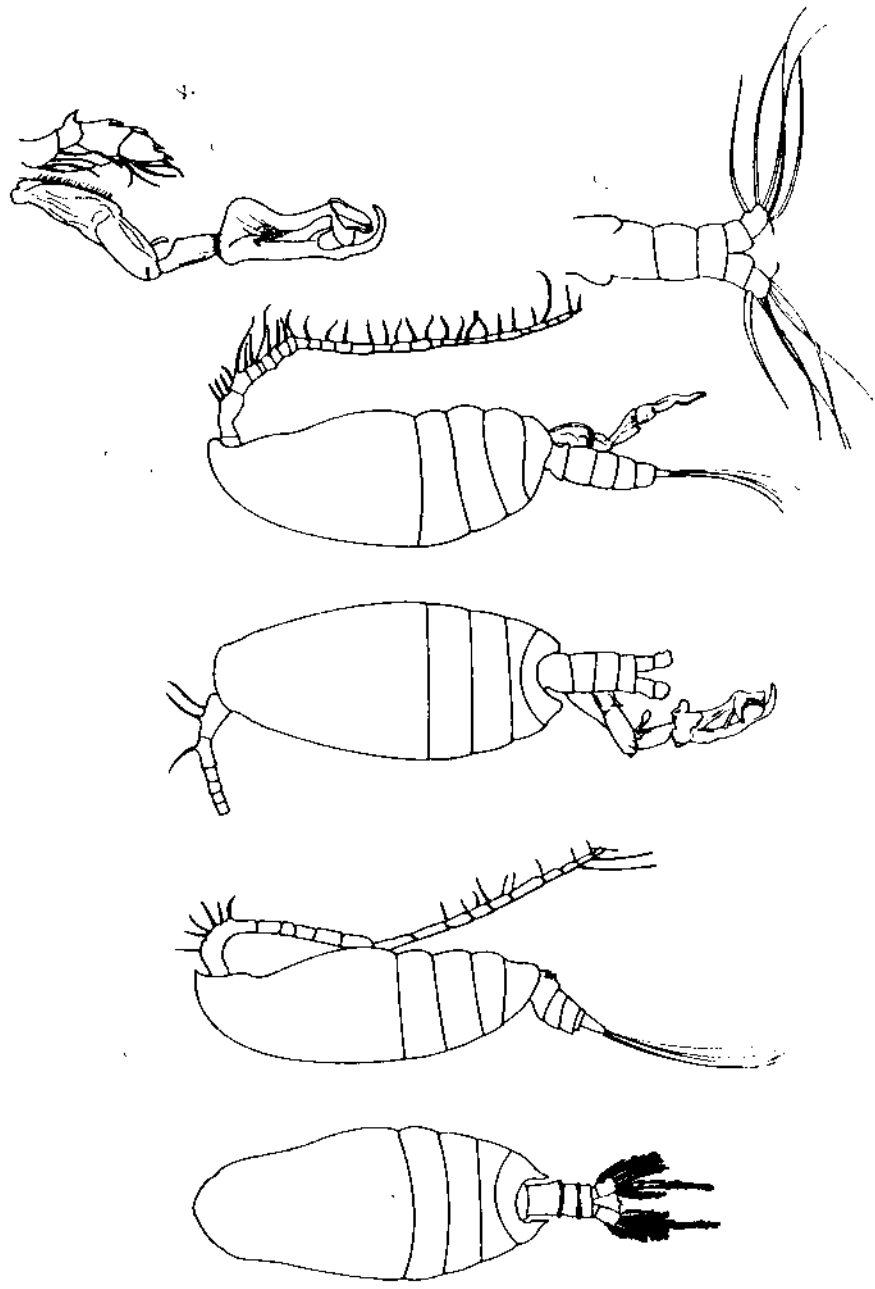
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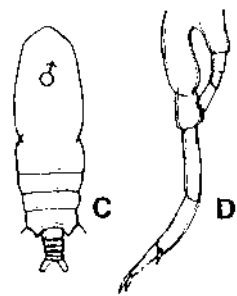
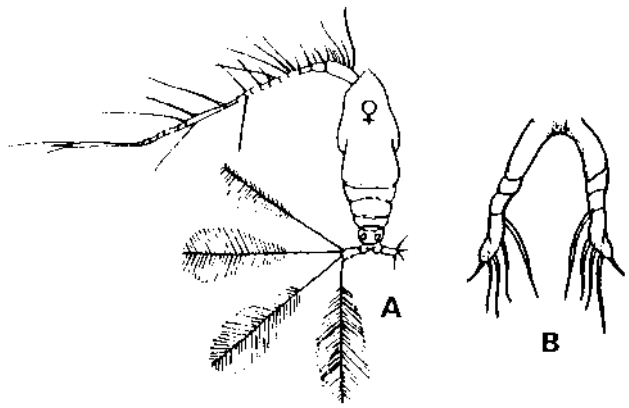


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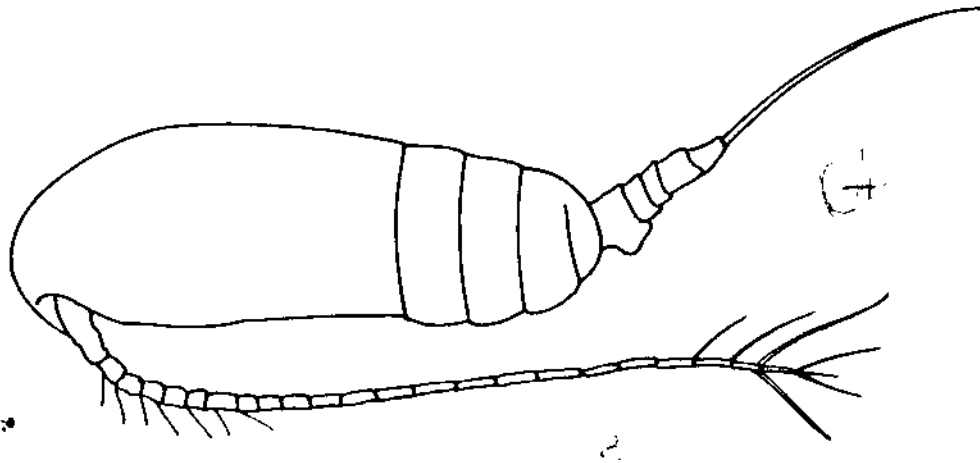
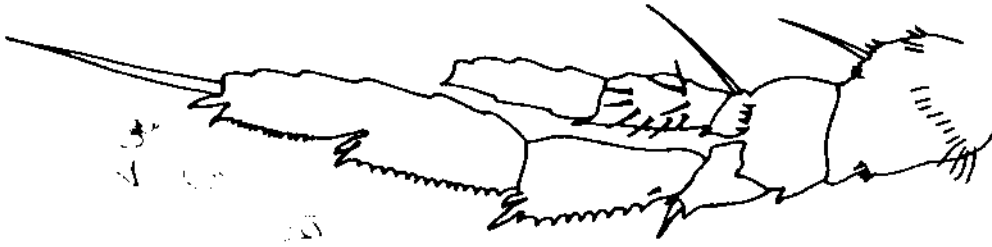
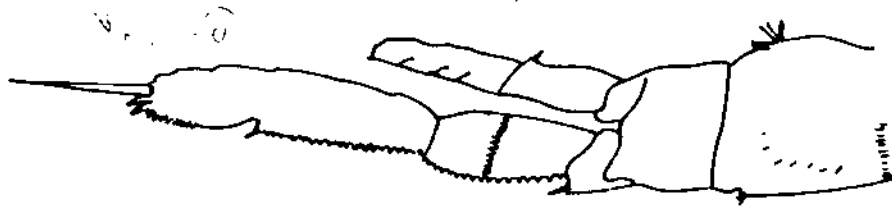
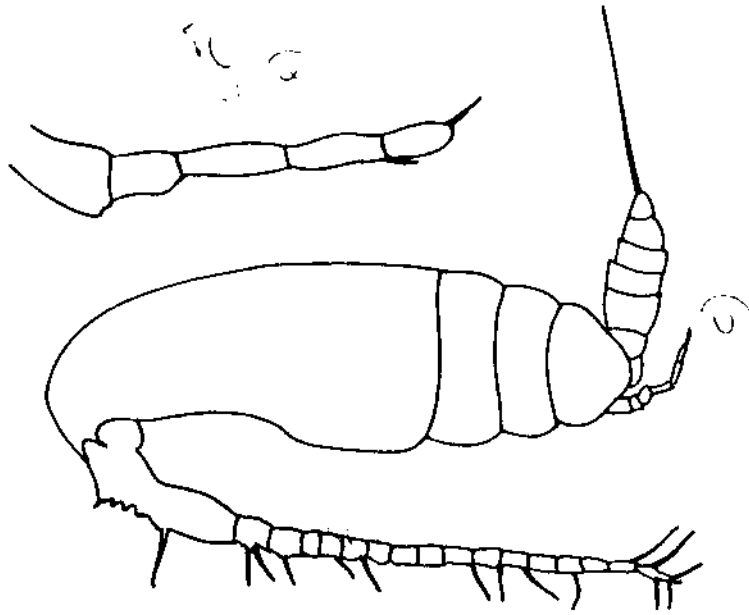
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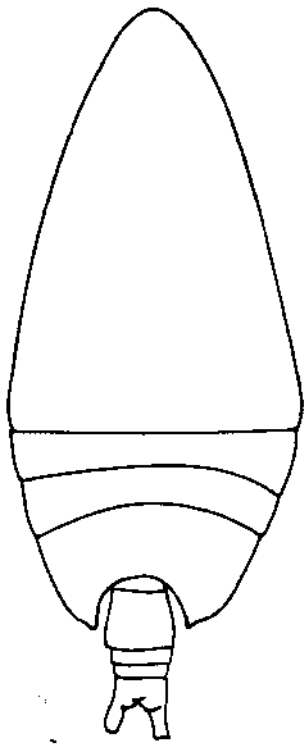


Fig. 12

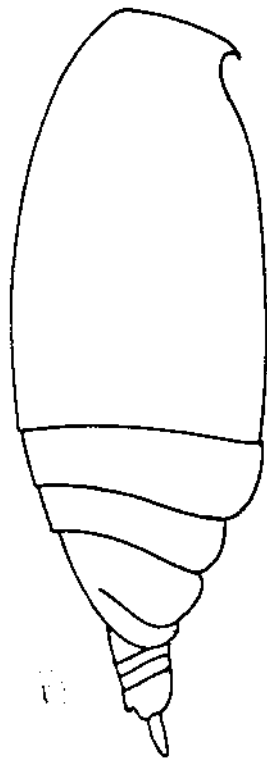


Fig. 13

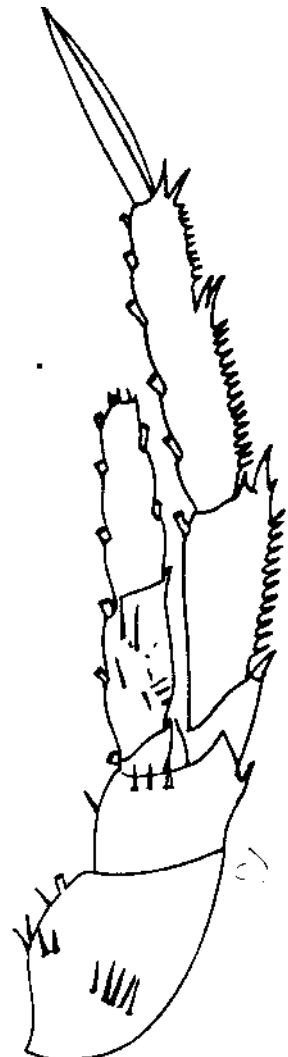
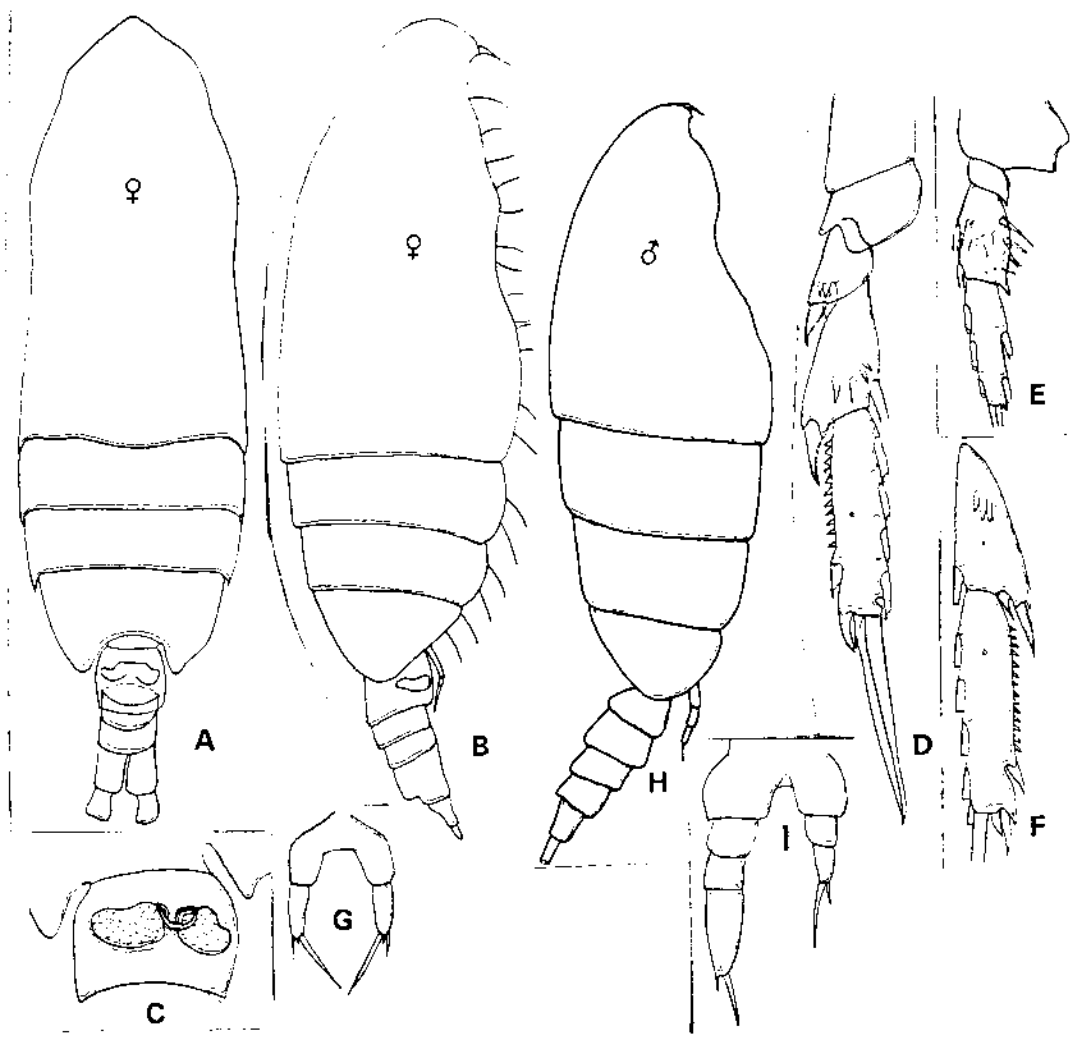
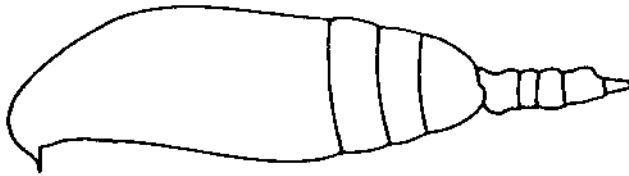
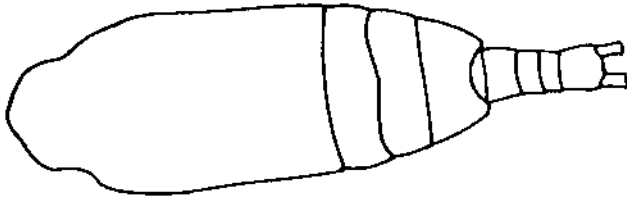
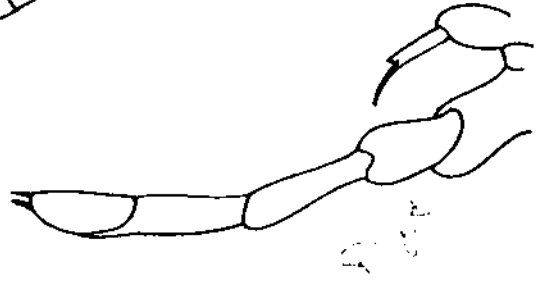
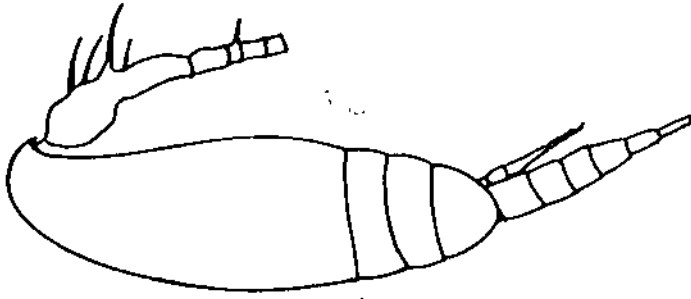
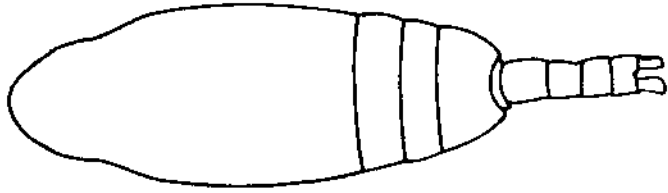


Fig. 14





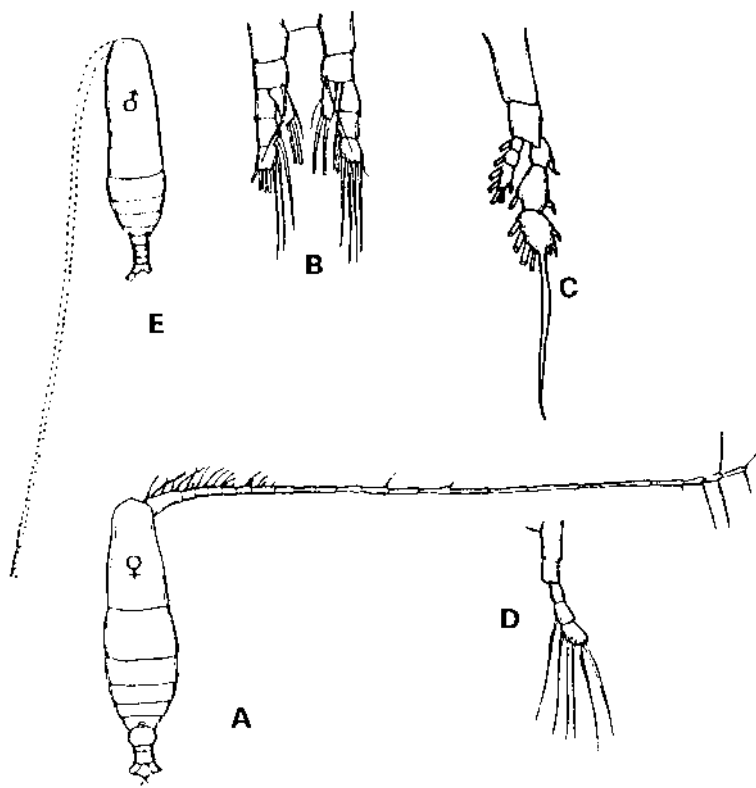
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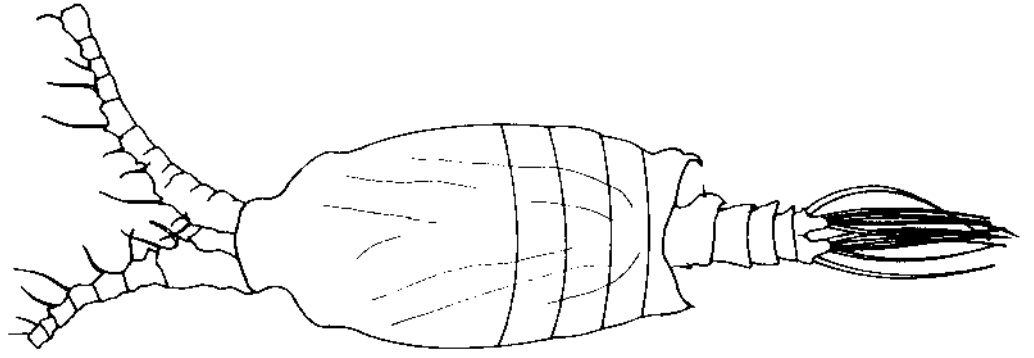
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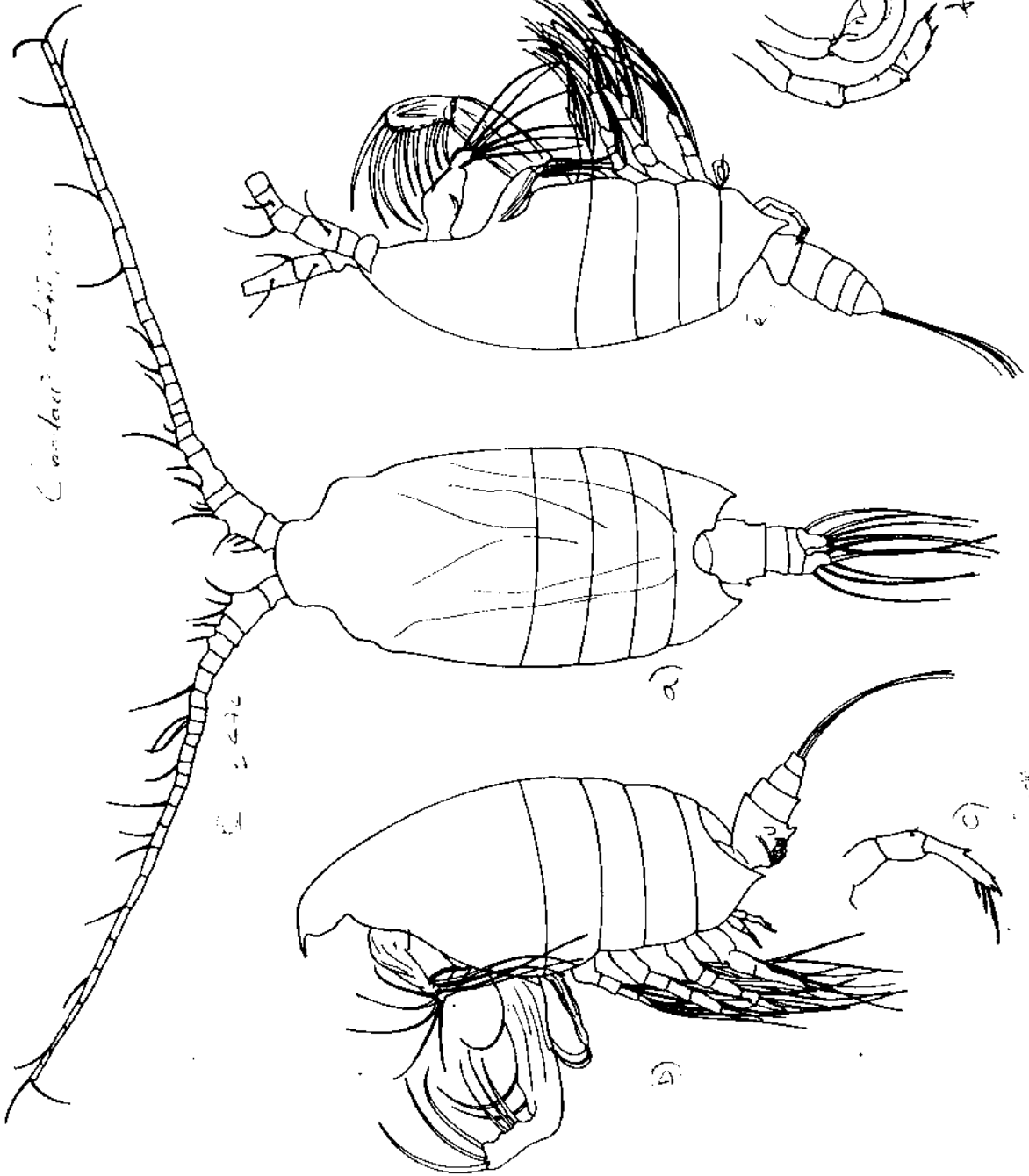
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215

(1)



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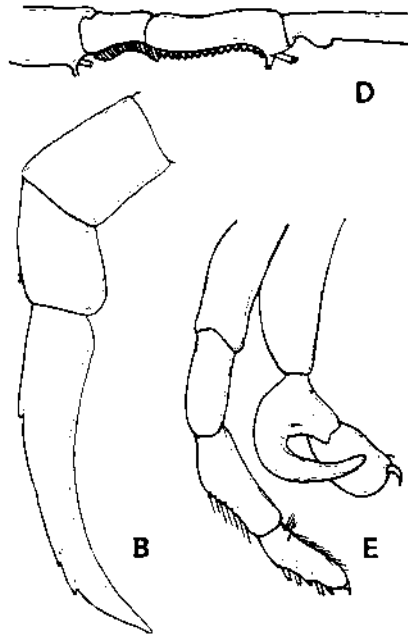
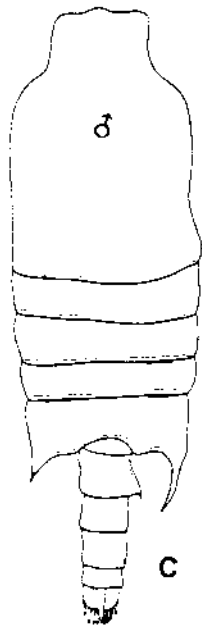
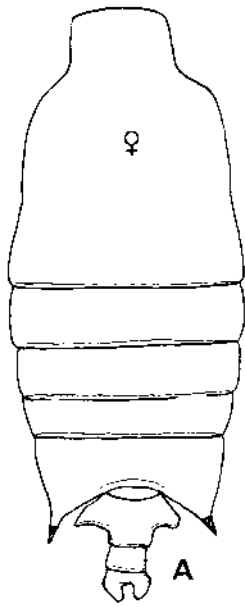
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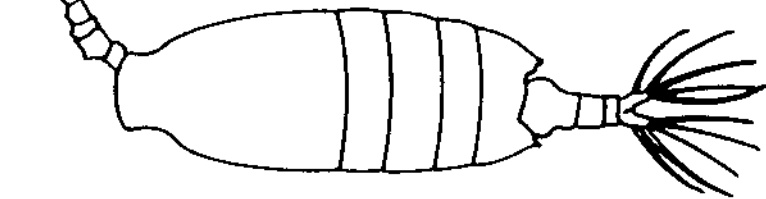
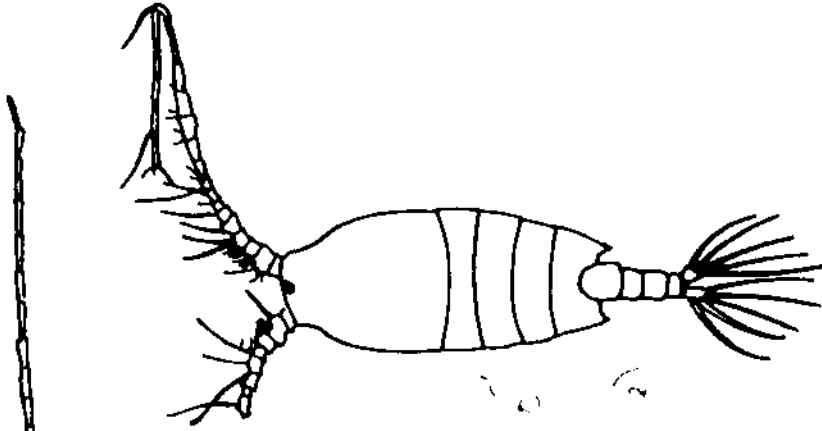
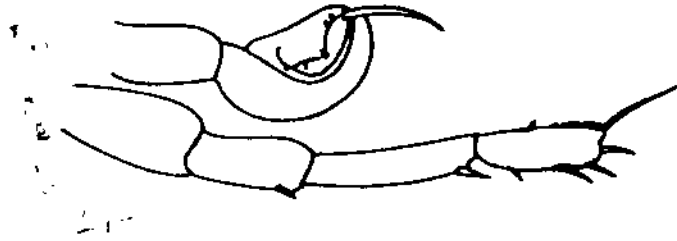
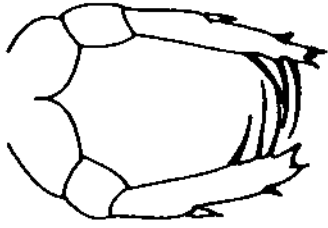
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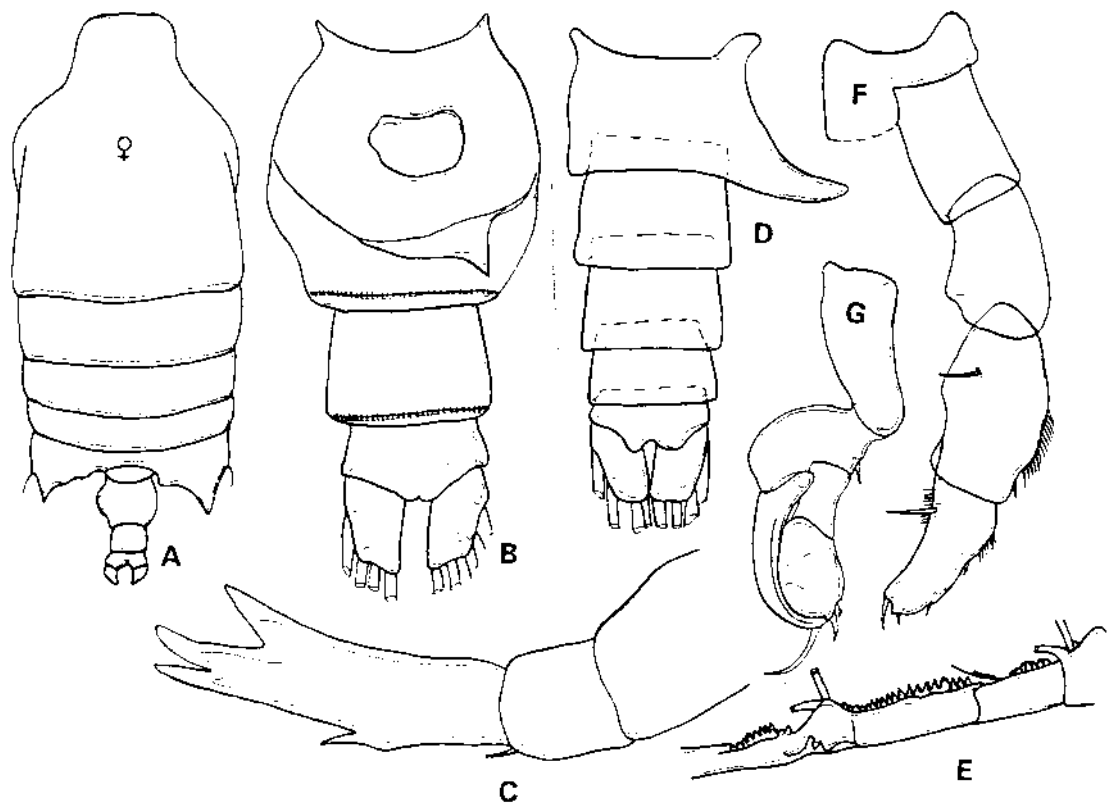
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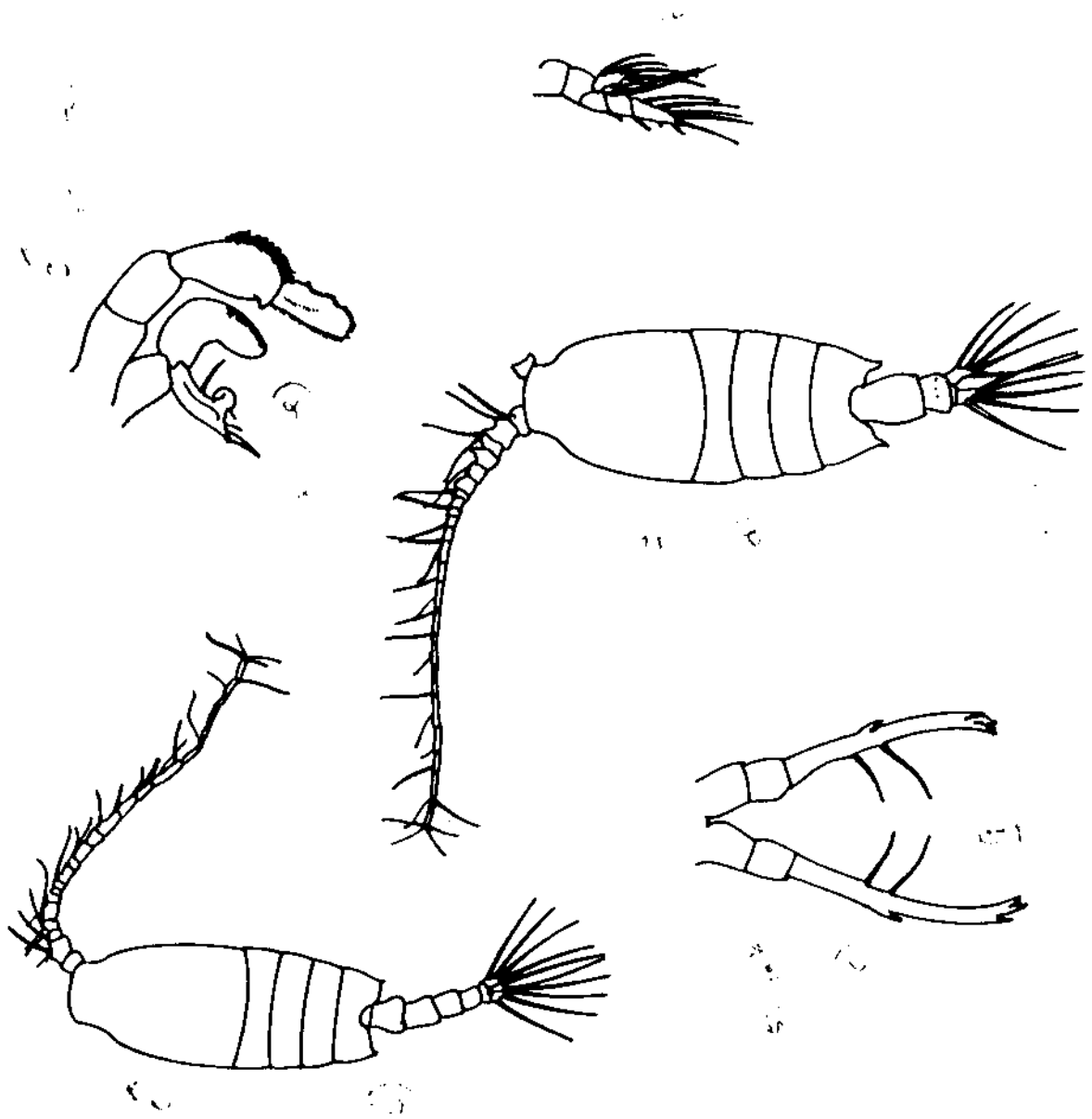
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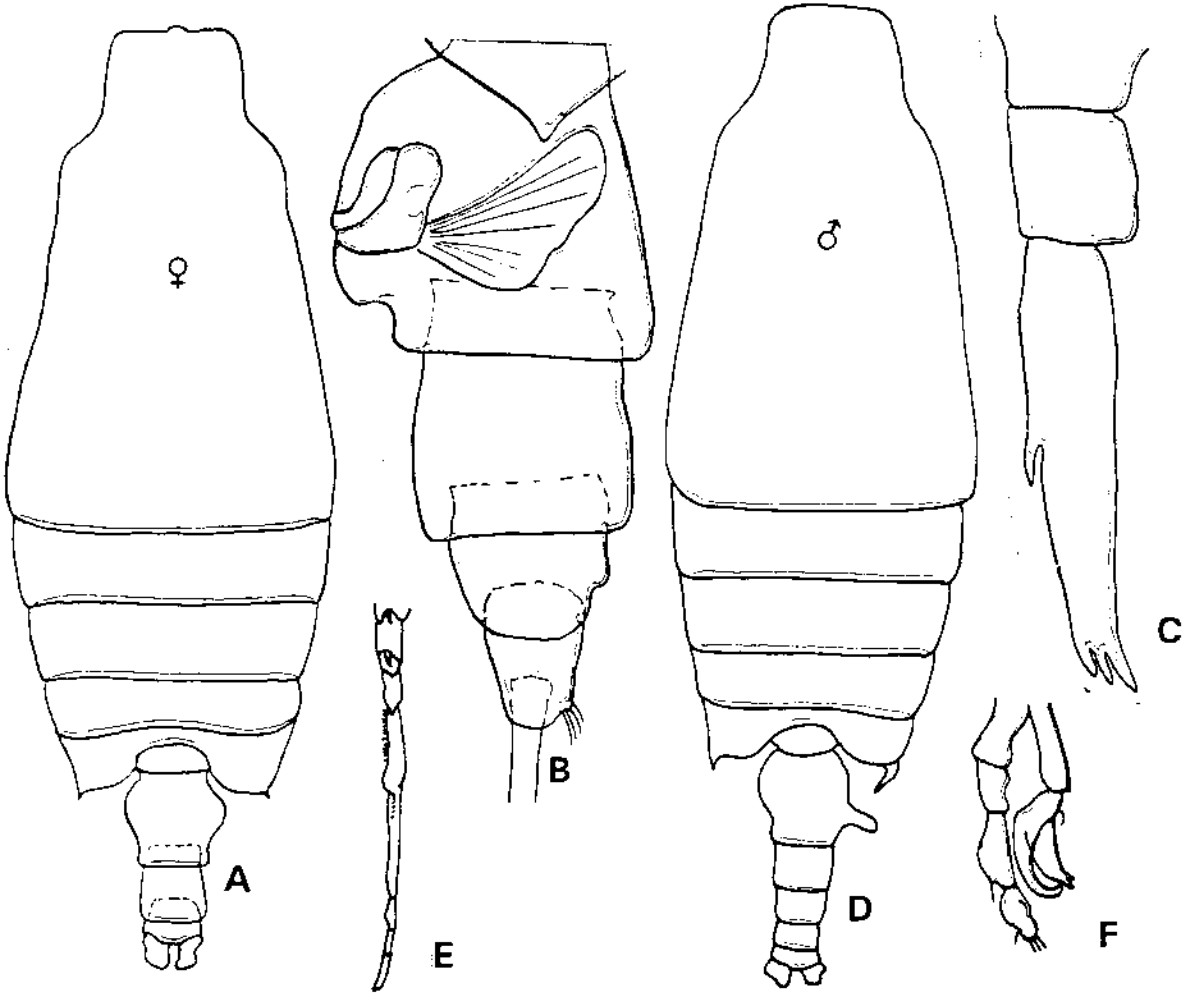


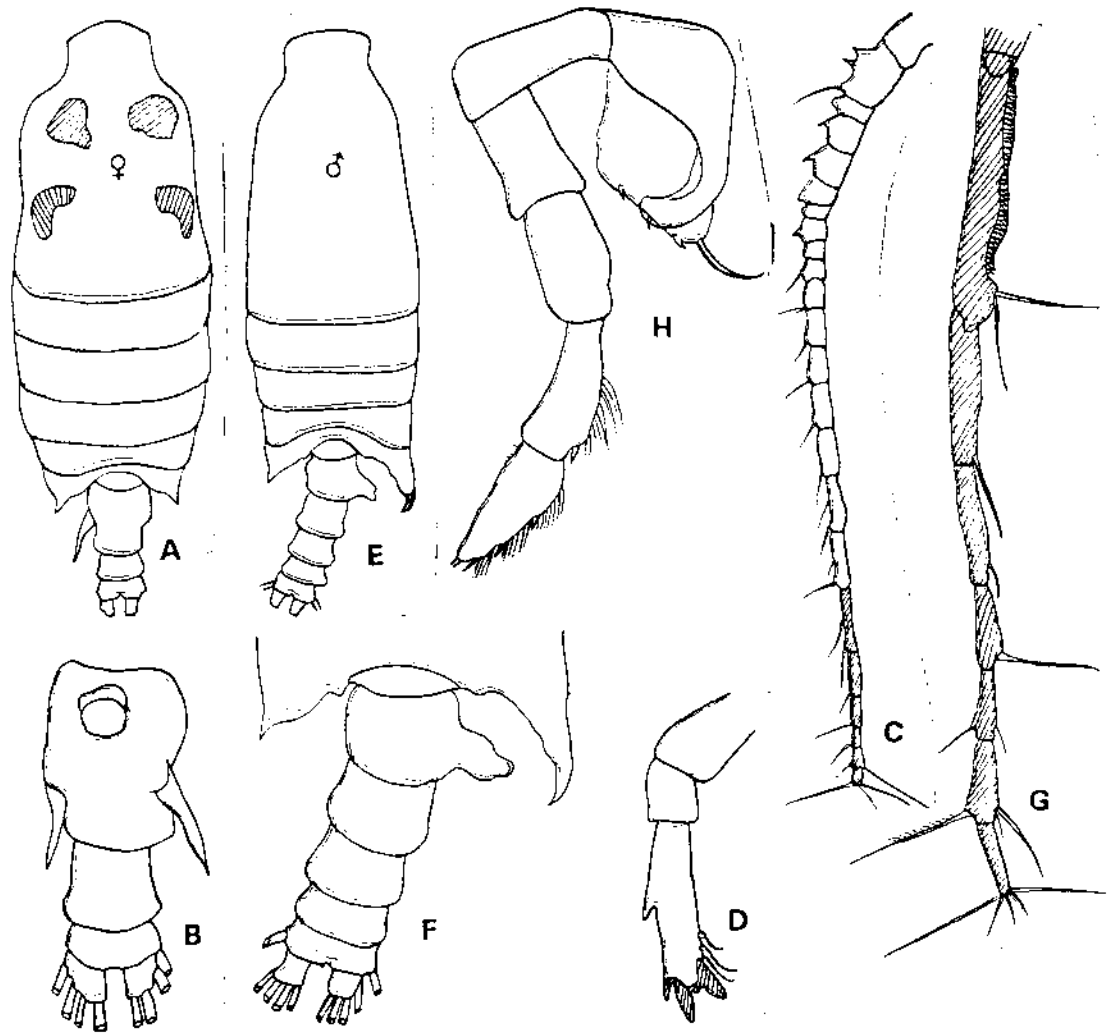


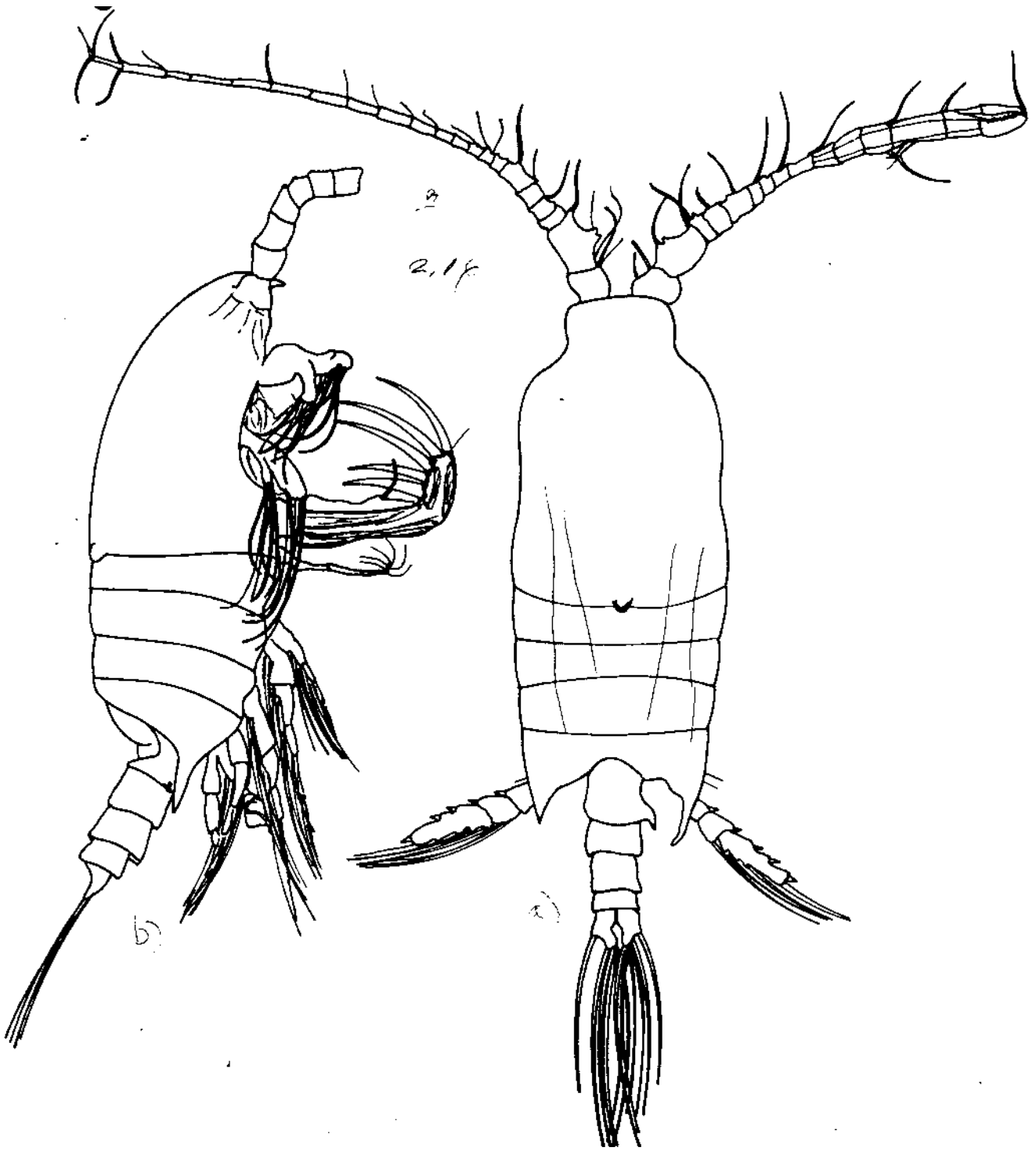






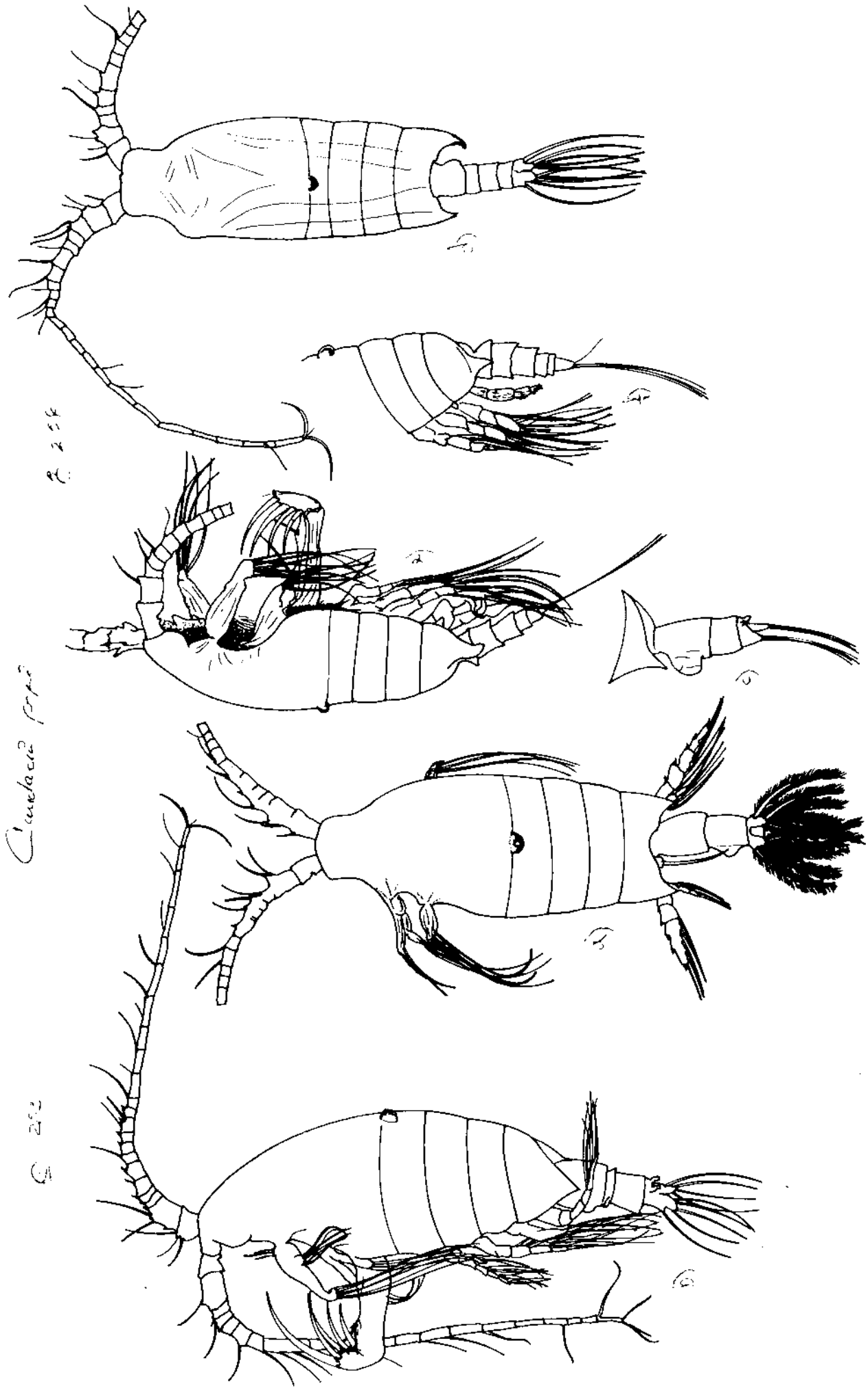




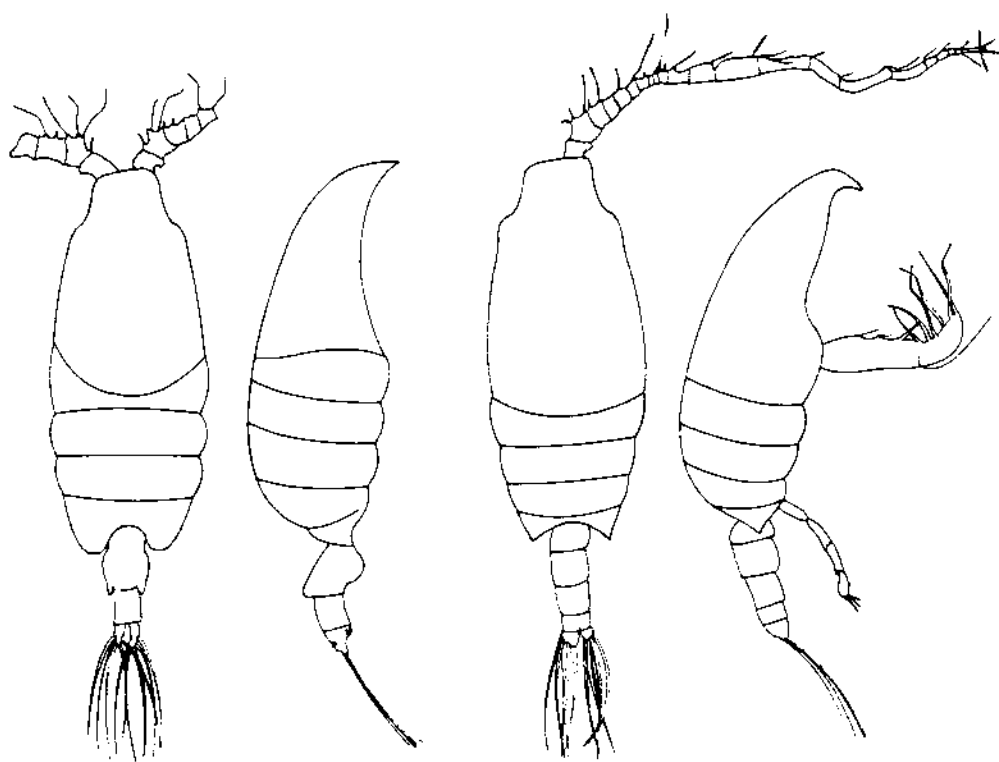


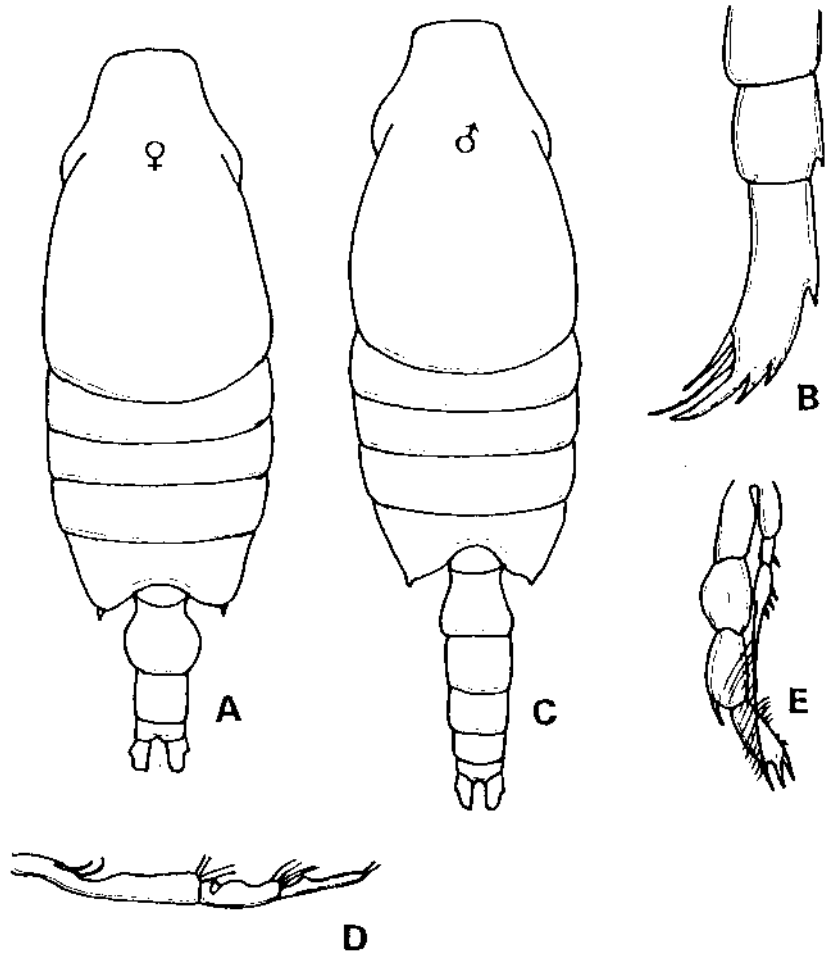
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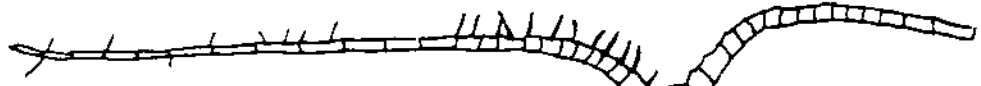
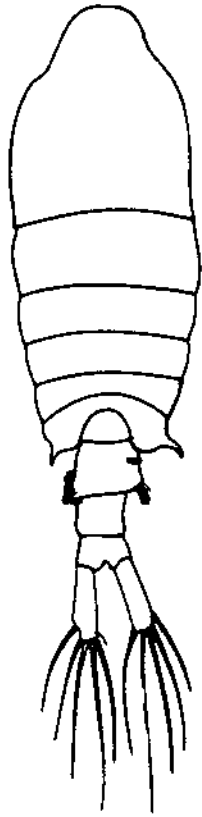


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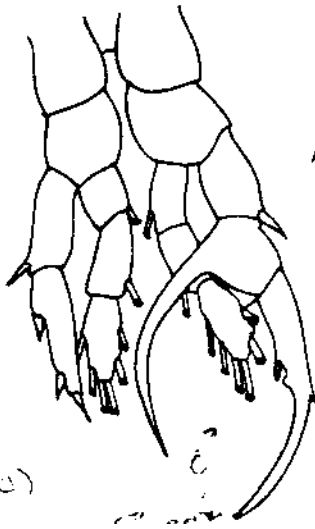




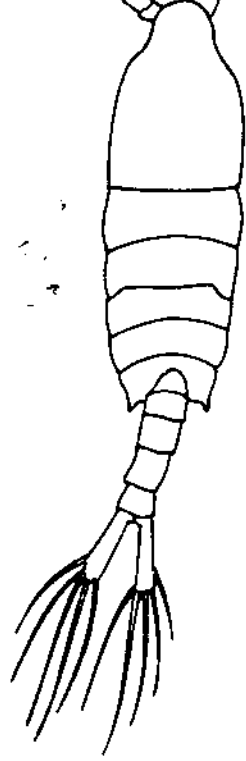




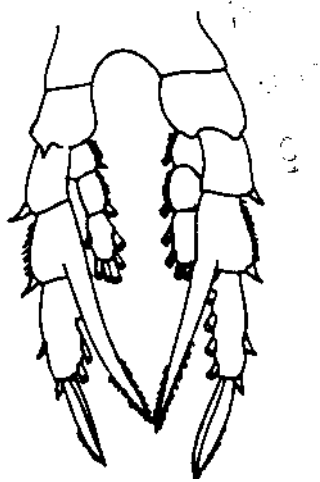
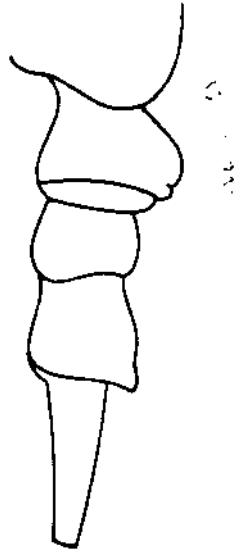
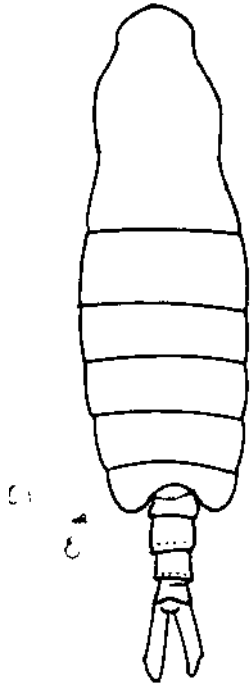
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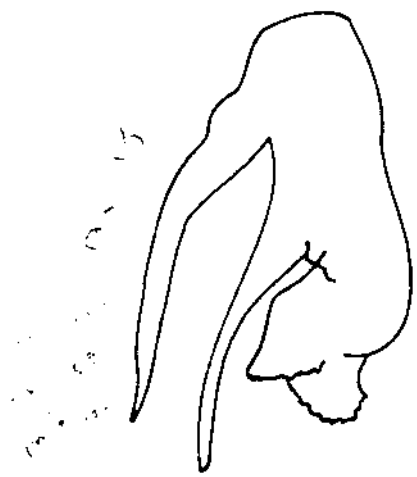
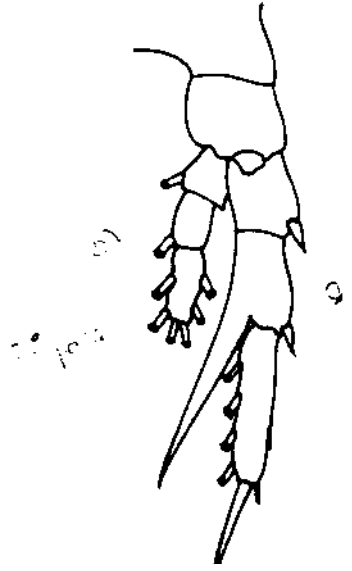
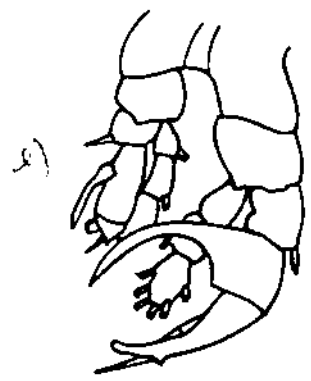
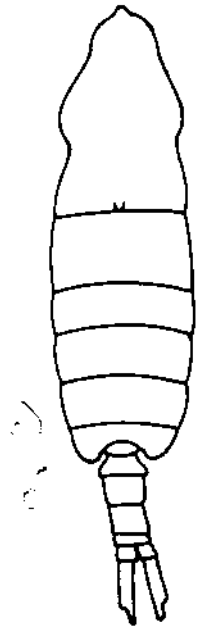
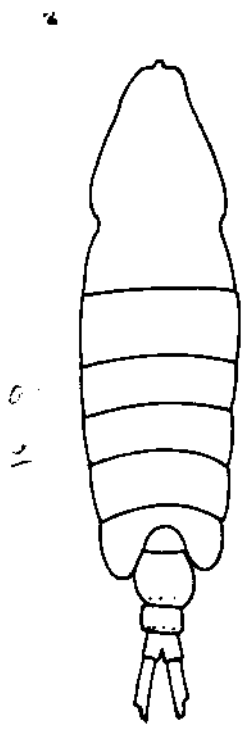


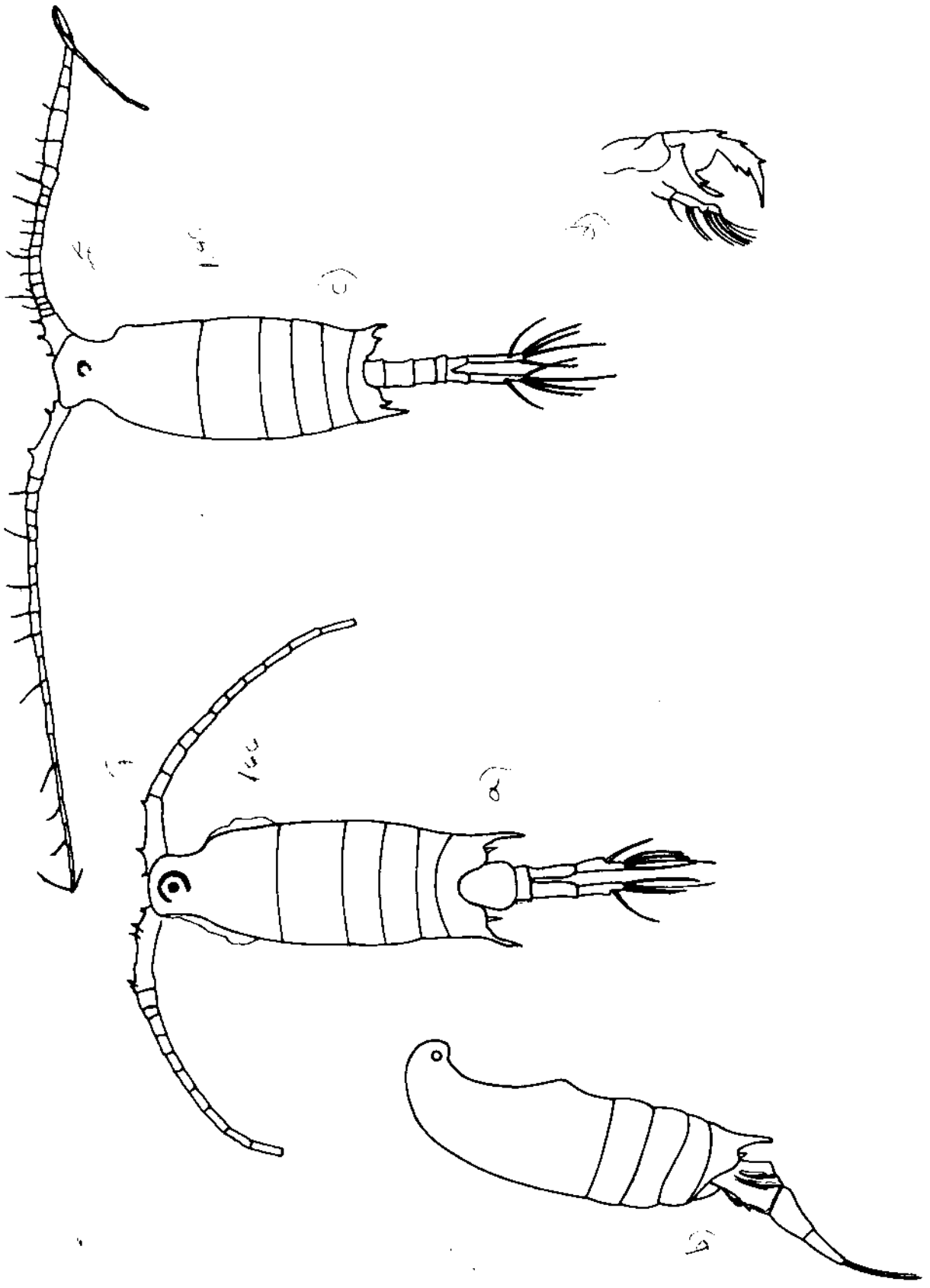
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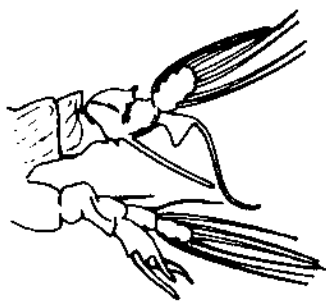


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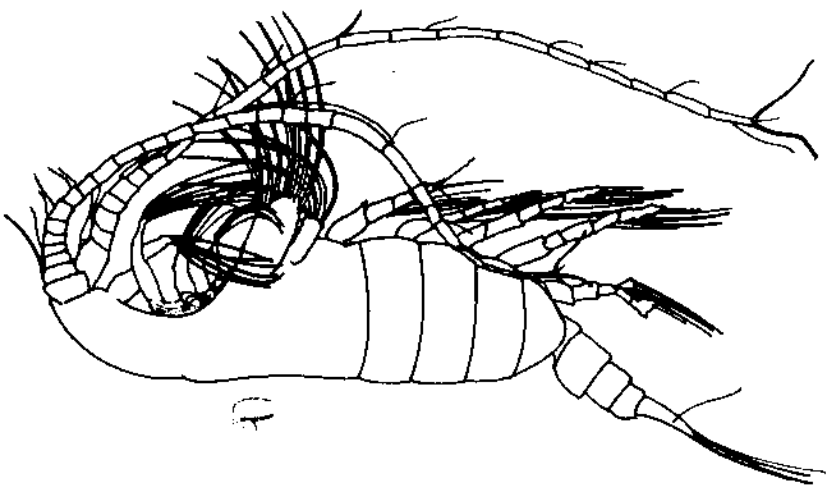
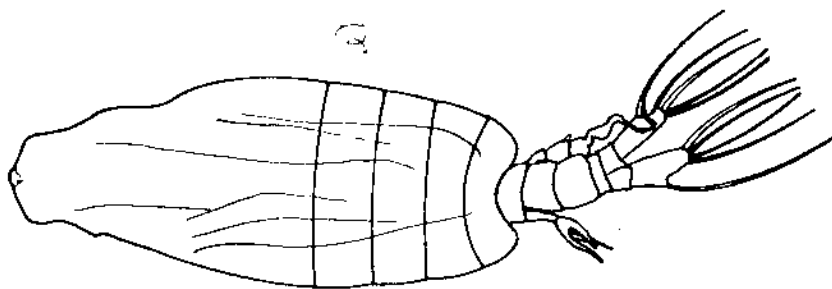






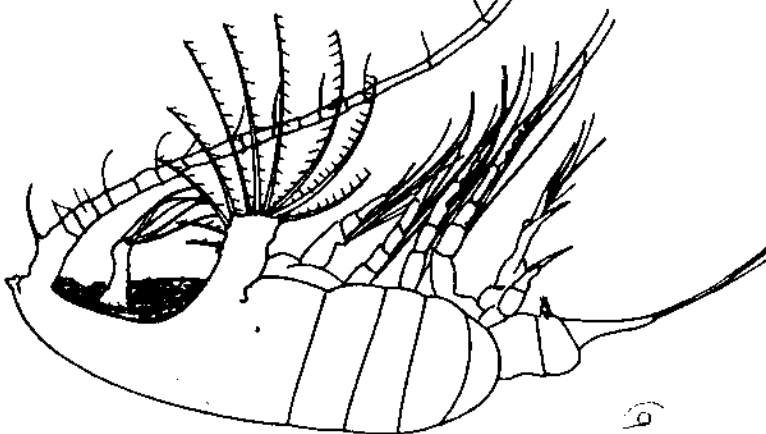
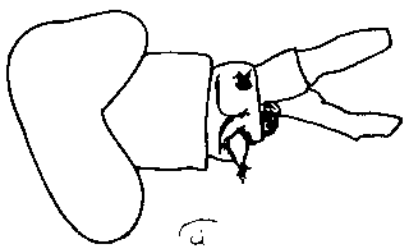


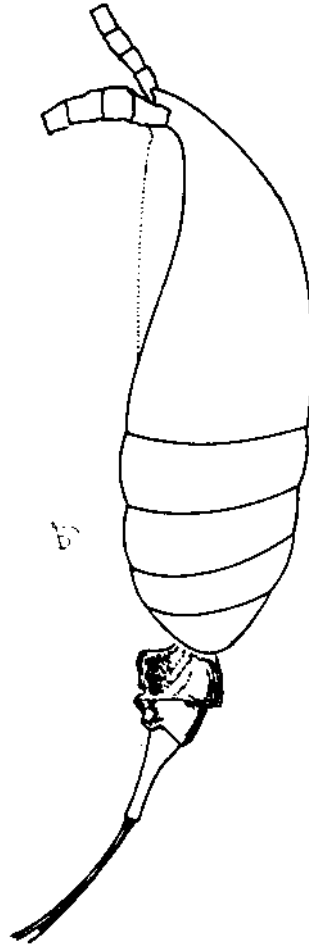
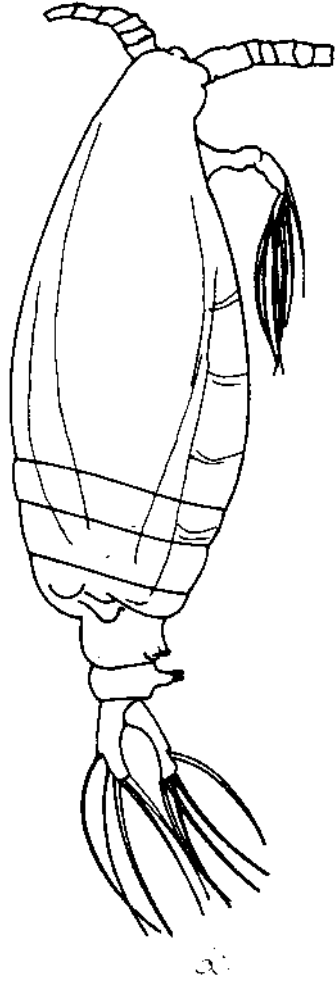
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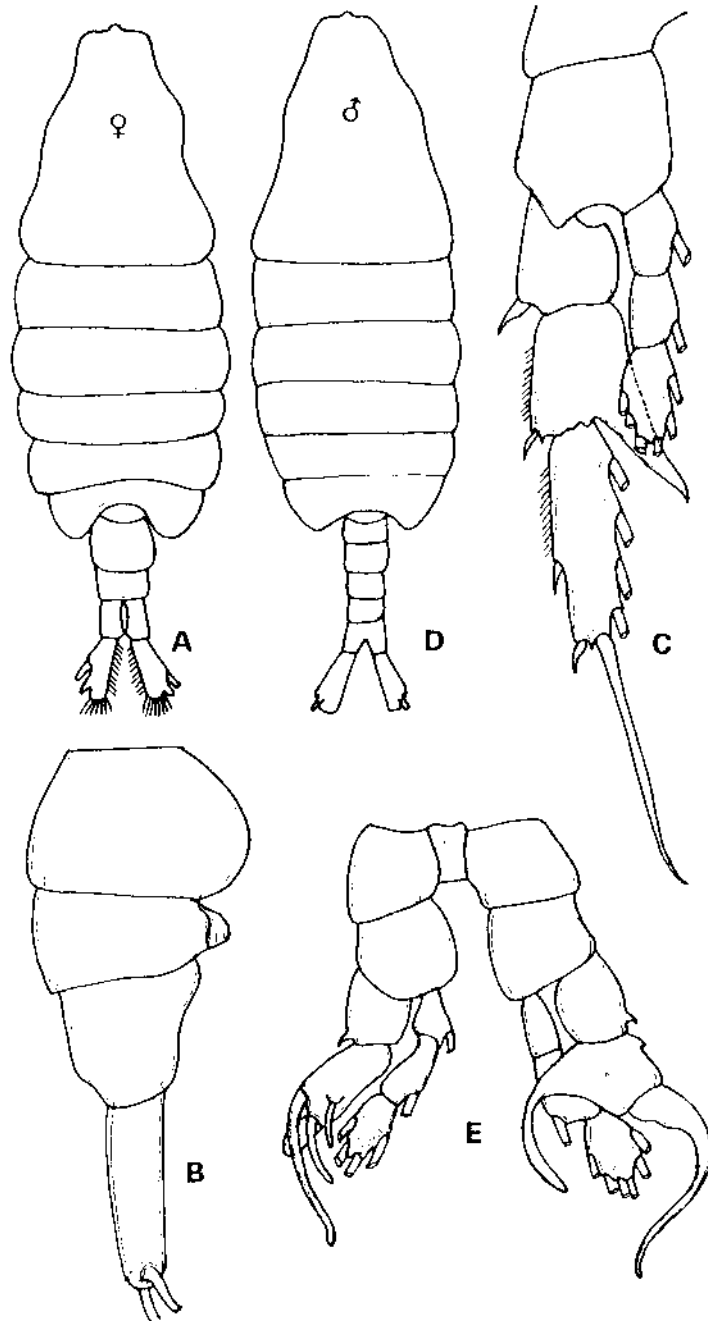


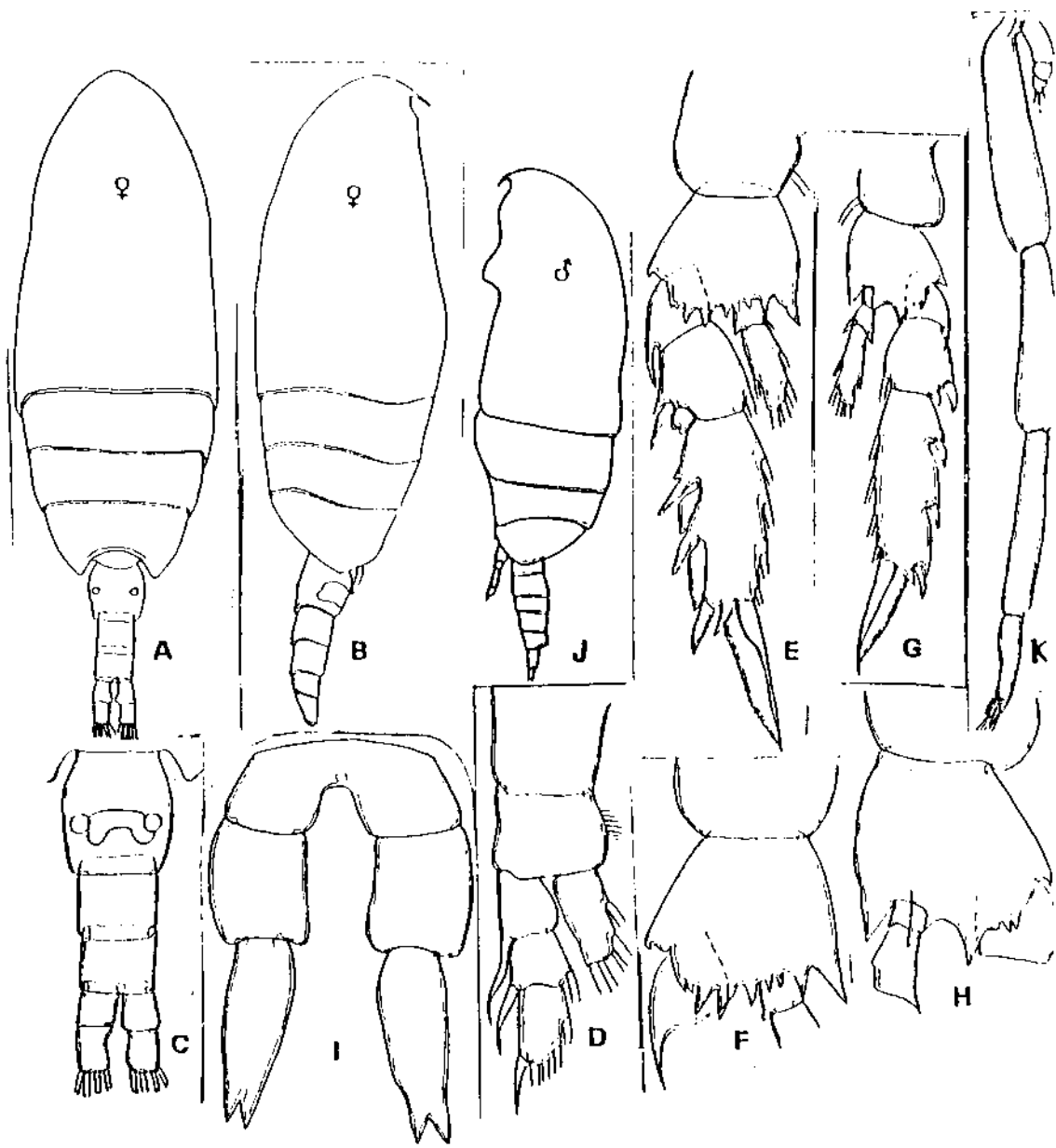
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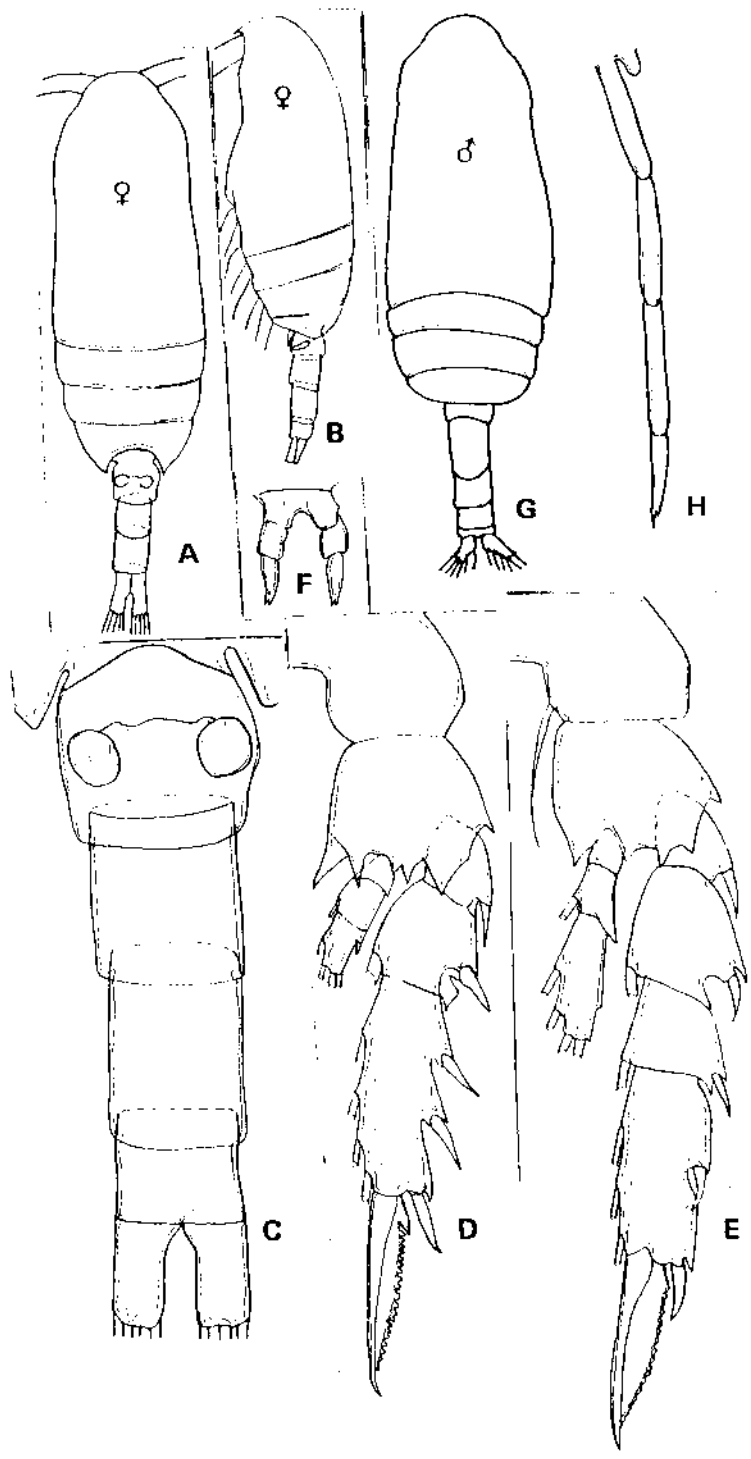


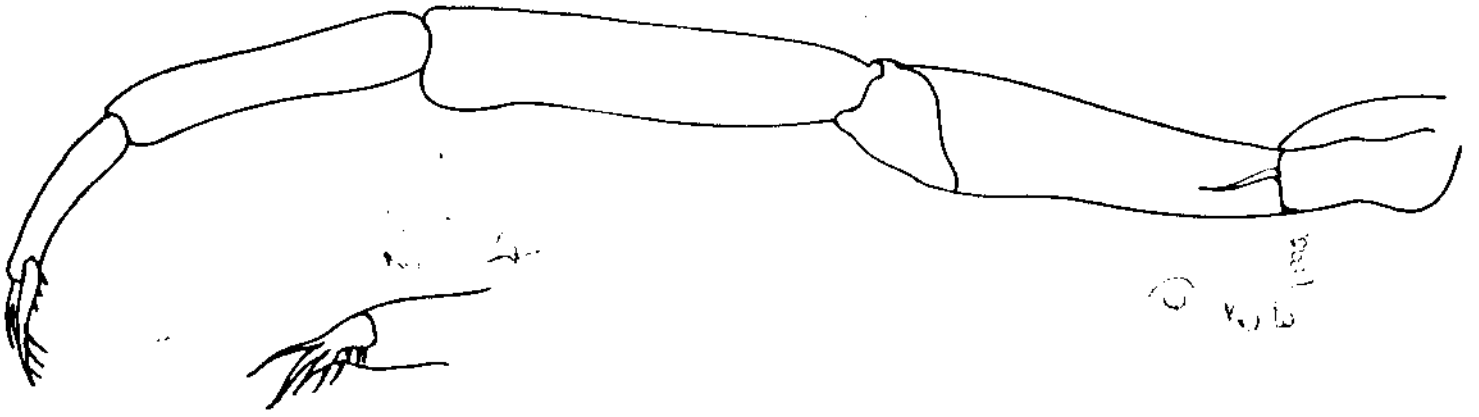








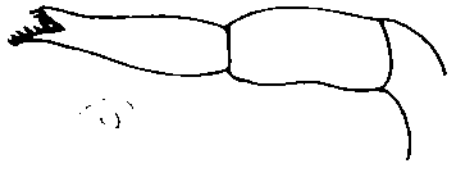
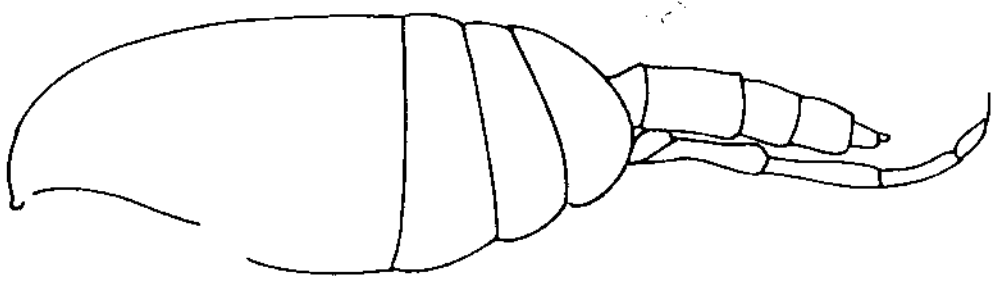




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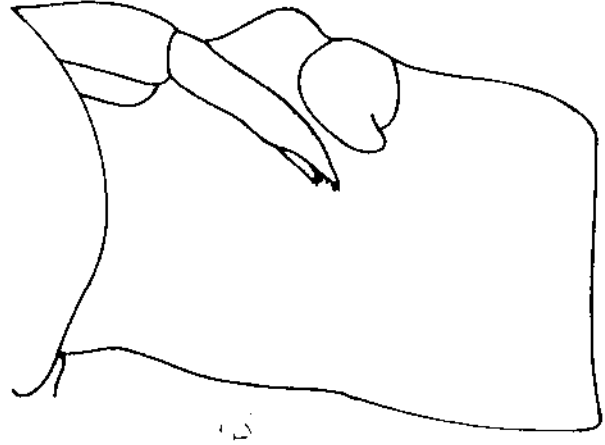


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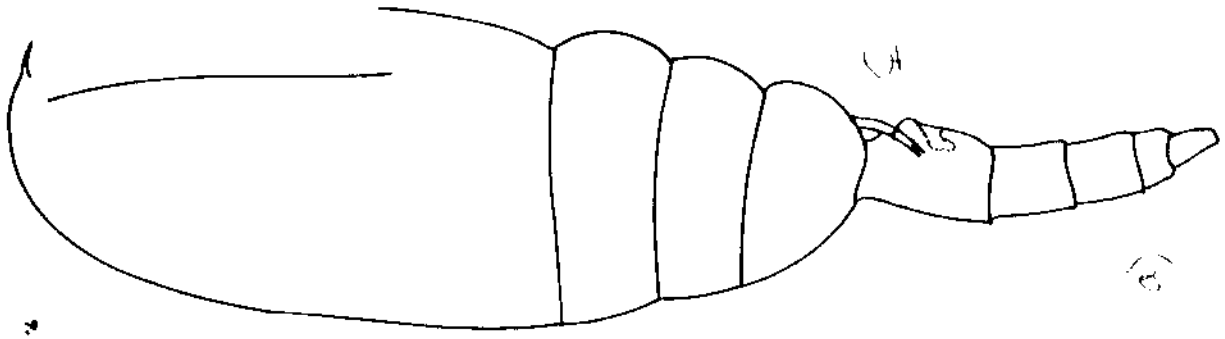
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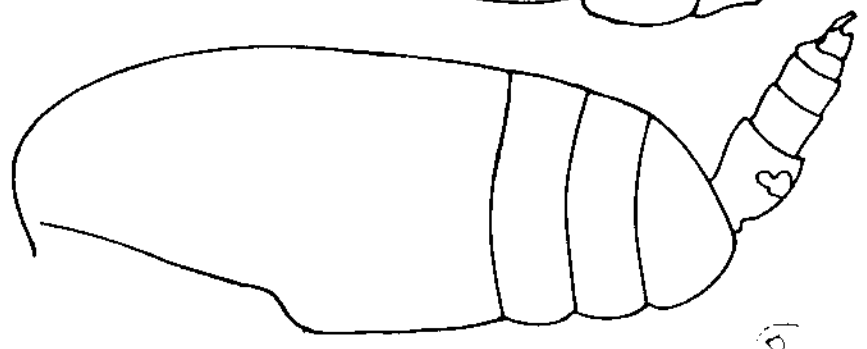
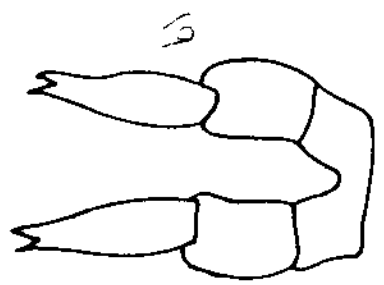
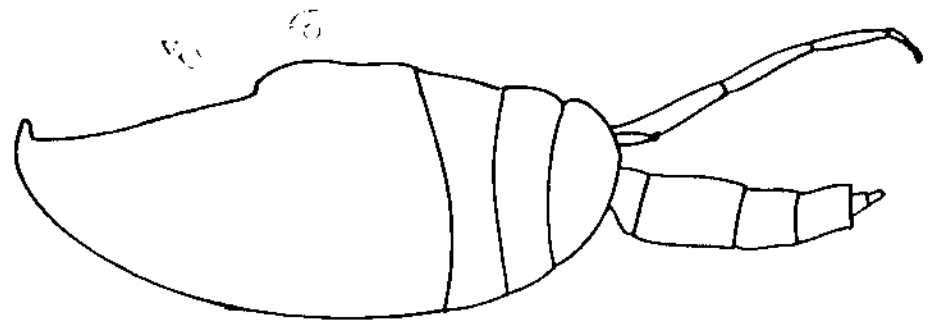
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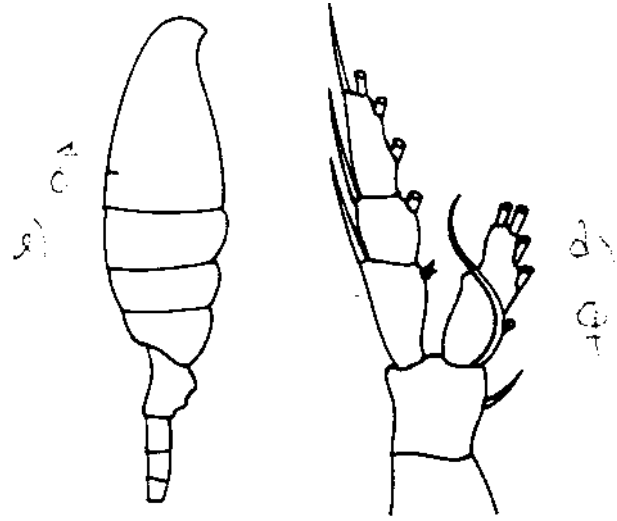
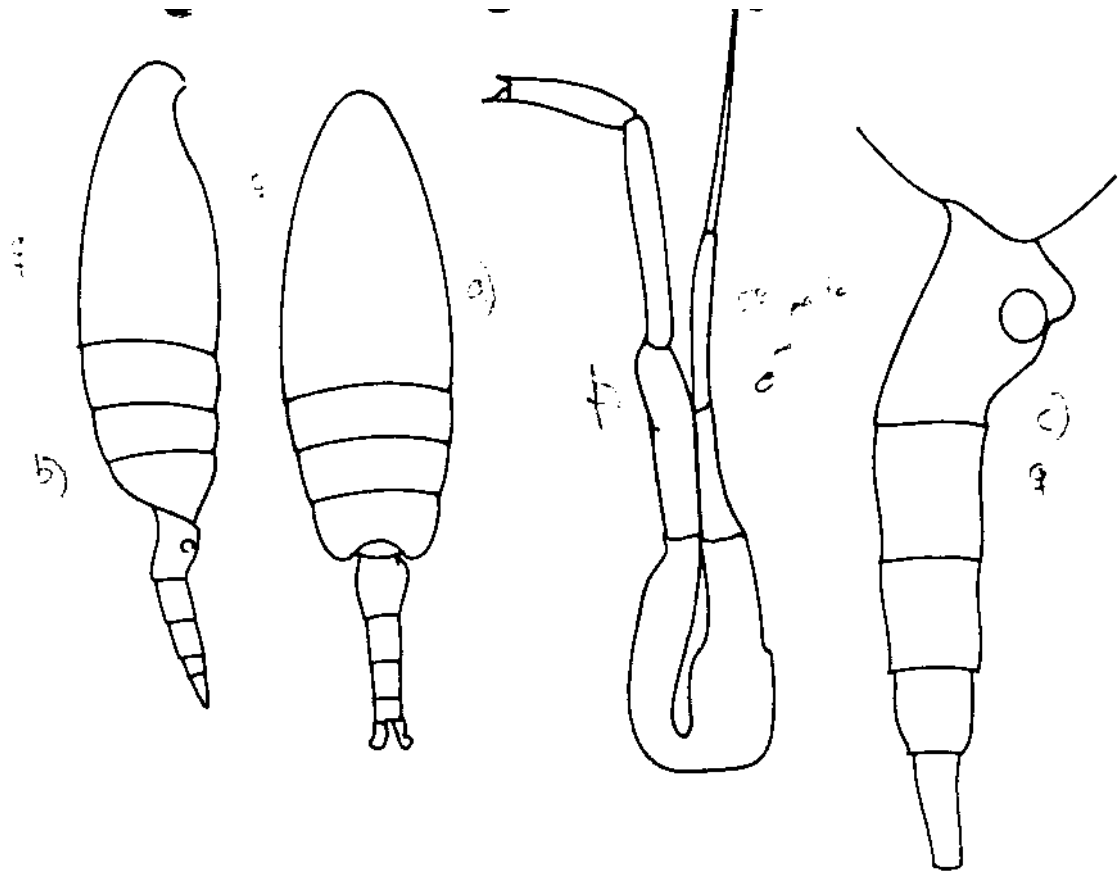
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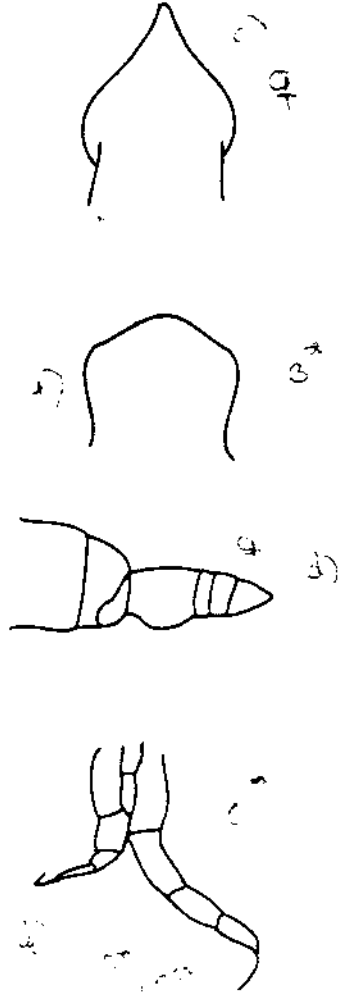
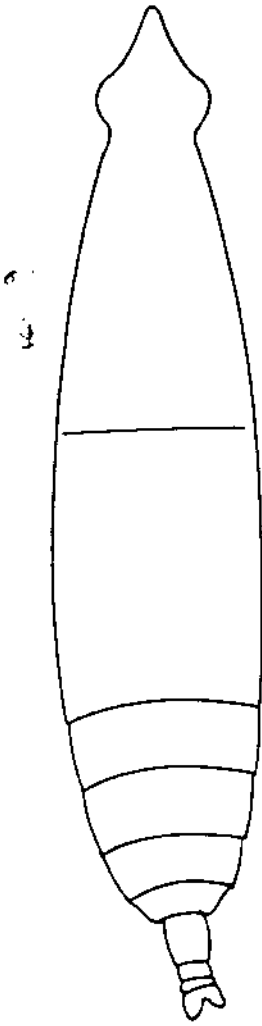
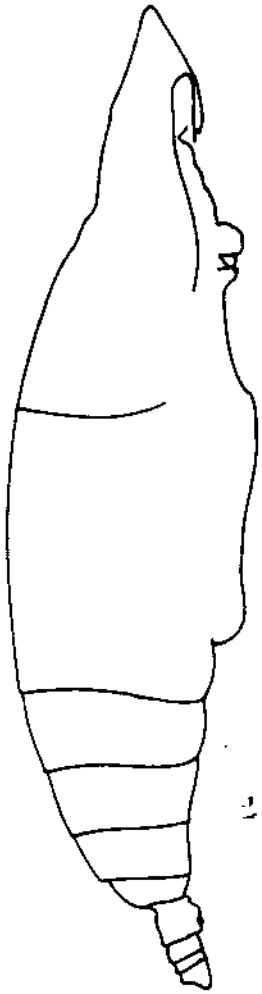
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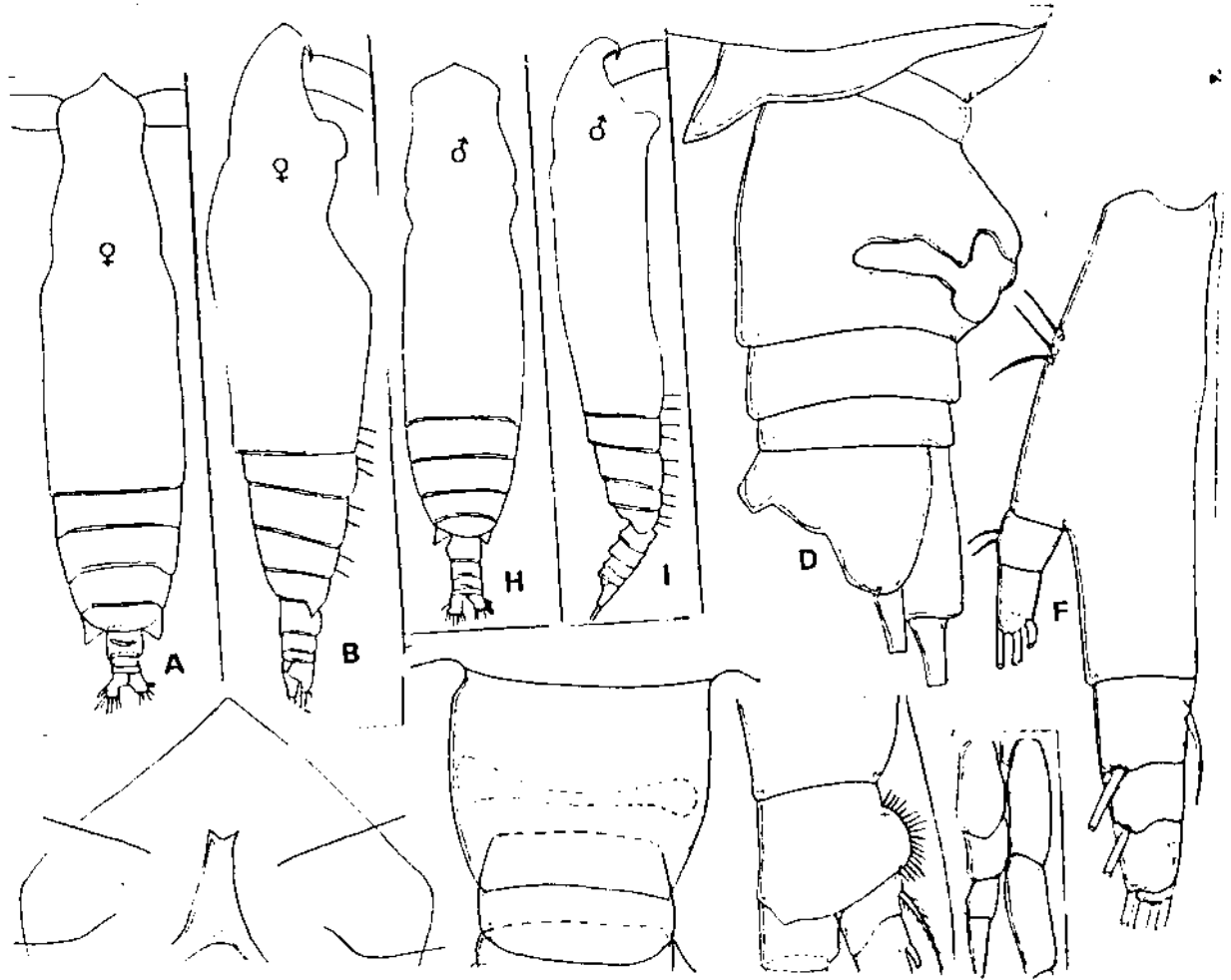


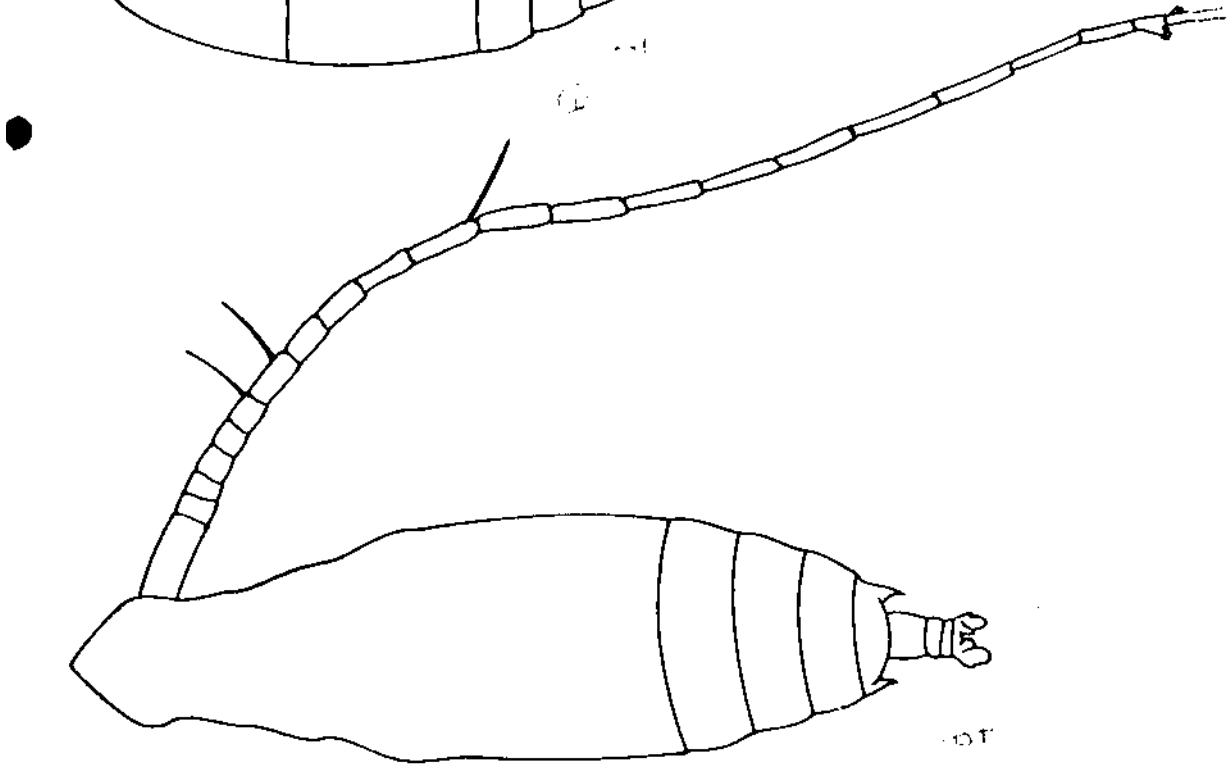
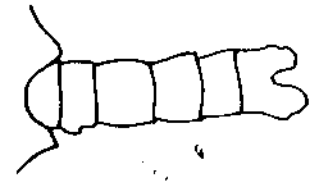
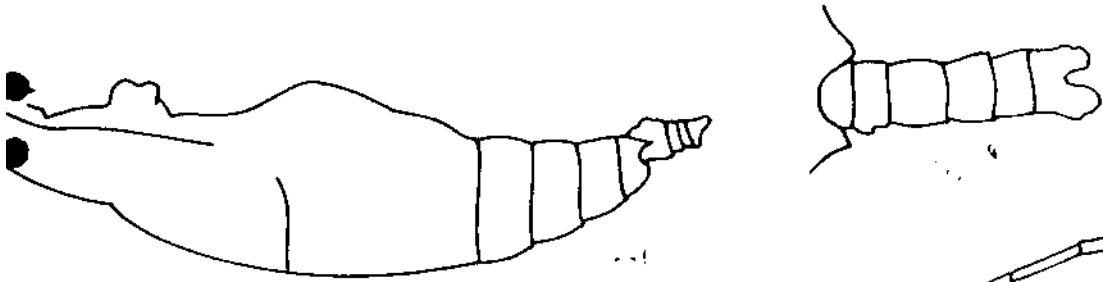
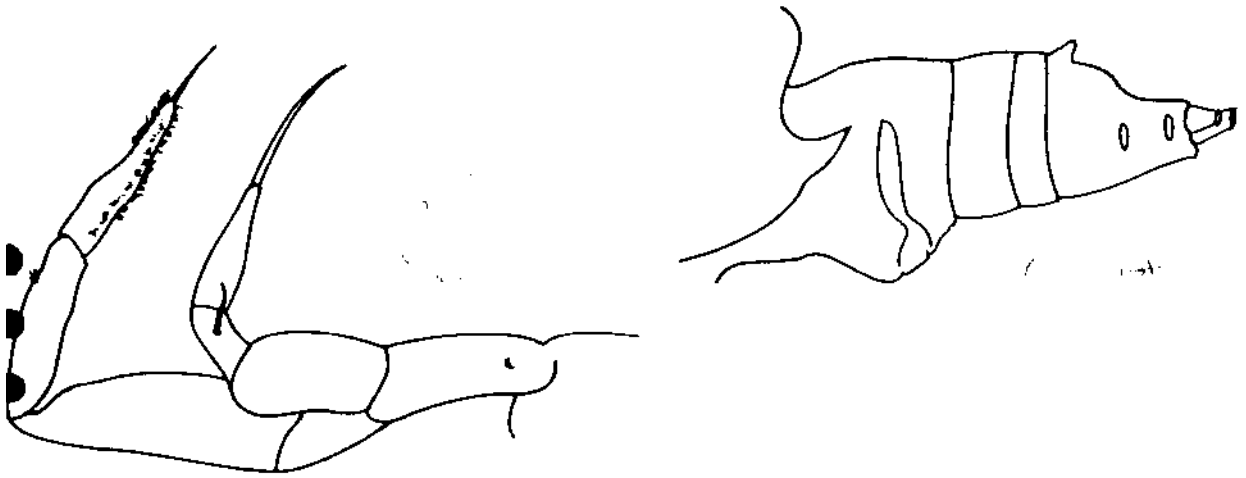
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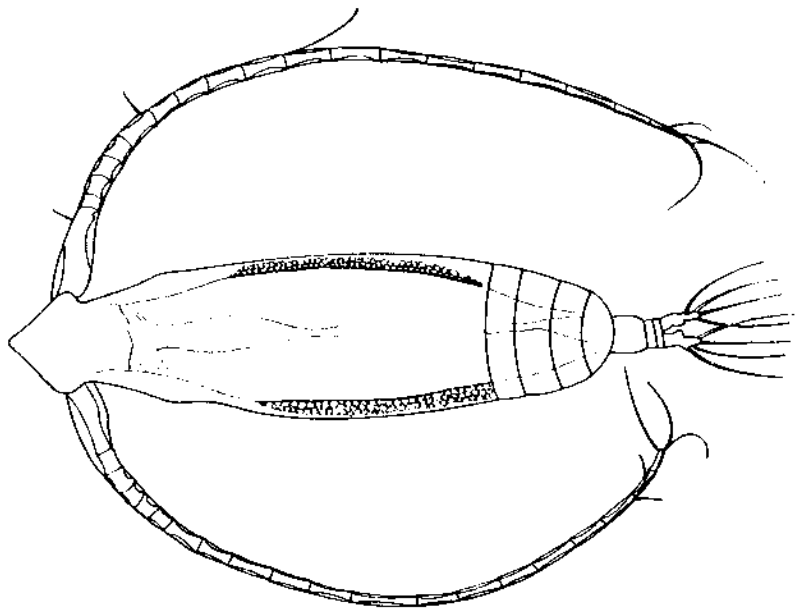
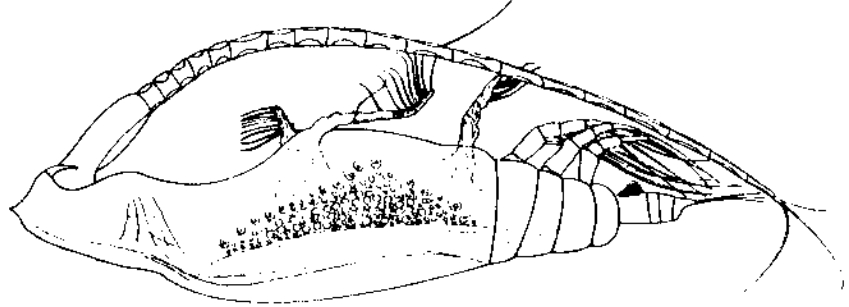
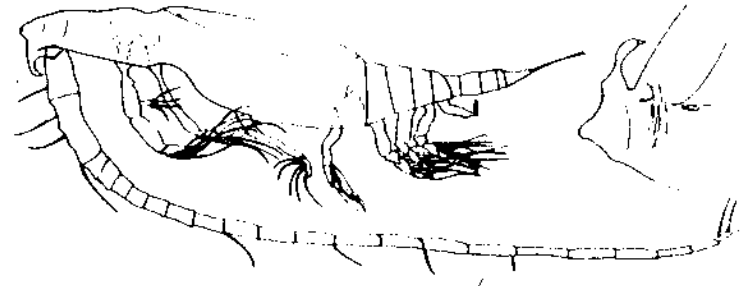
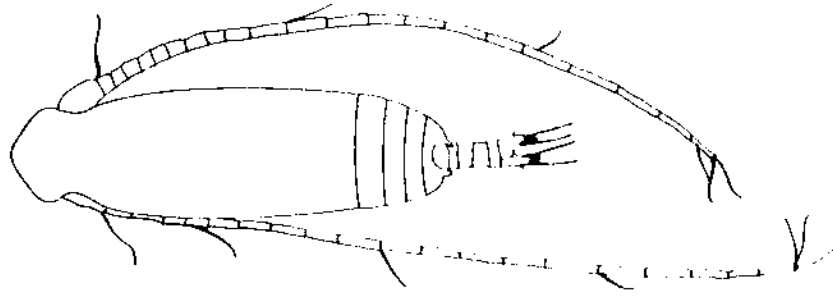
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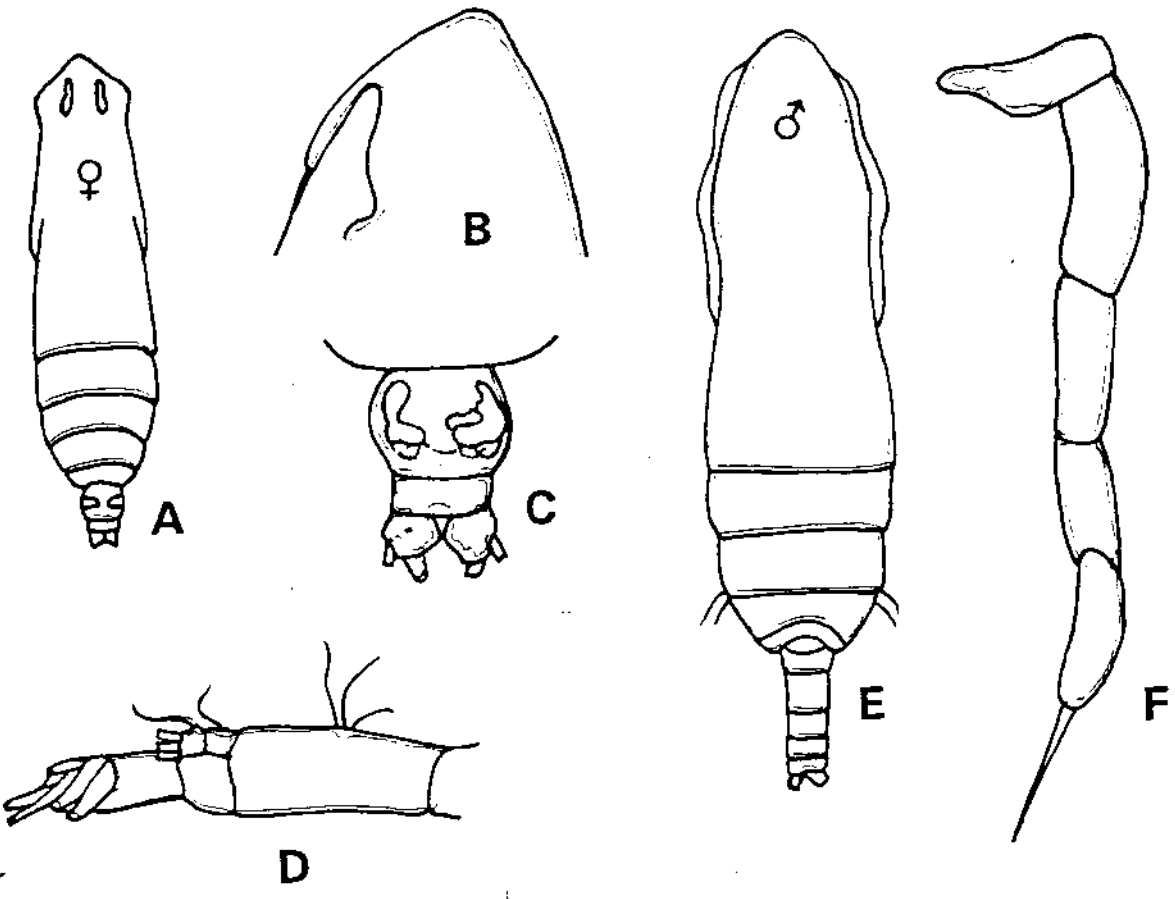


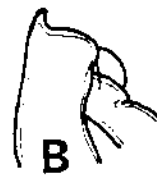
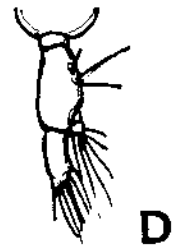
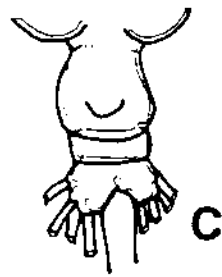
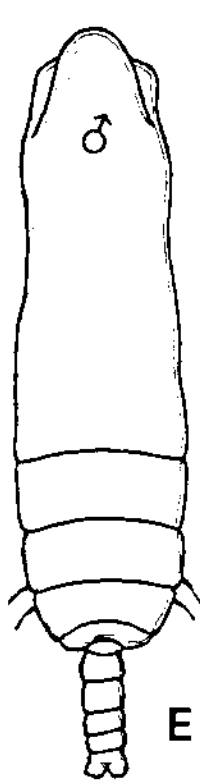


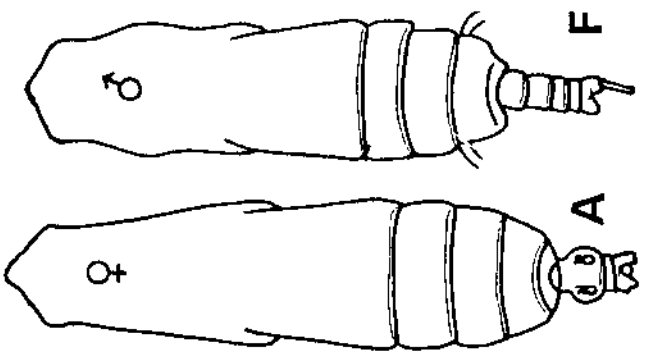
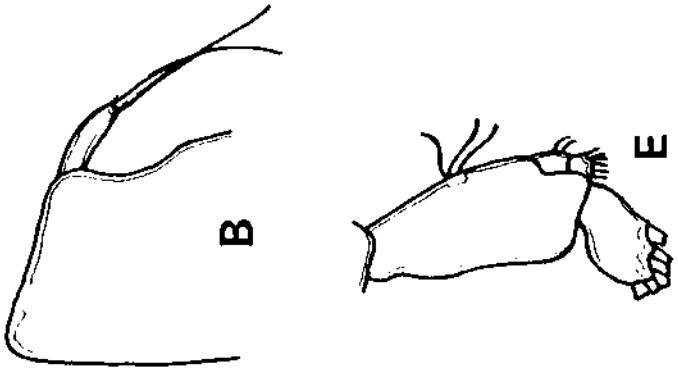
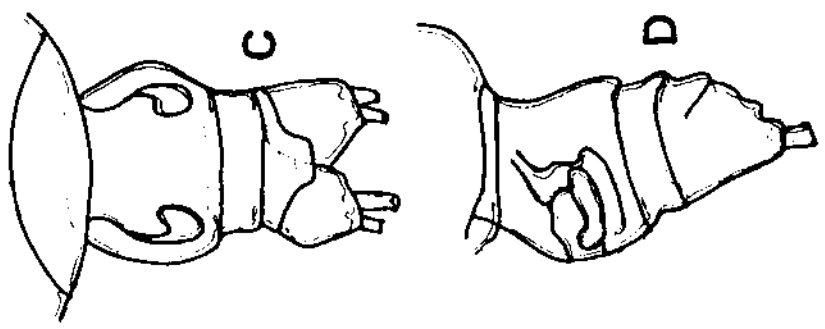
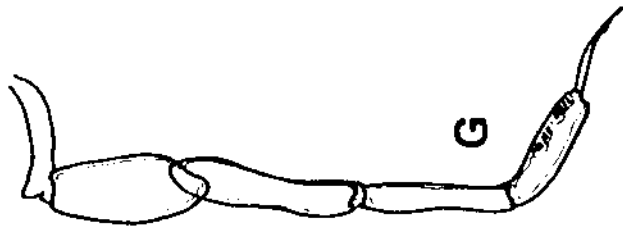


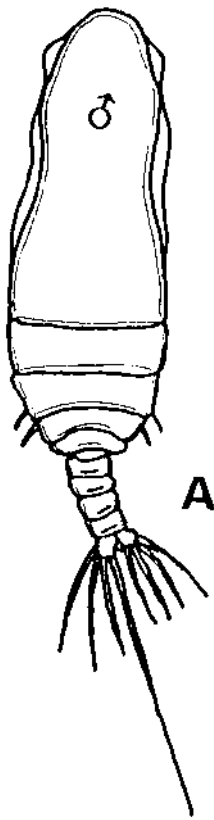




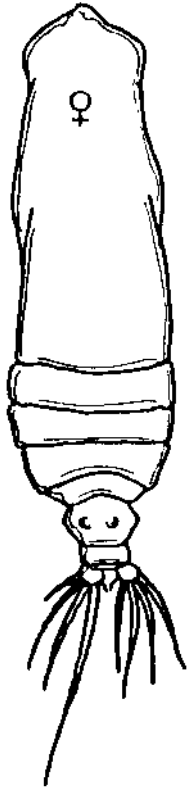




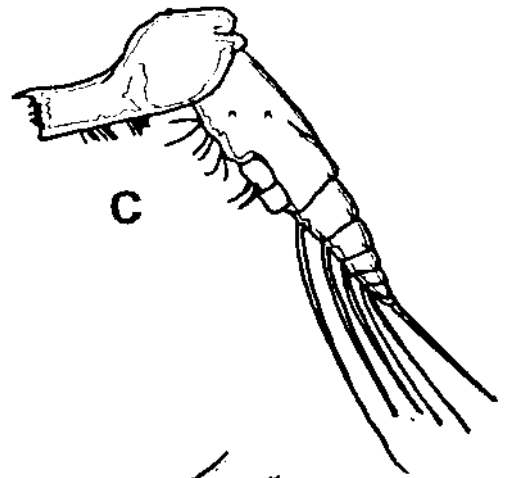




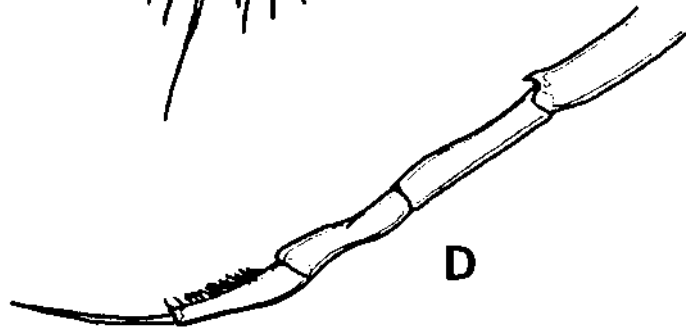
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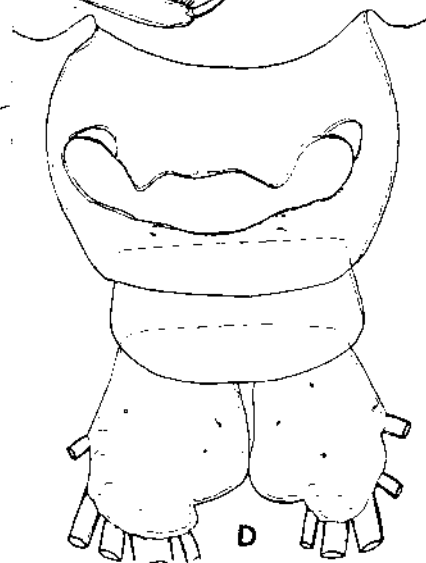
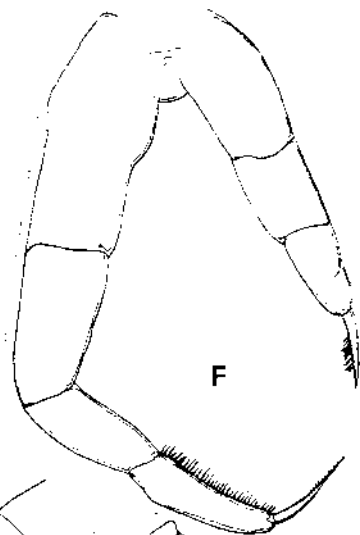
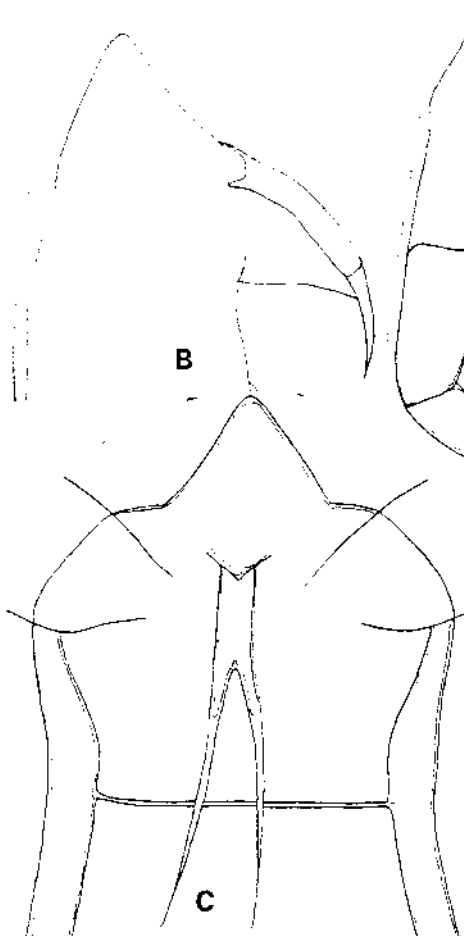
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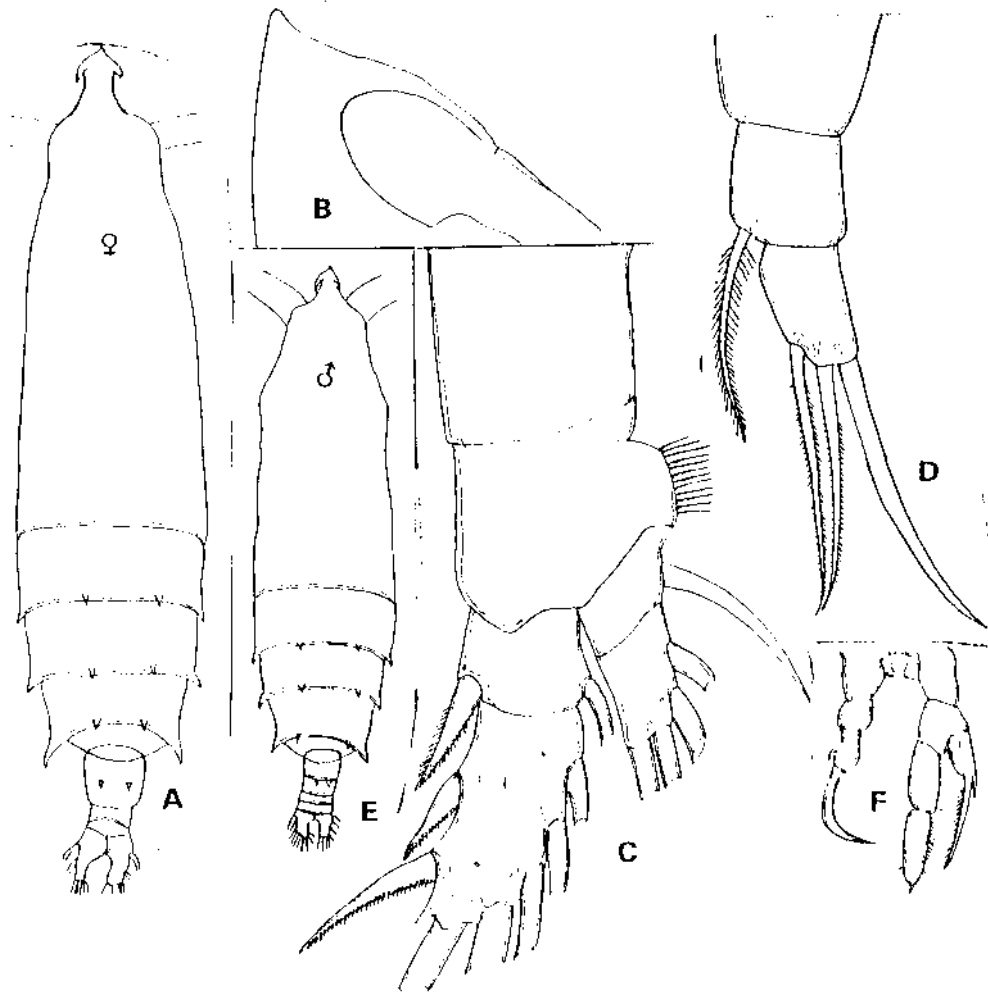


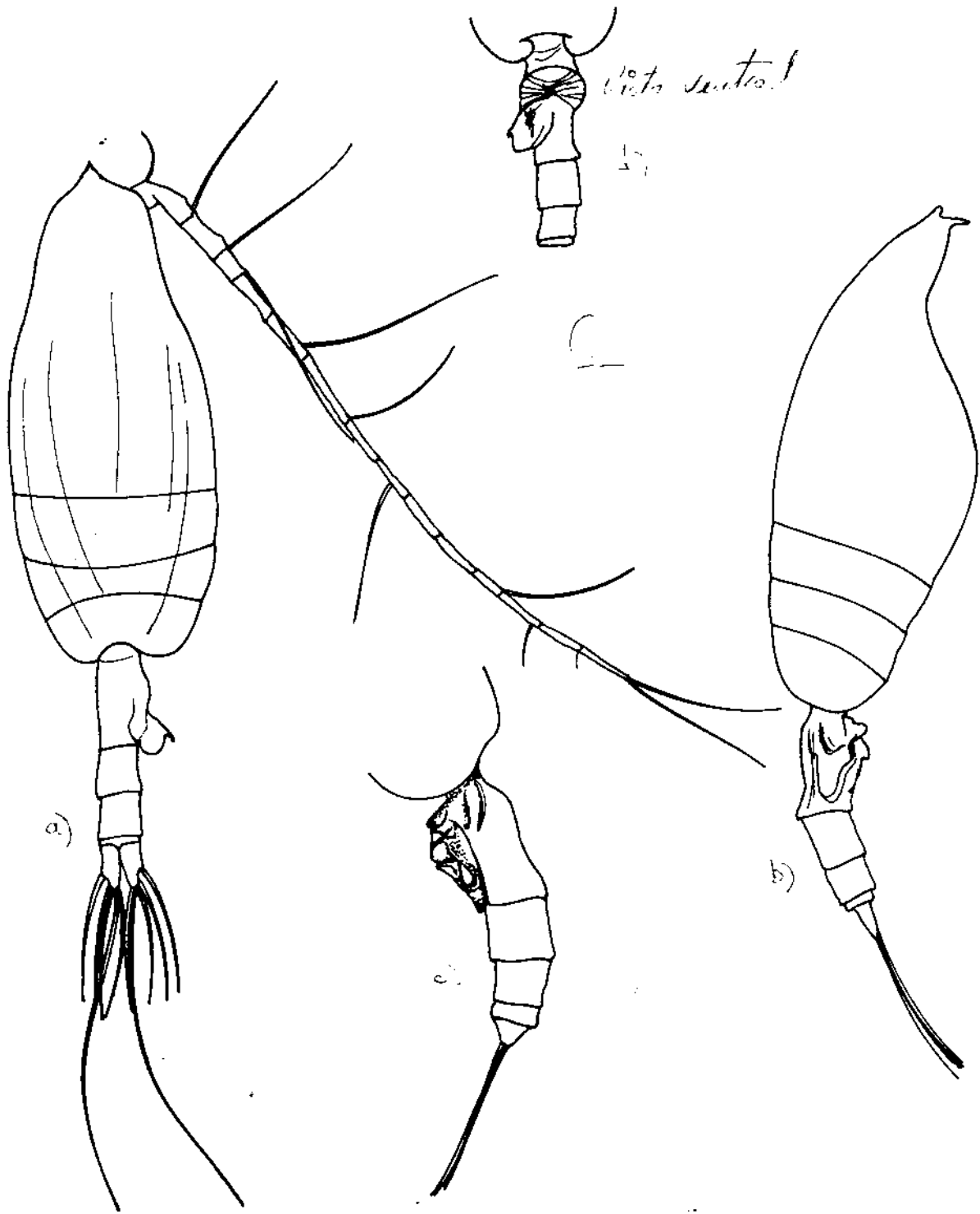
C



D





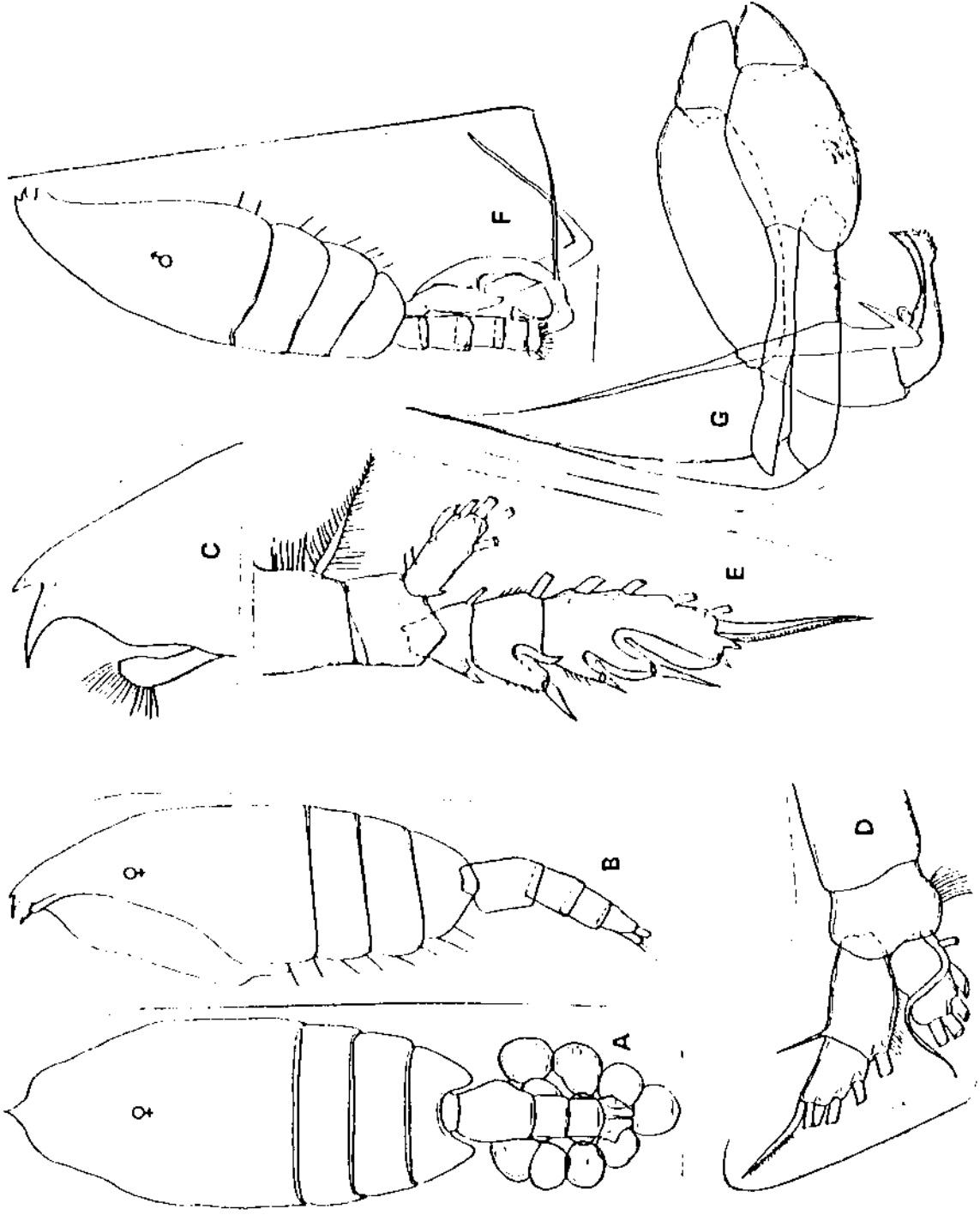


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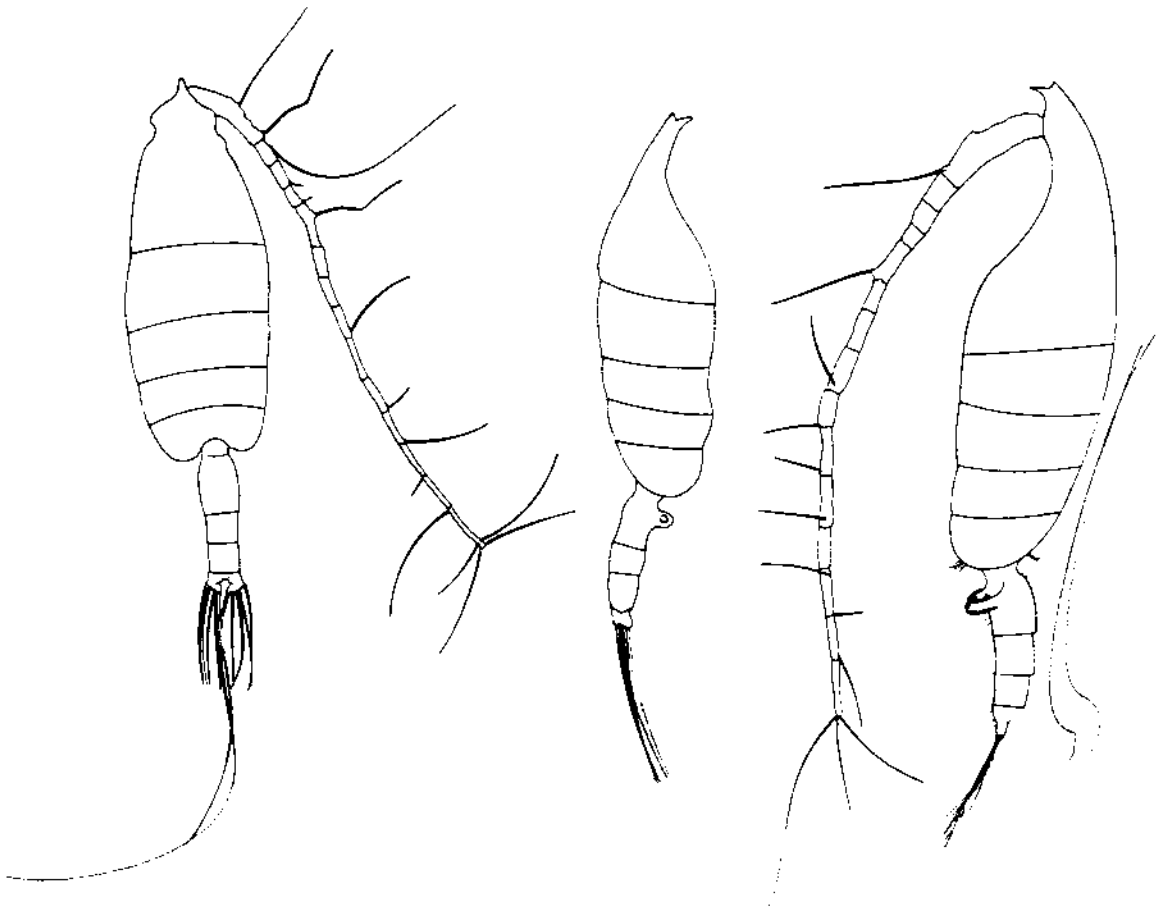
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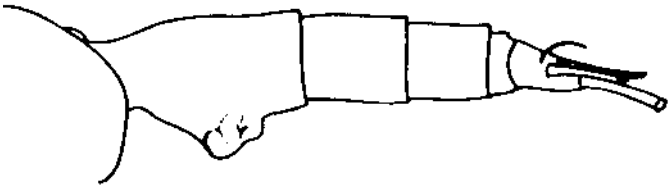
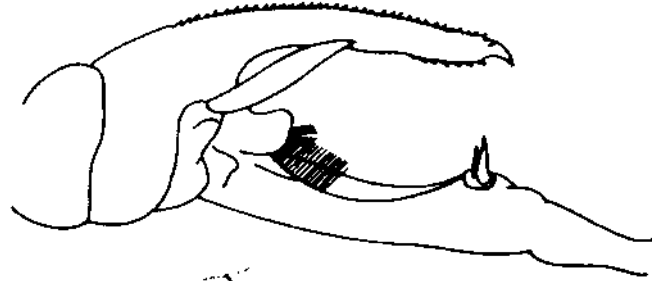
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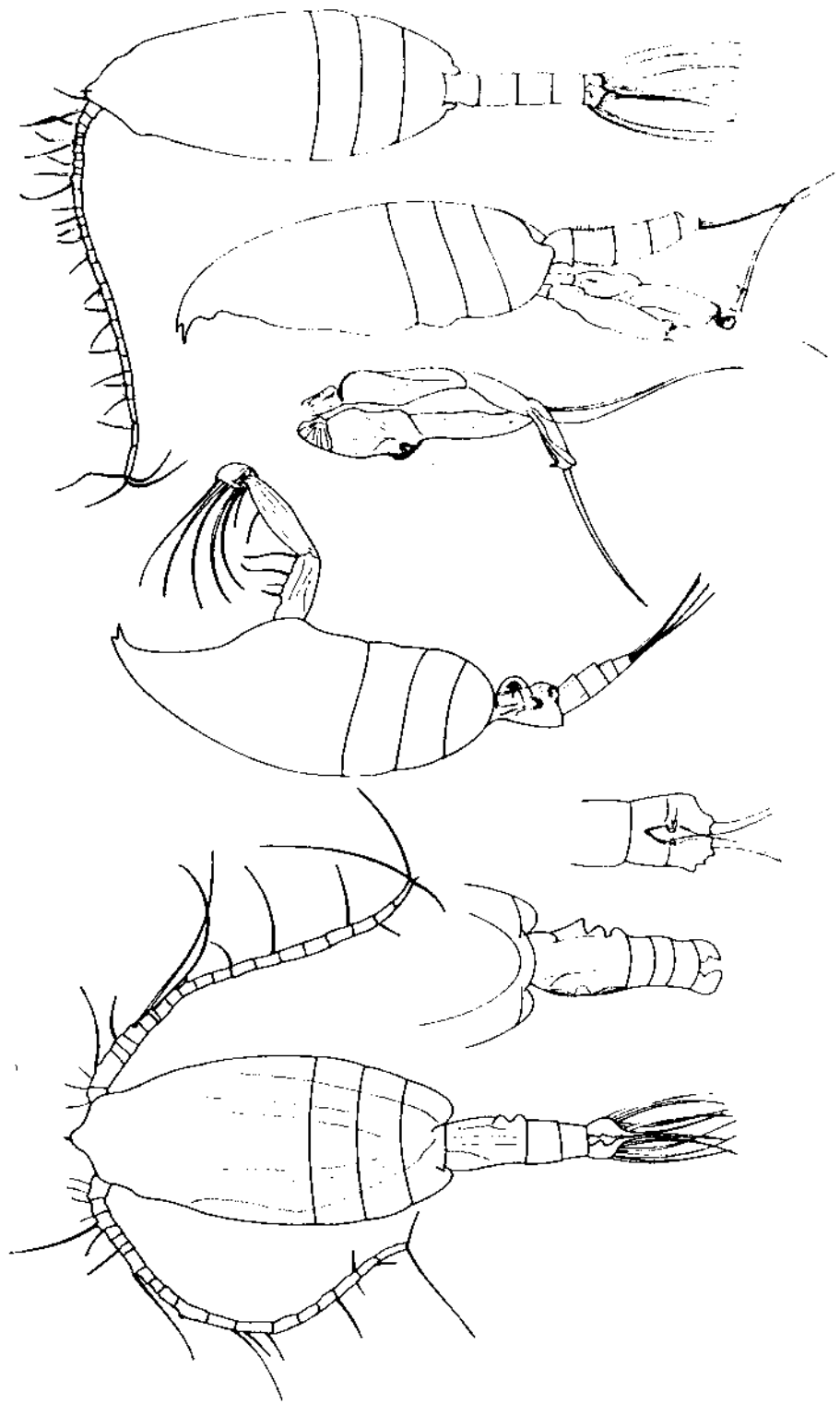
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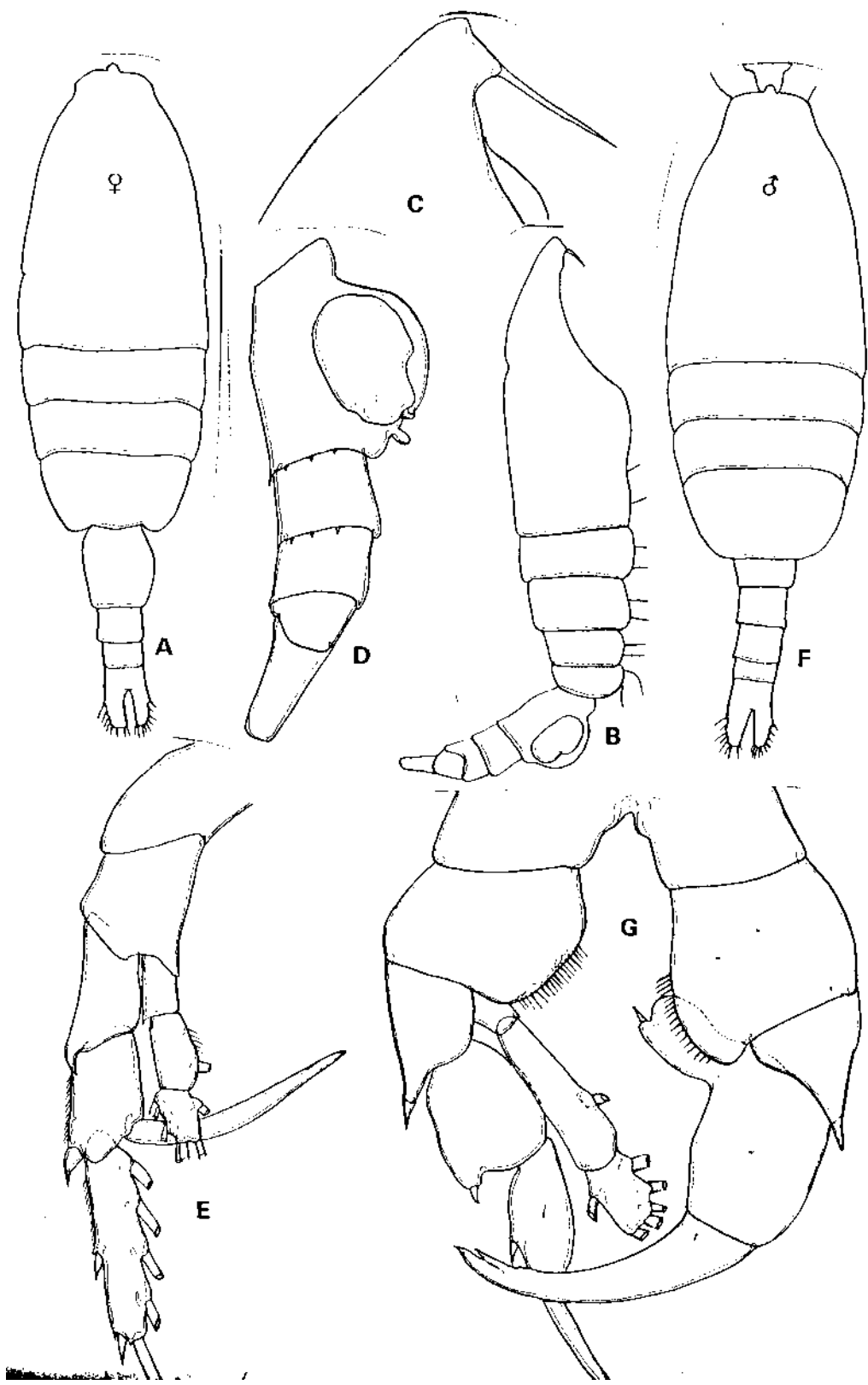




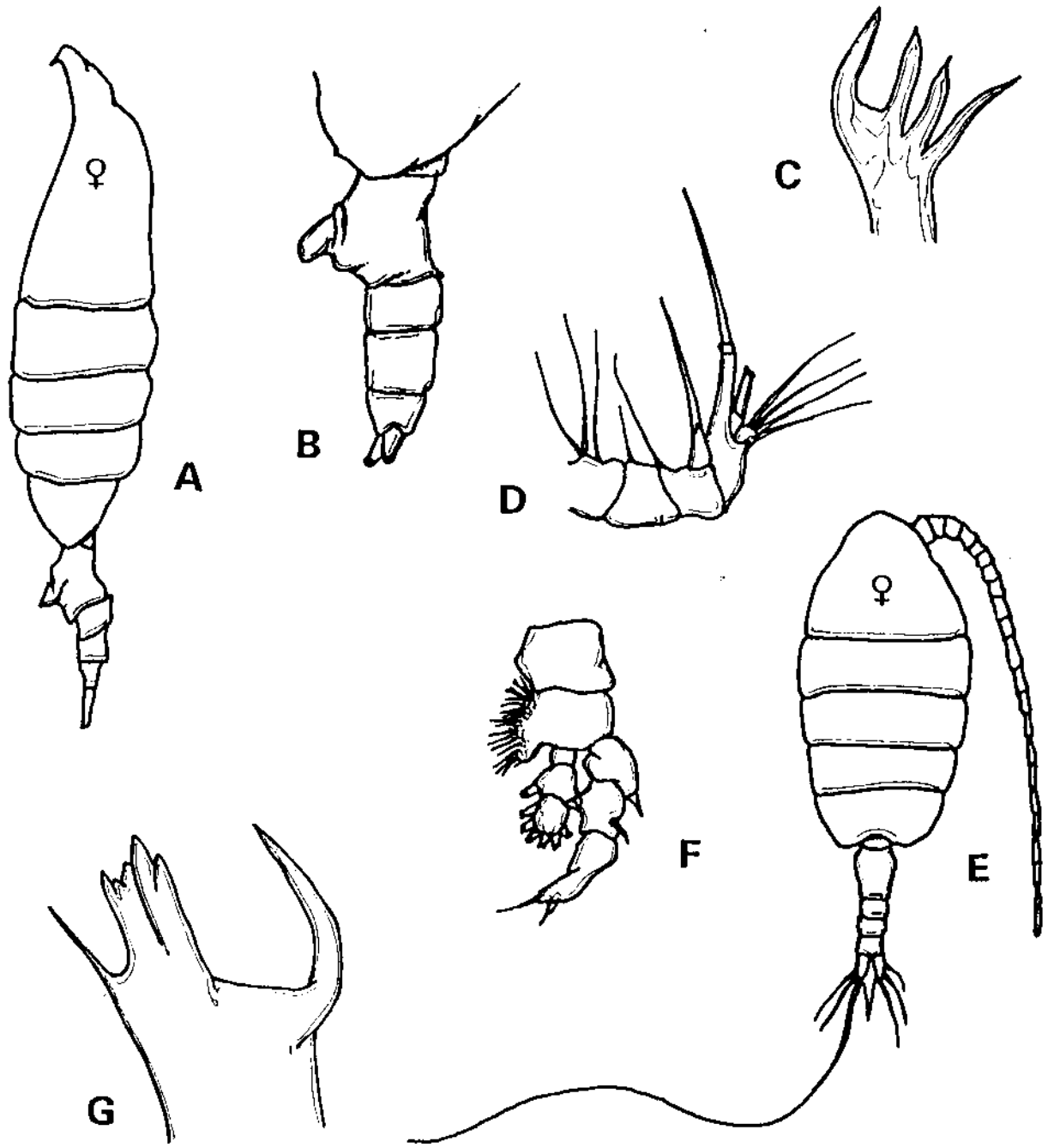




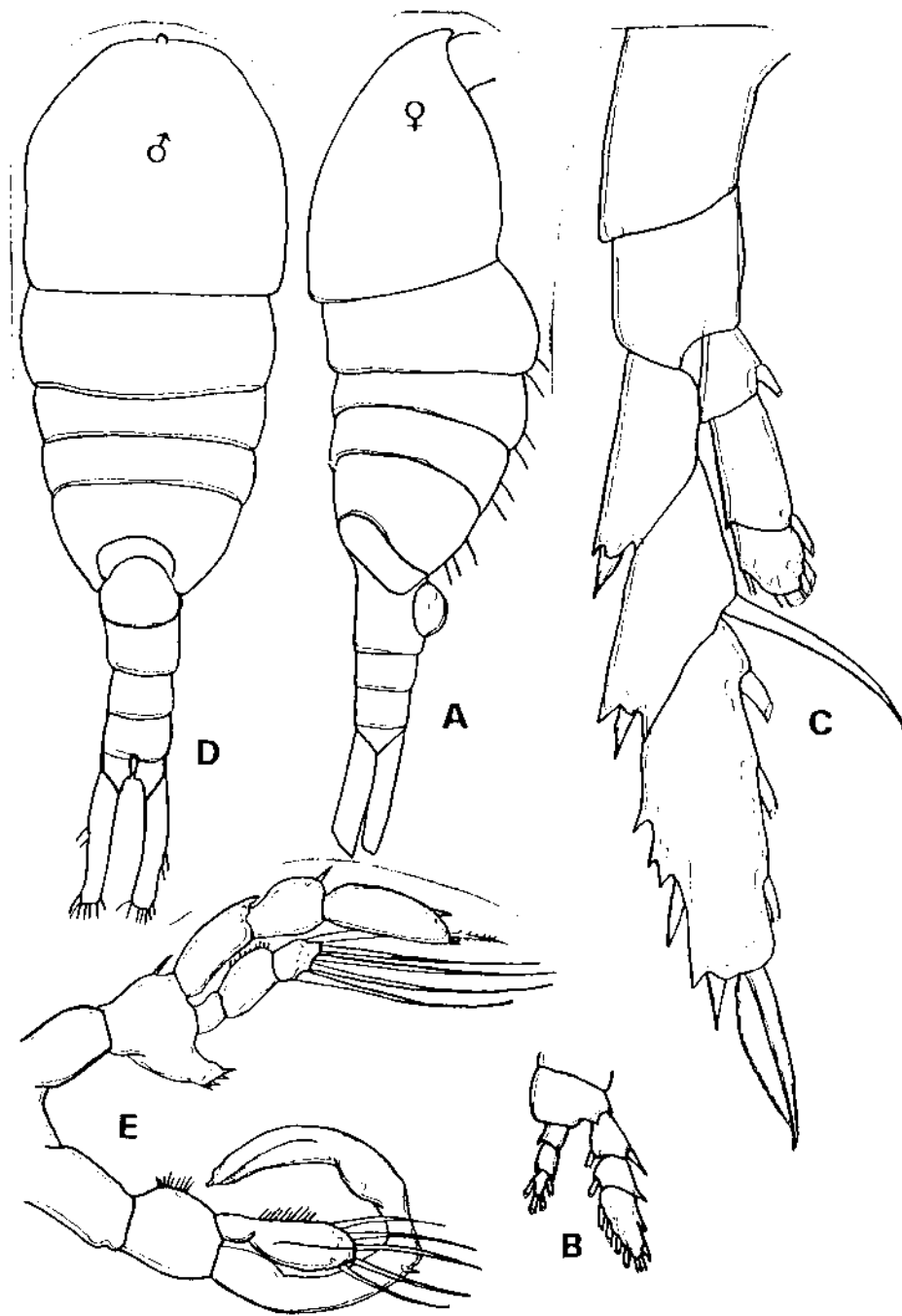




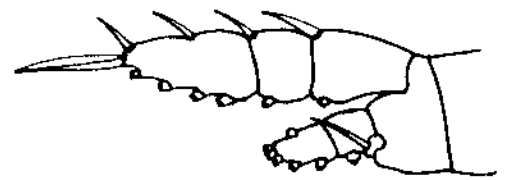
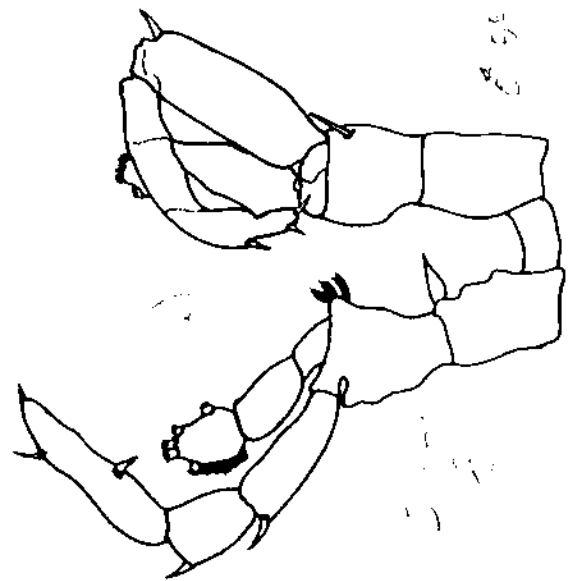
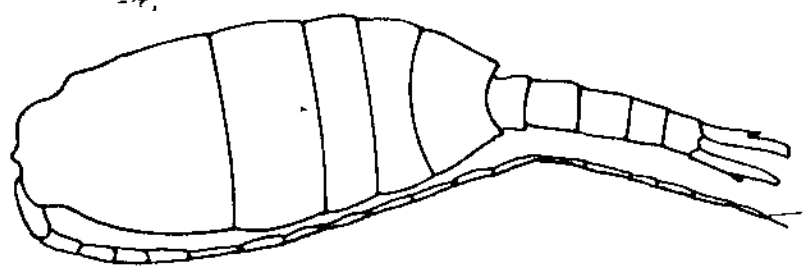
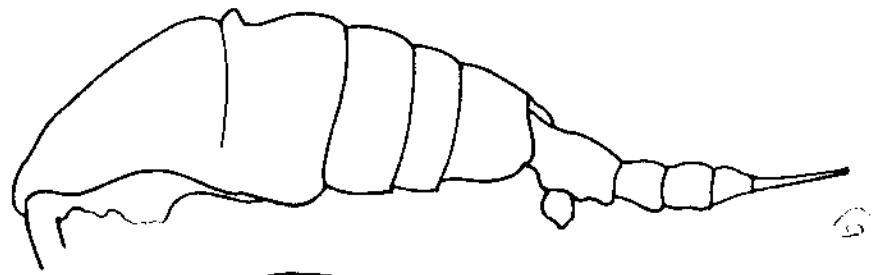
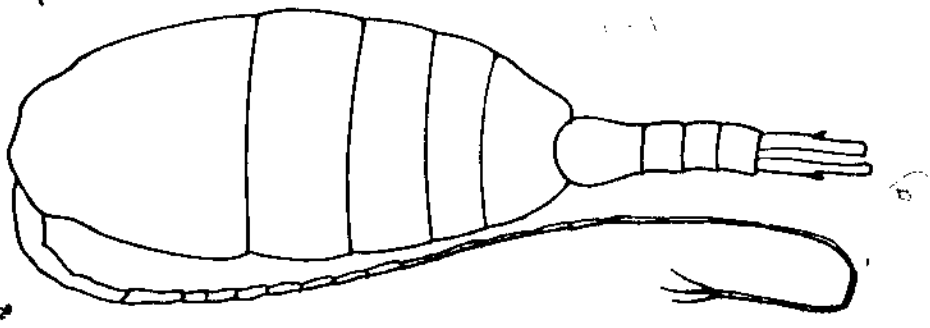
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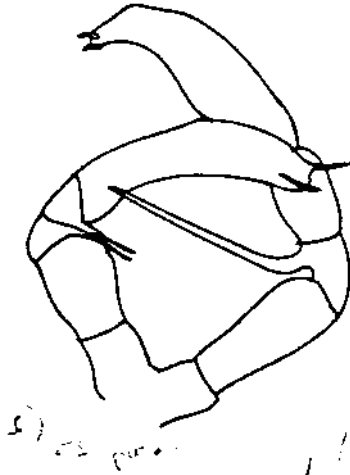
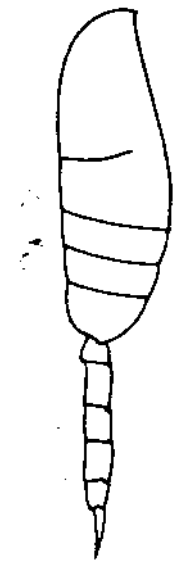
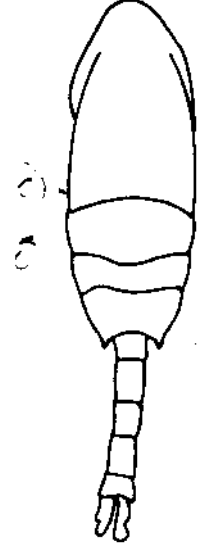
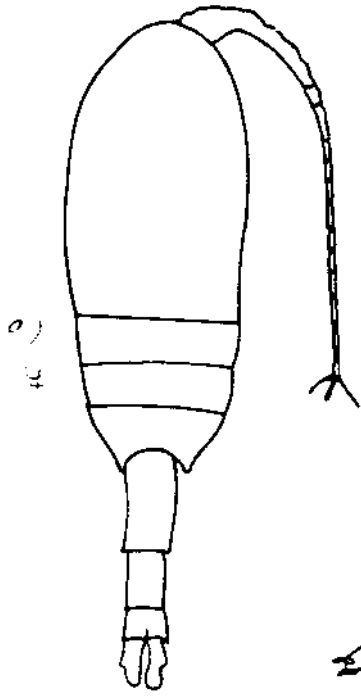
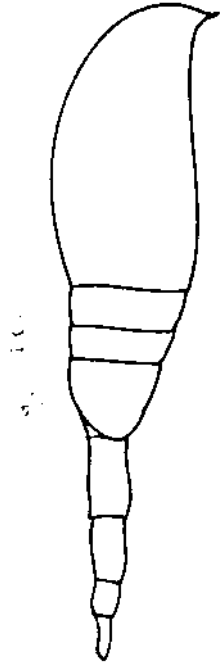
*Heterostylops longicauda*



*Lucicutia furcata*

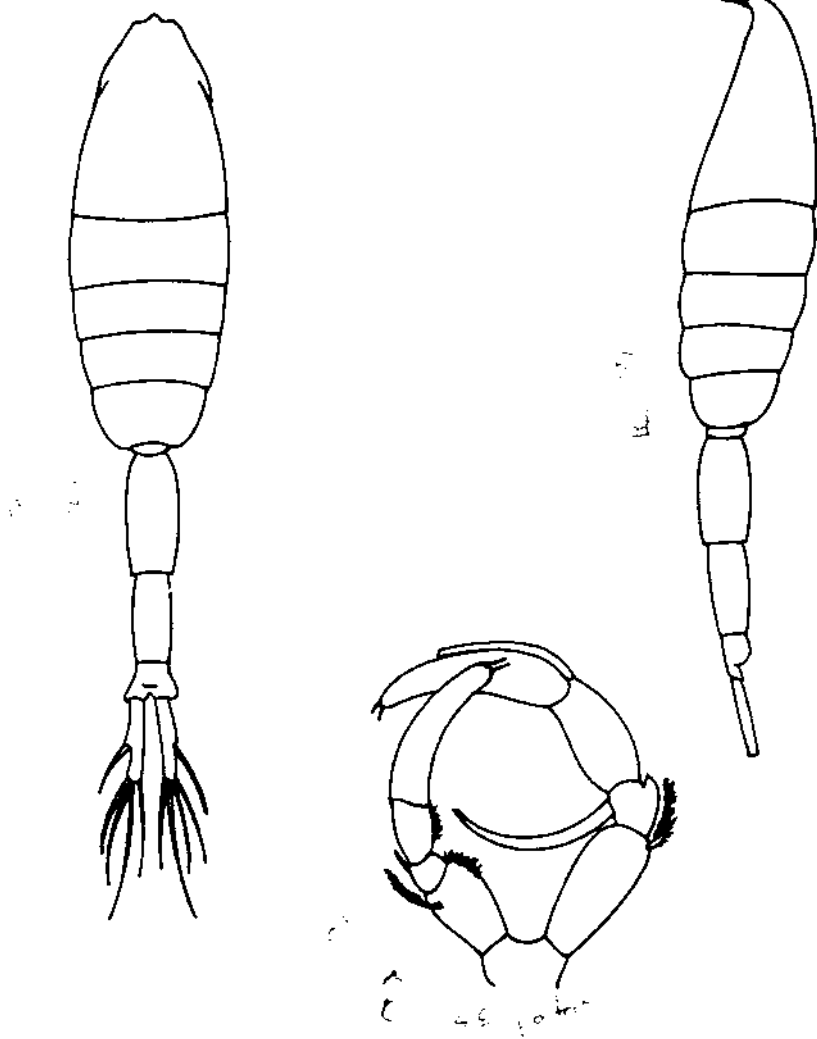


*Handwritten text, possibly a name or label, oriented vertically.*



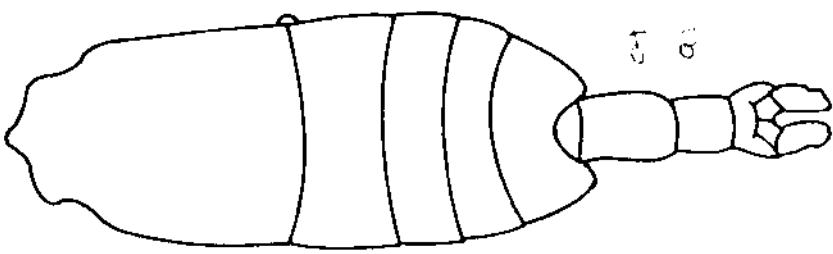
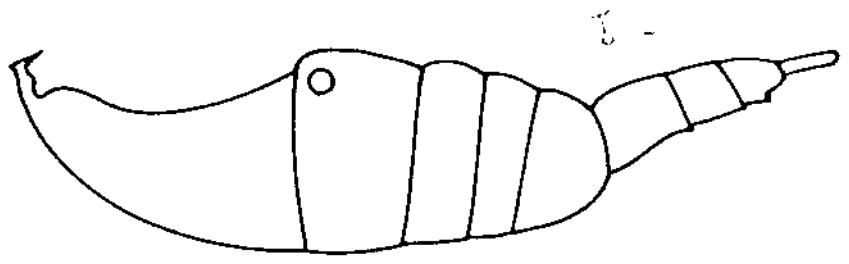
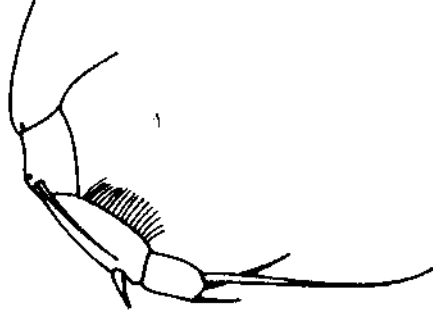
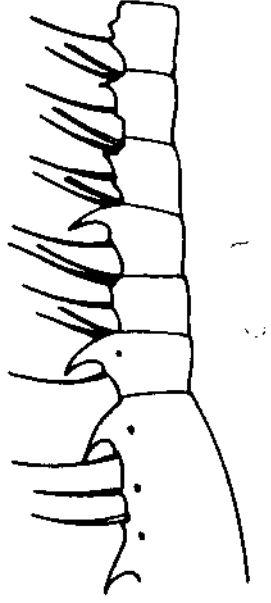
*Hydris ...*

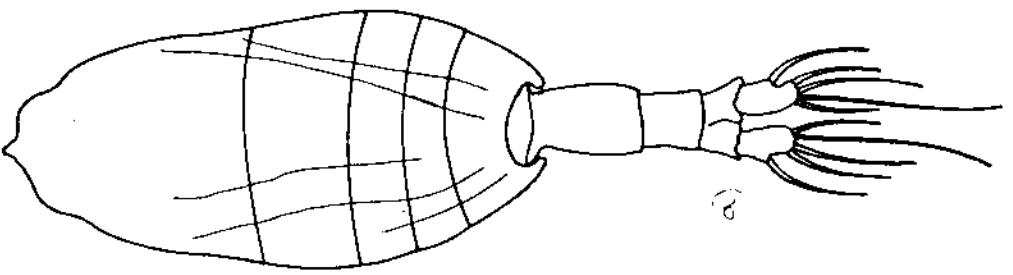
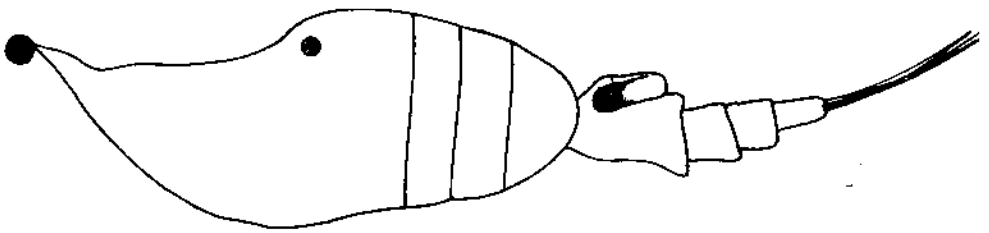
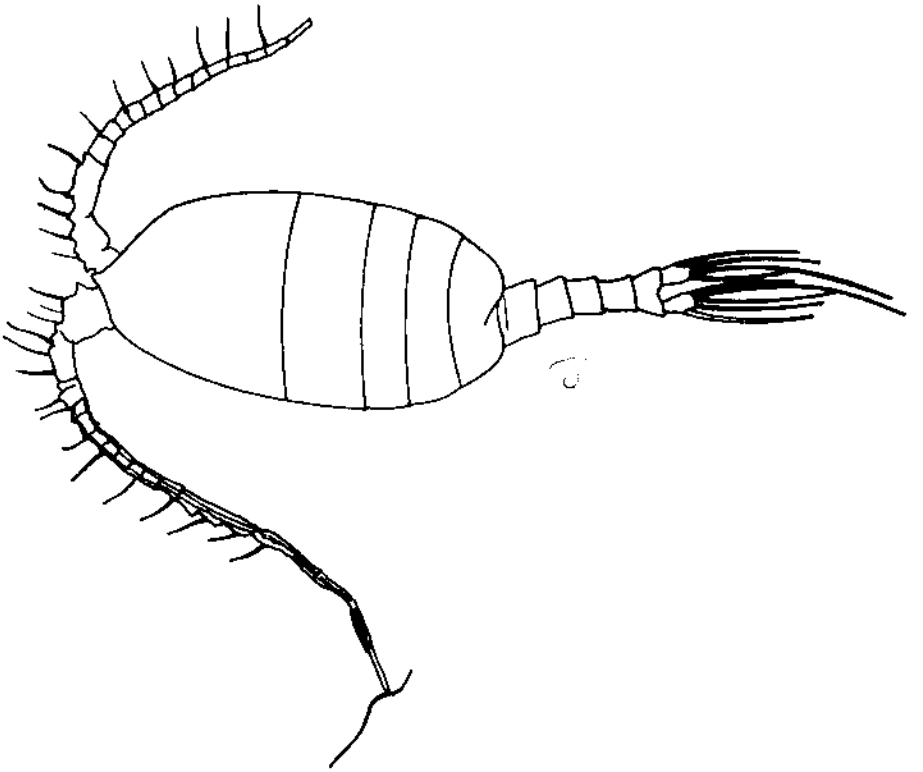
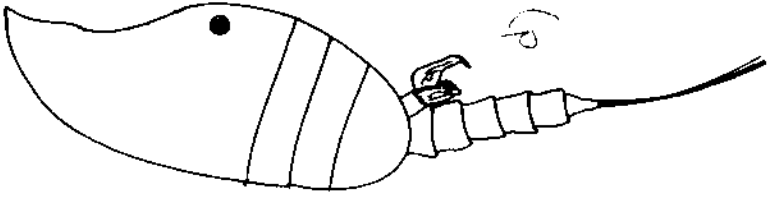




*Actinia praeceps*

*Phoronopsis yezoensis* (Ito)

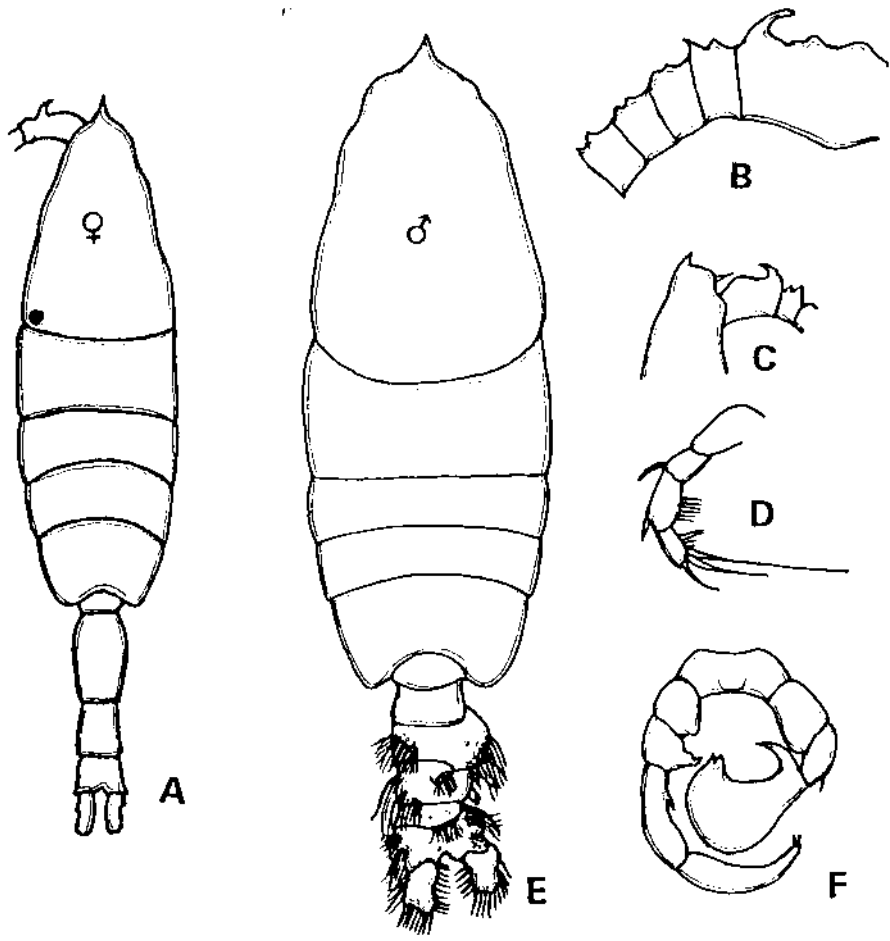




Pluteus

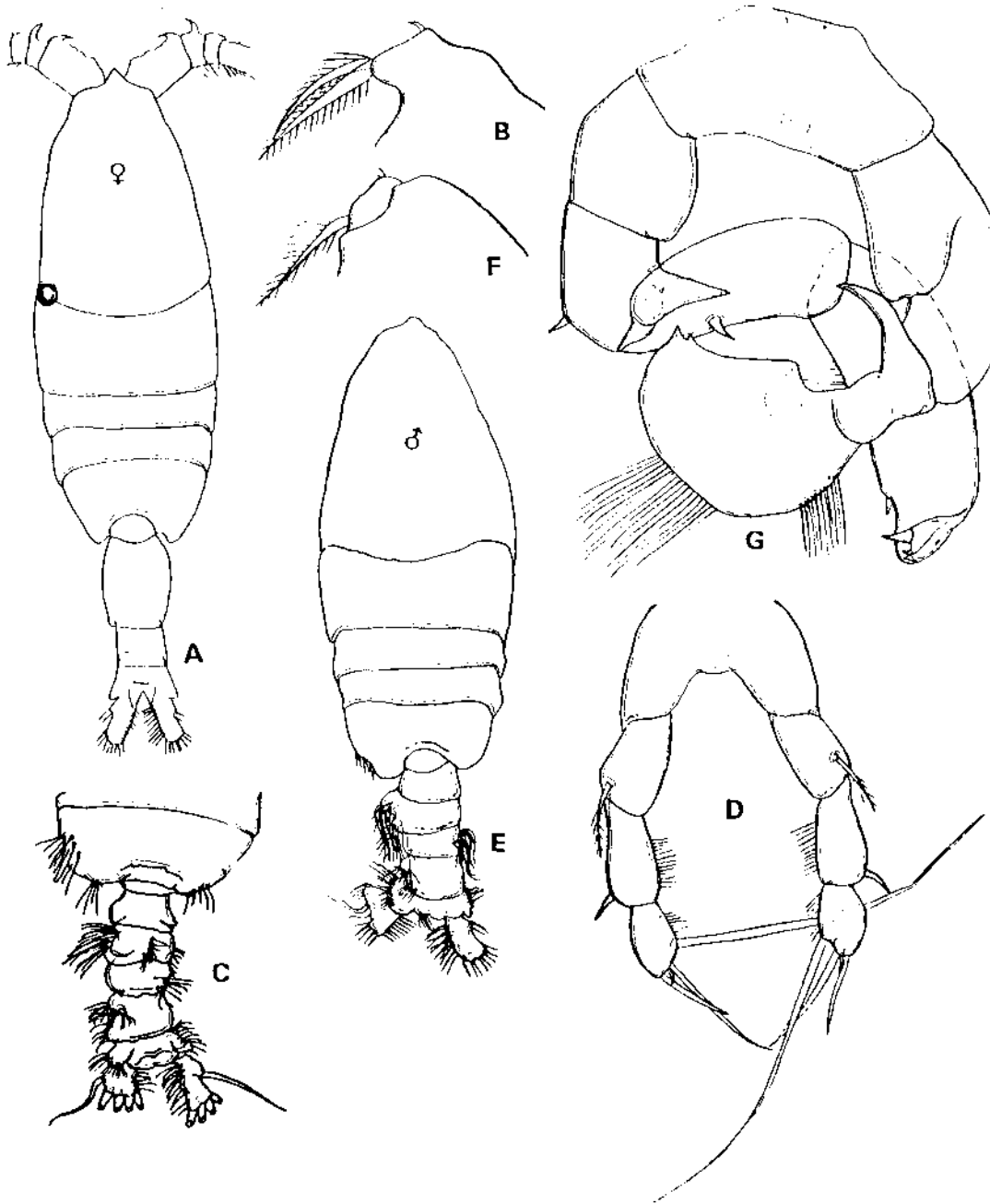
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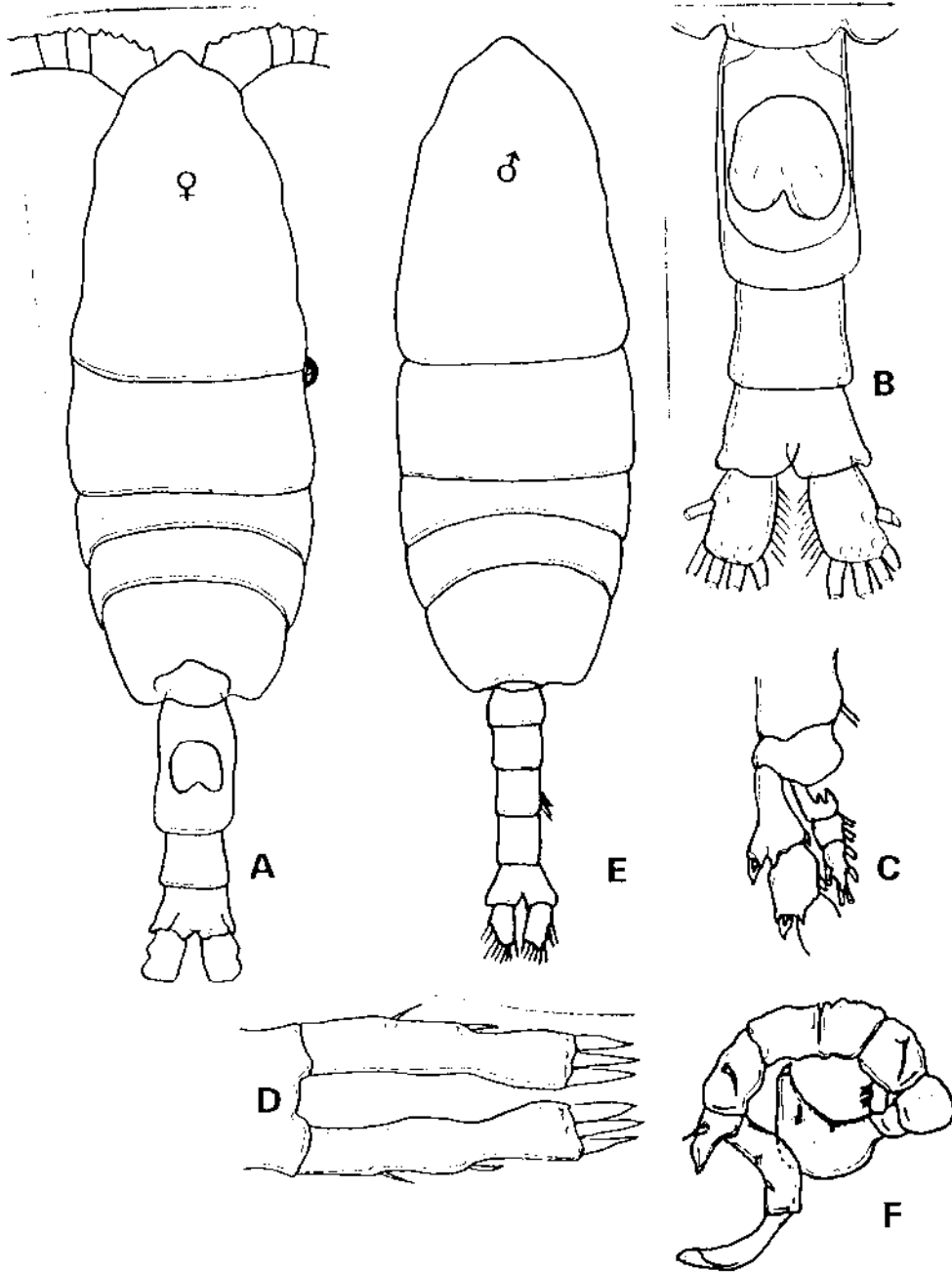
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r

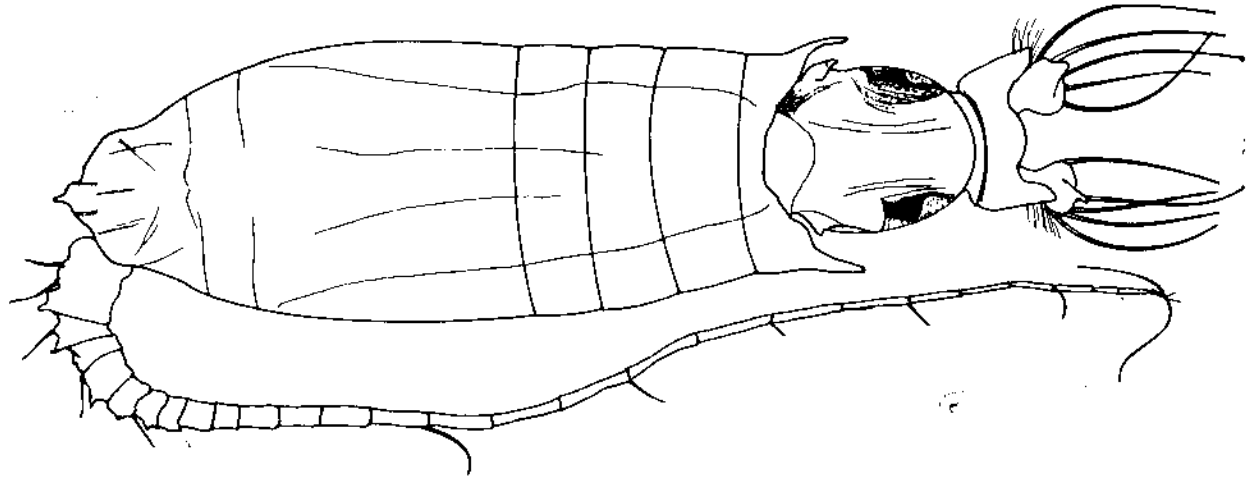
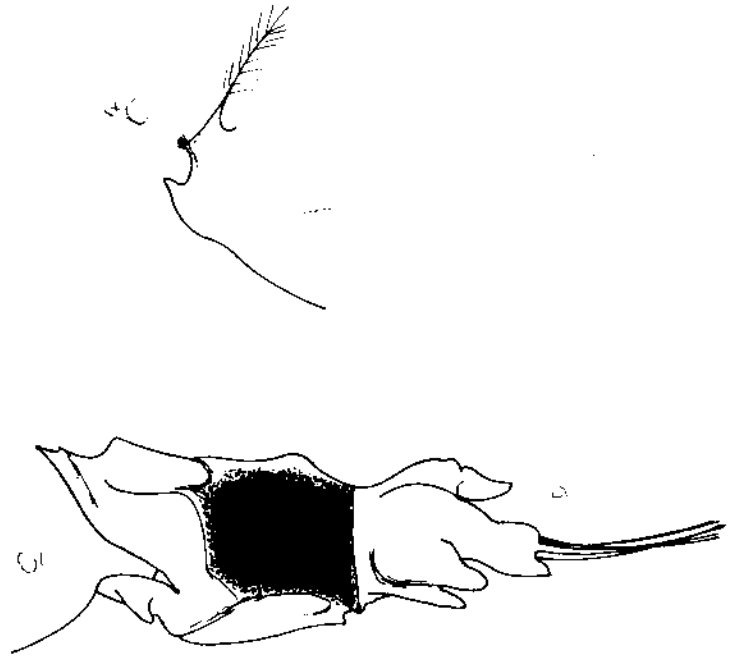
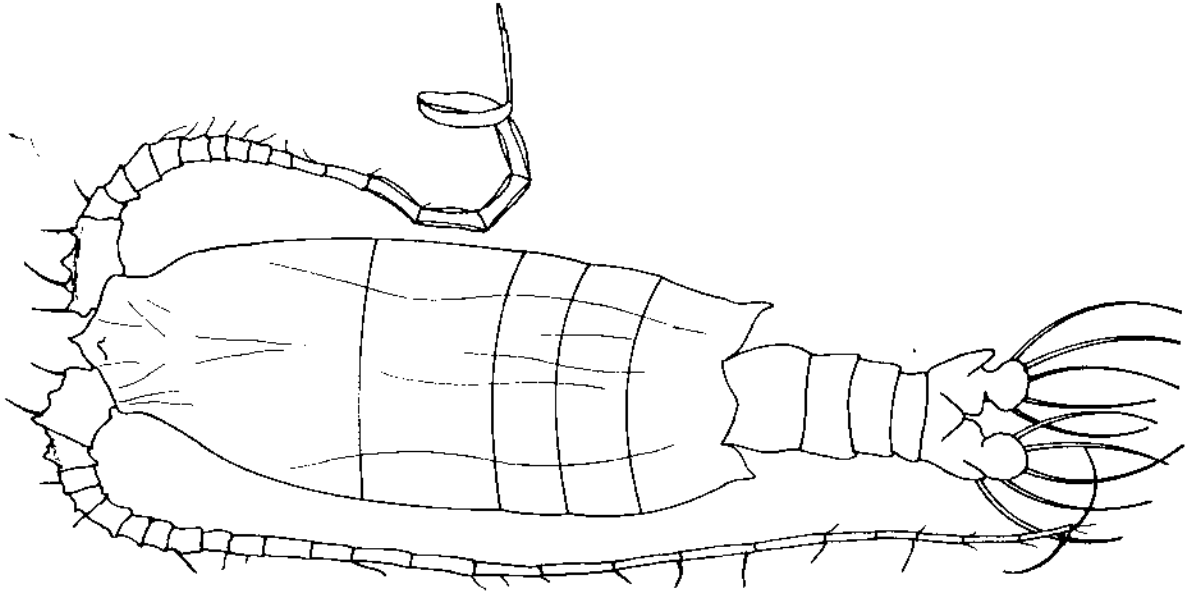
*Handwritten text, possibly a title or reference, is present at the bottom of the page.*

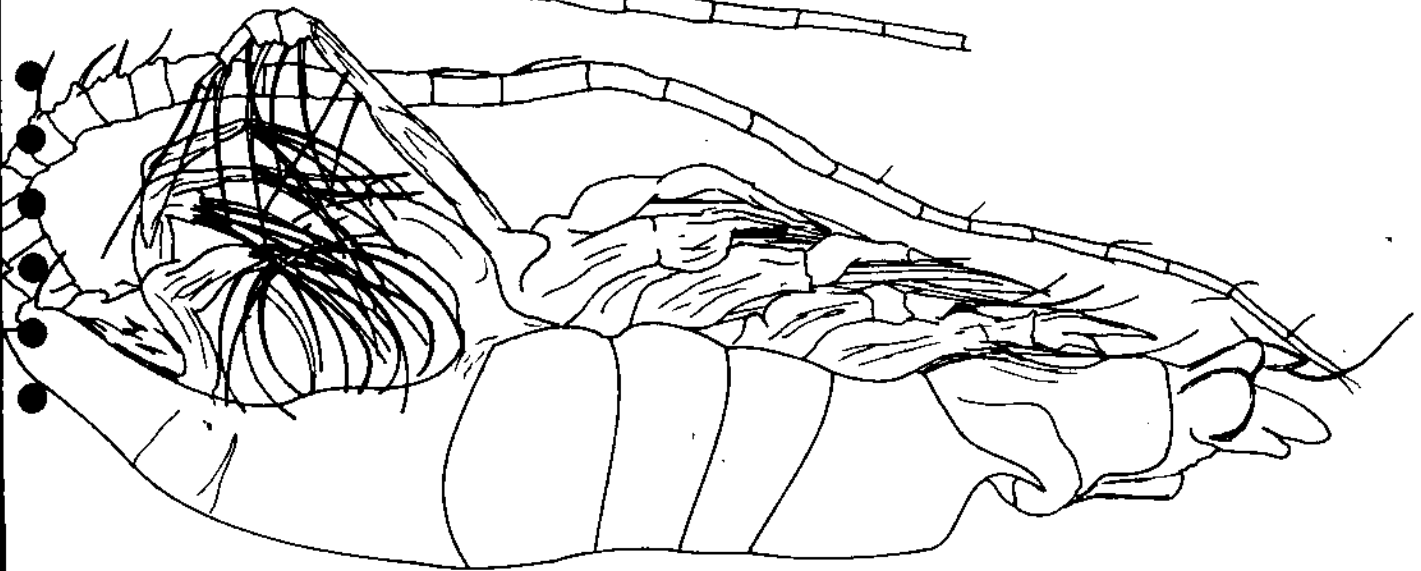
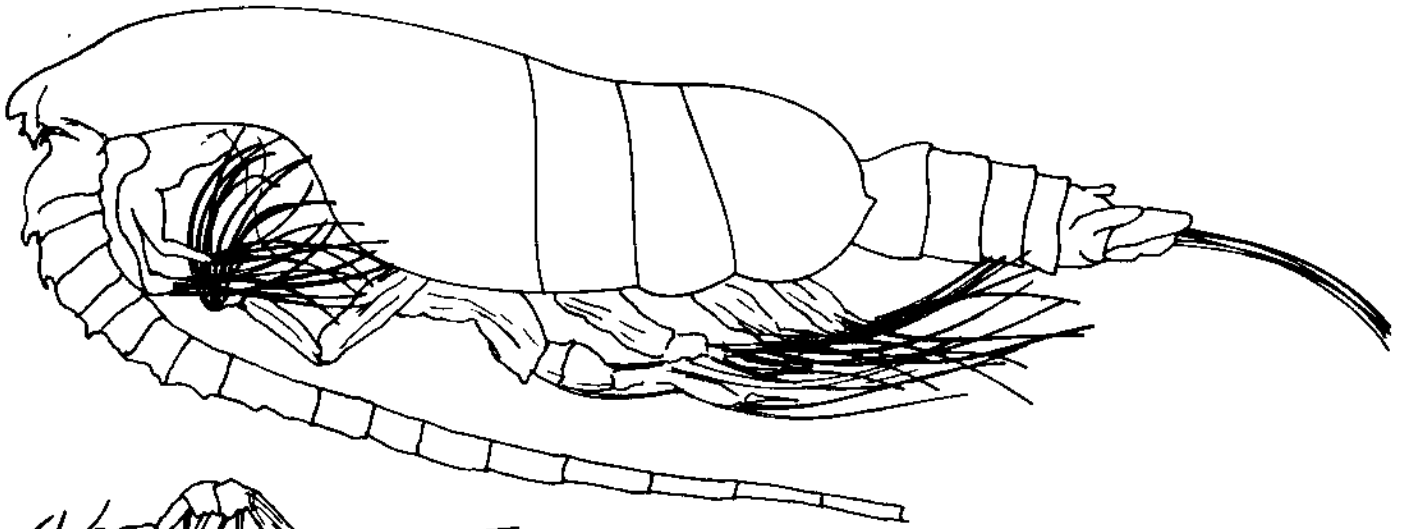
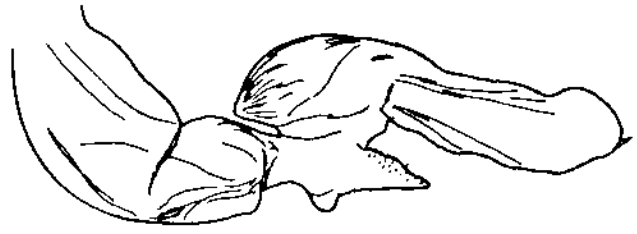




*Flecoptera*

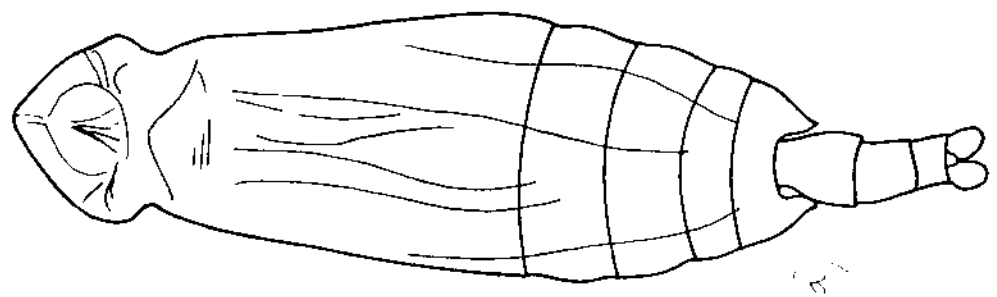
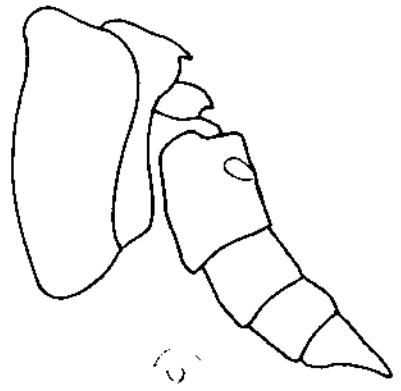
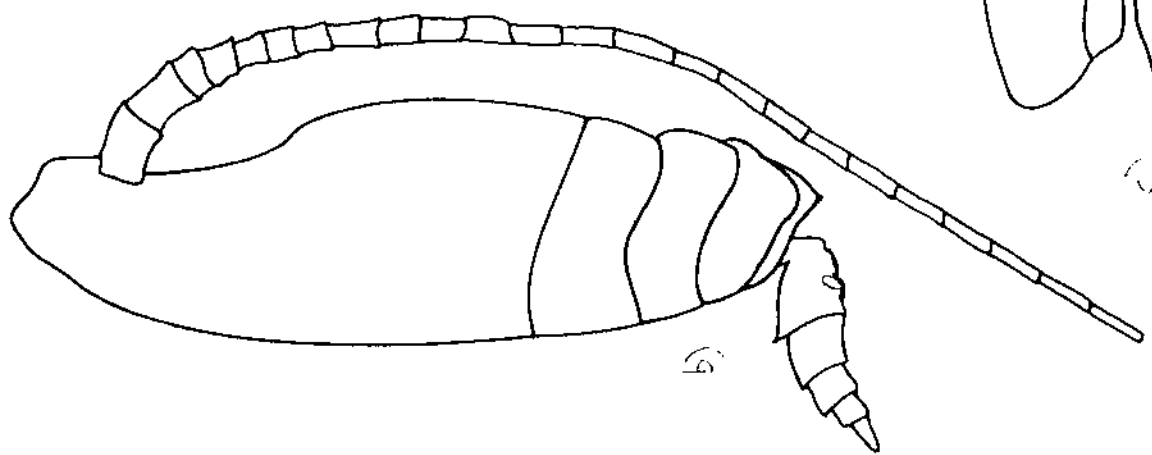
non 6/7 7-

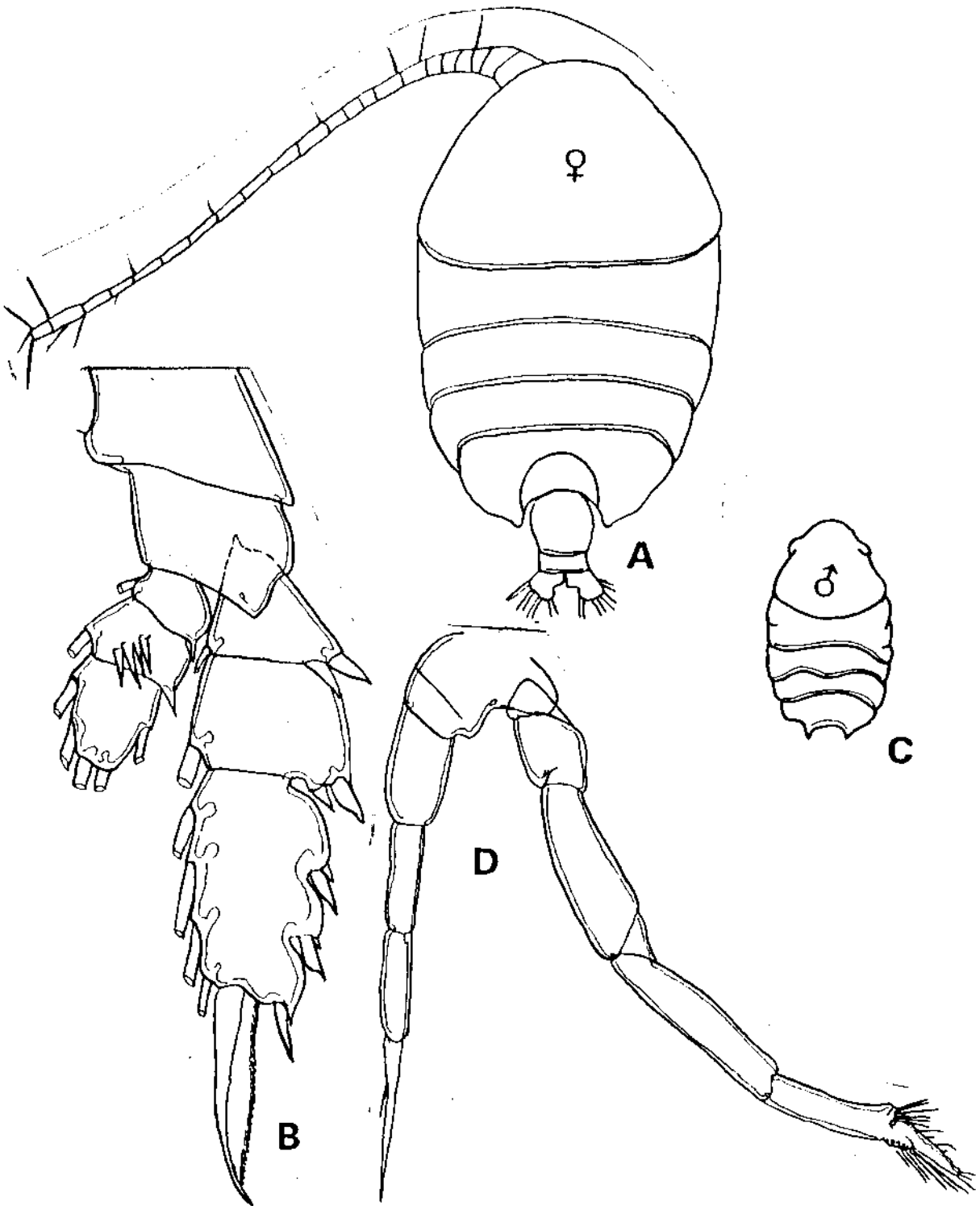






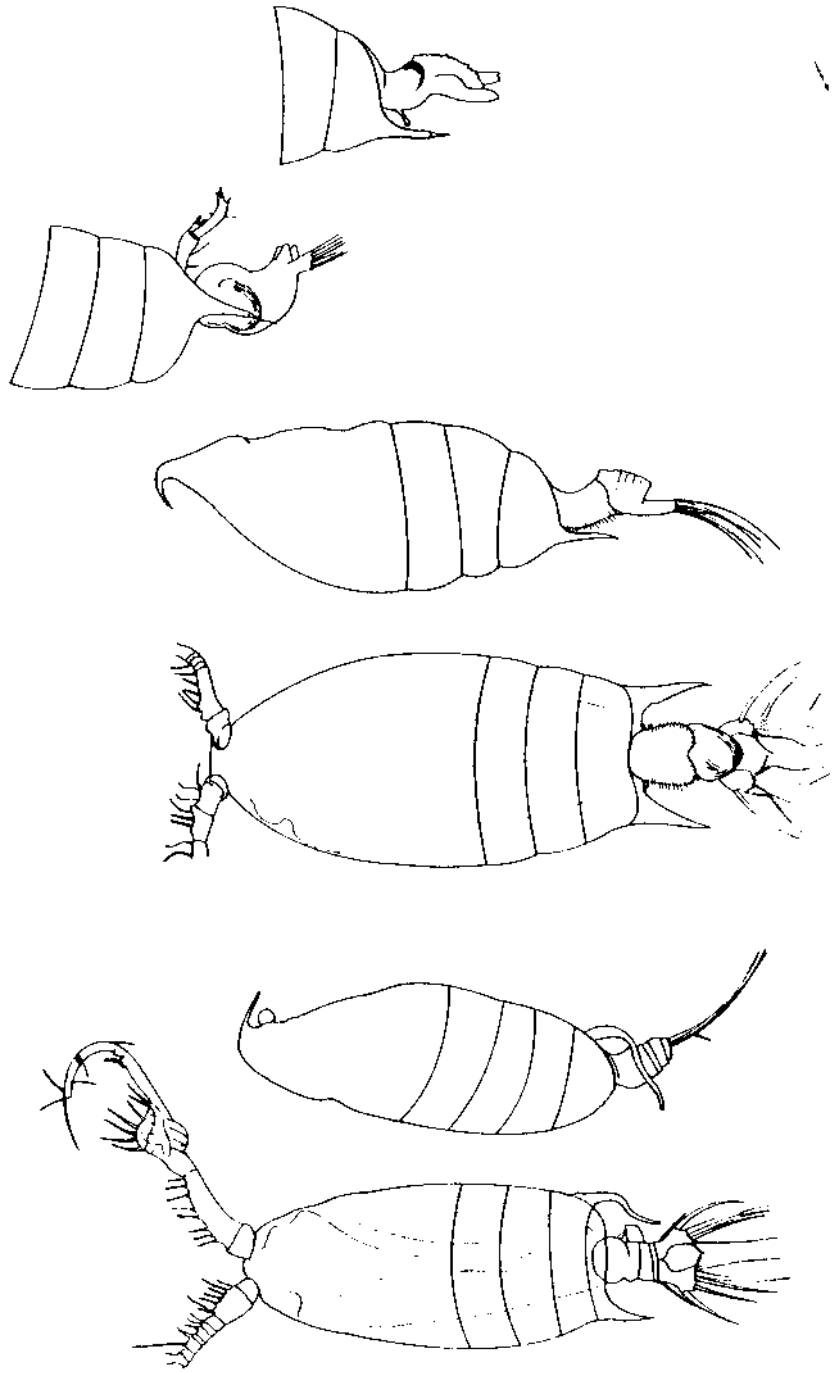
Cephalopoda - Tectas  
Fig. 1



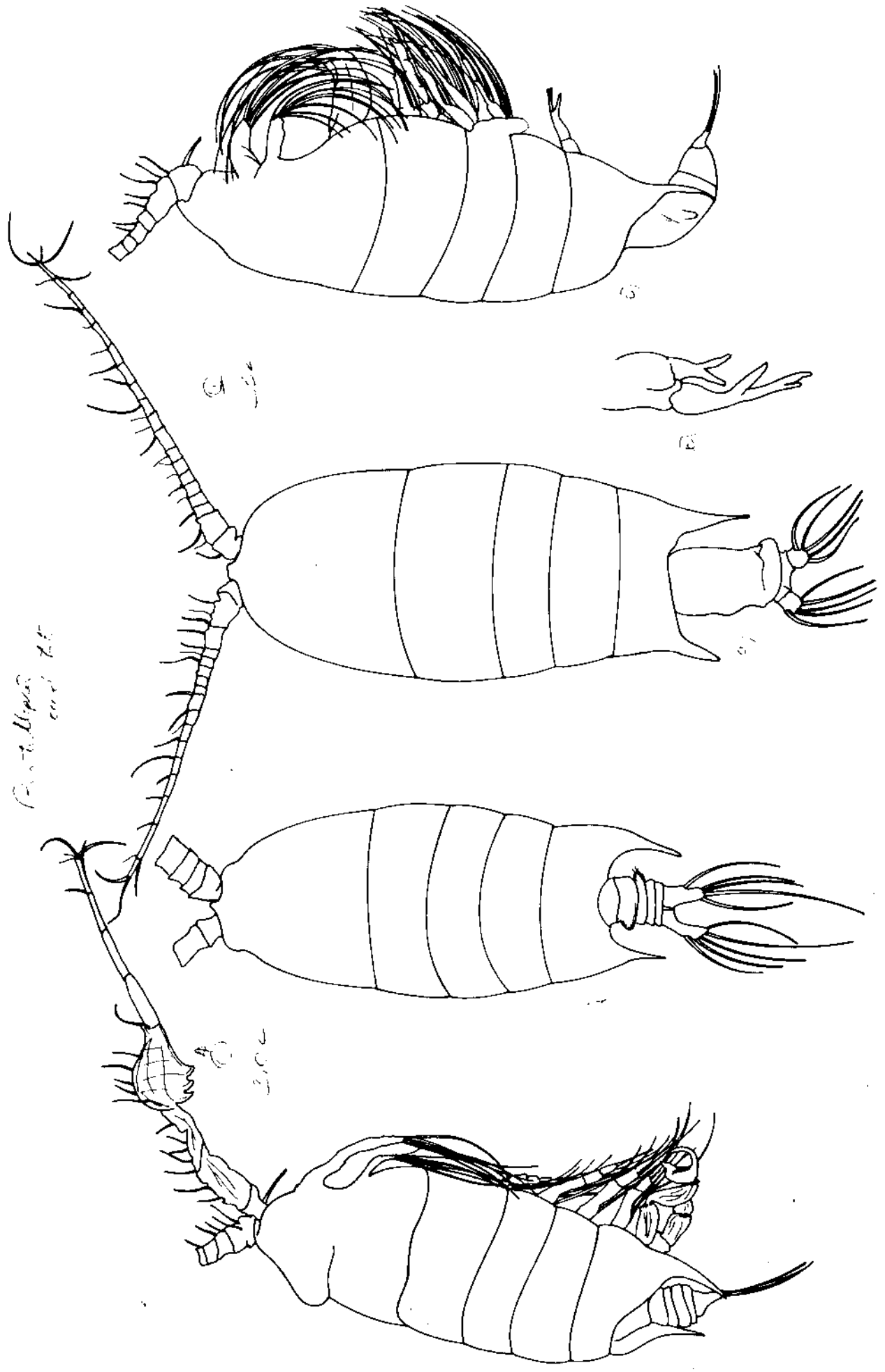


387

*Phacusa campifera*



*Hand-drawn sketches of a segmented worm, showing its head, body segments, and tail.*



*Pantodon*  
and 7.5

6

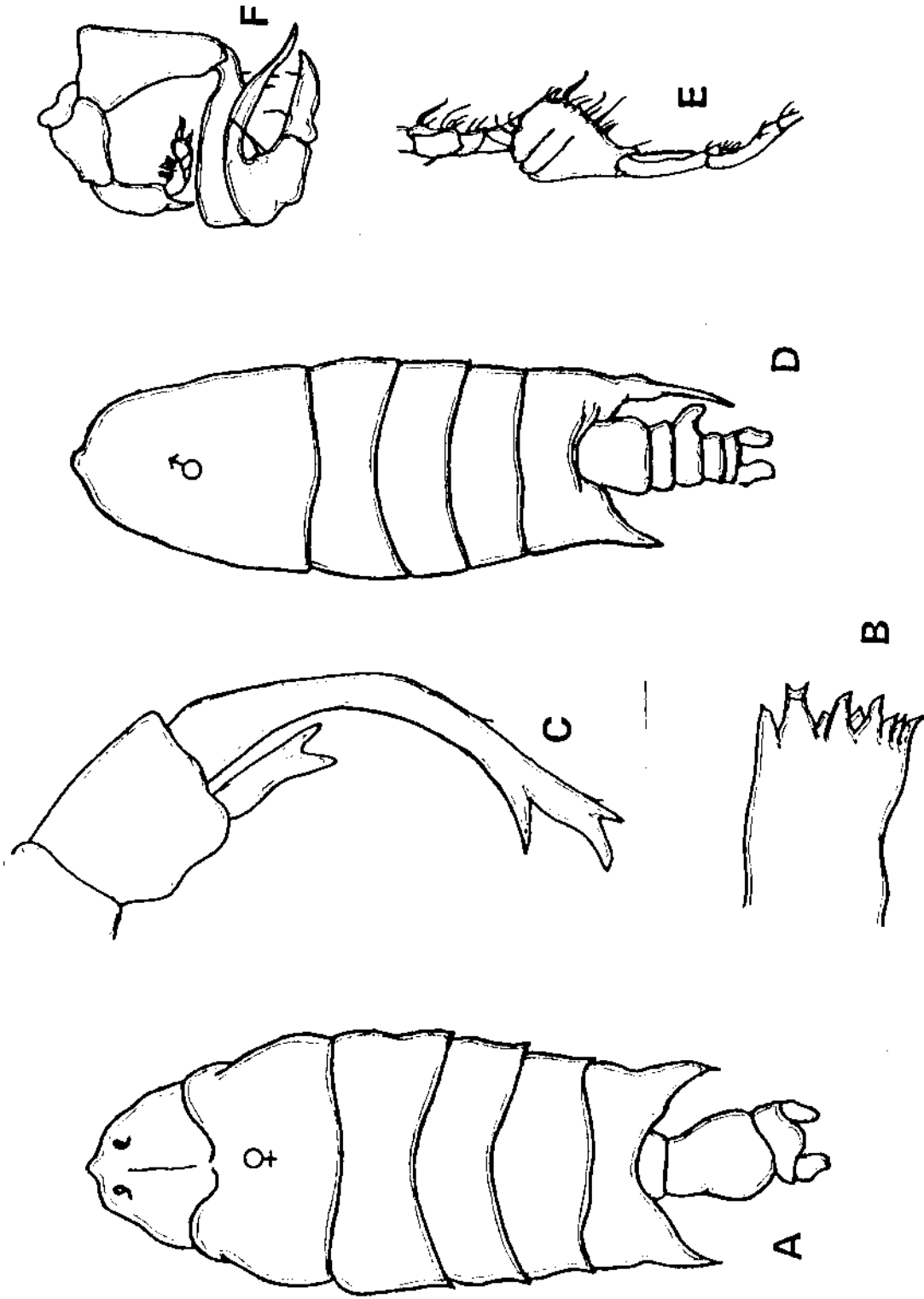
7

8

9

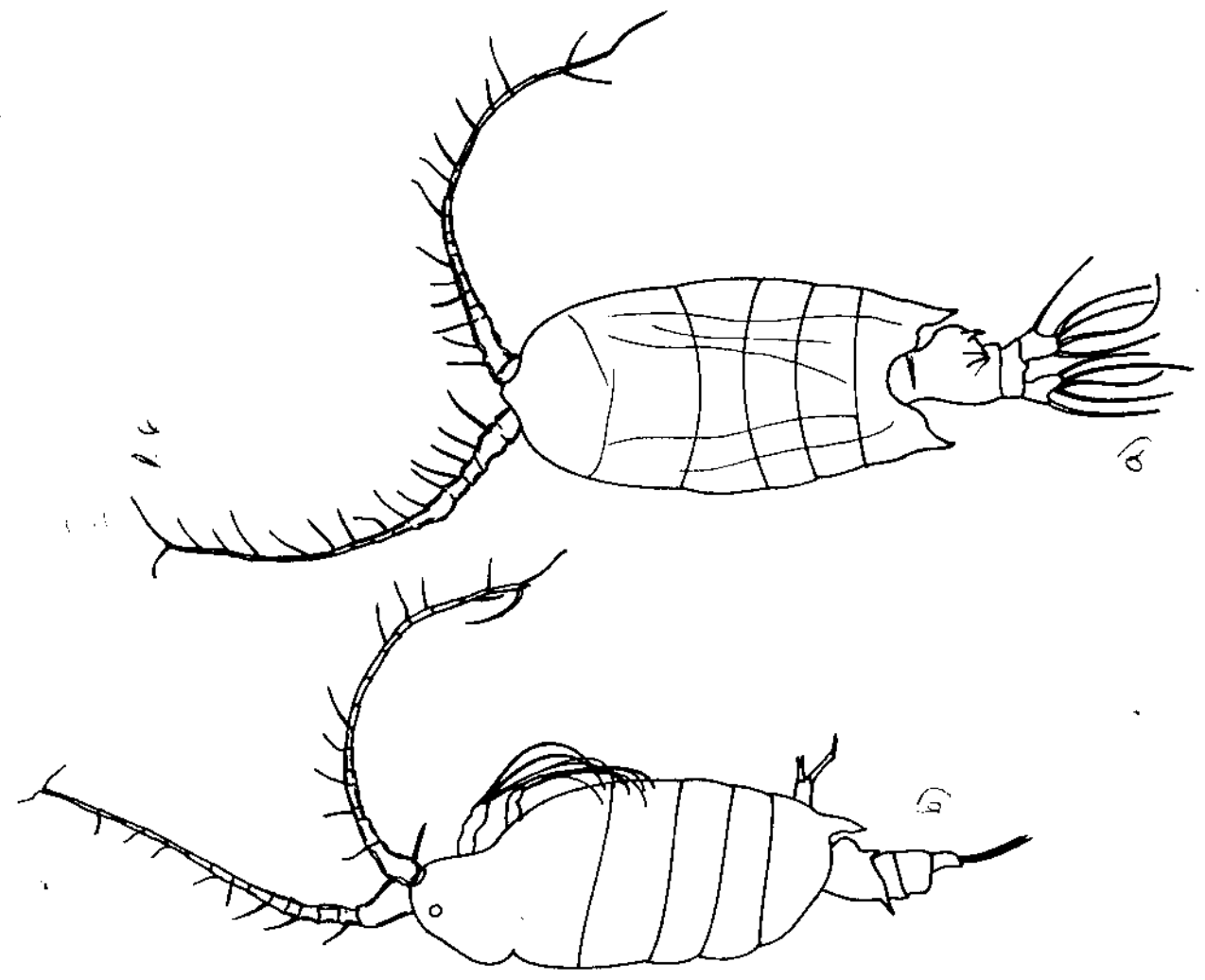
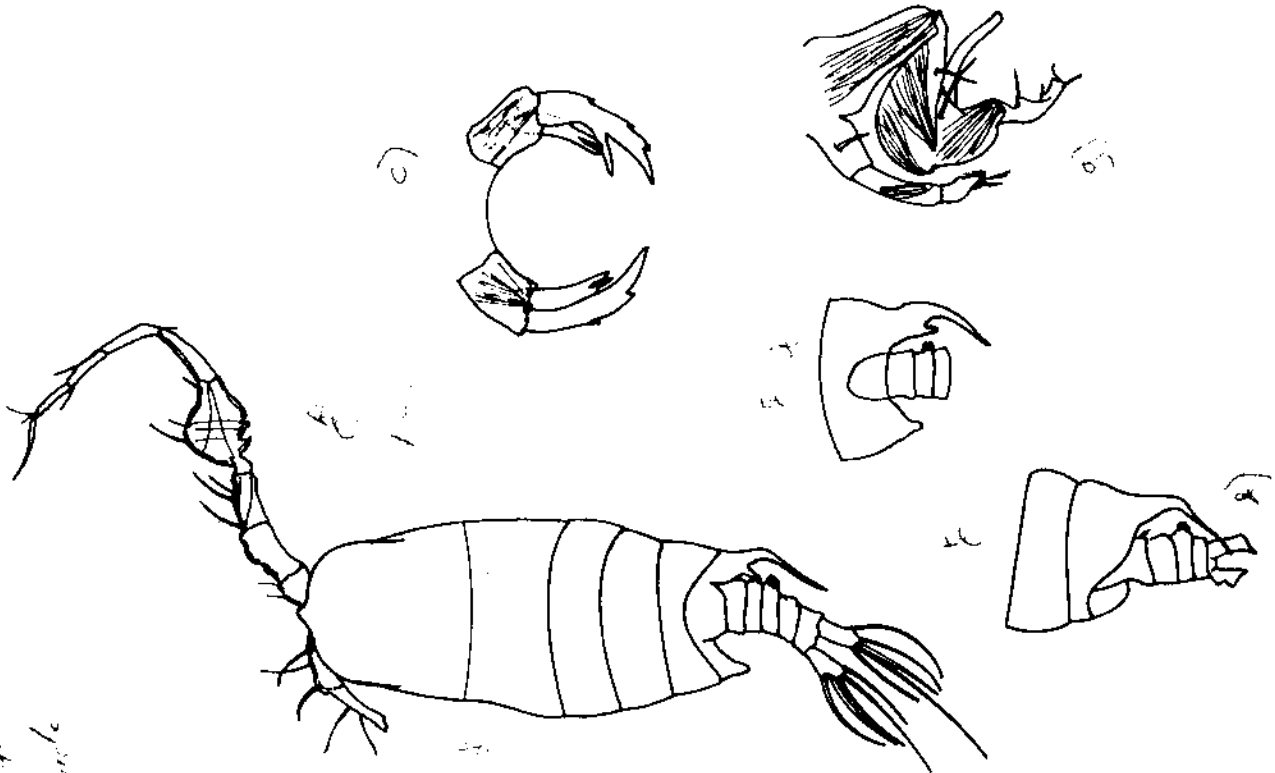
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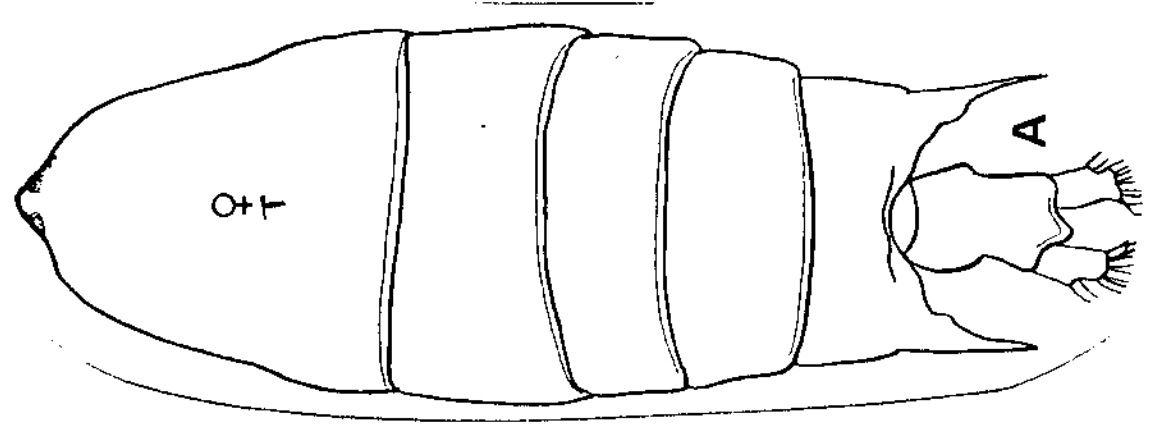
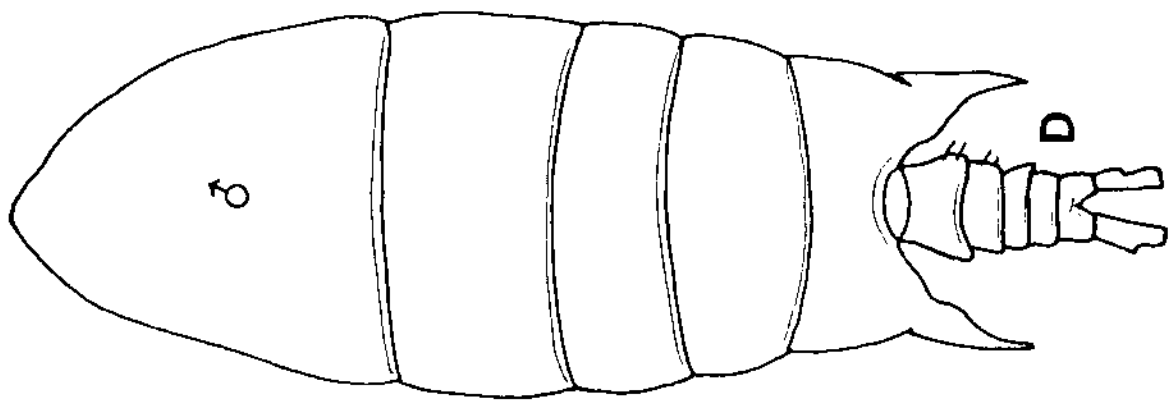
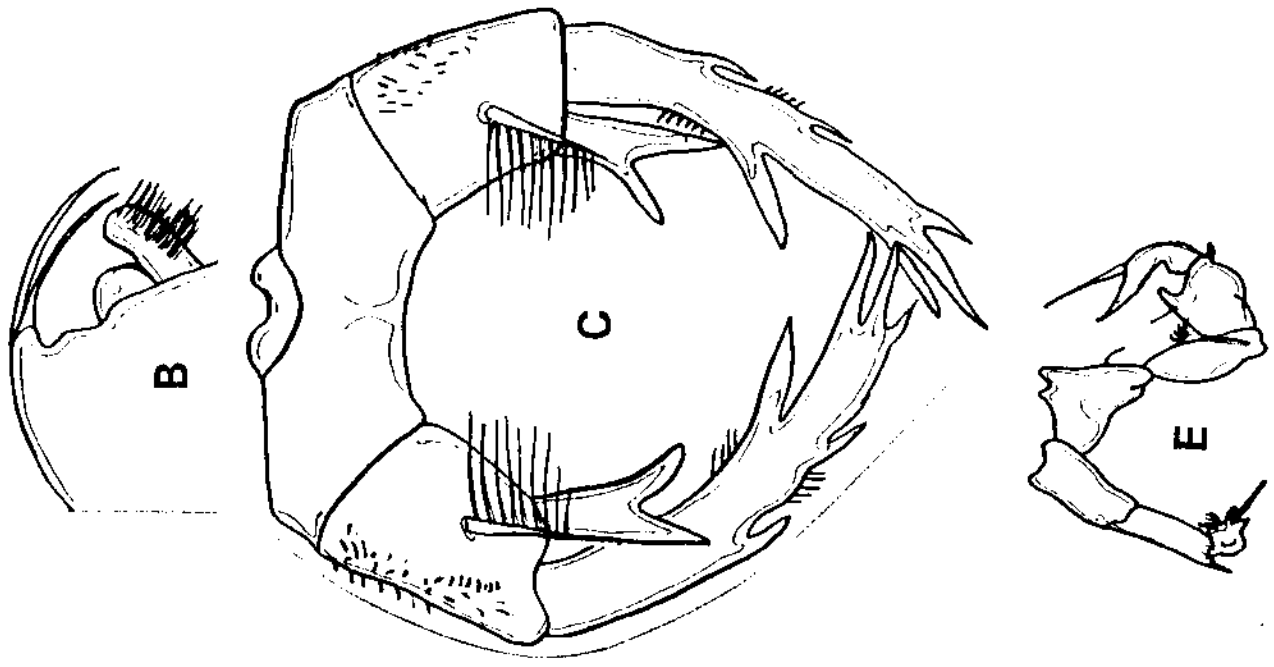
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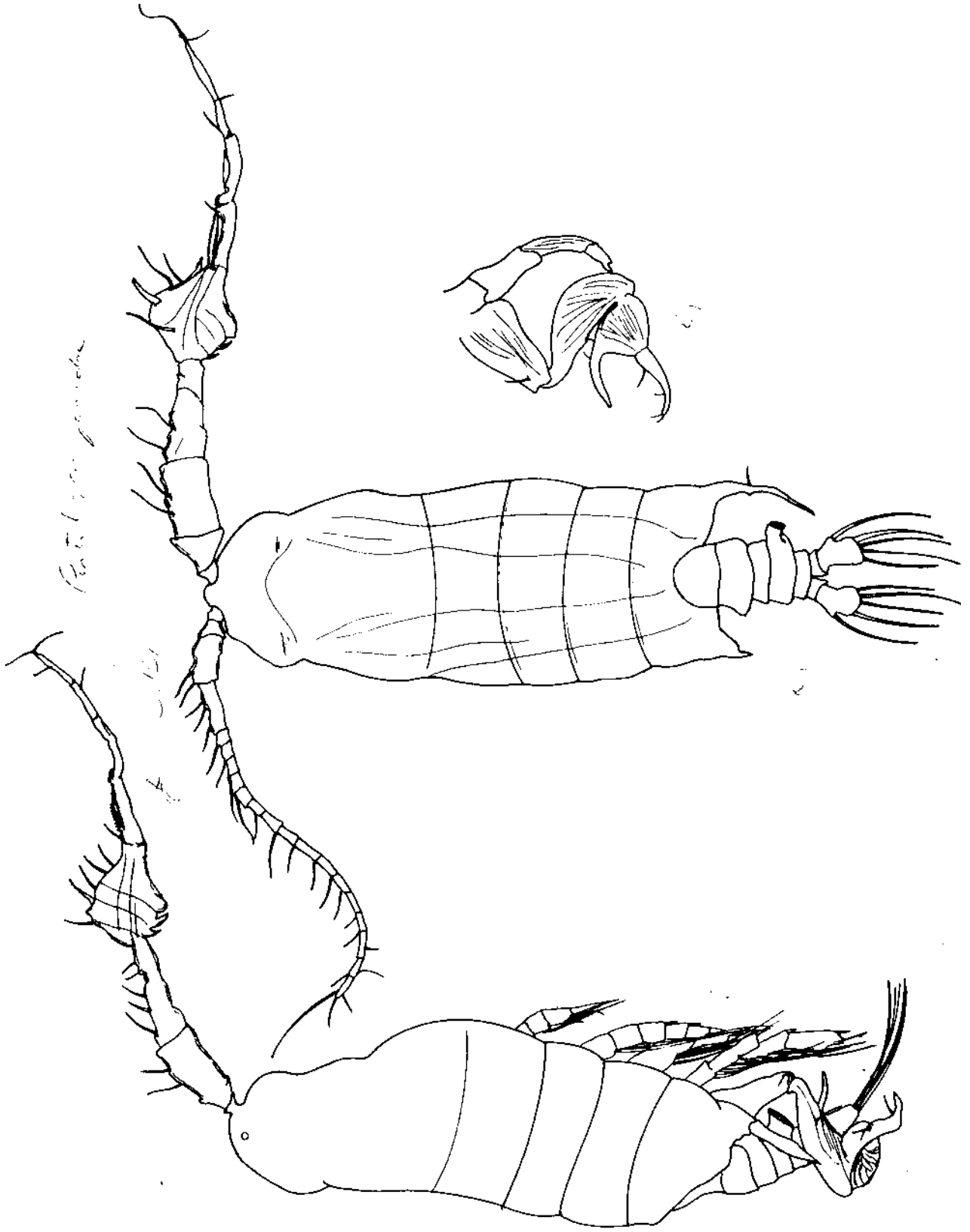
*Fig. 2. 1. 01. 2. 1920.*

*Pan. L. Hippis*  
*H. s. s. s. s. s.*

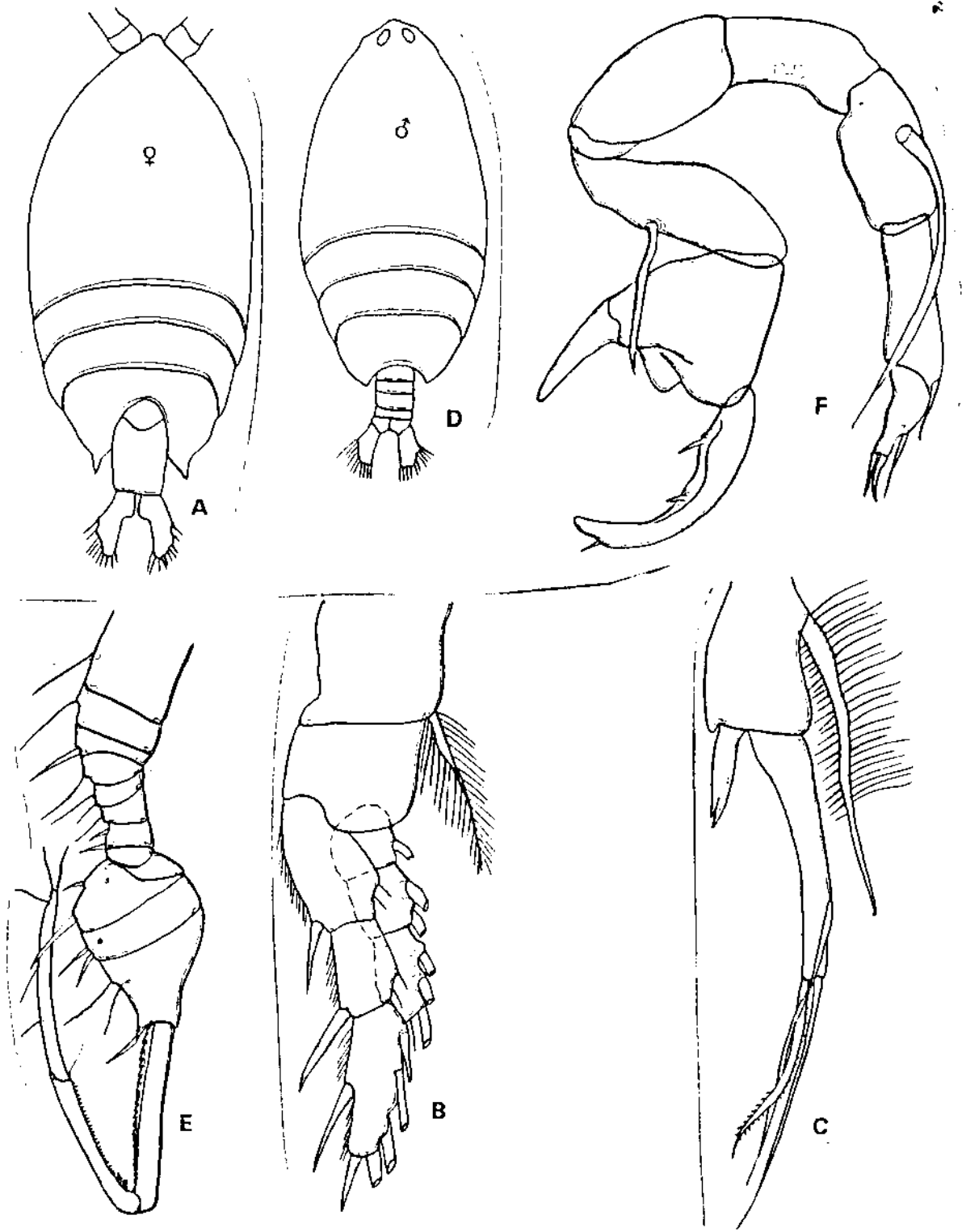




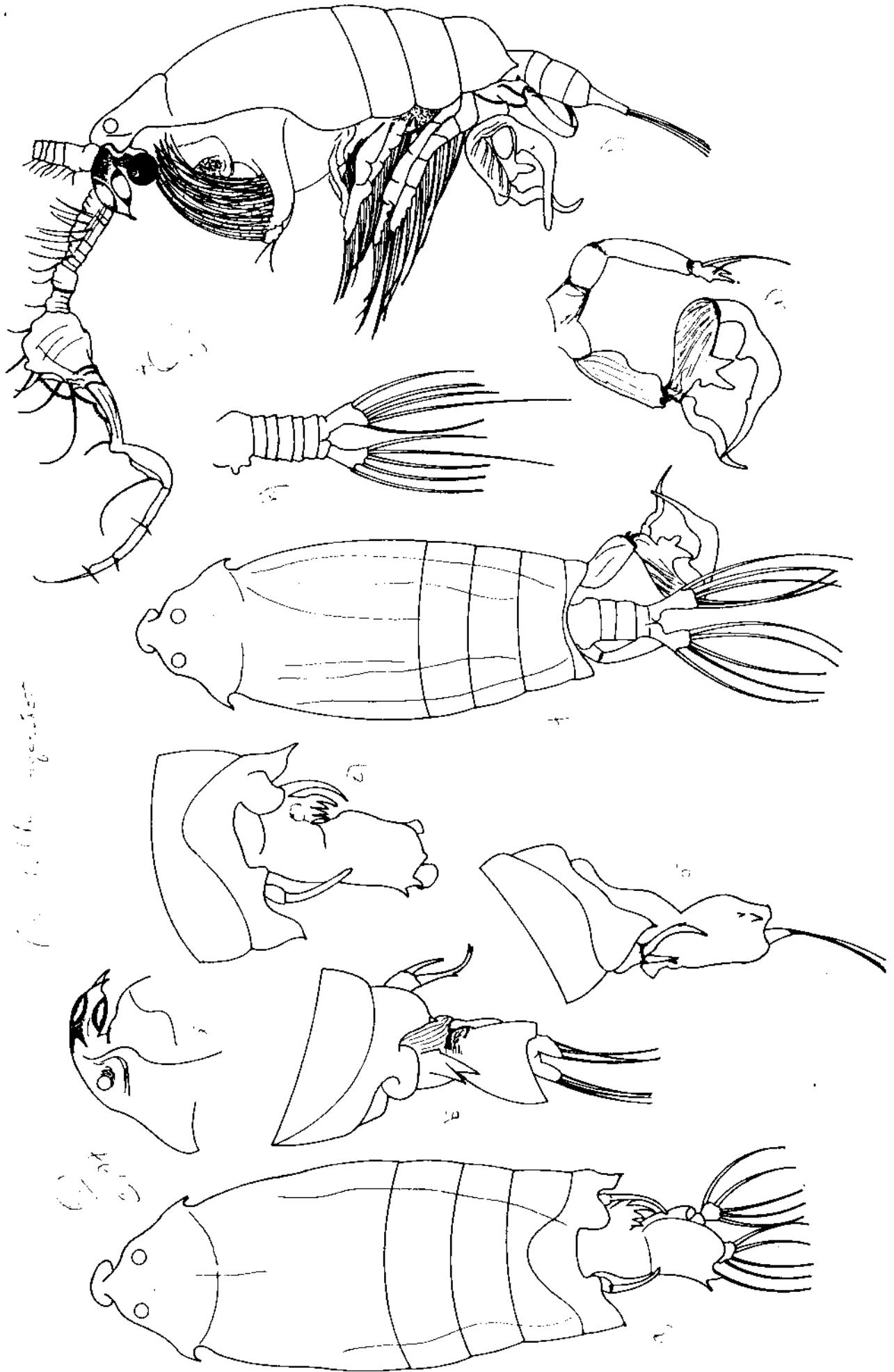
*Pentodonta yosk*

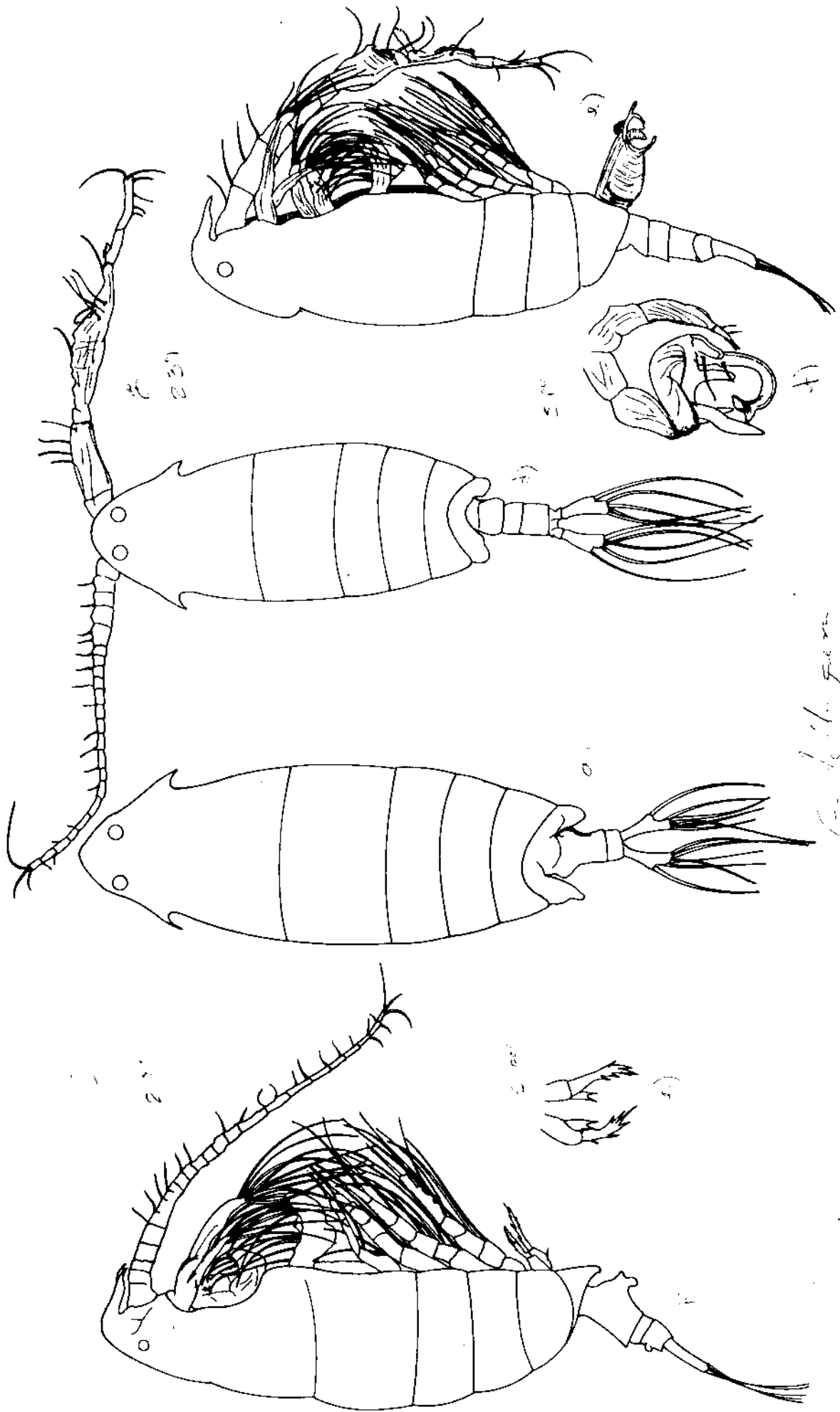


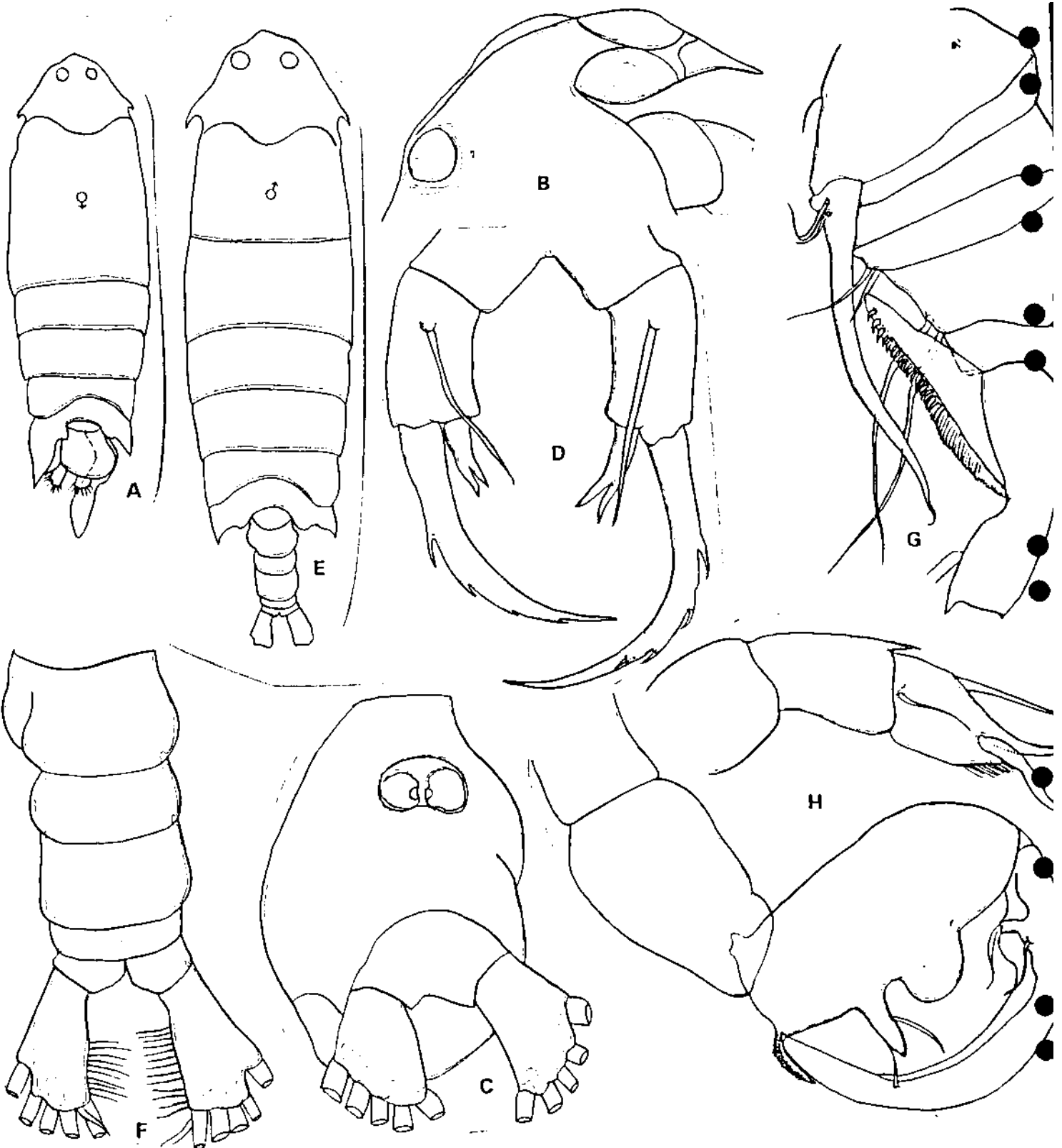




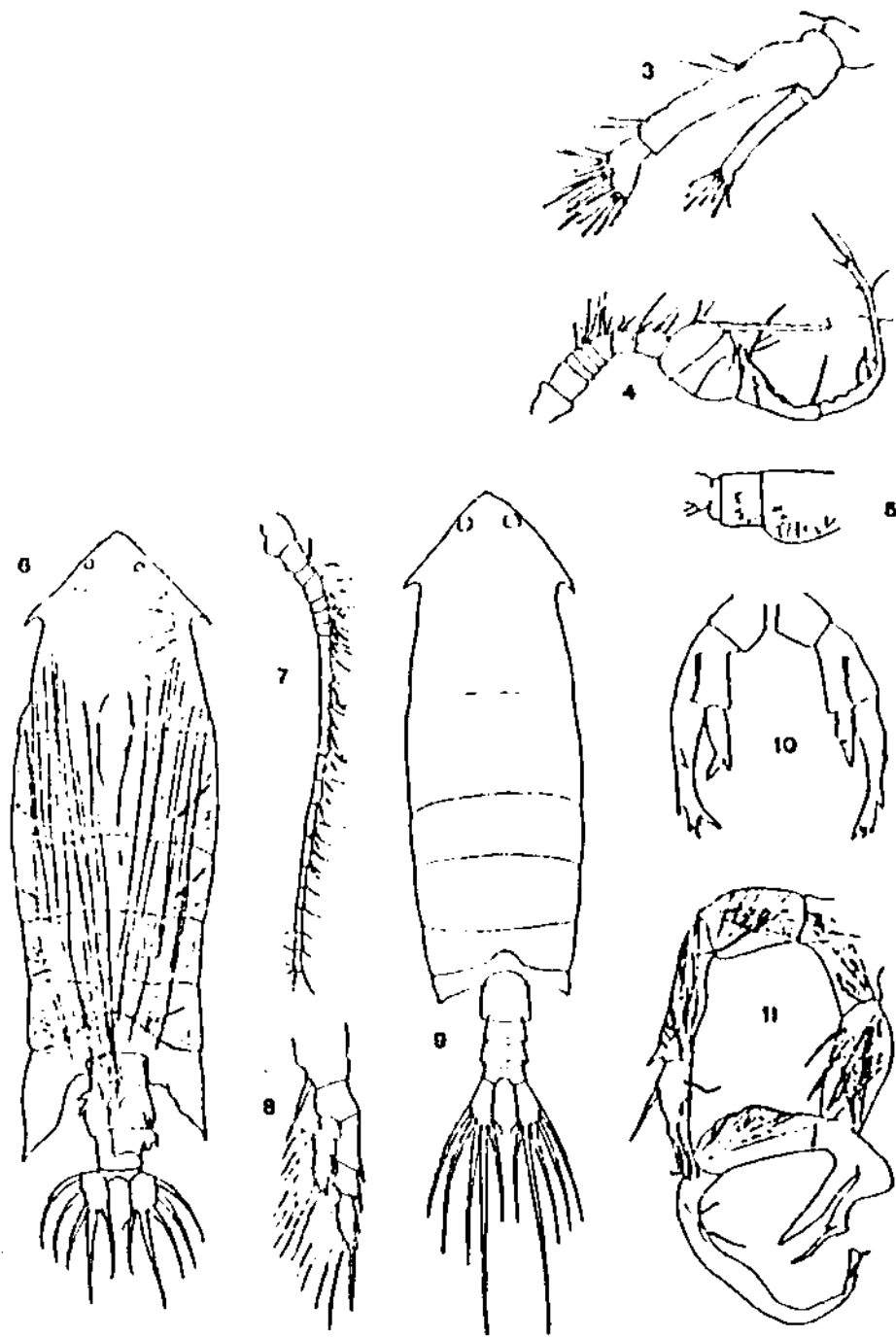
*Tetradium summati*



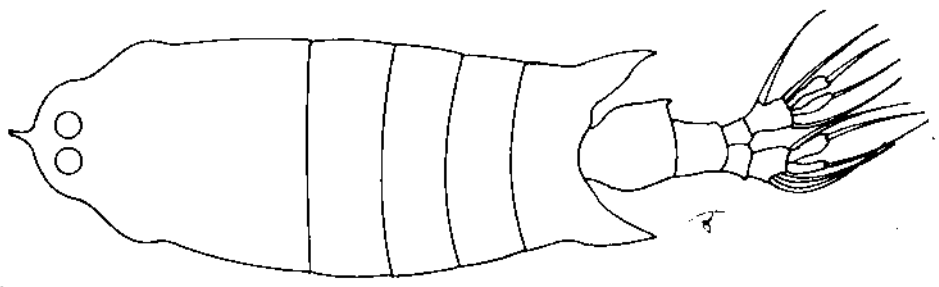
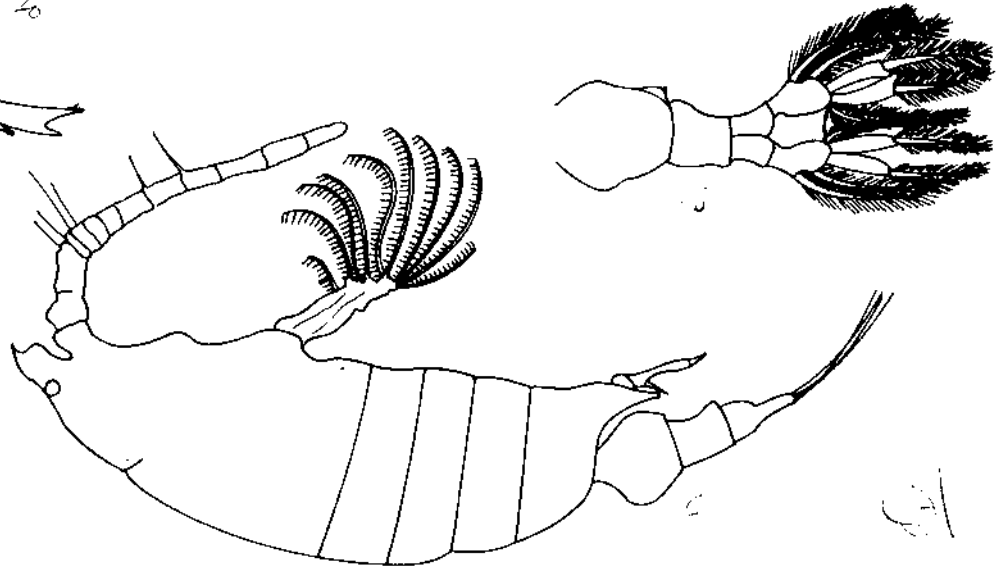
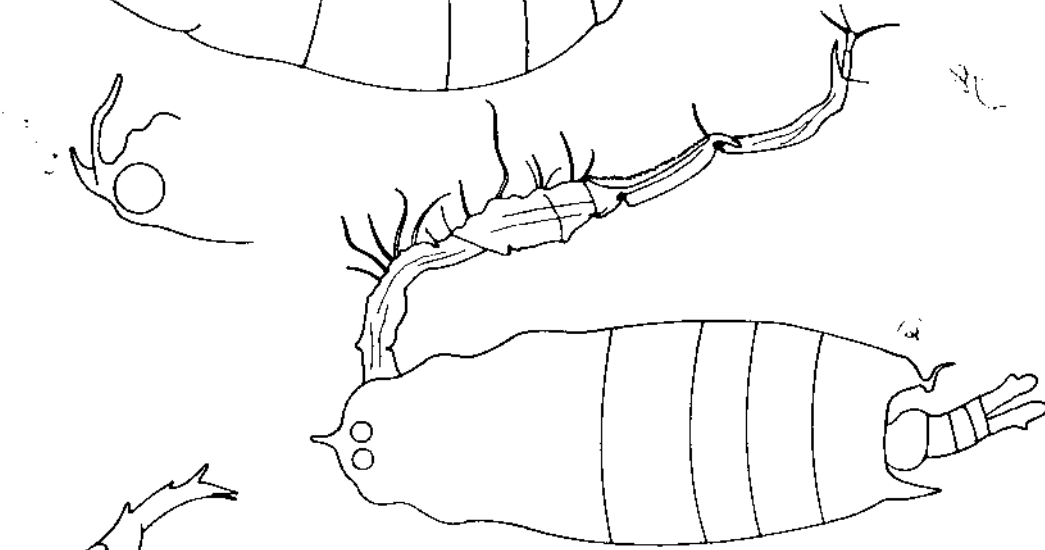
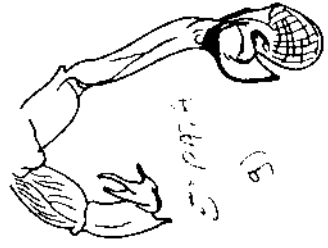
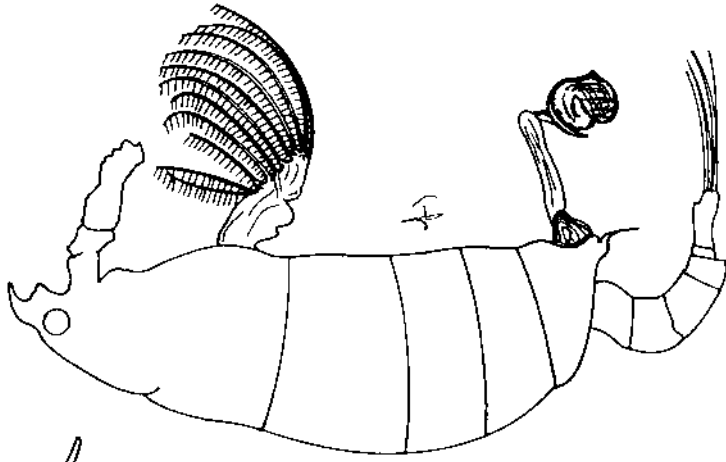




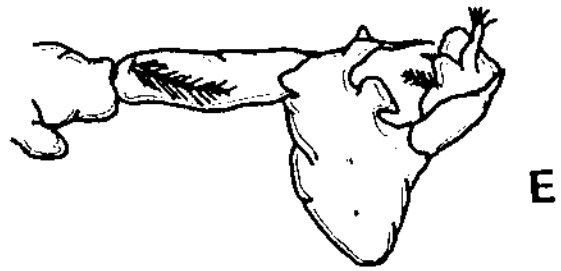
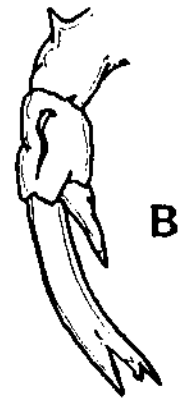
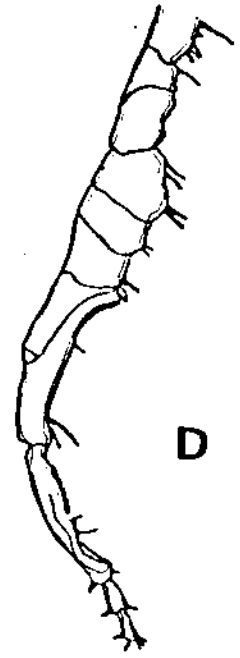
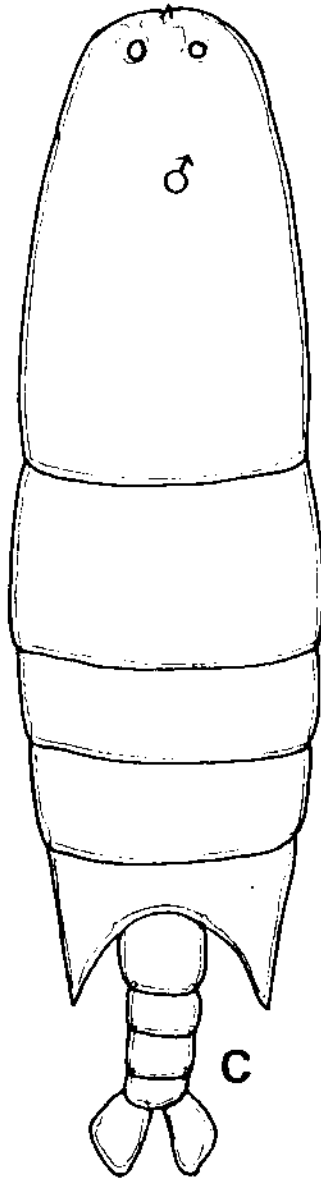
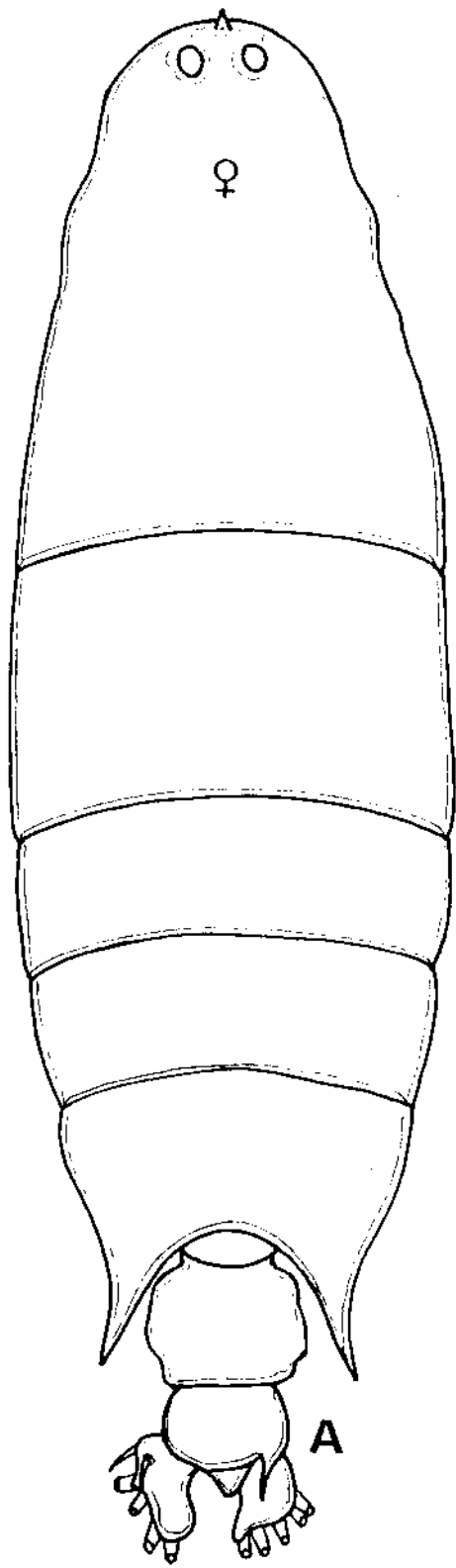
*Poutieria succedanea*



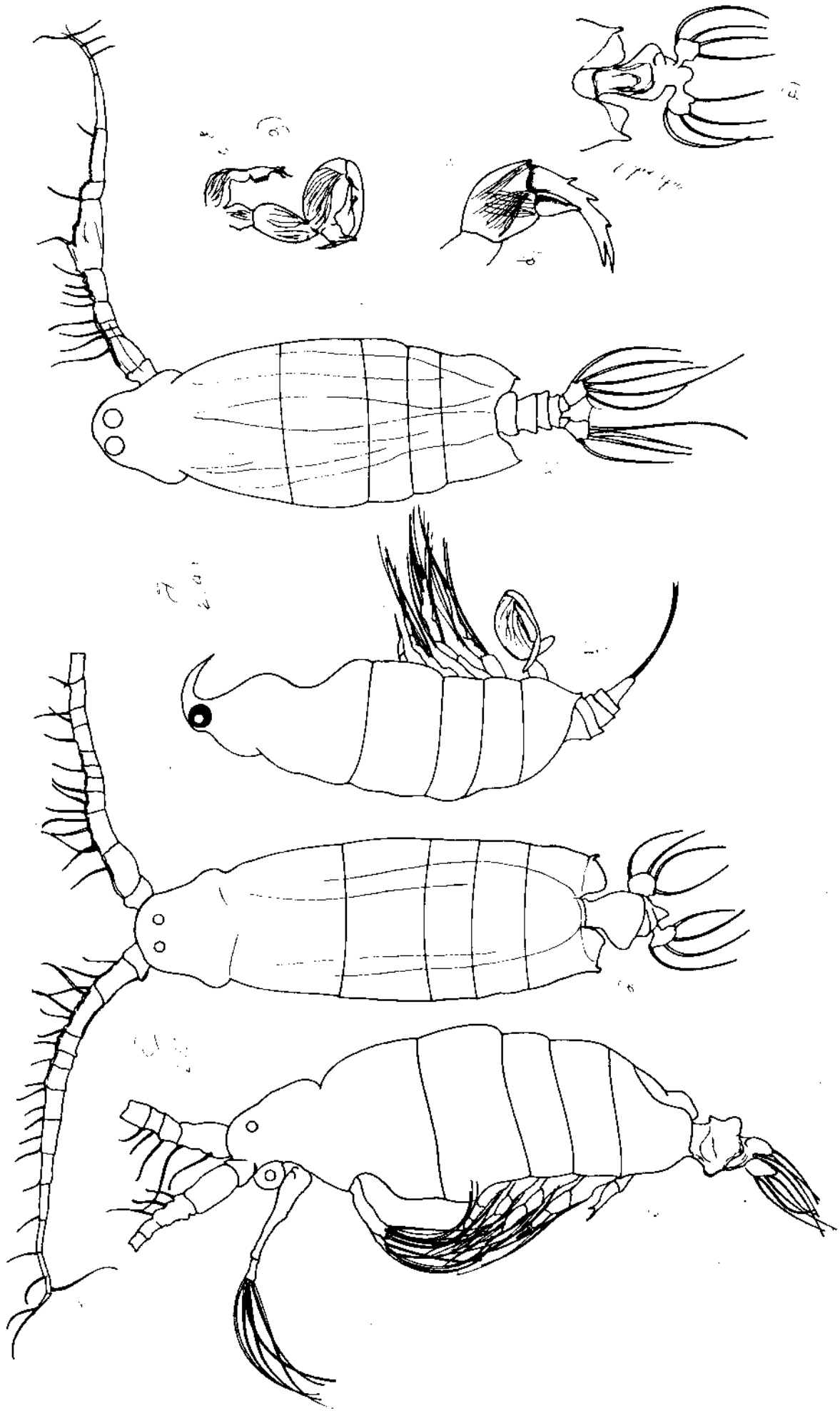
*Pentecoa spinicornis*



*hottelbergia*  
*arctica*

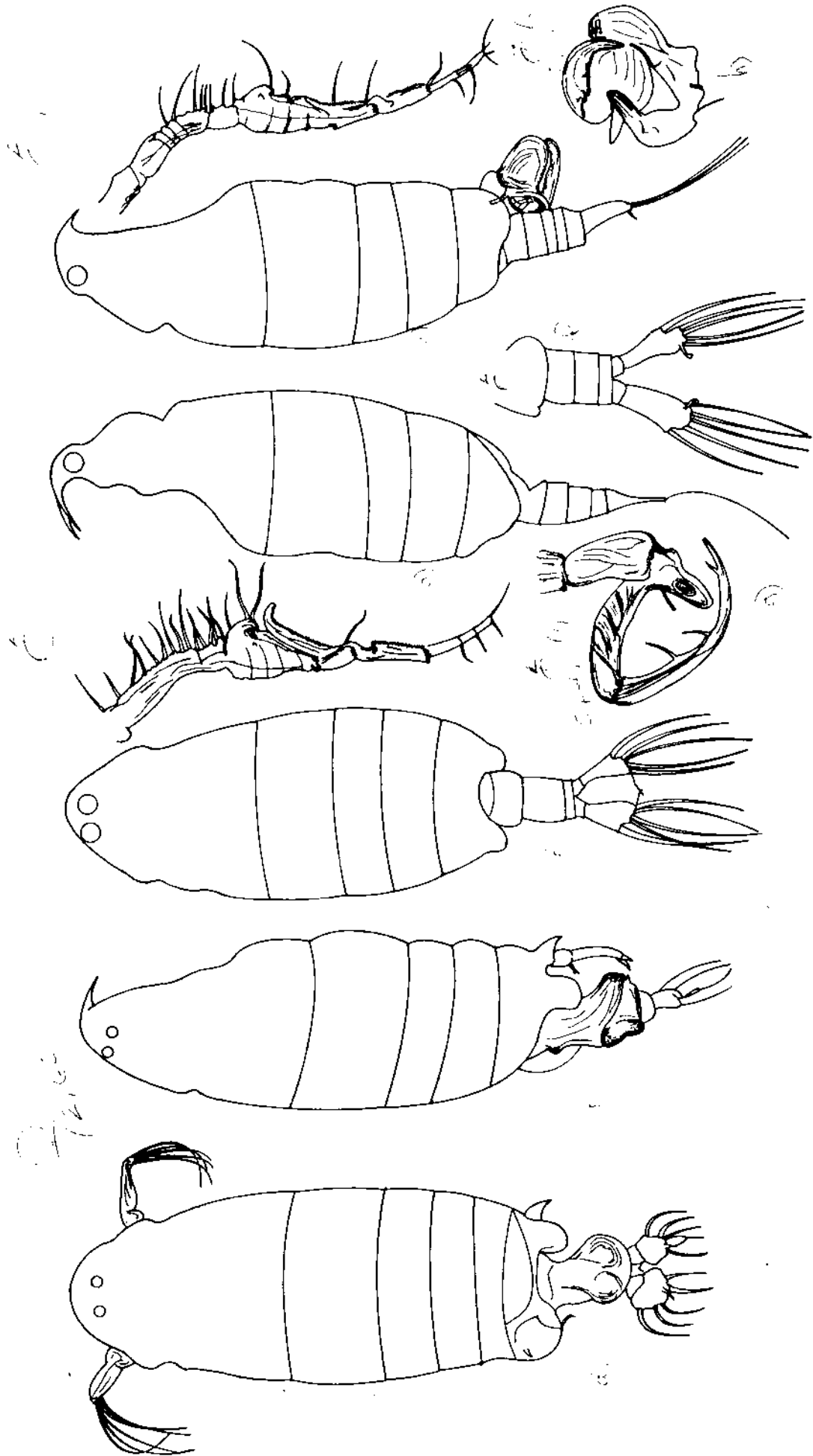


*L. lobum* of *h. s. t.*

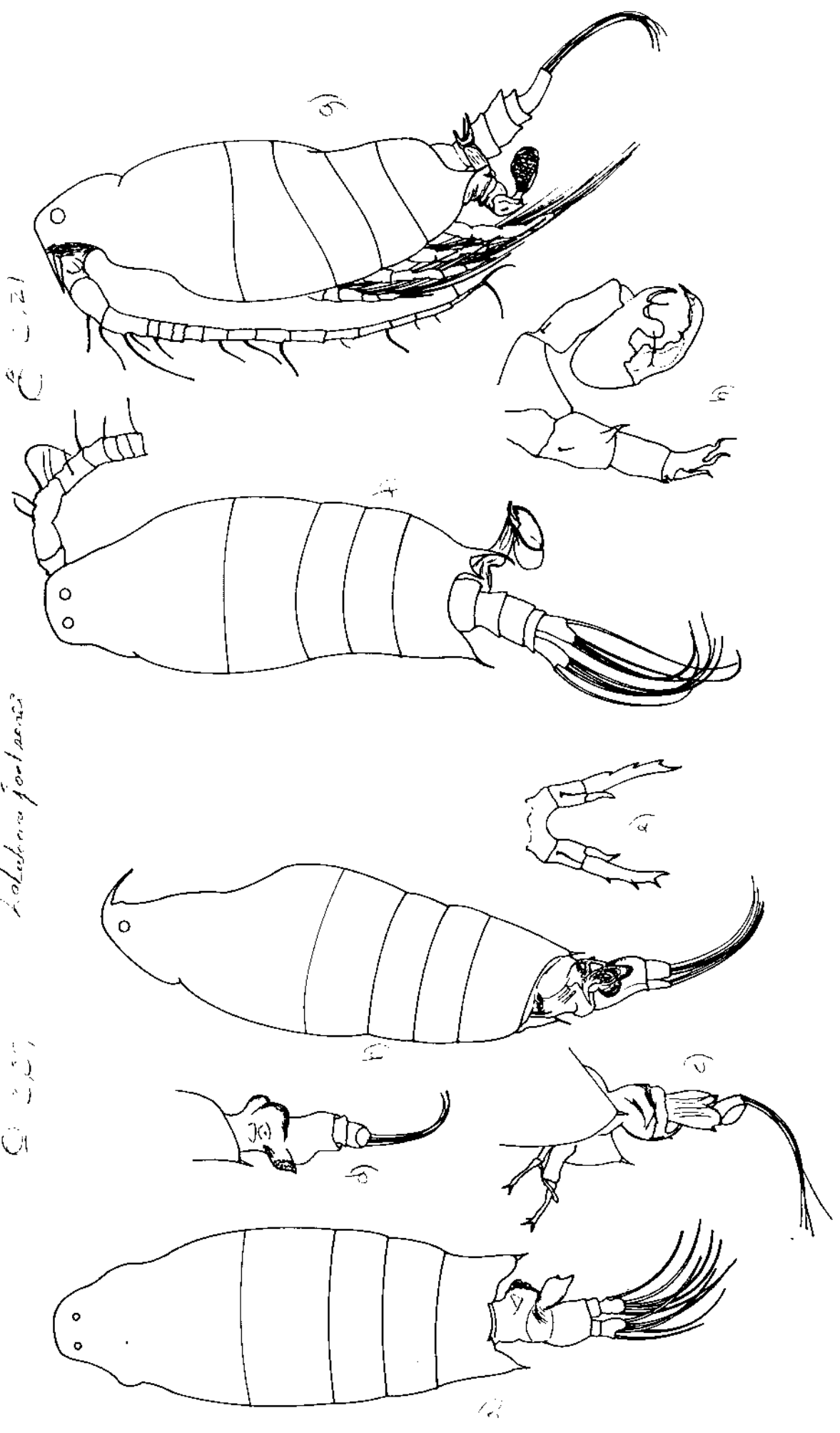


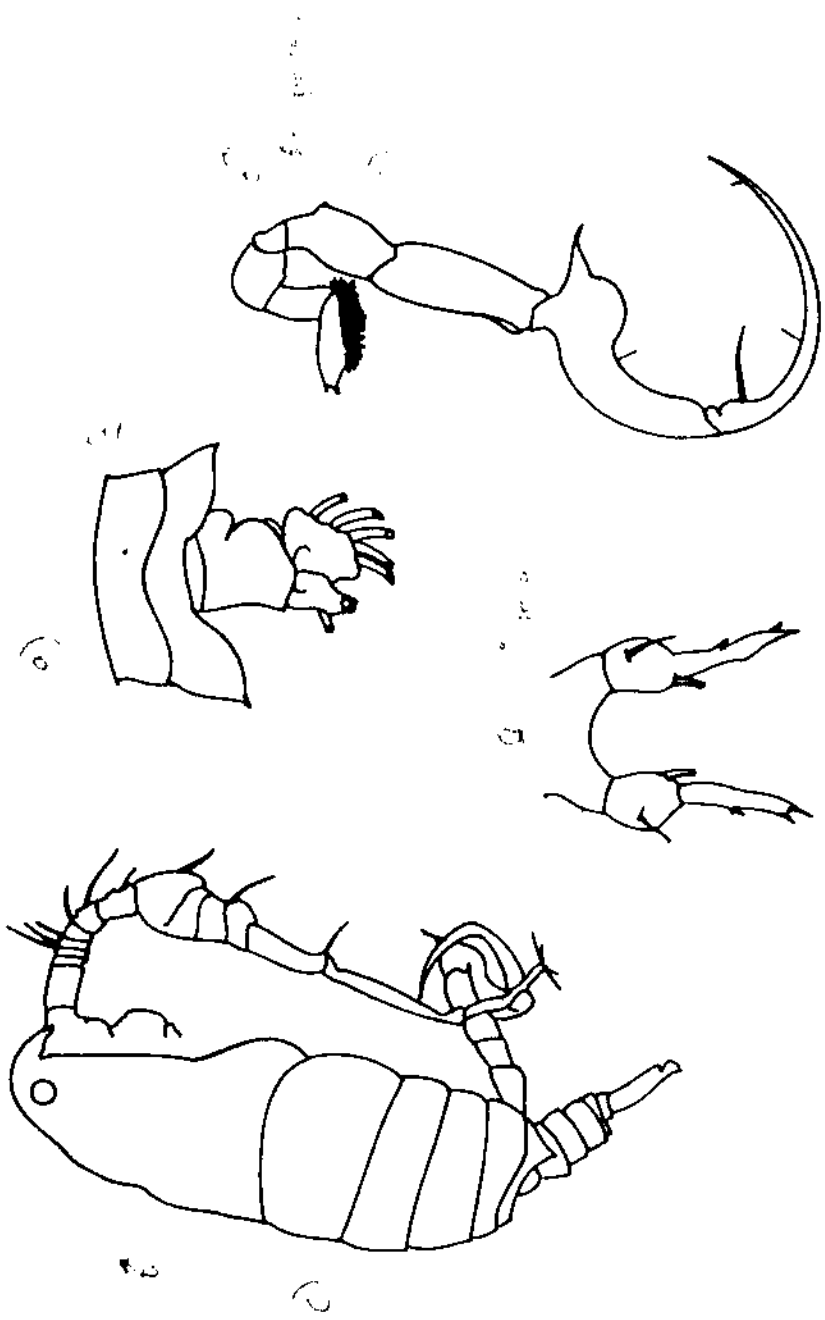


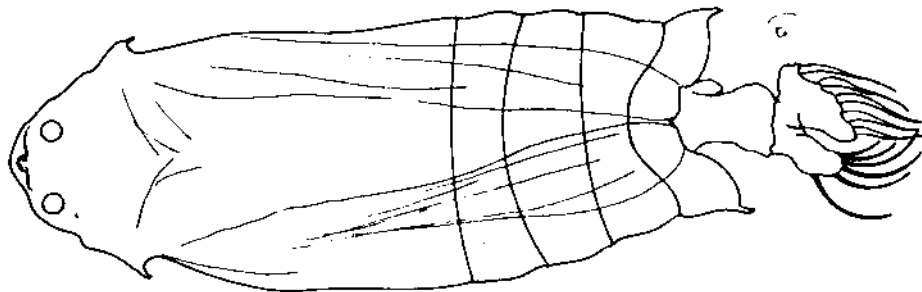
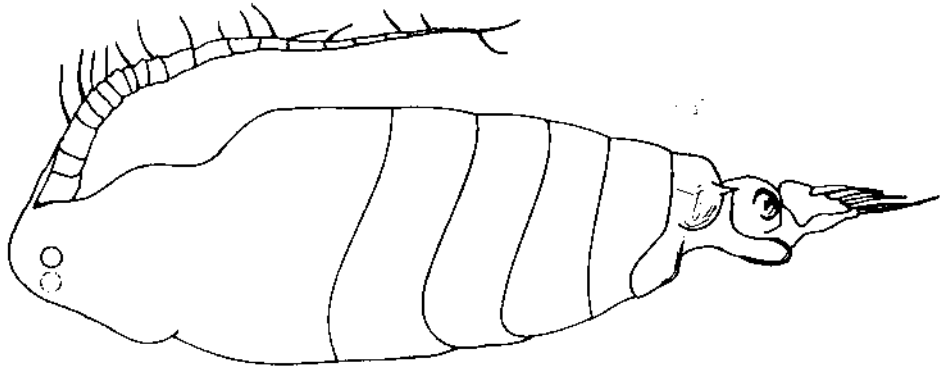
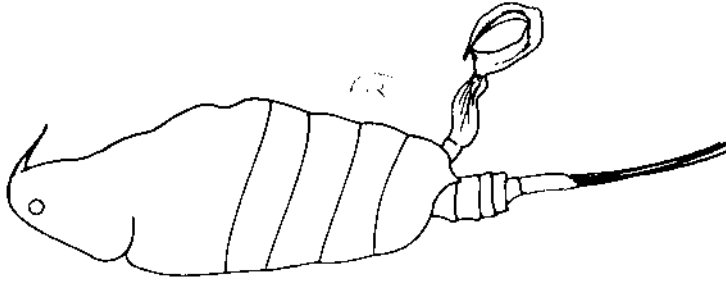
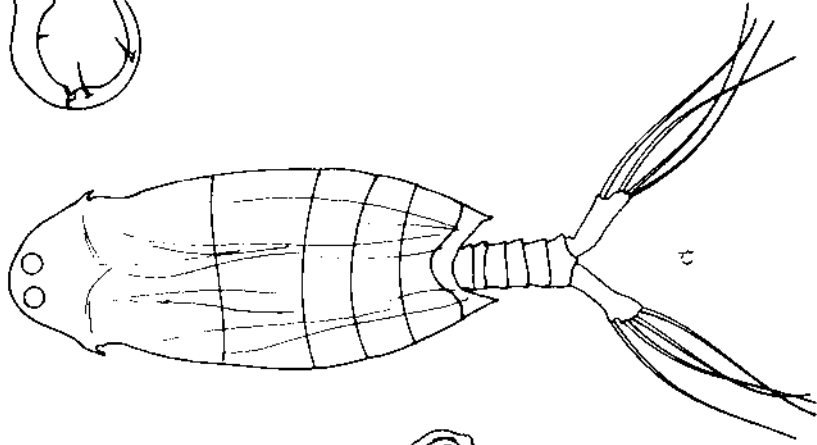
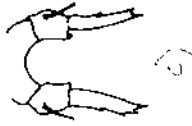
*Amphipoda*



Q 2, 27, *Lobulera foot parts*







*L. subaequalis*

Fig. 1-6

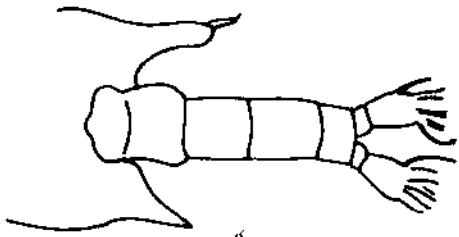


Fig. 11



Fig. 12

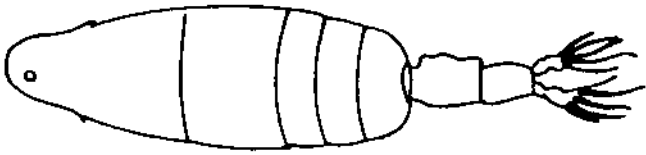


Fig. 13

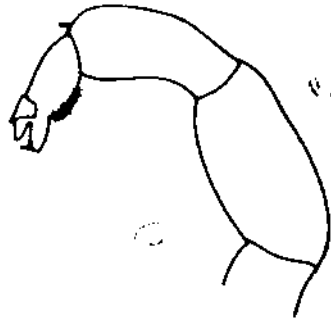


Fig. 14

Fig. 15

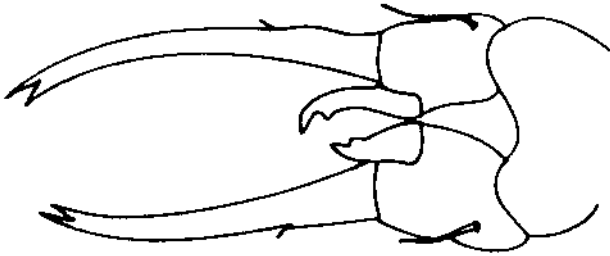
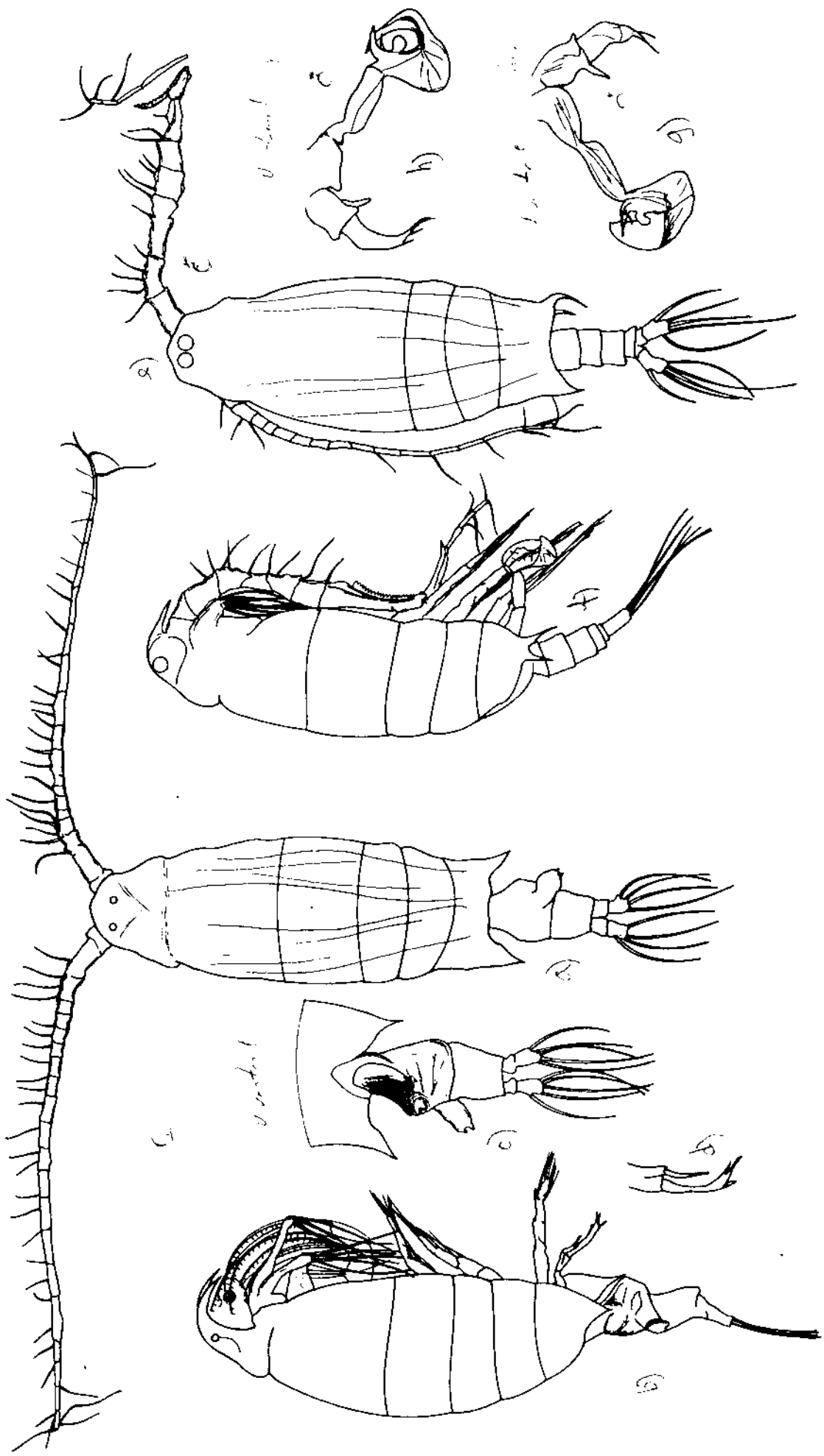
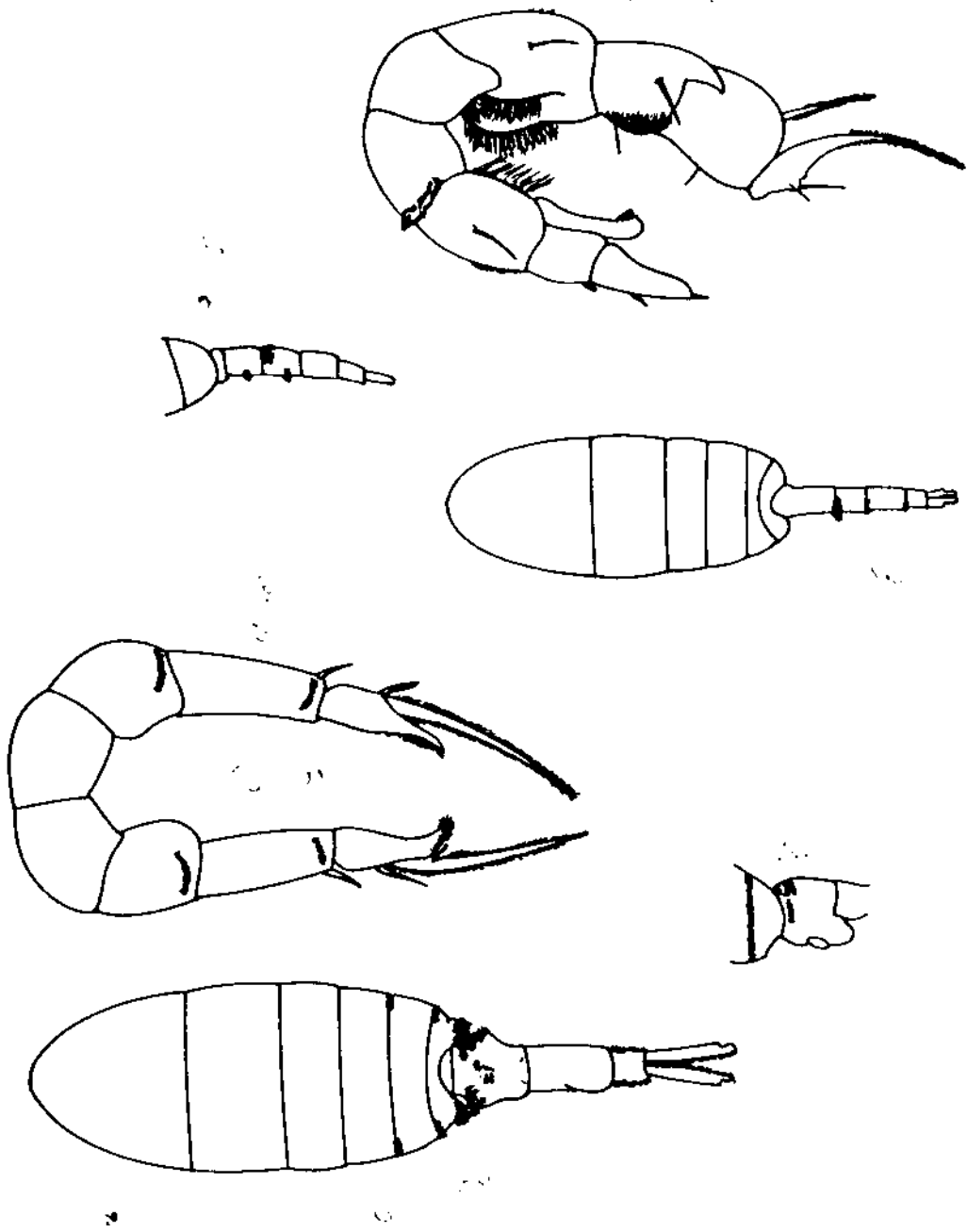


Fig. 16

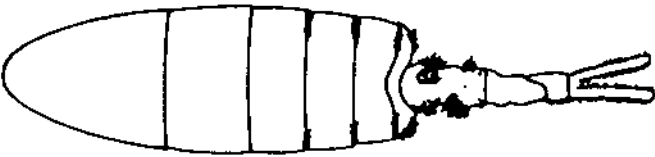
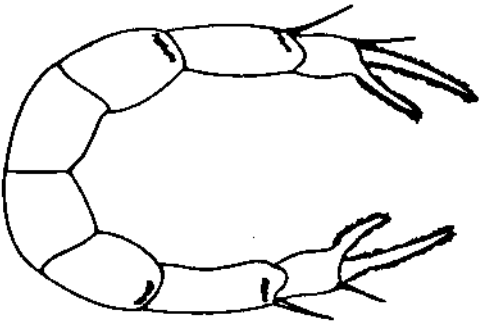
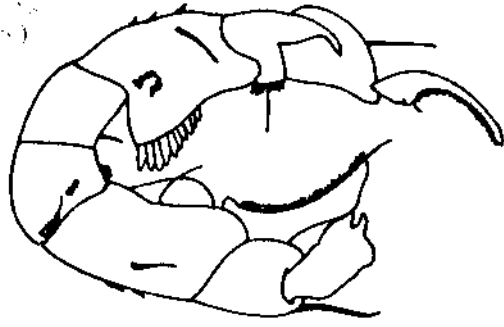
Hand-drawn sketches of insect-like creatures, possibly larvae or pupae, showing various stages or views.

*Arthropoda*





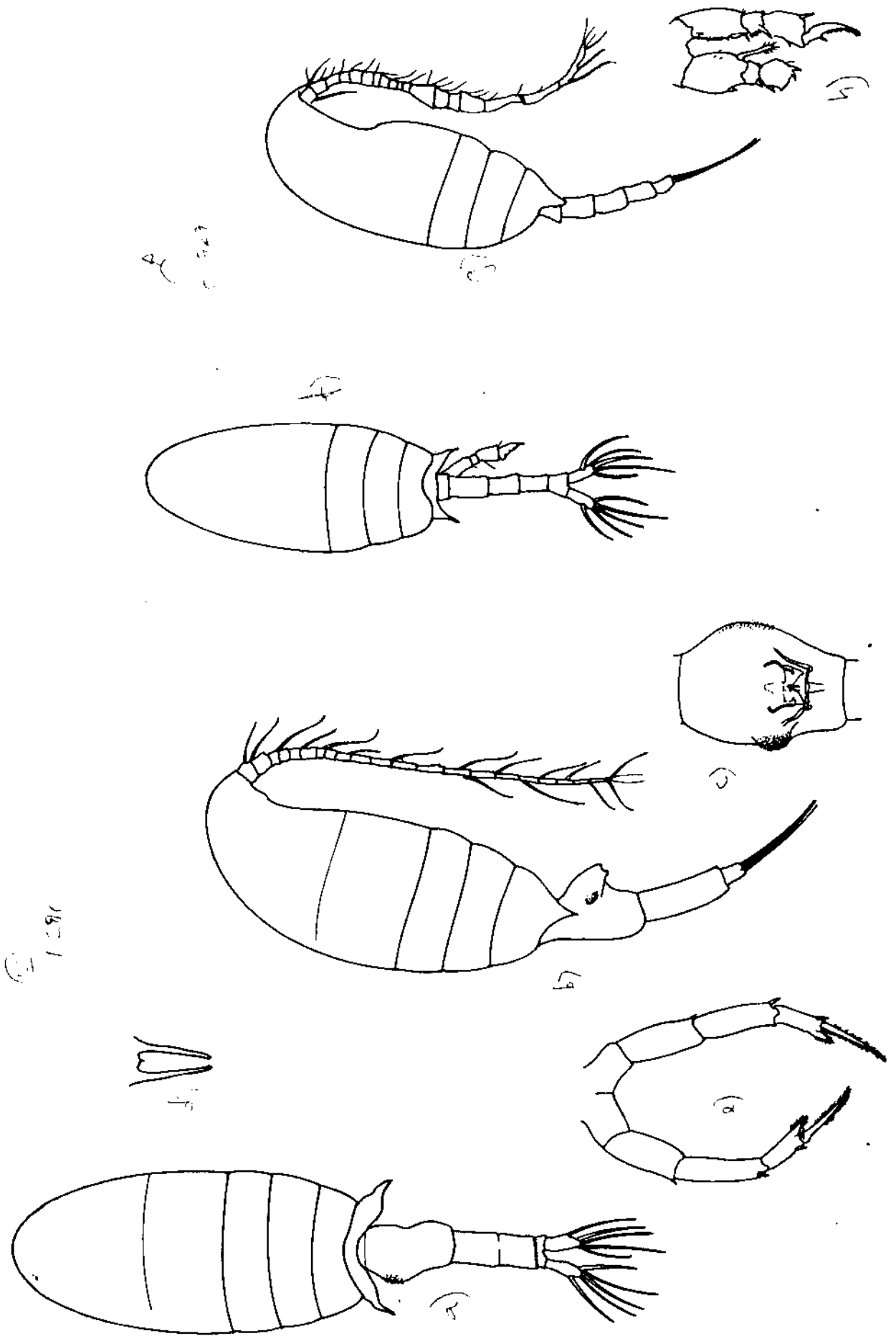
*Procheilopterus sublimis*

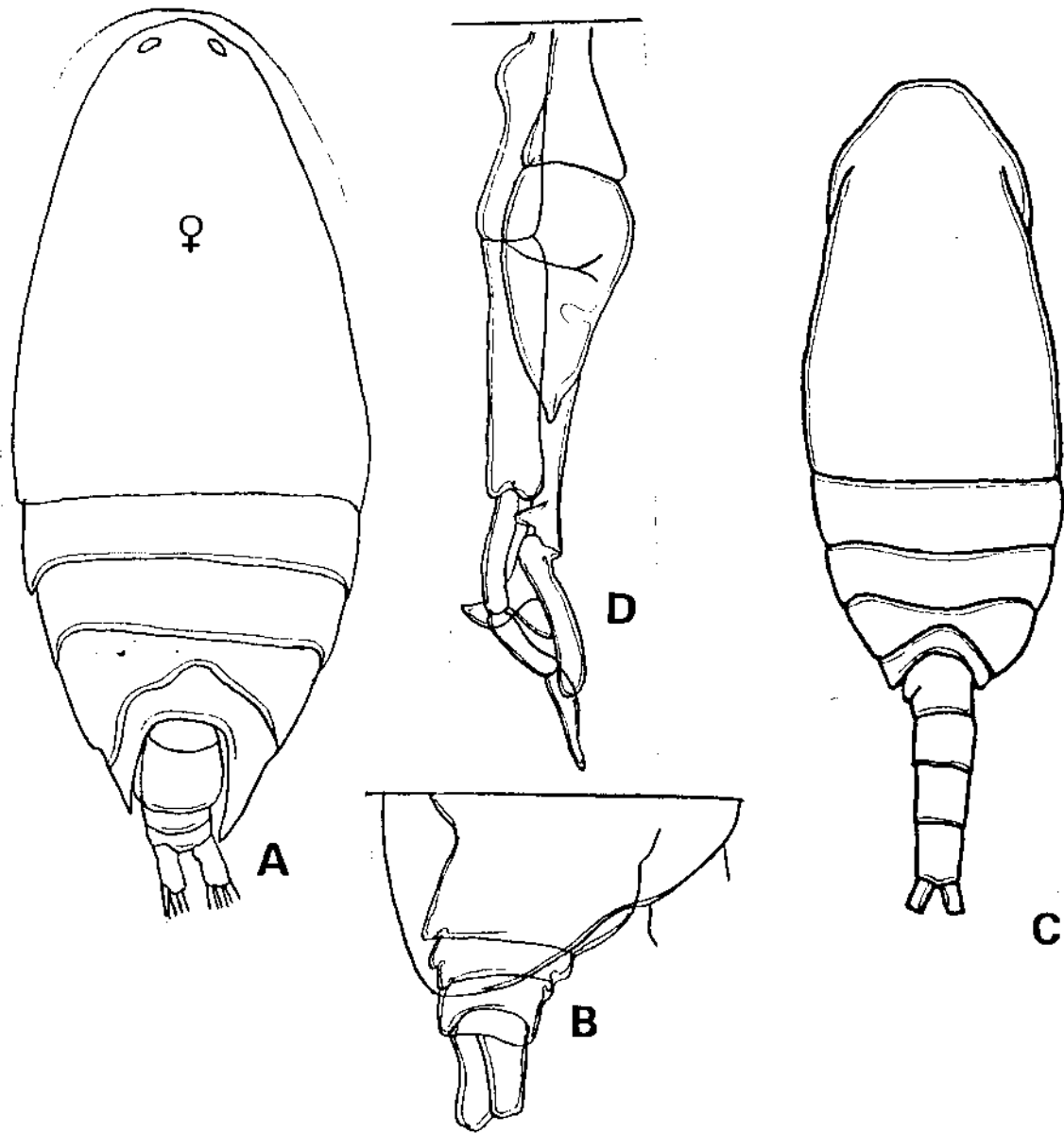


*Scudocera*

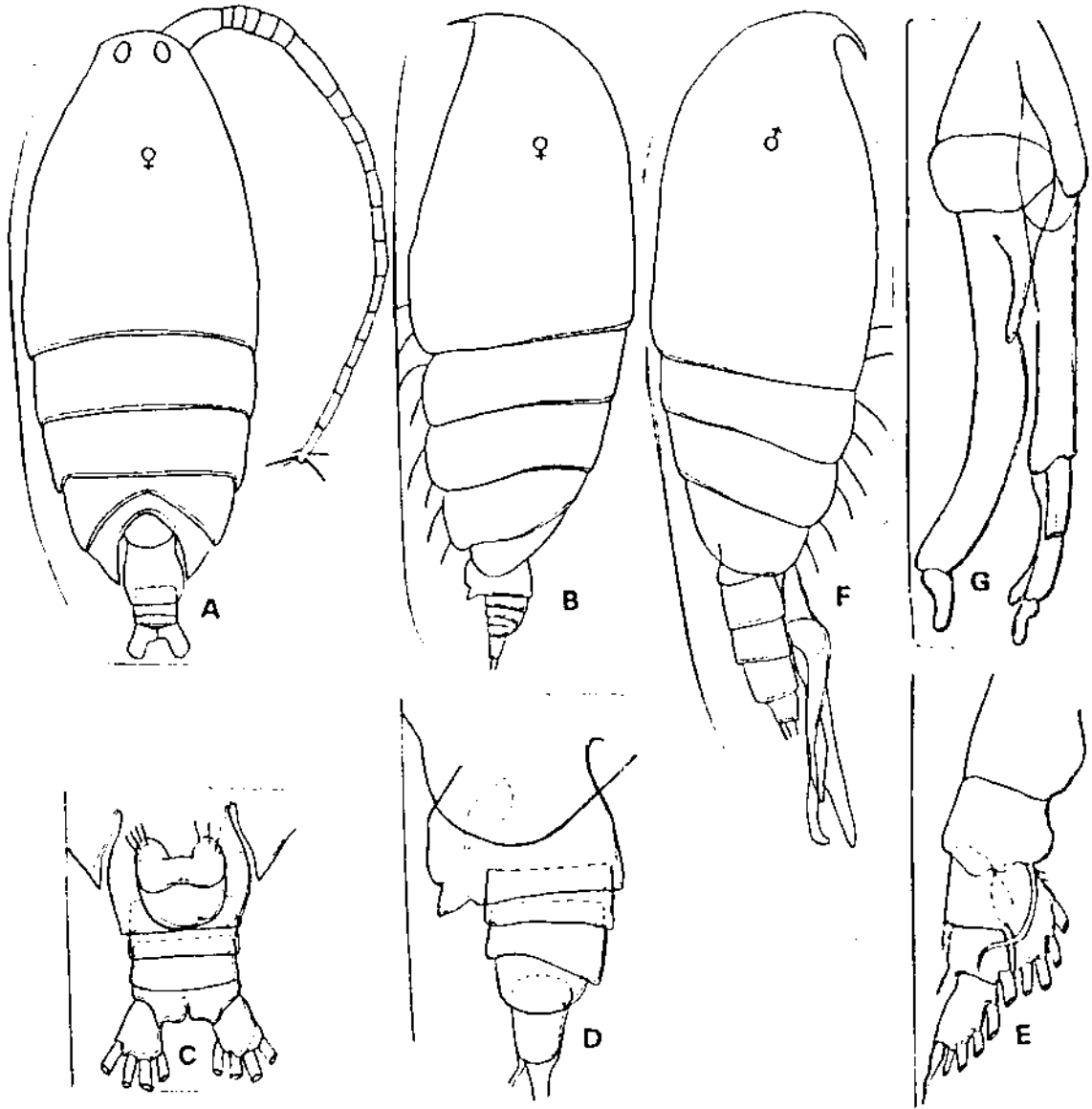


*Pseudocyclops v. wrighti*

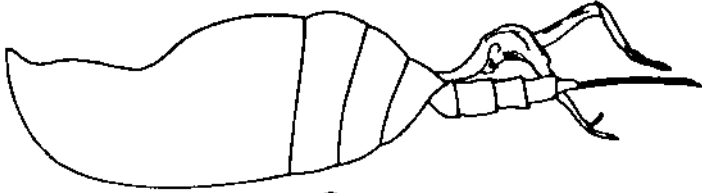




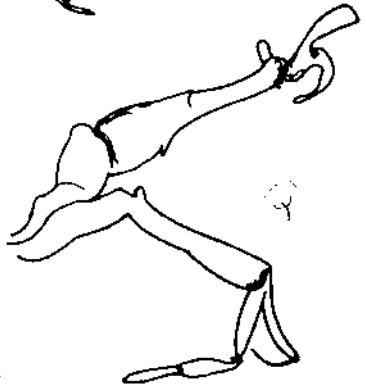
*Scolothrips longipennis*



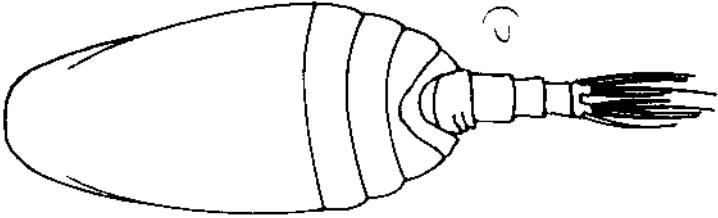
*Scolocentrus sinuatus*



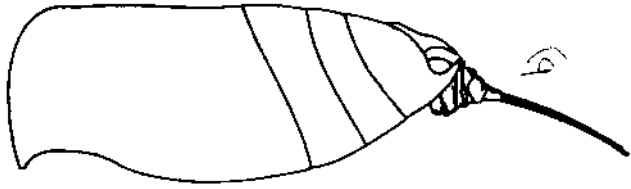
6p



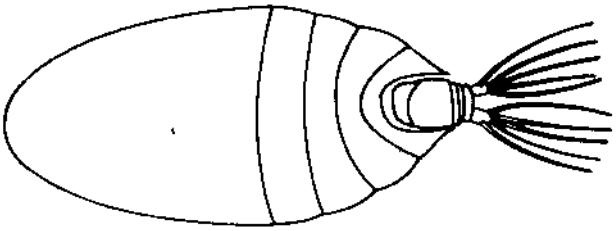
6r



6c



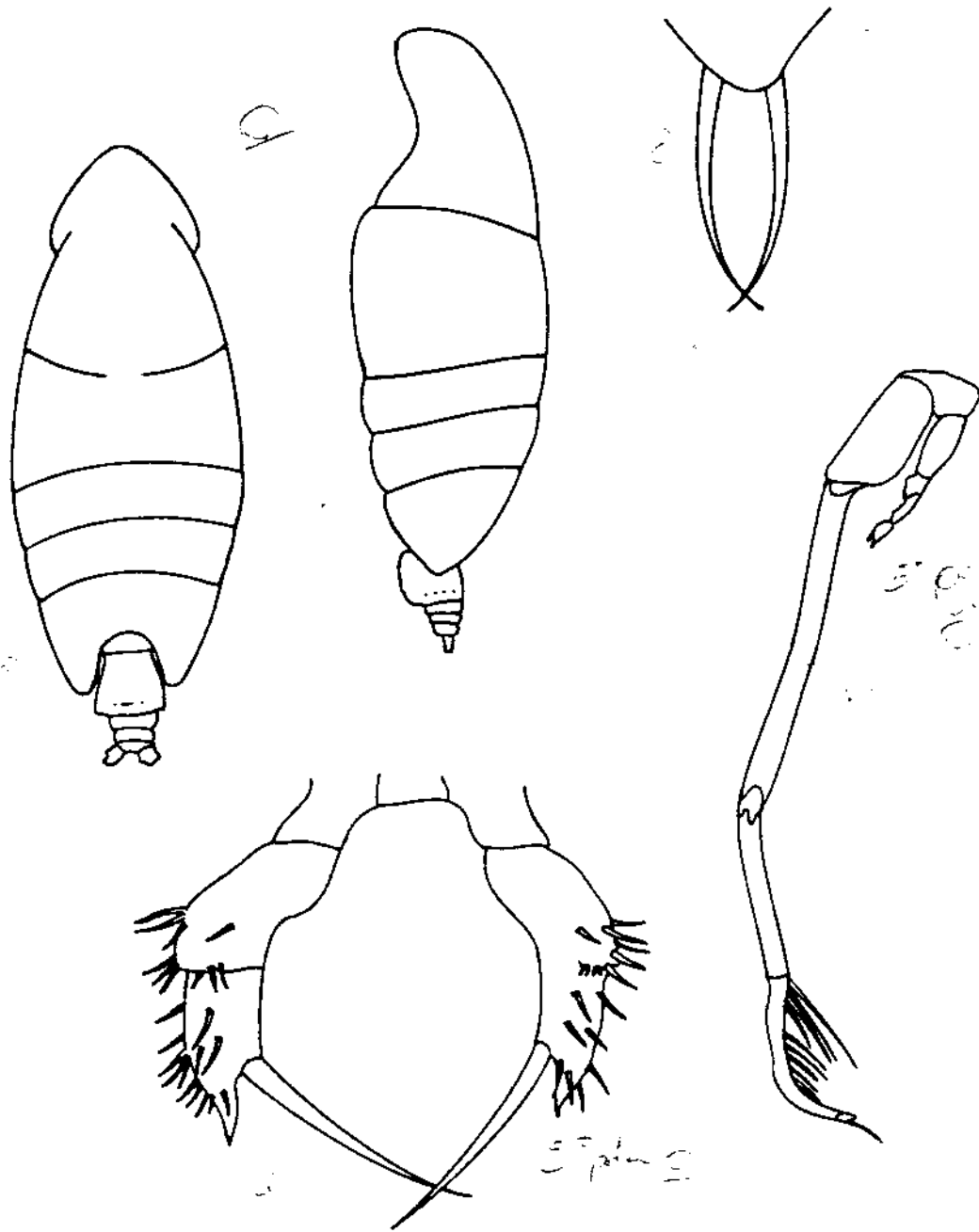
6q



6b

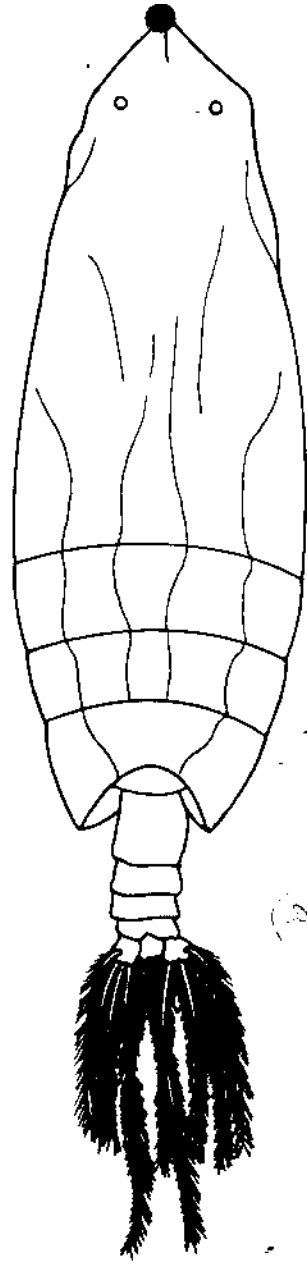
121

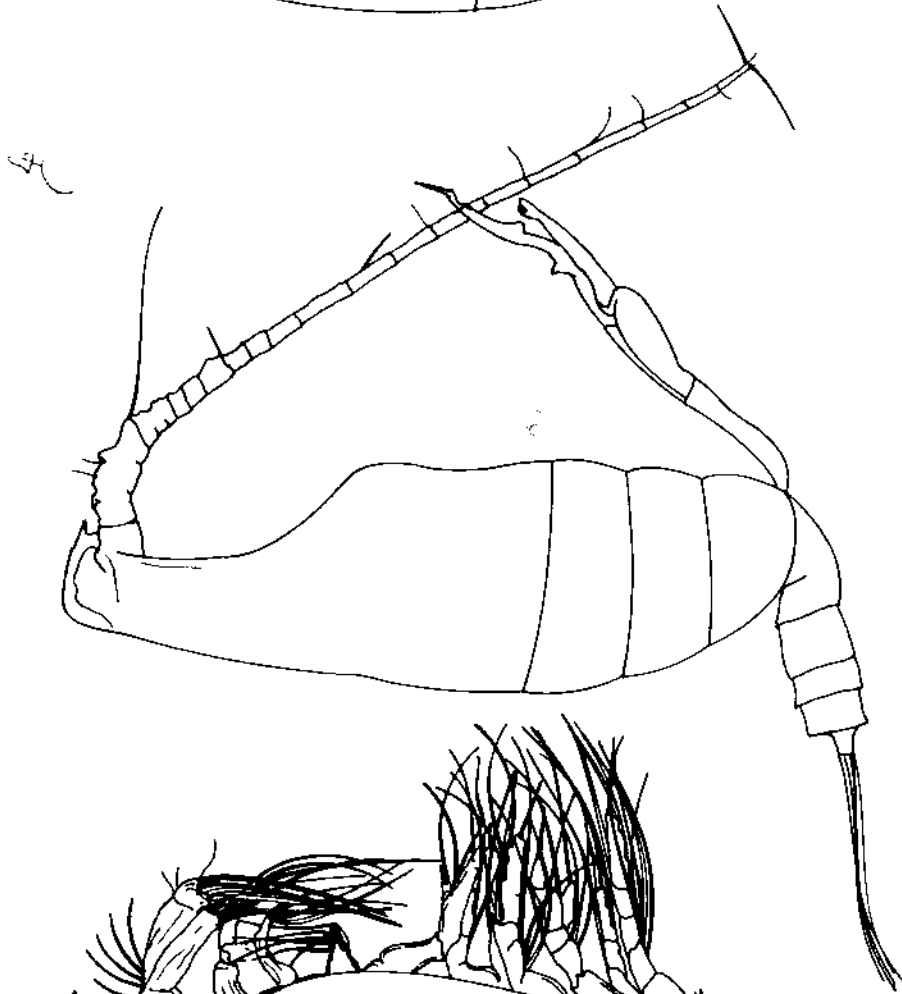
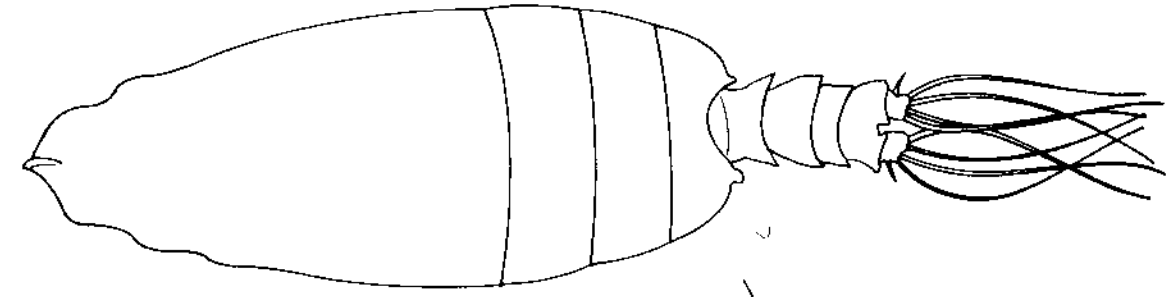
124



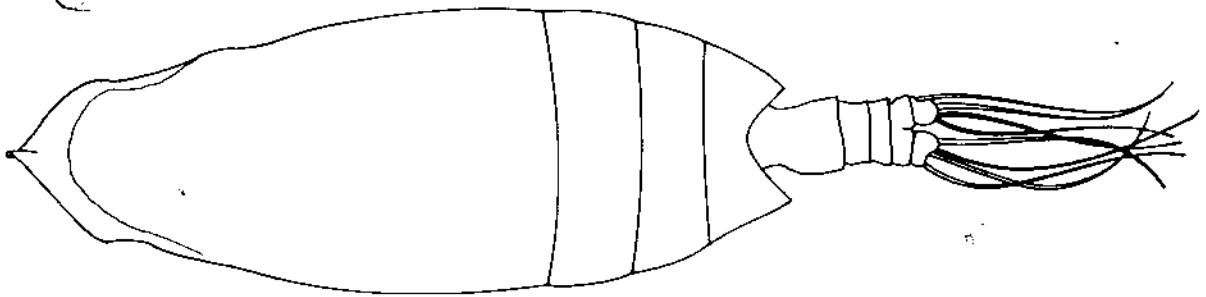
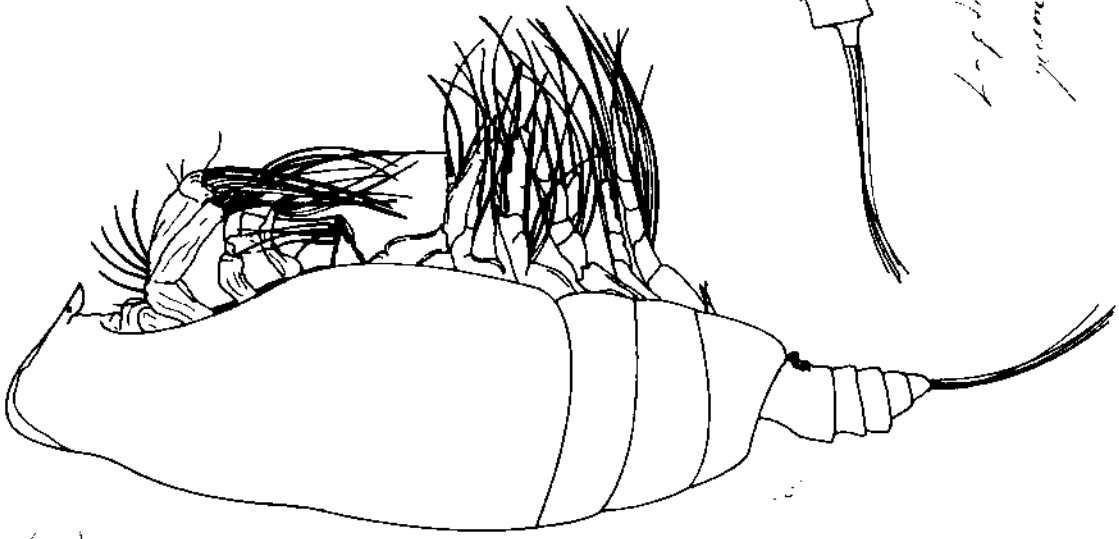
*Scatocrypta clompus*

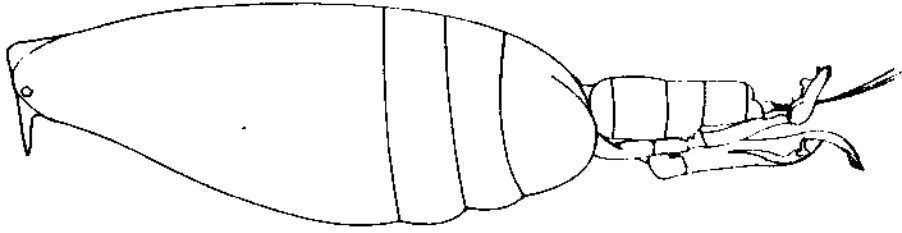
27



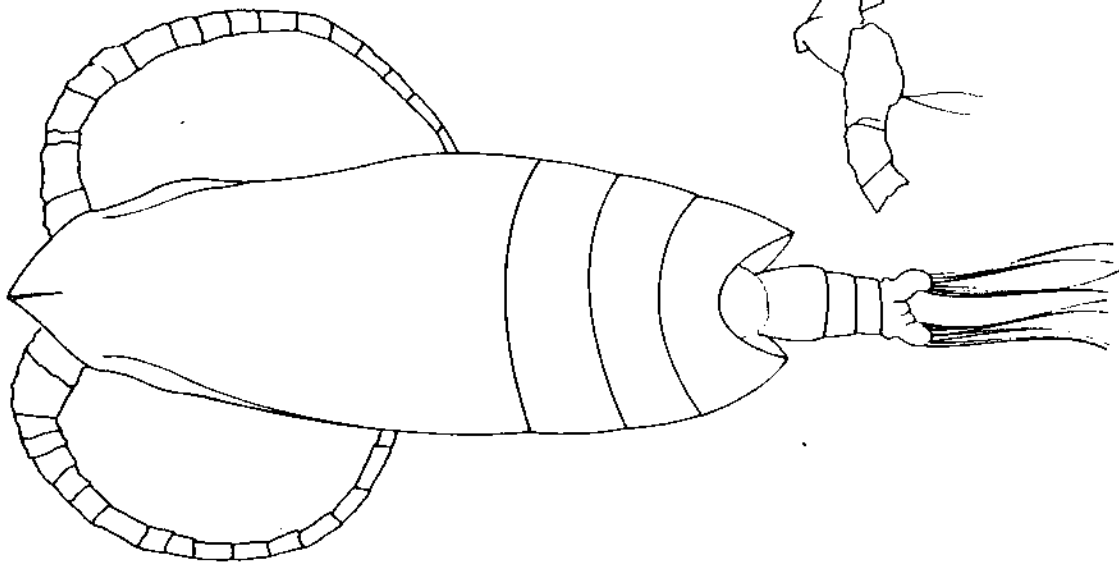
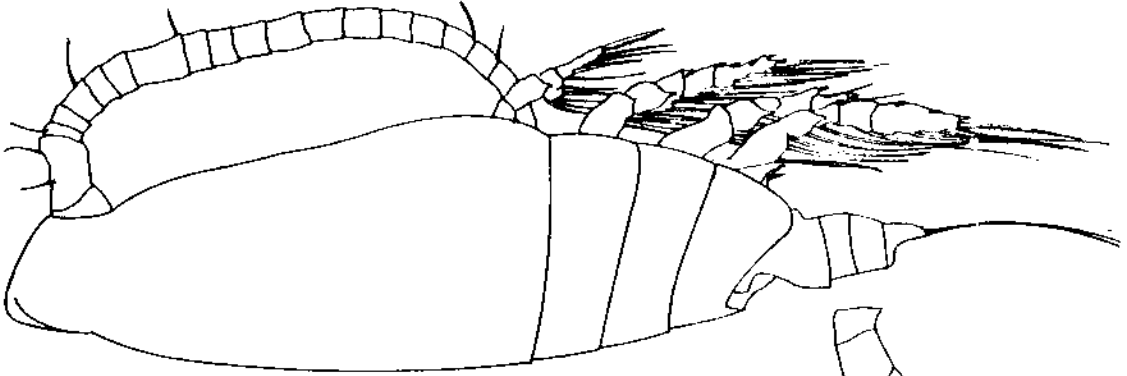
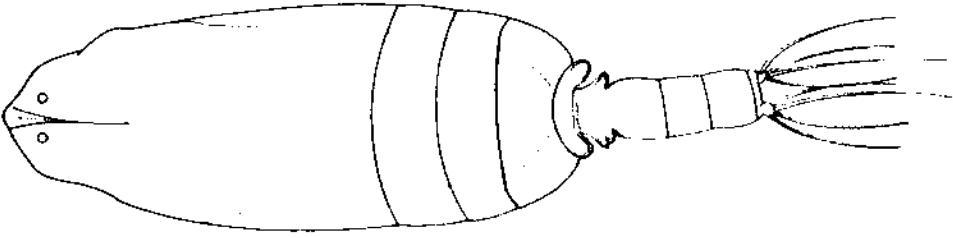


*Leptochloa  
punctipennis*



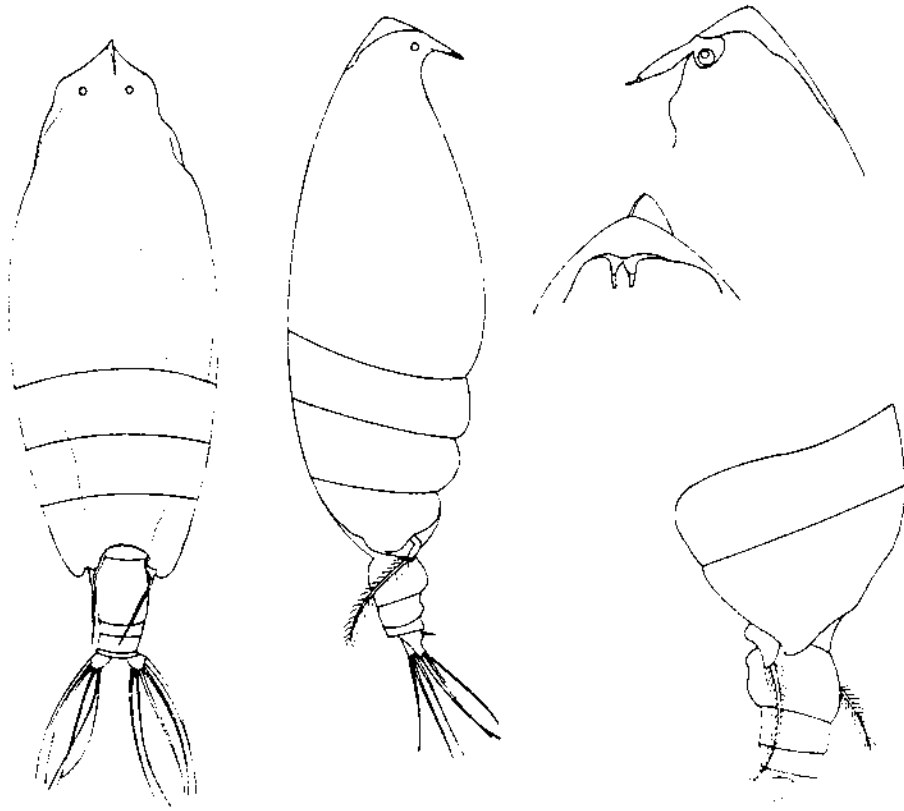


11

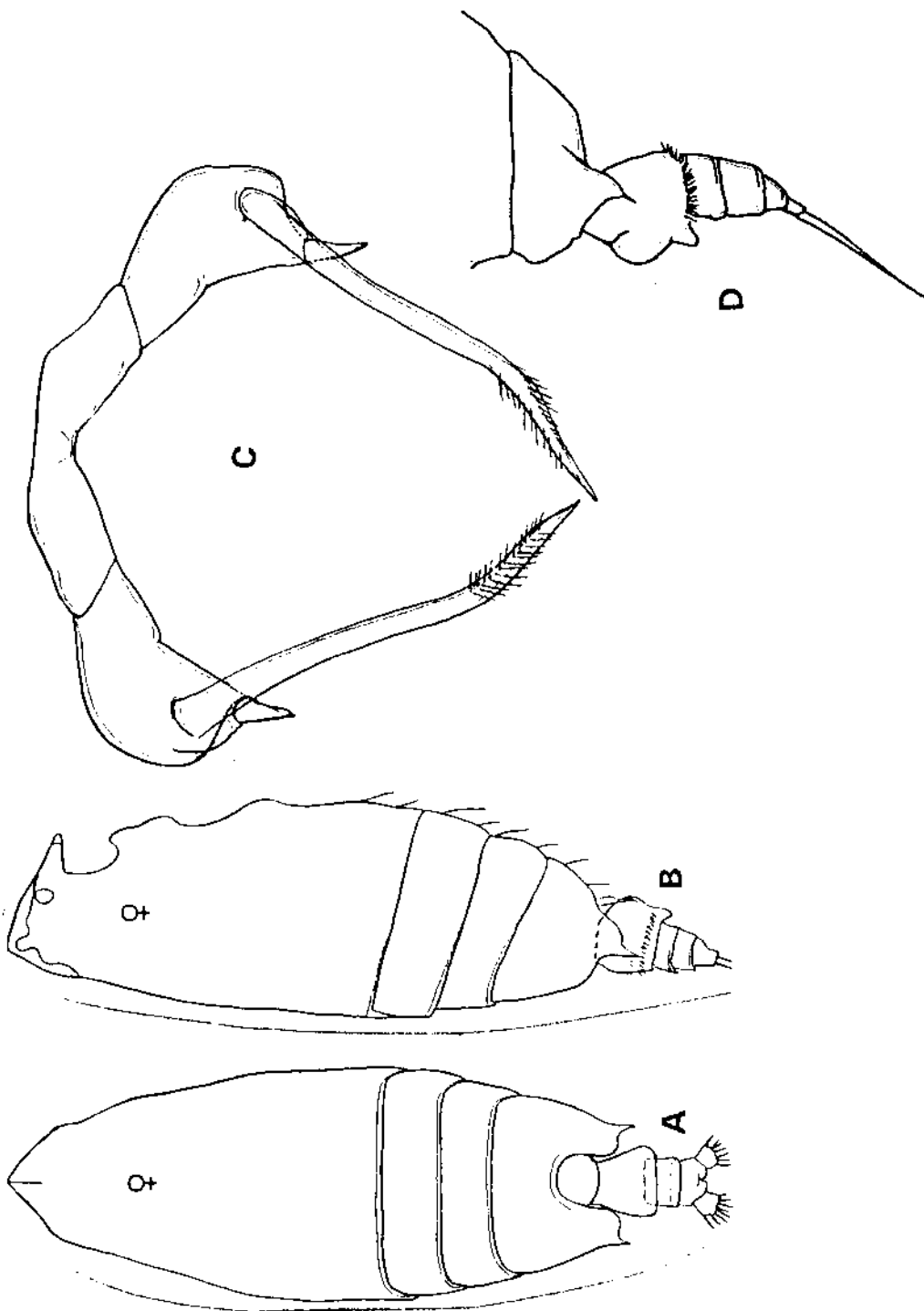


Scotellana

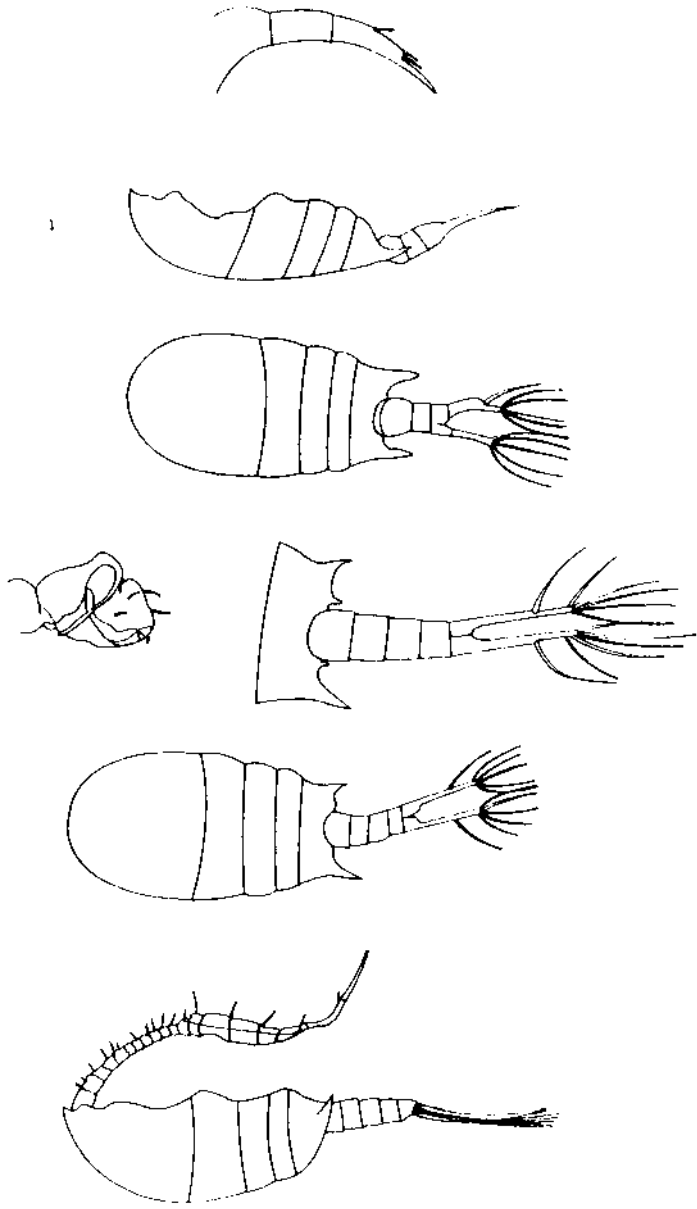




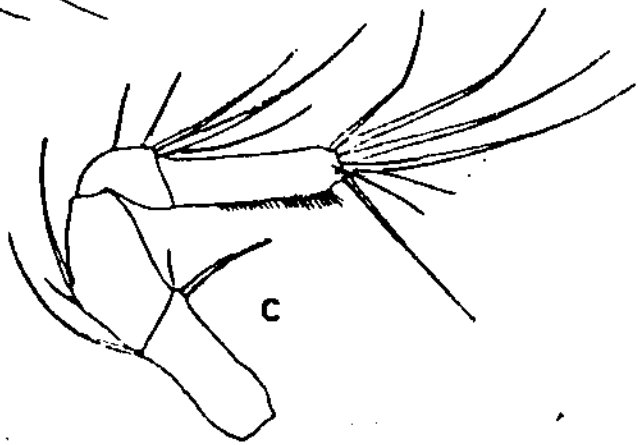
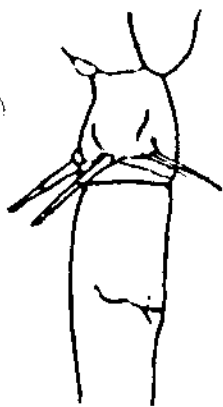
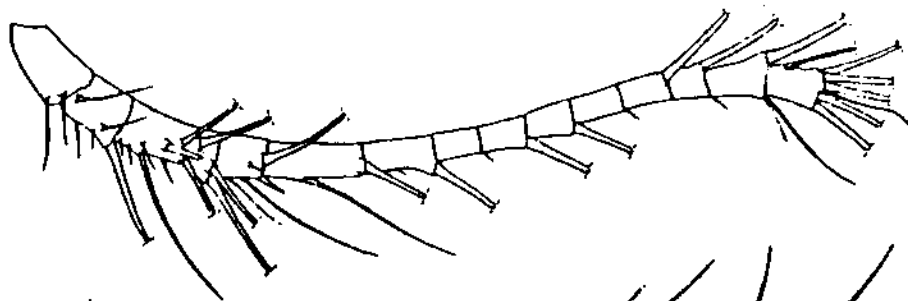
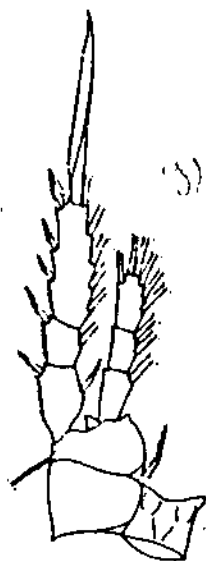
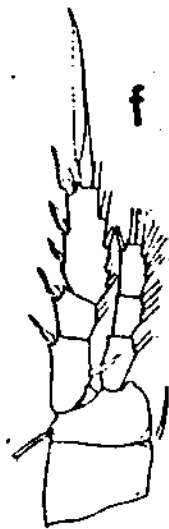
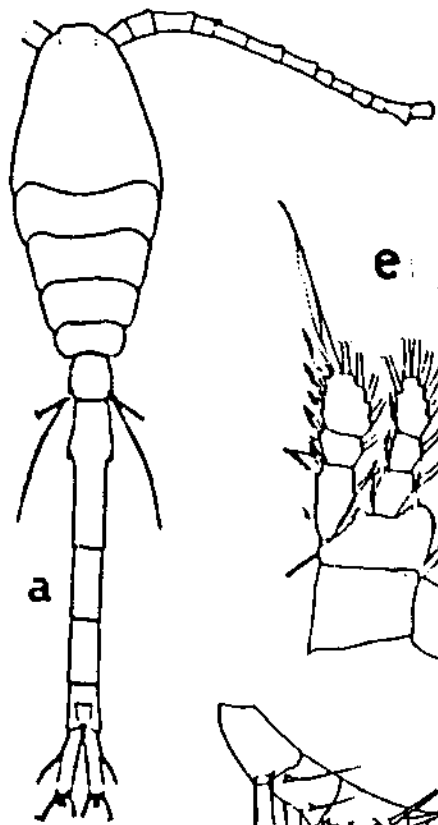
*Diaptomus salinus*



*Serphocaris serripes*

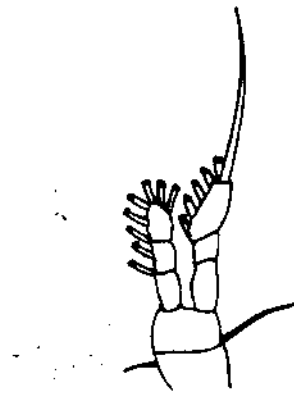
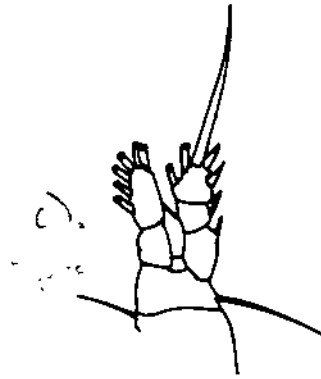
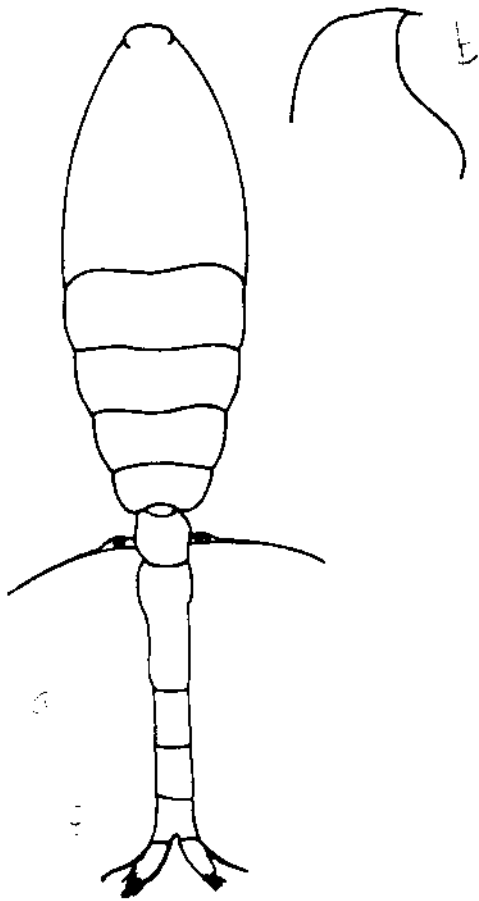


*T. uona* *in* *caudata*



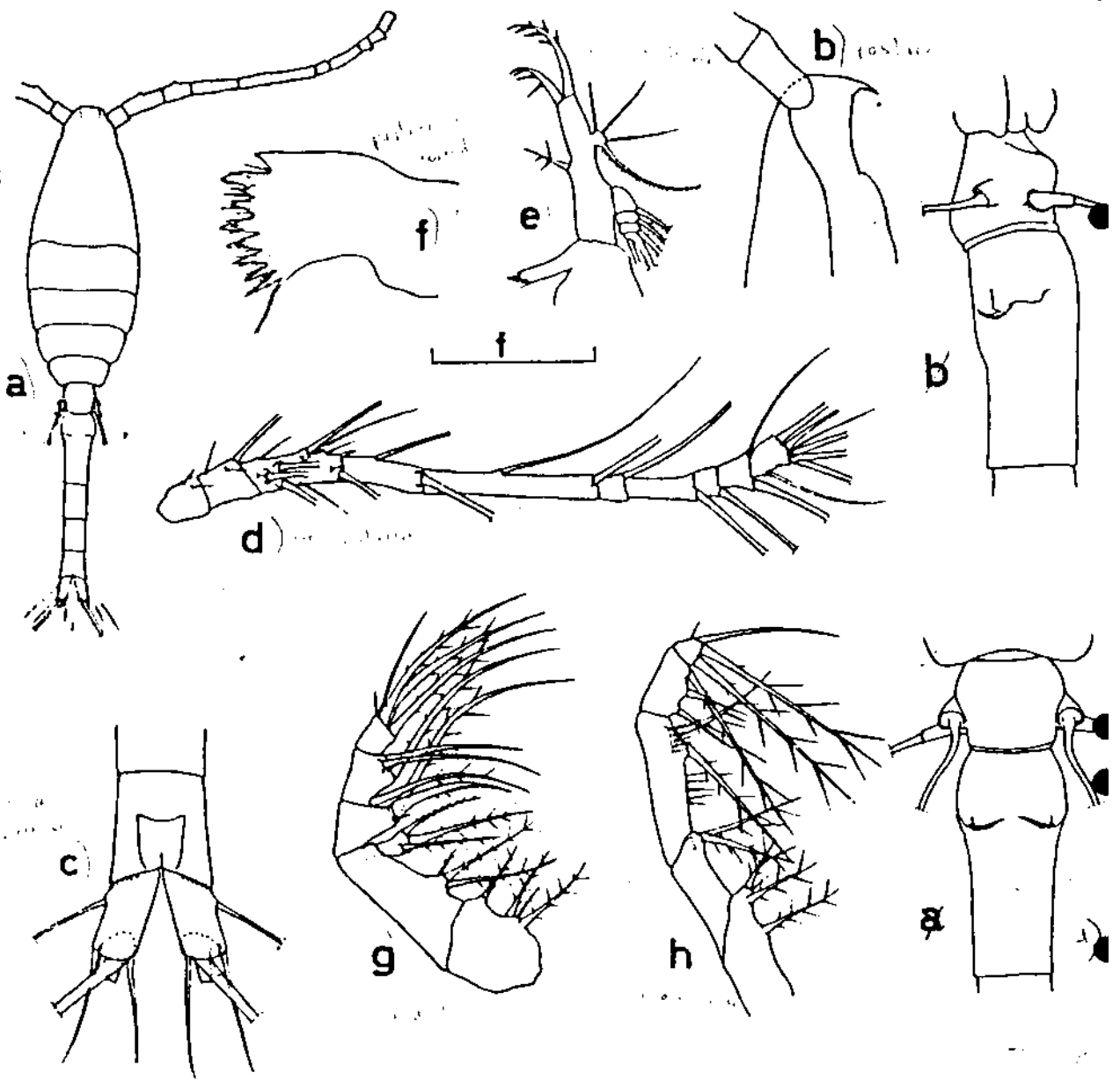
*Urosalpinx*

*Urosalpinx*



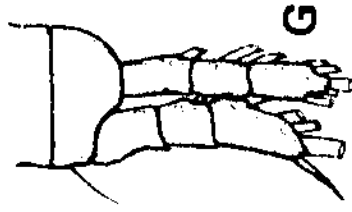
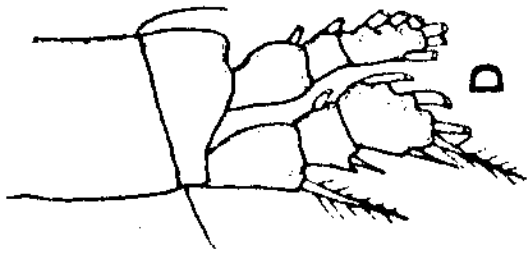
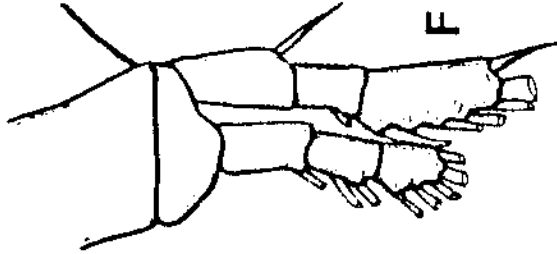
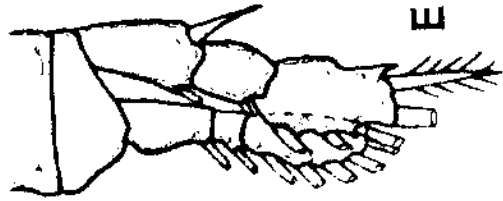
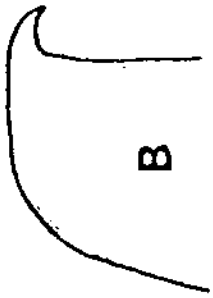
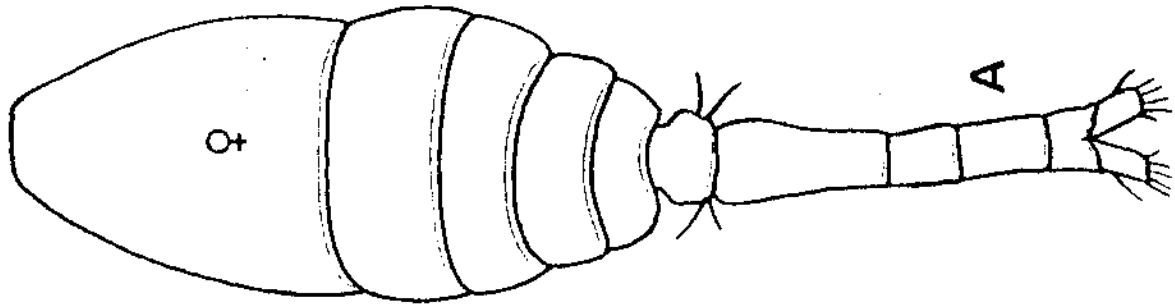
*Oligone deopleri*

11/10/20  
D. S. S.

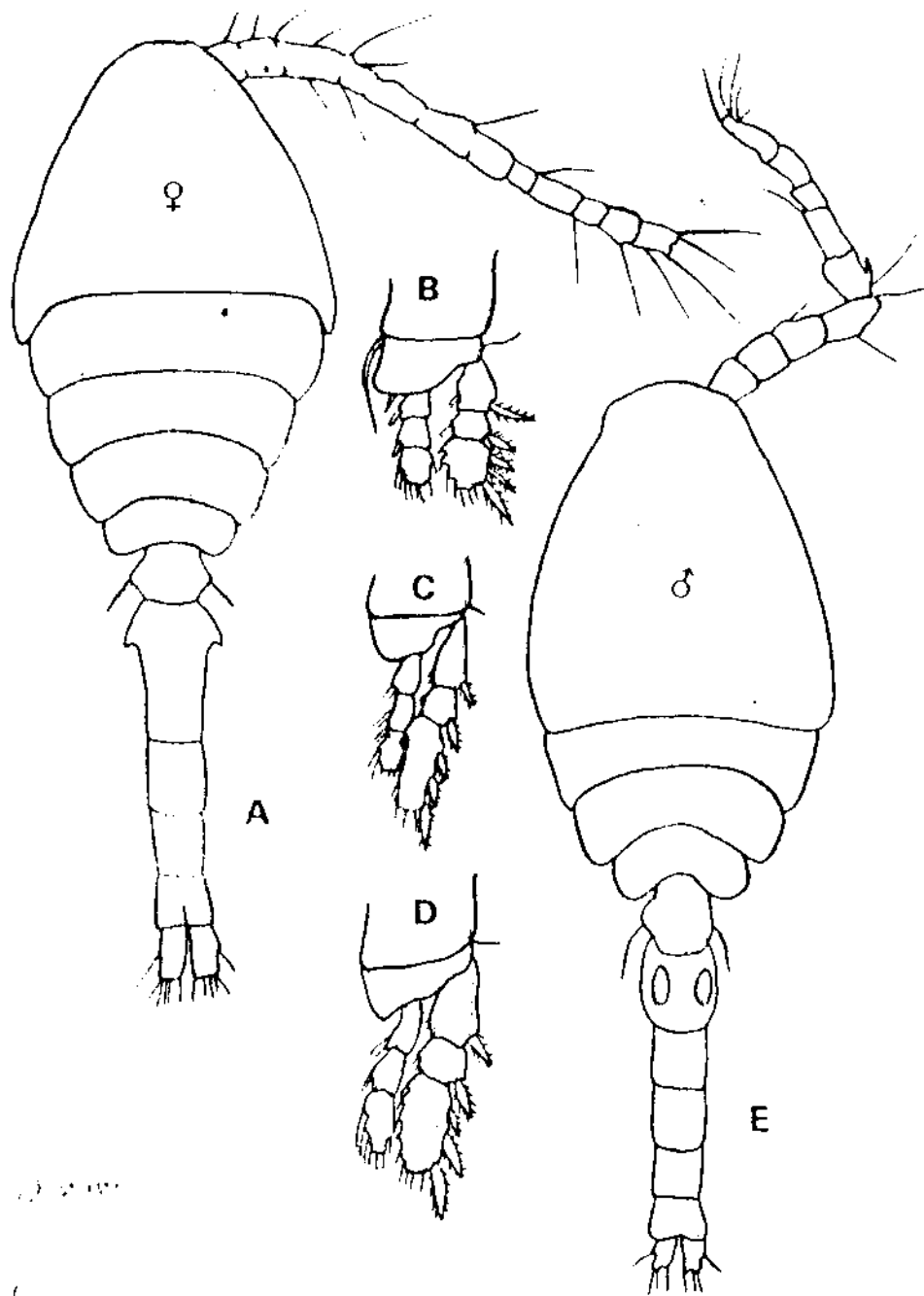


*Chironomus*

*Chironomus*



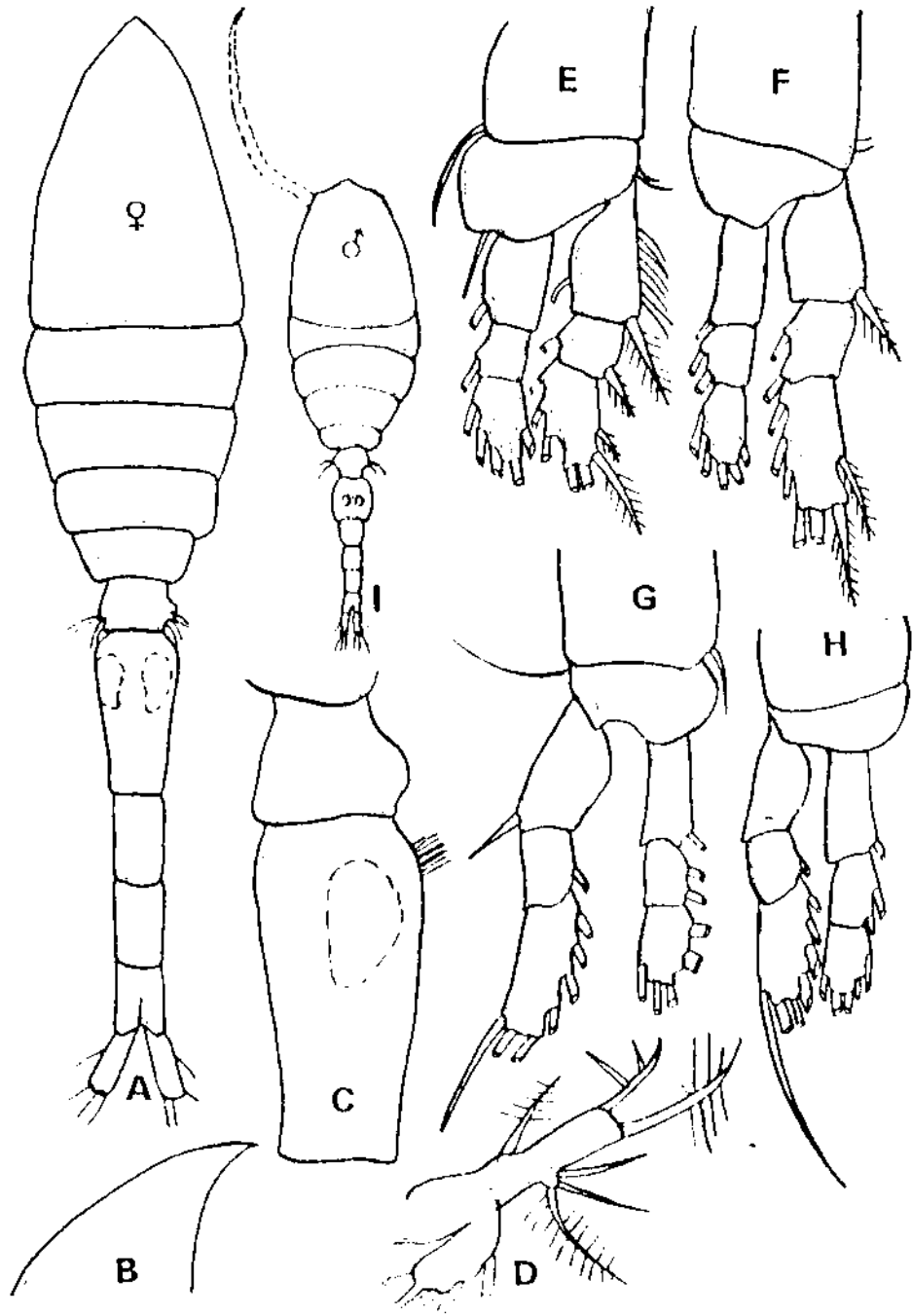
*O. sumalis* *Chironomus sumalis*



1921

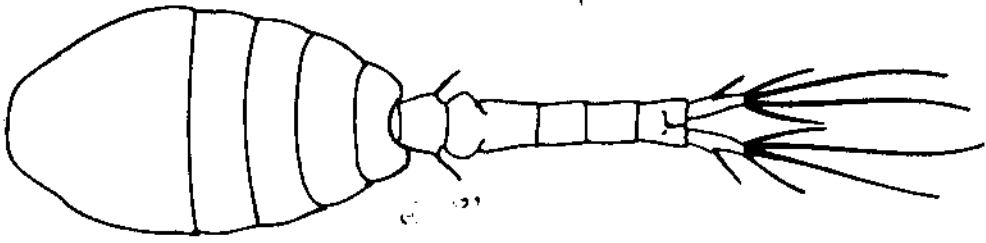
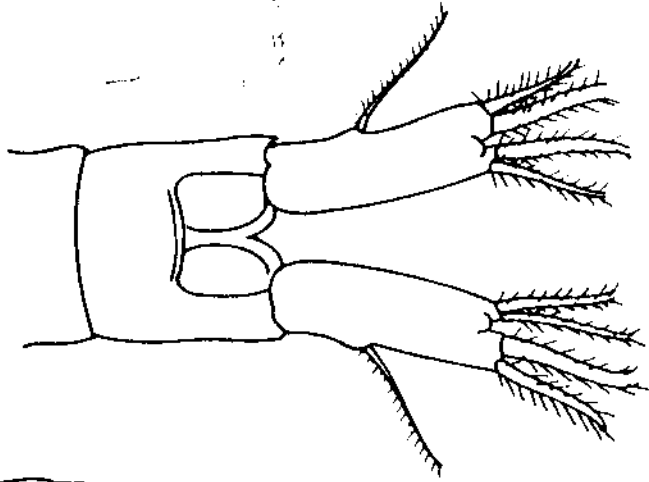
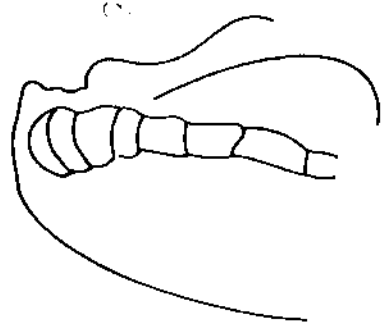
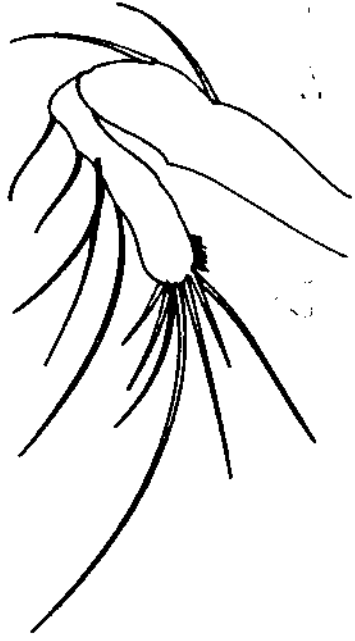
*Citronia vicia*



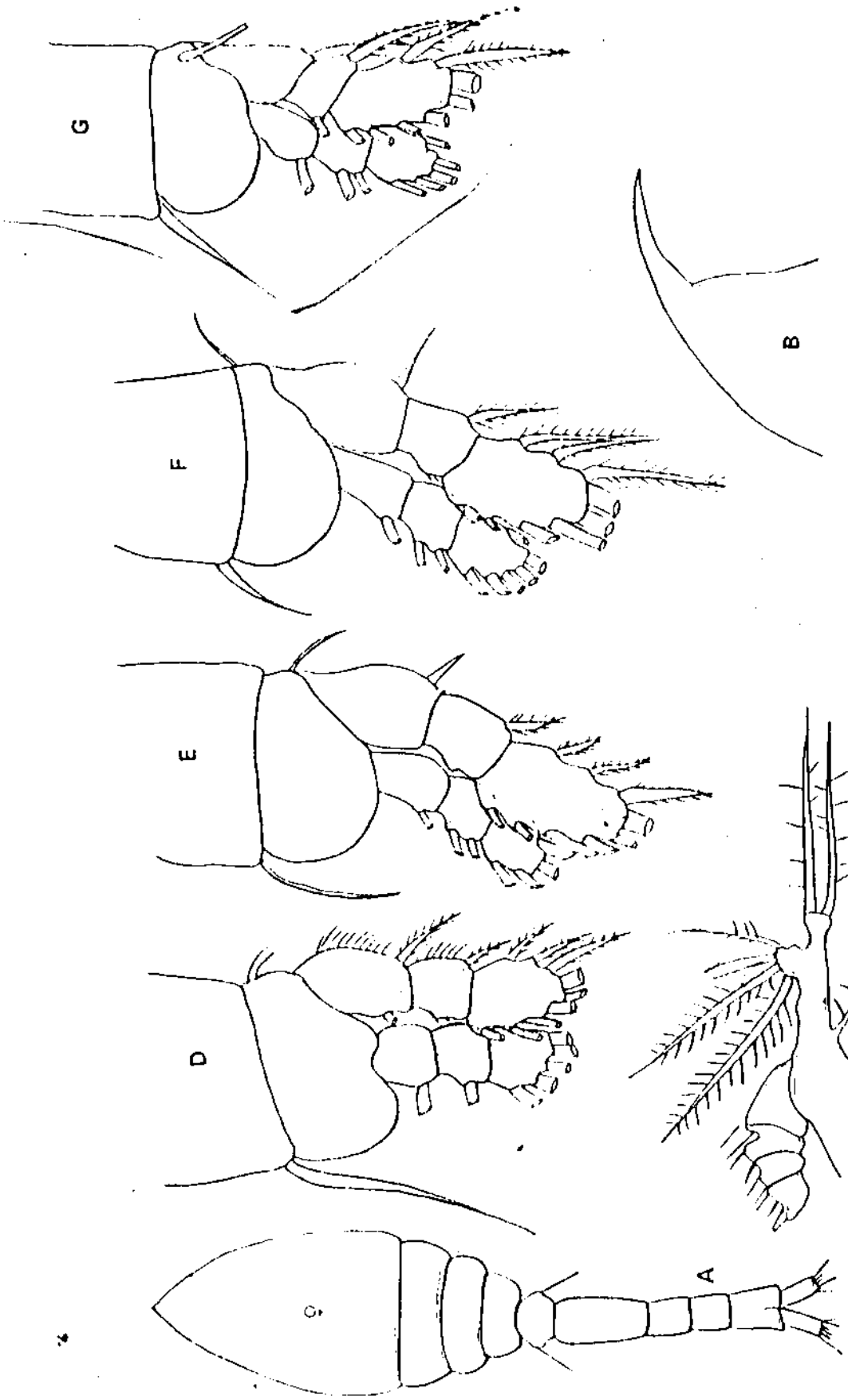


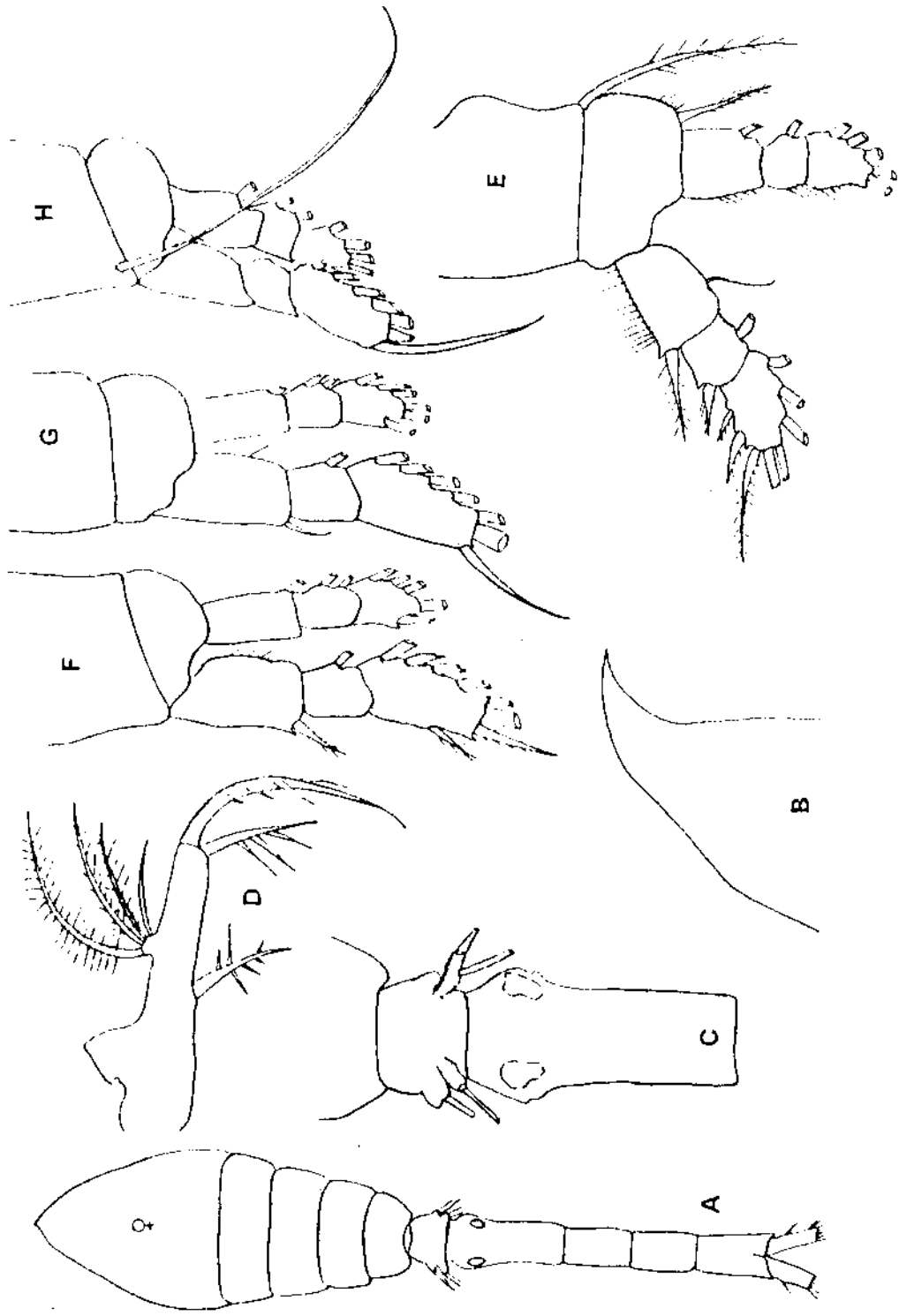
*Urena palustris*

*Urena palustris*

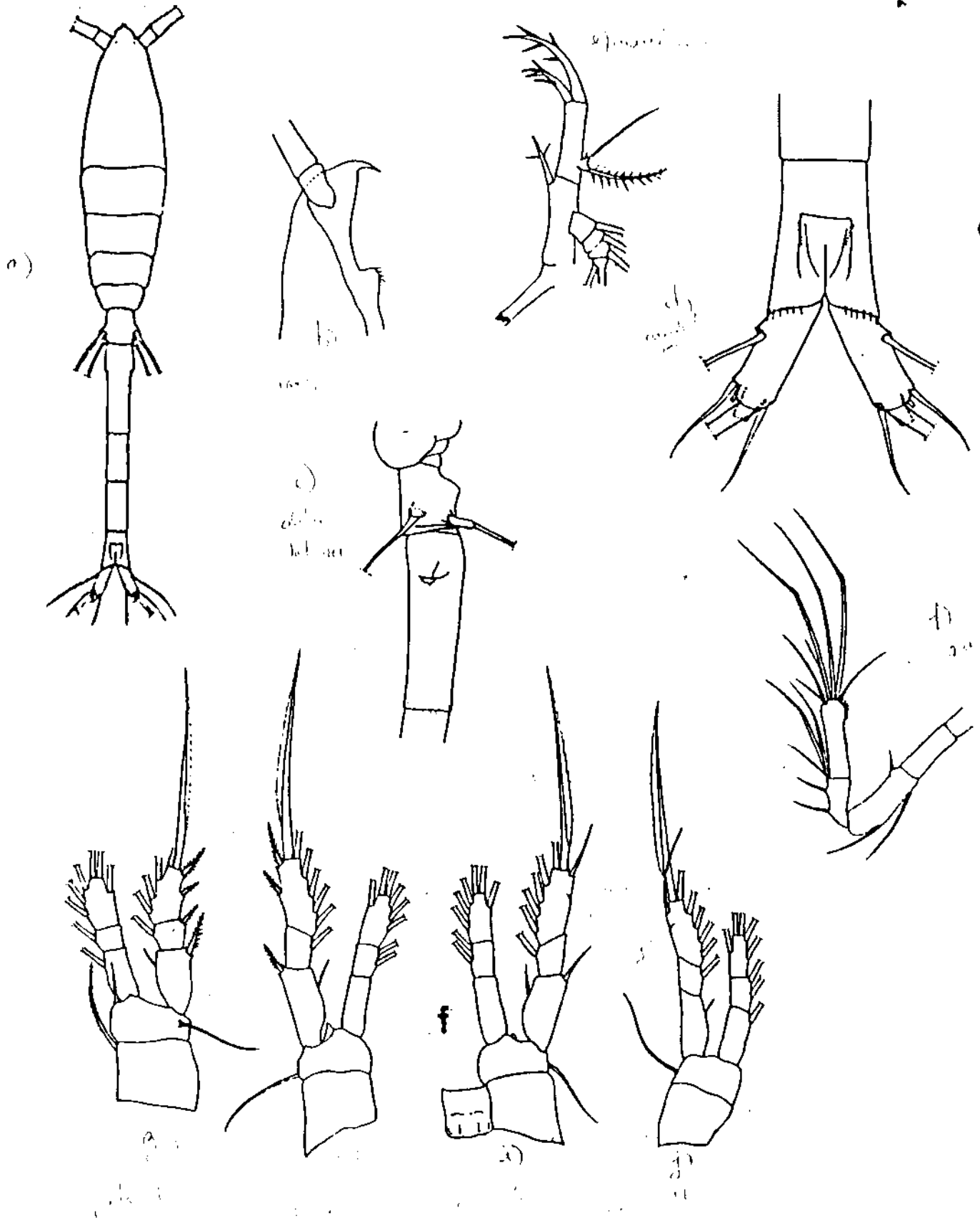


*Asplanchna setigera*

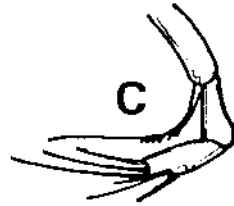
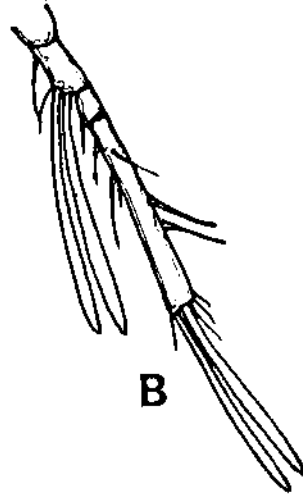
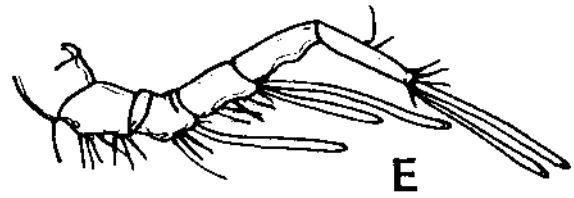
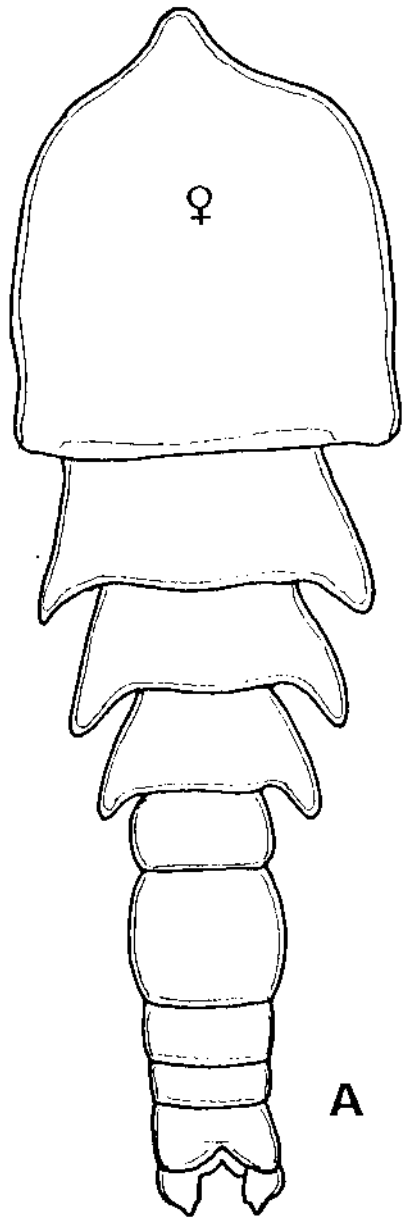




*D. ...*



117  
*Phaenocarpa*



A

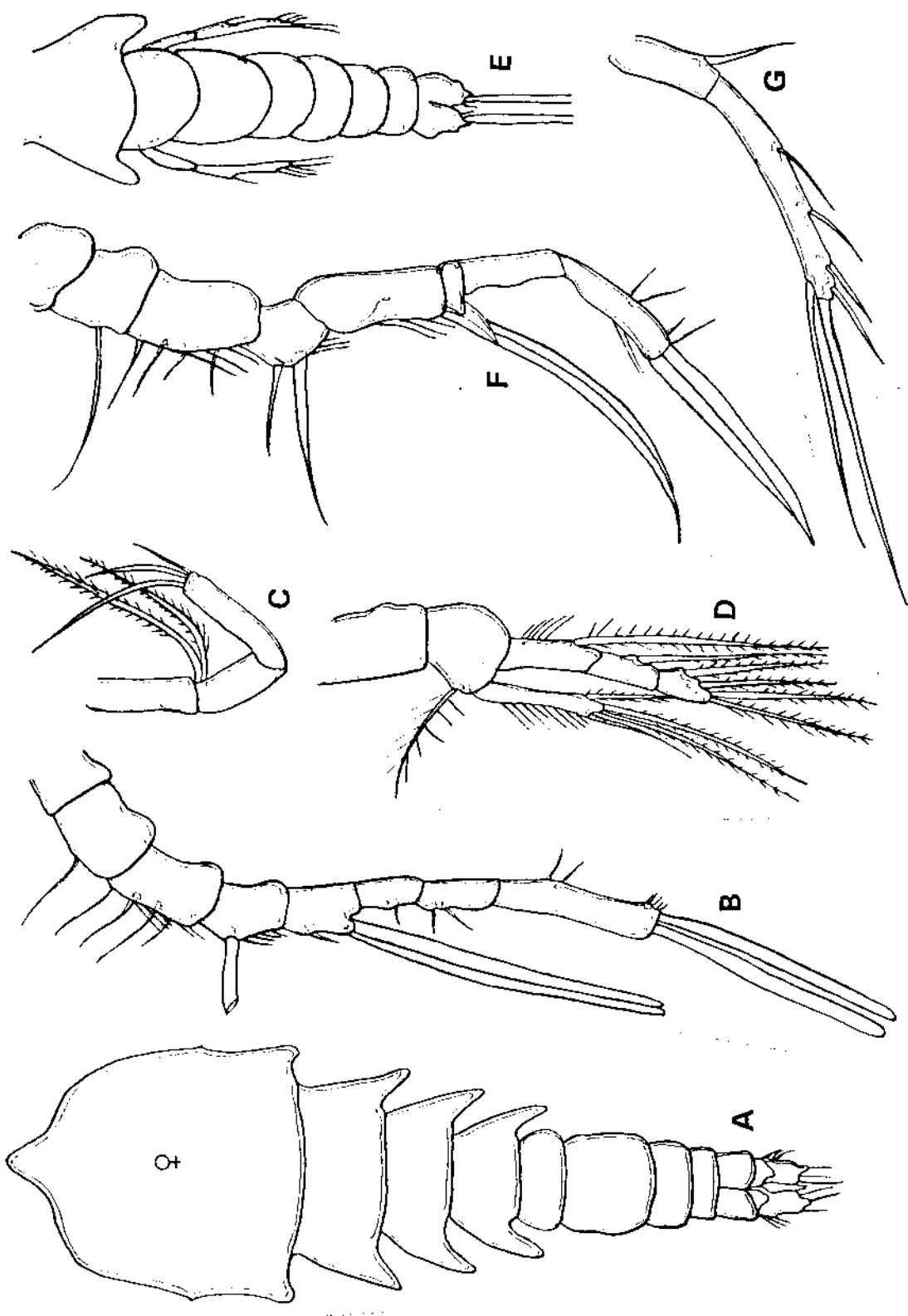
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B

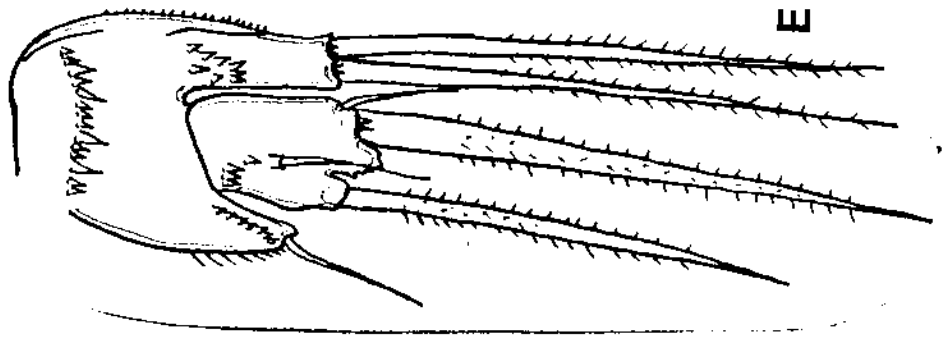
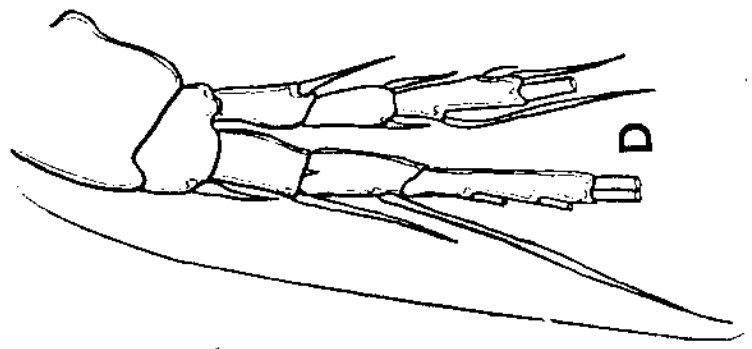
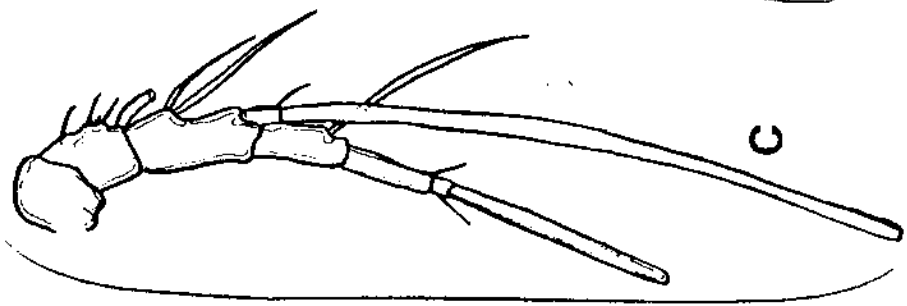
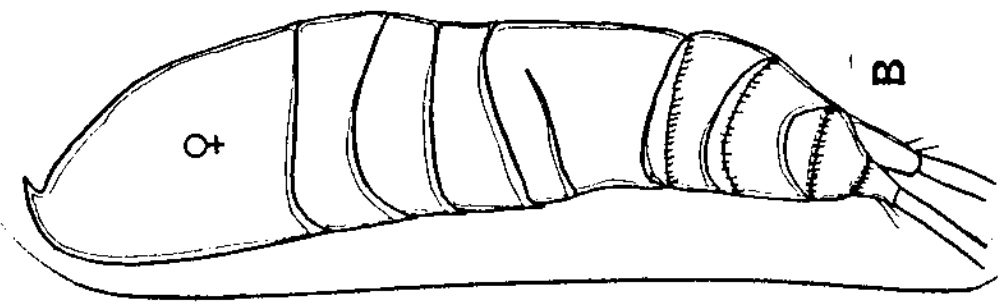
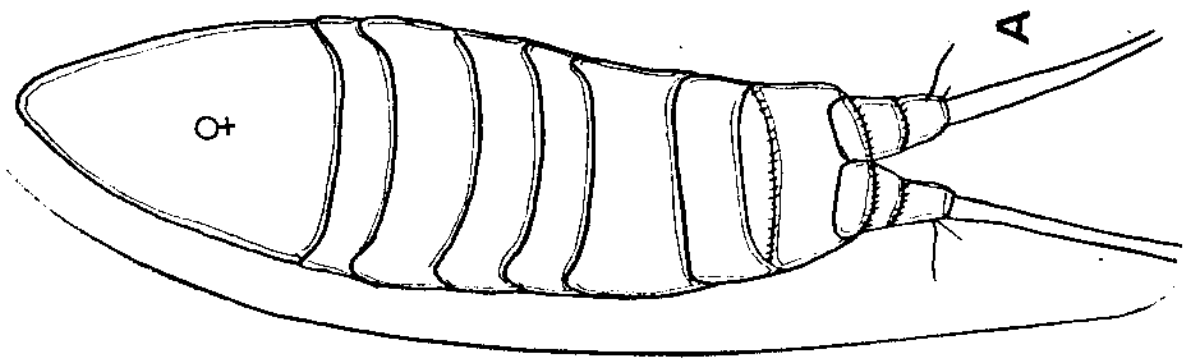
D

E

*Clytemnestra setulata*

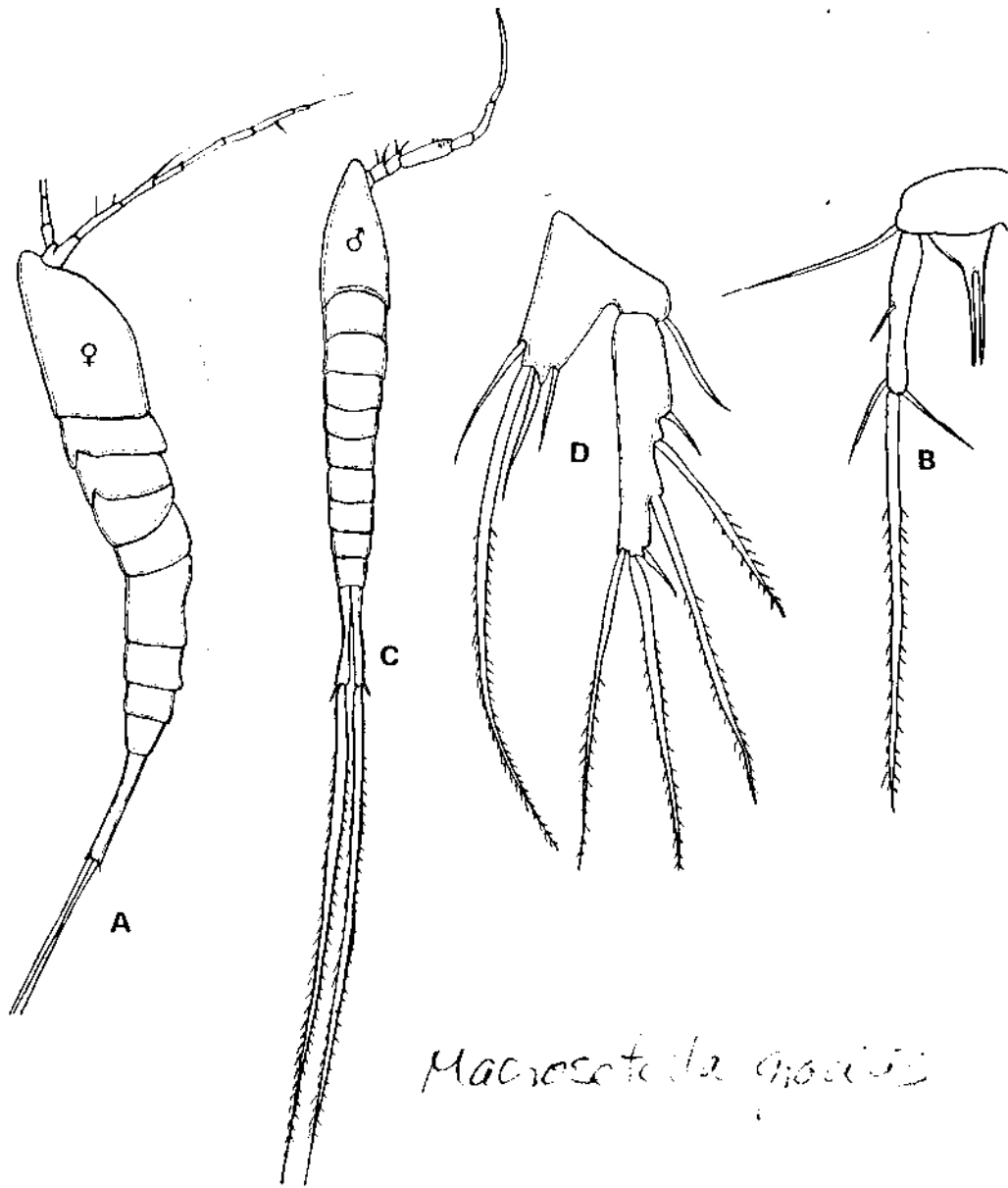


*Clytemnestra postica*

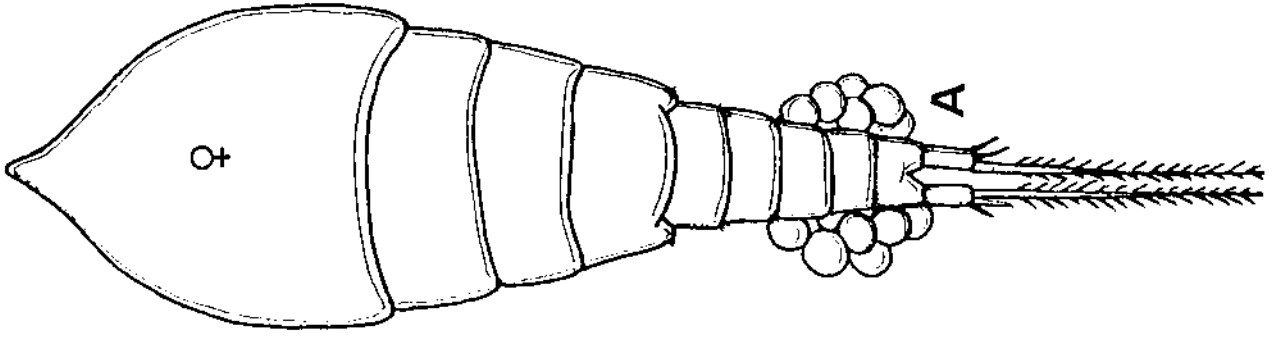
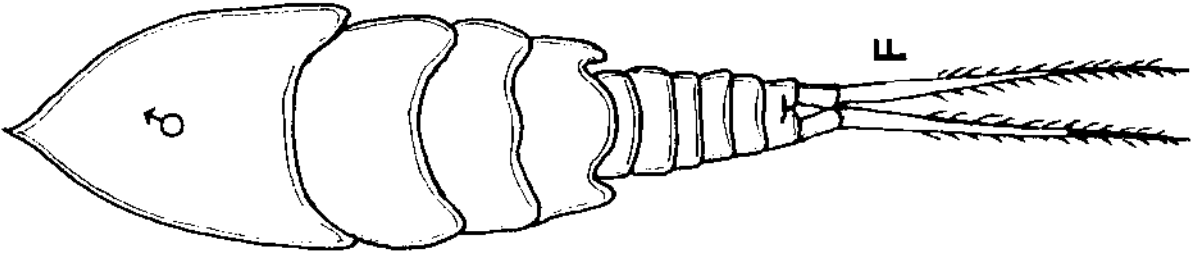
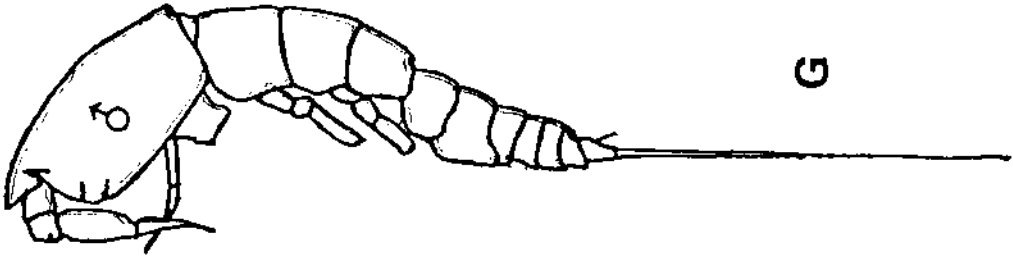
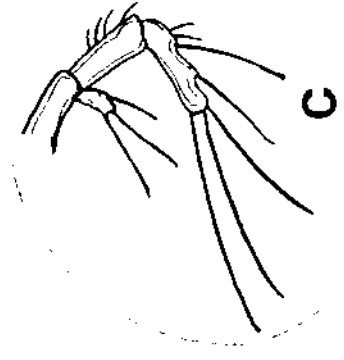
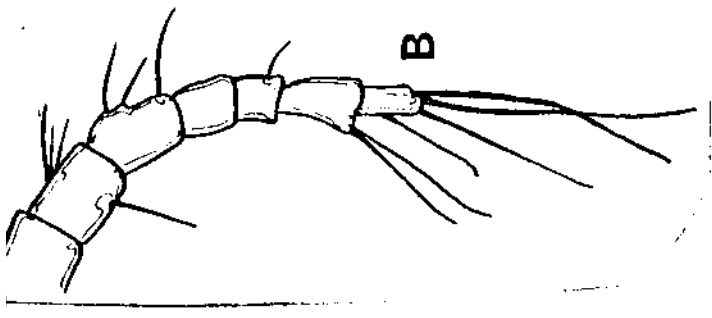
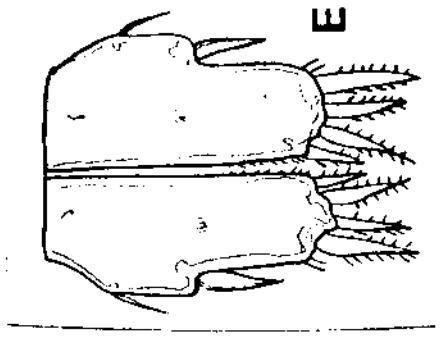
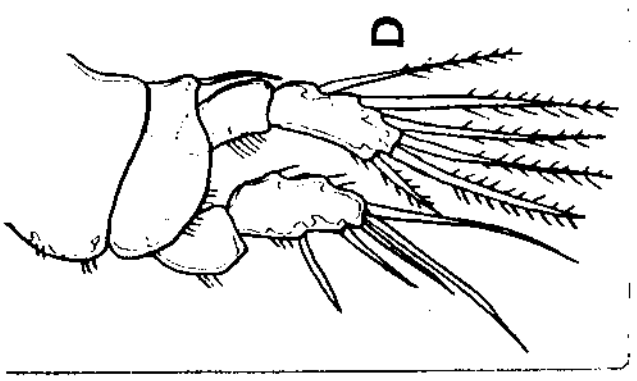


*Heteromysis*

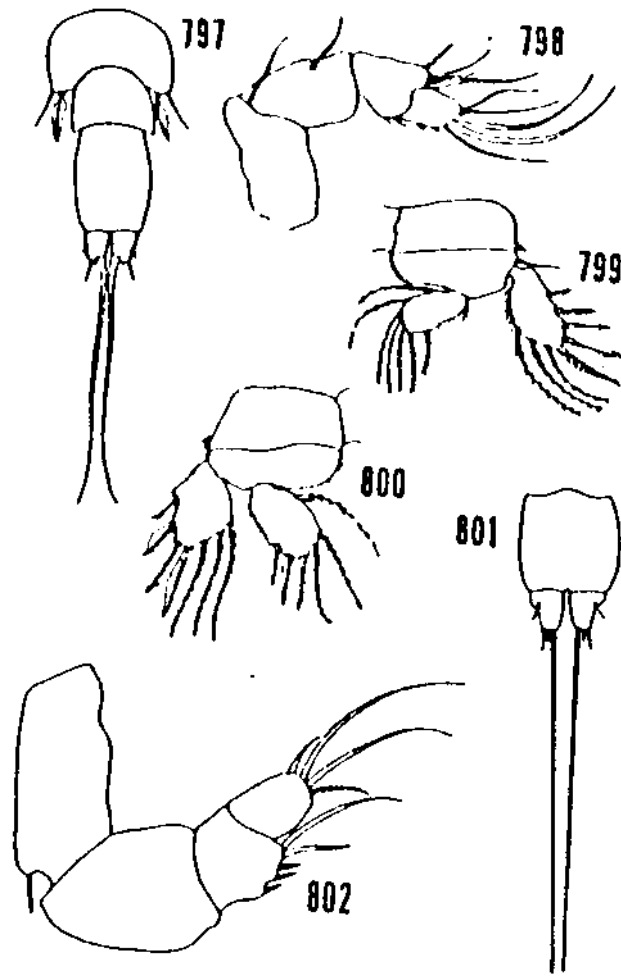




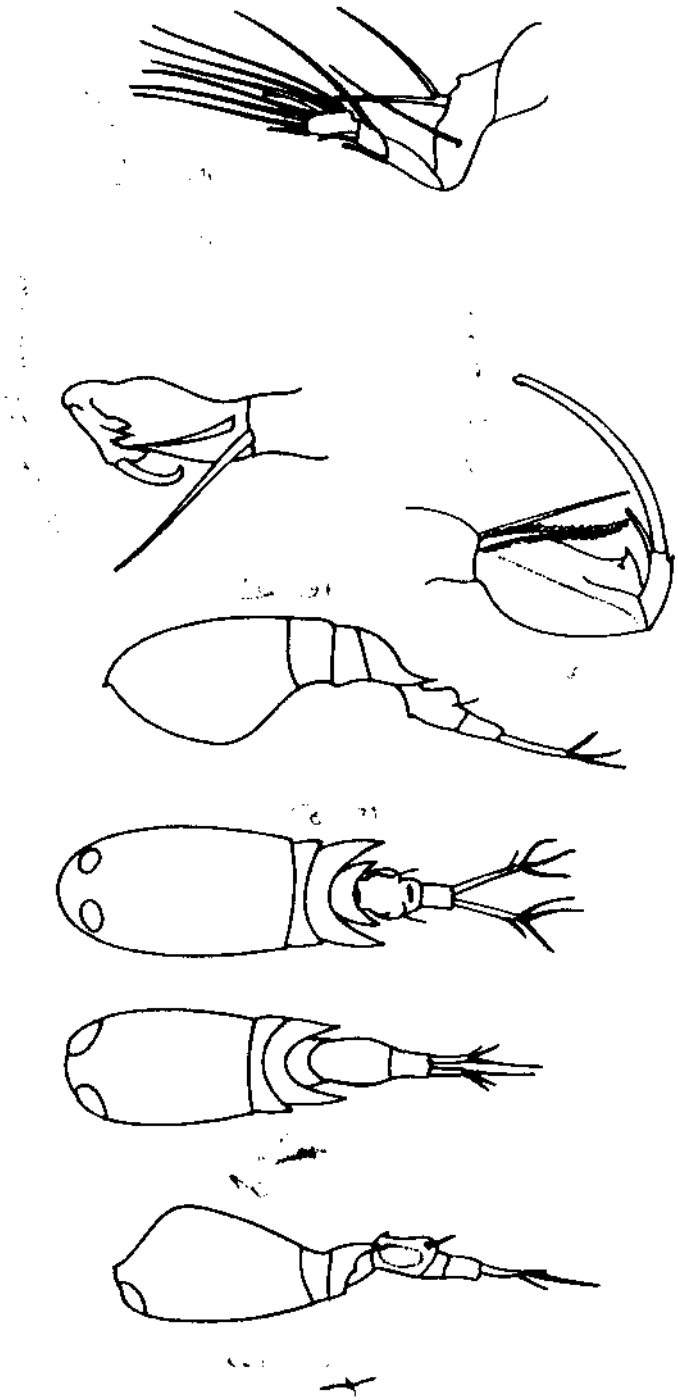
*Macrosetella grossii*



*Callinectes*  
*setiferus*



*Sappinia topica*



*Corycaeus*

070

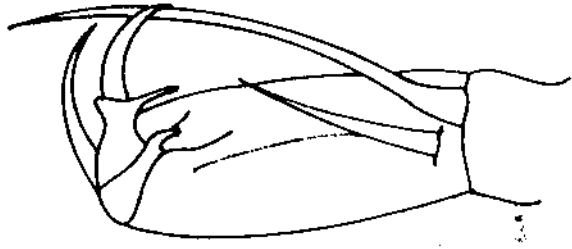


Fig. 1  
maxilla



Fig. 2



Fig. 3

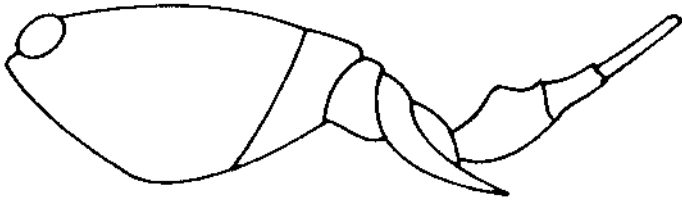


Fig. 4

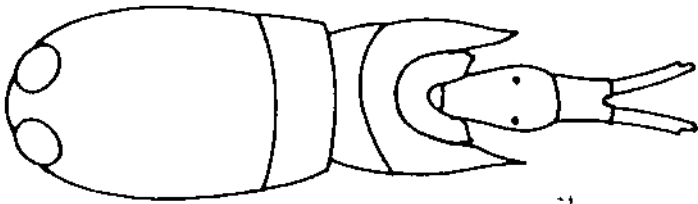


Fig. 5

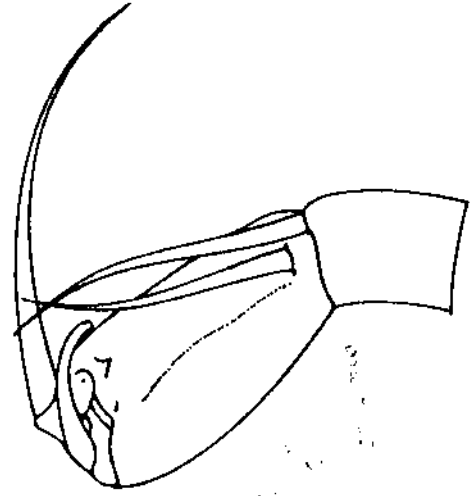
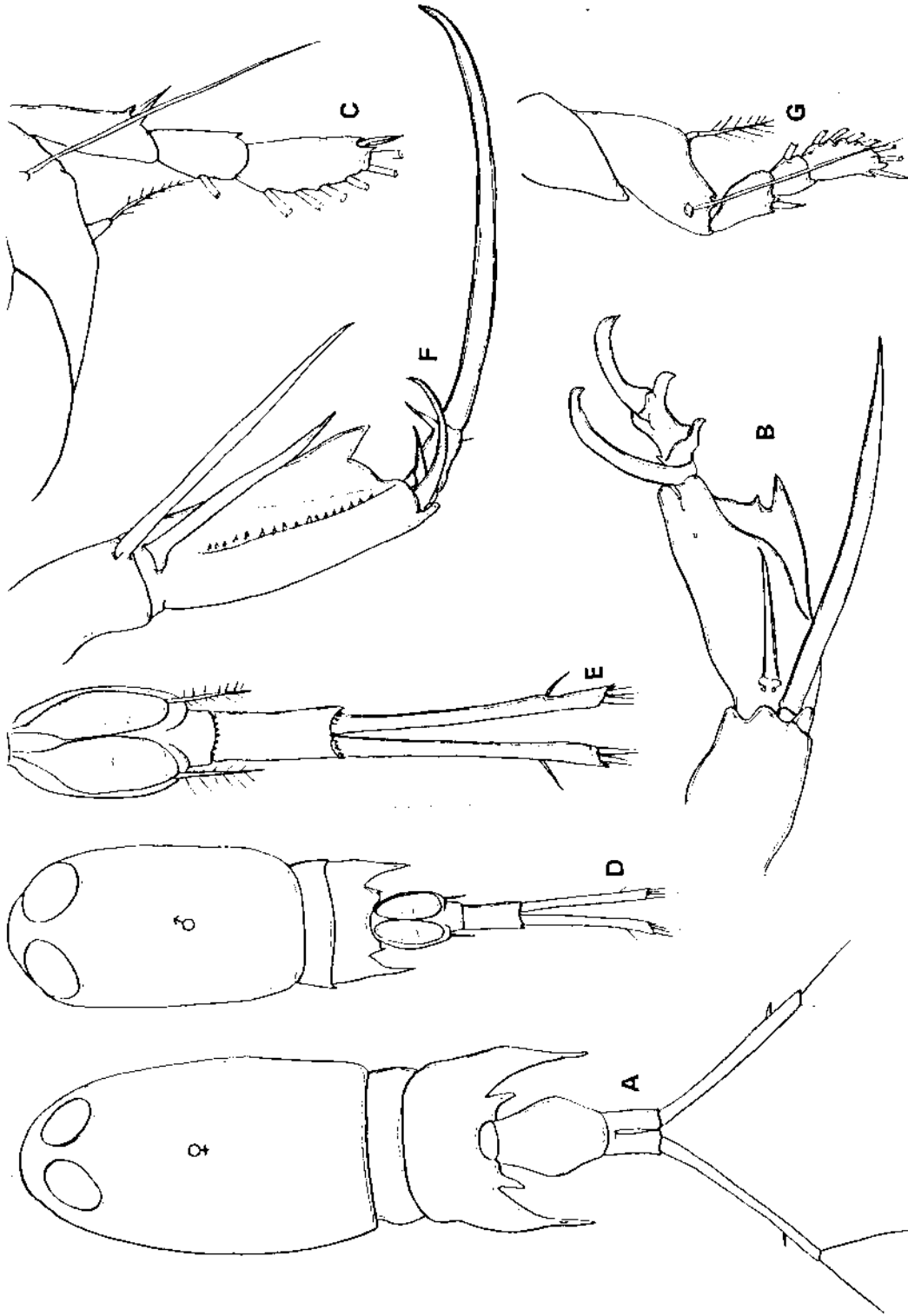
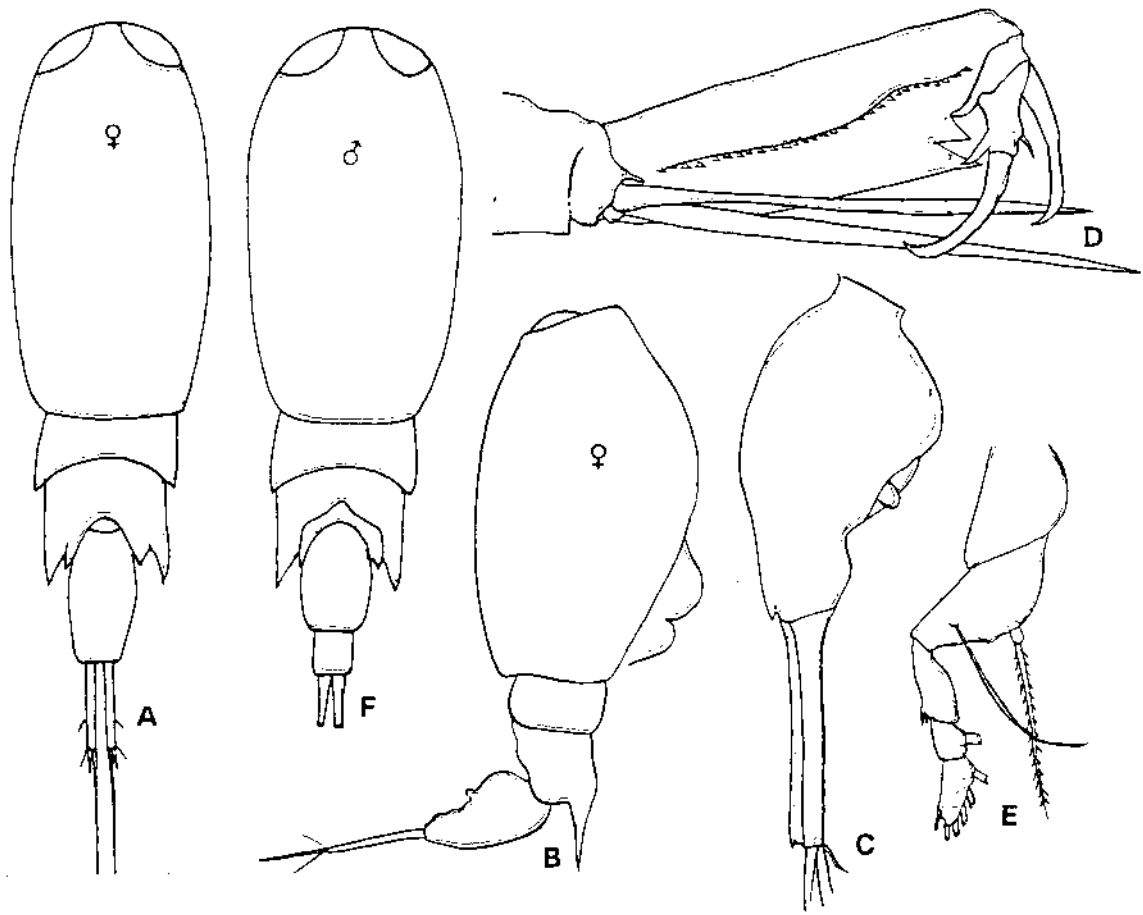


Fig. 6  
maxilla

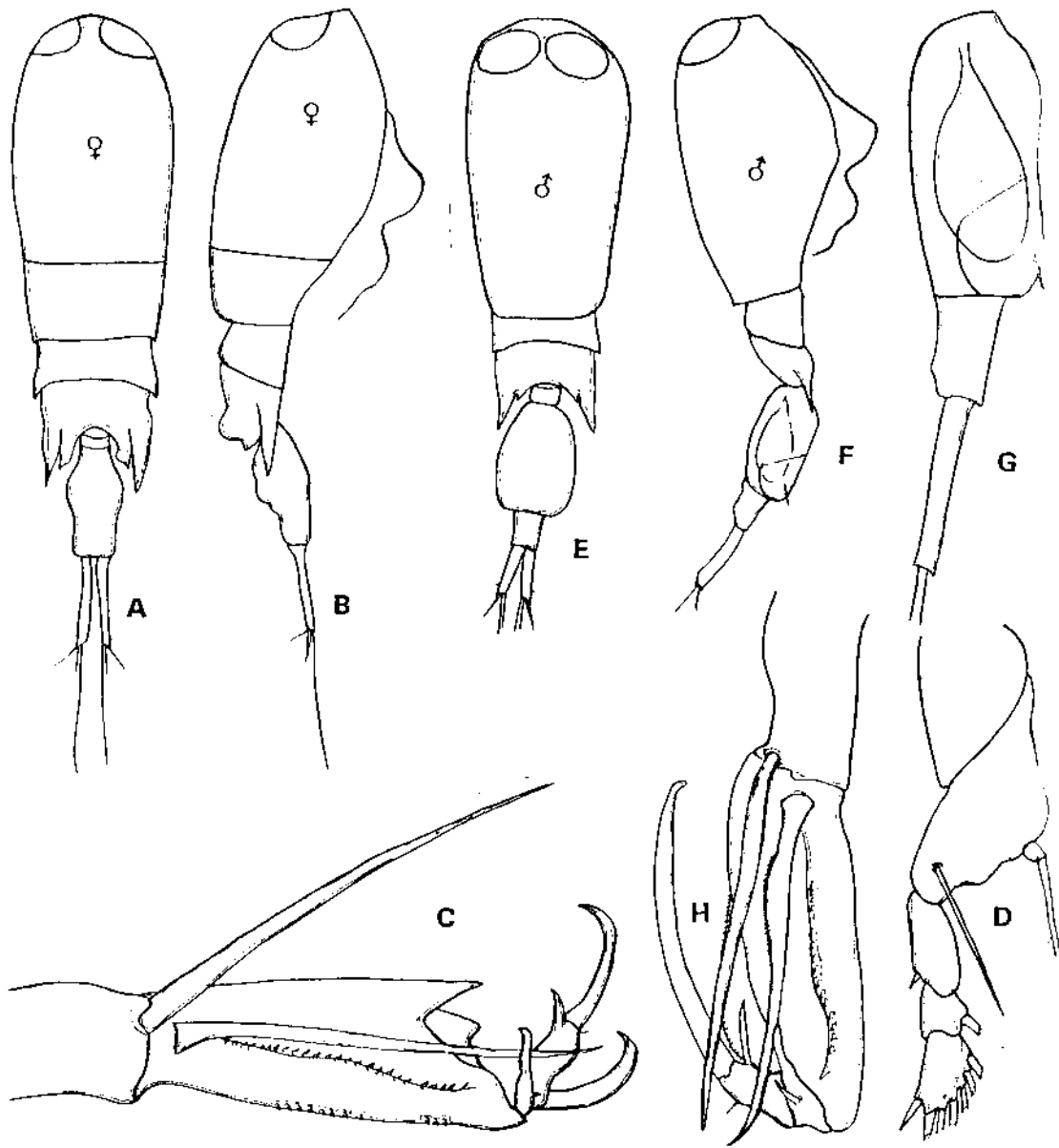
*Corjaria crassicauda*



*Ceryleca sibirica*

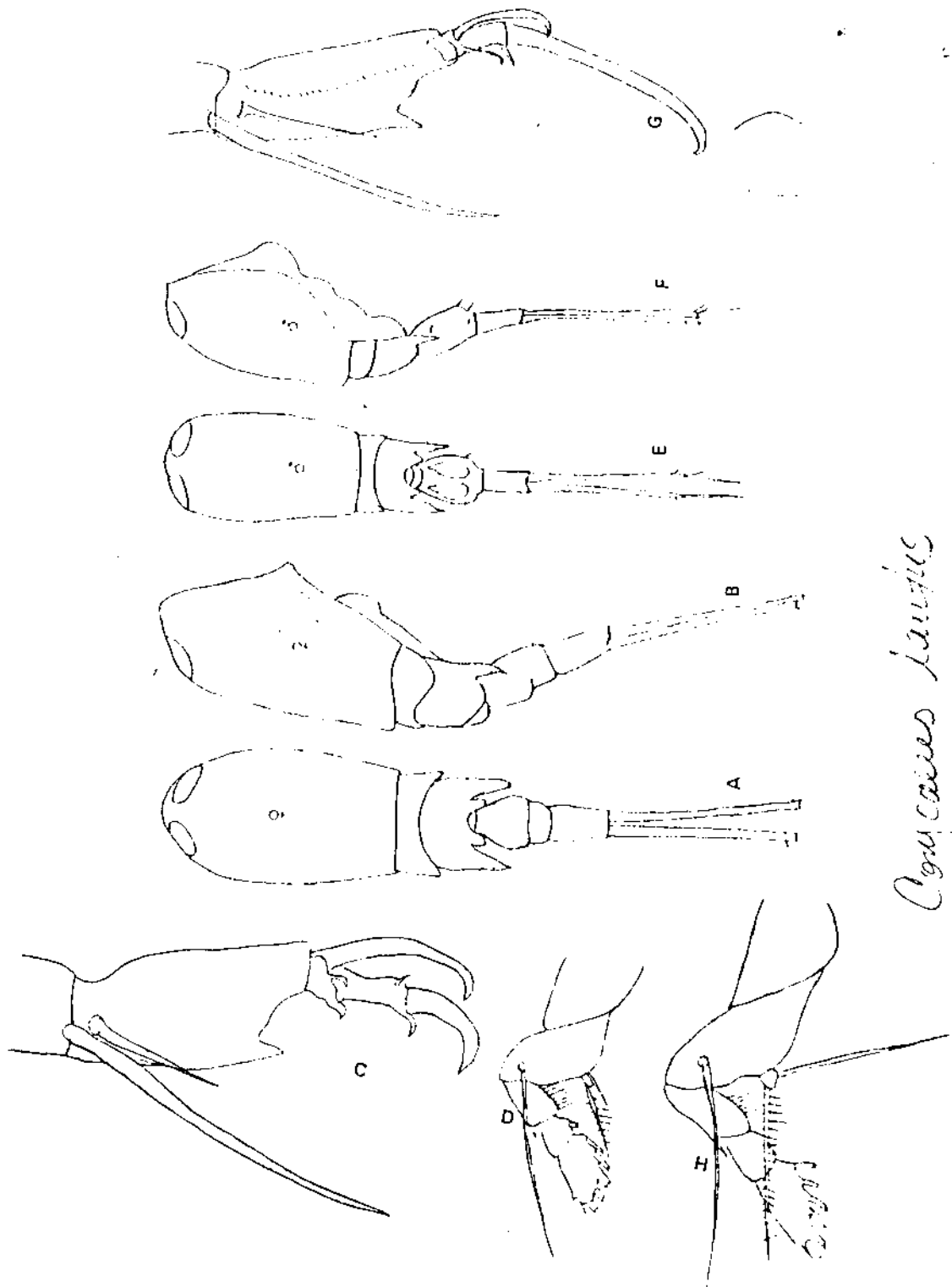


*Polysphincta*

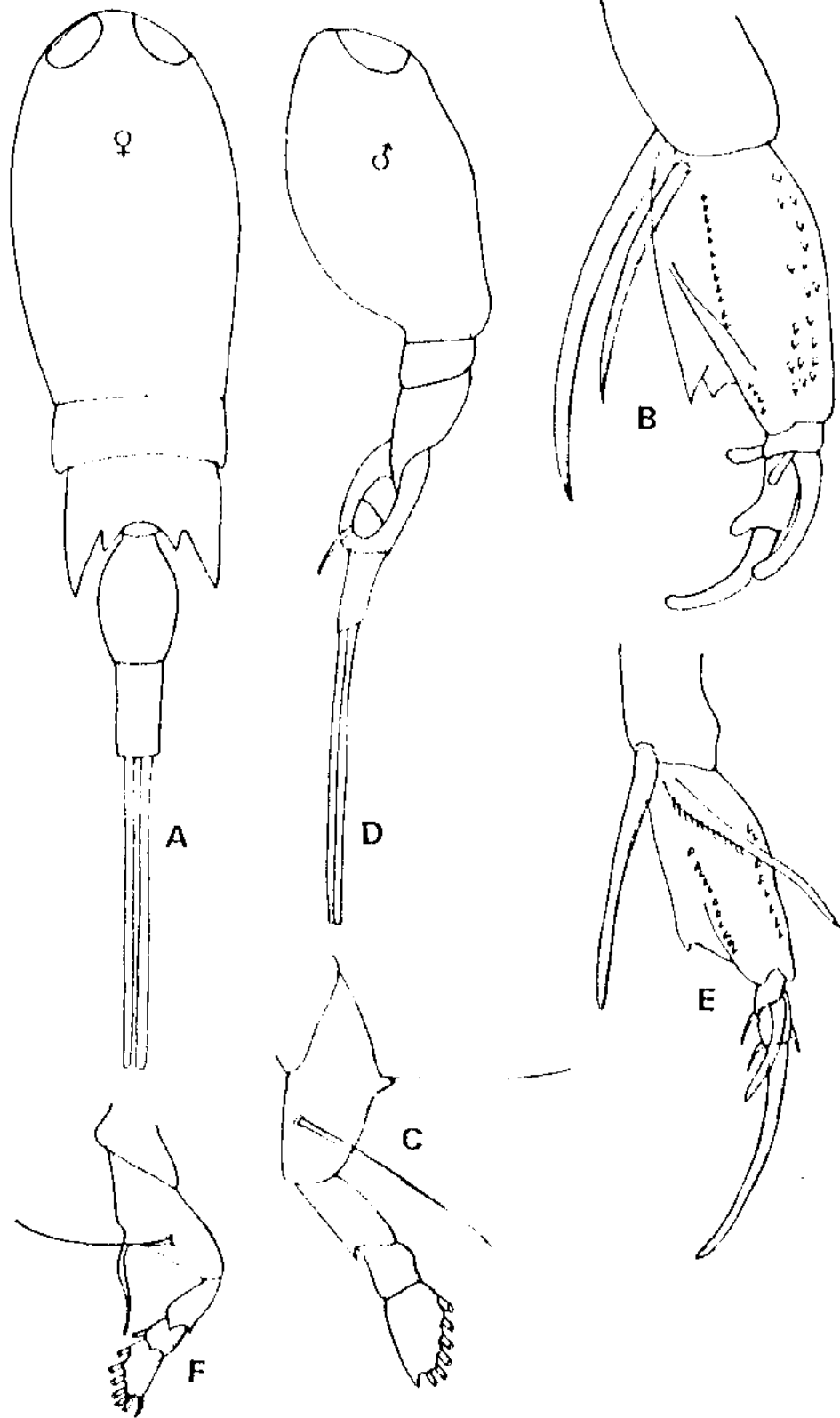


*Gammarus typicus*



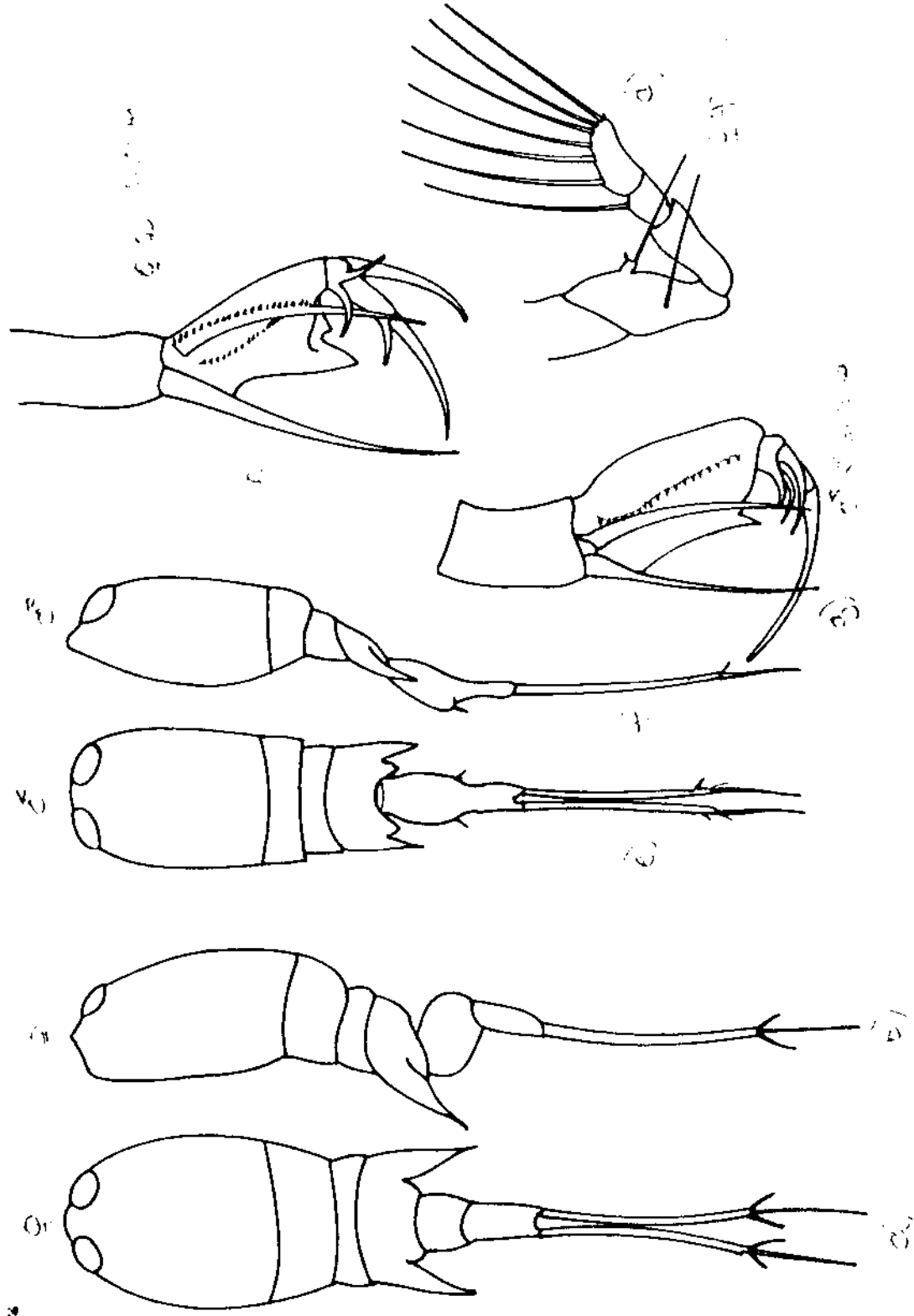


*Chrysomelid Larvae*

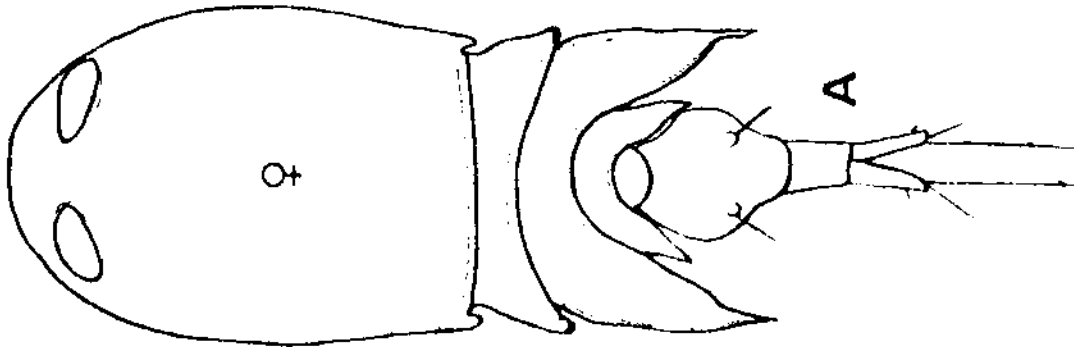
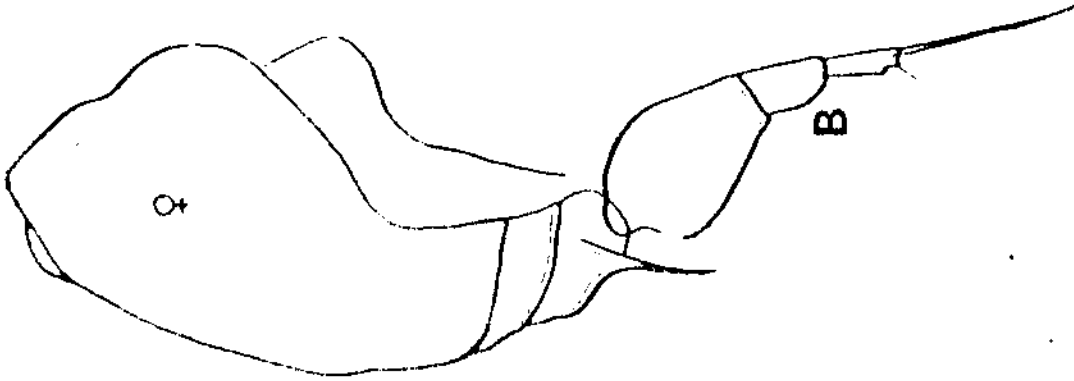
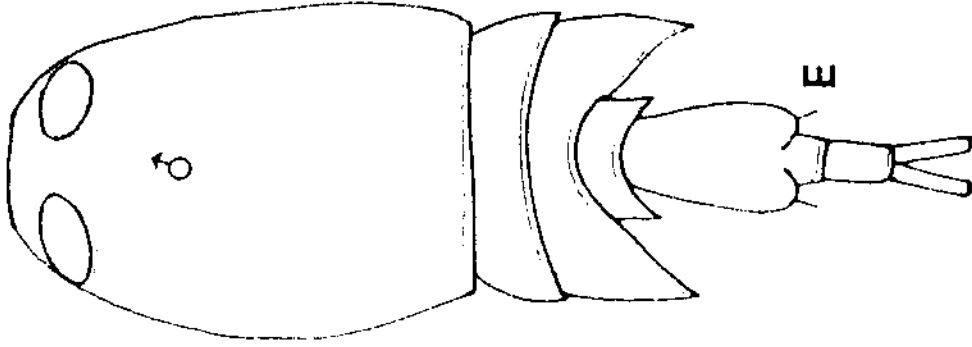
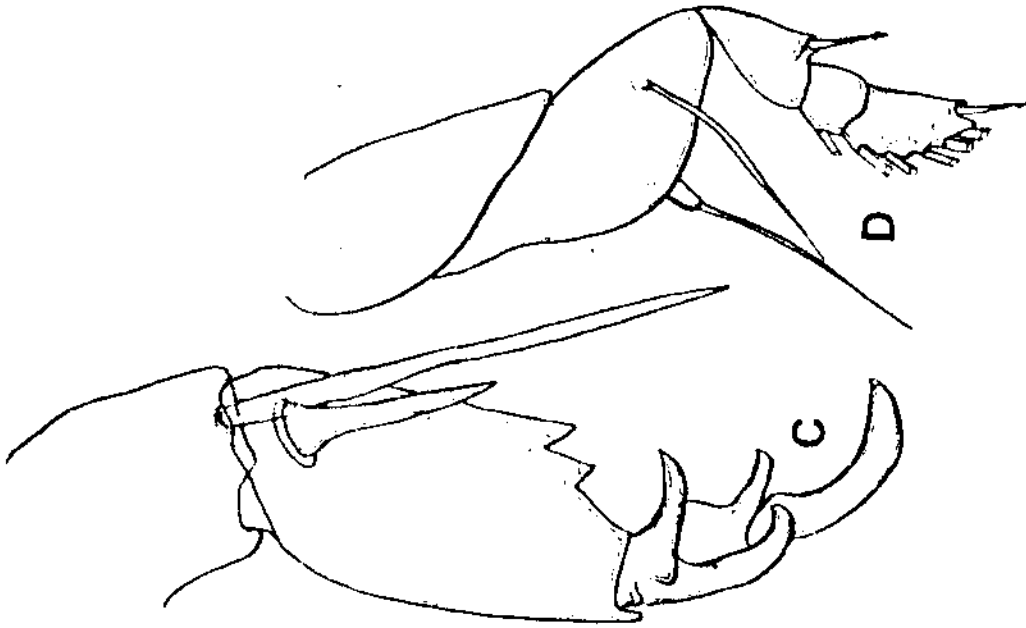


*Caryacus furcatus*

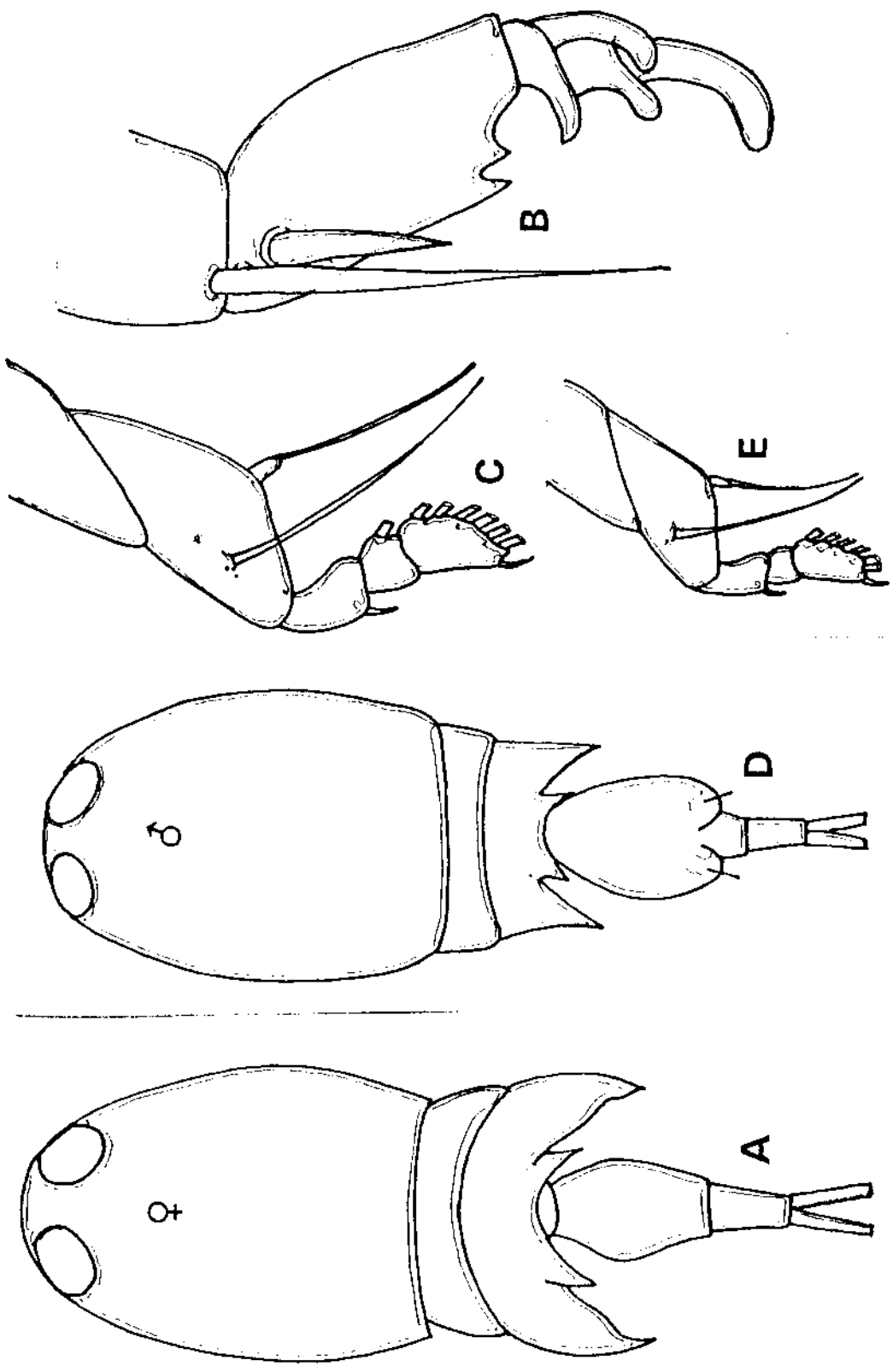
242 197 194  
110 75



*Caryocera longistylis*

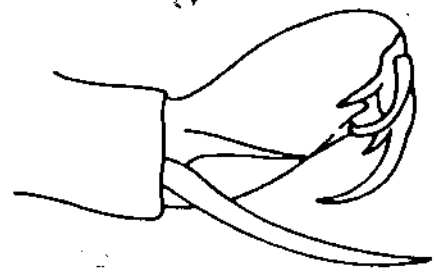
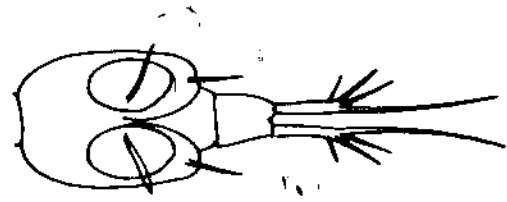
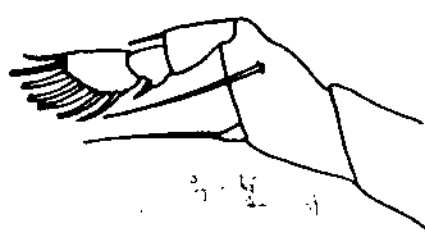


*Cop. caesus caesus*

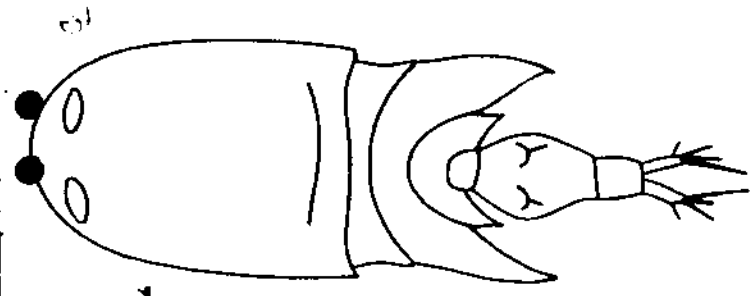
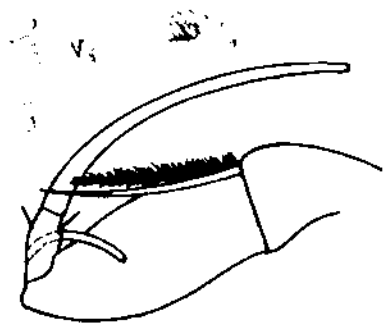


Penicillium sp.

Conidia

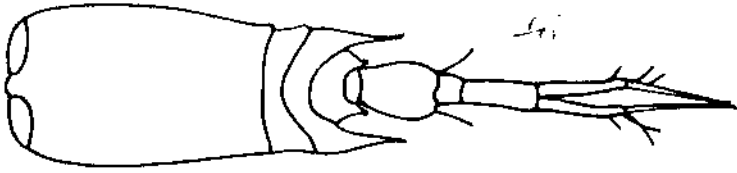


Spore

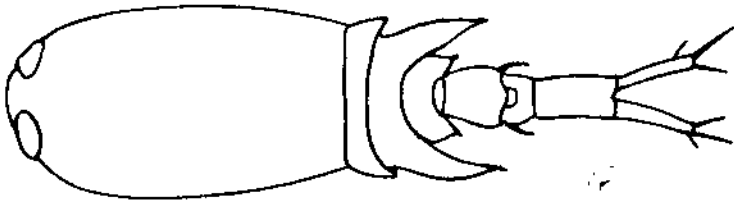




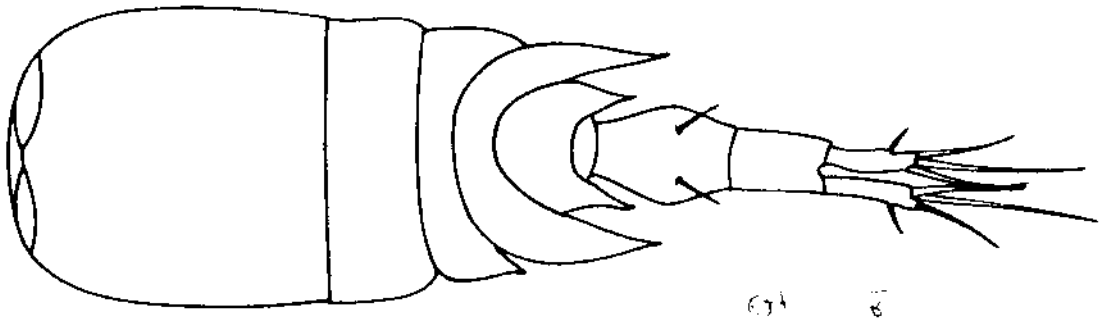
FEU



01



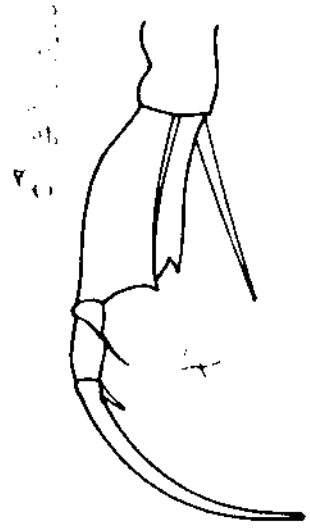
*Cerynus rufiventris*



1 ♀



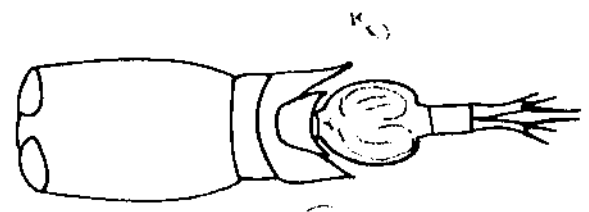
2 ♂



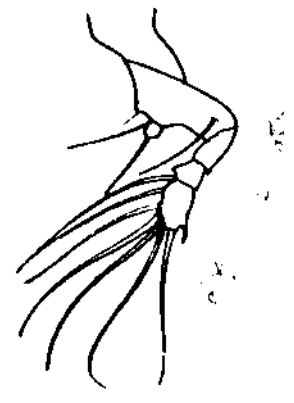
3 ♀



4 ♀



5 ♀

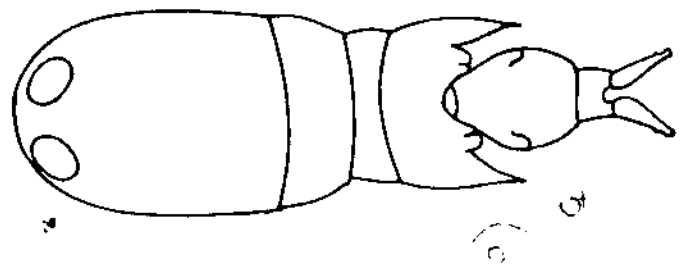
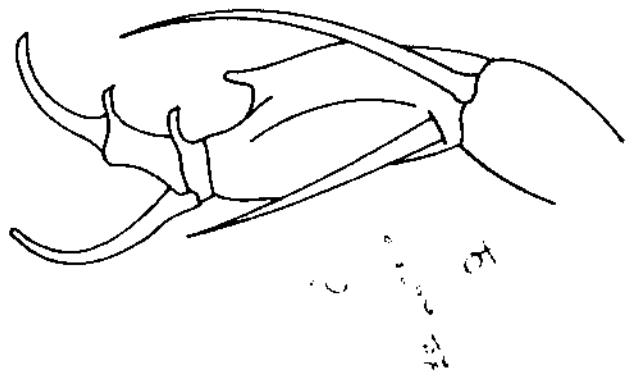
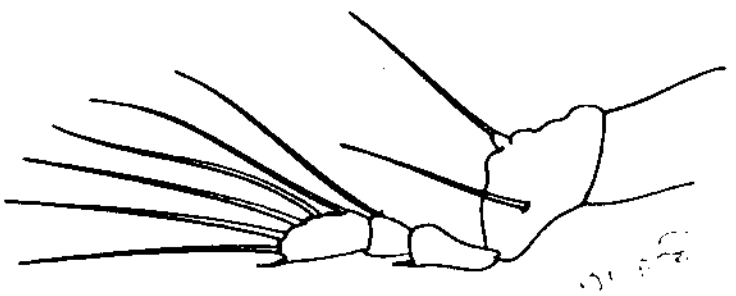
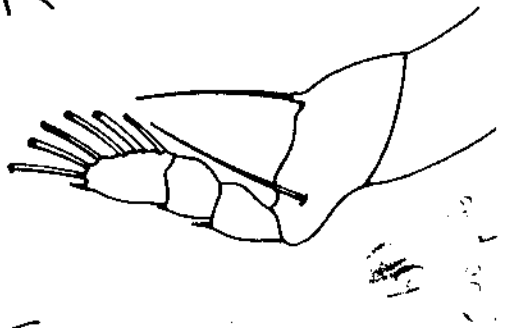
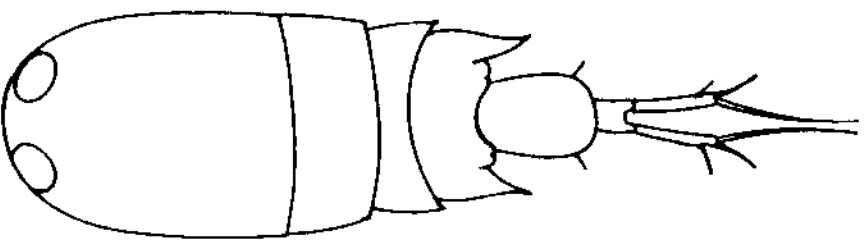
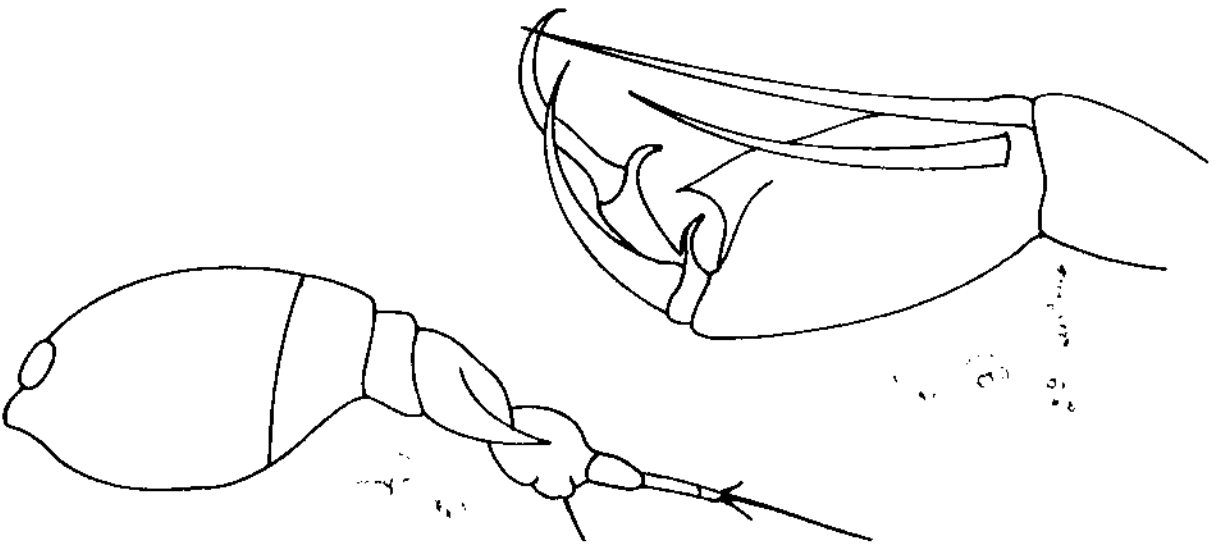


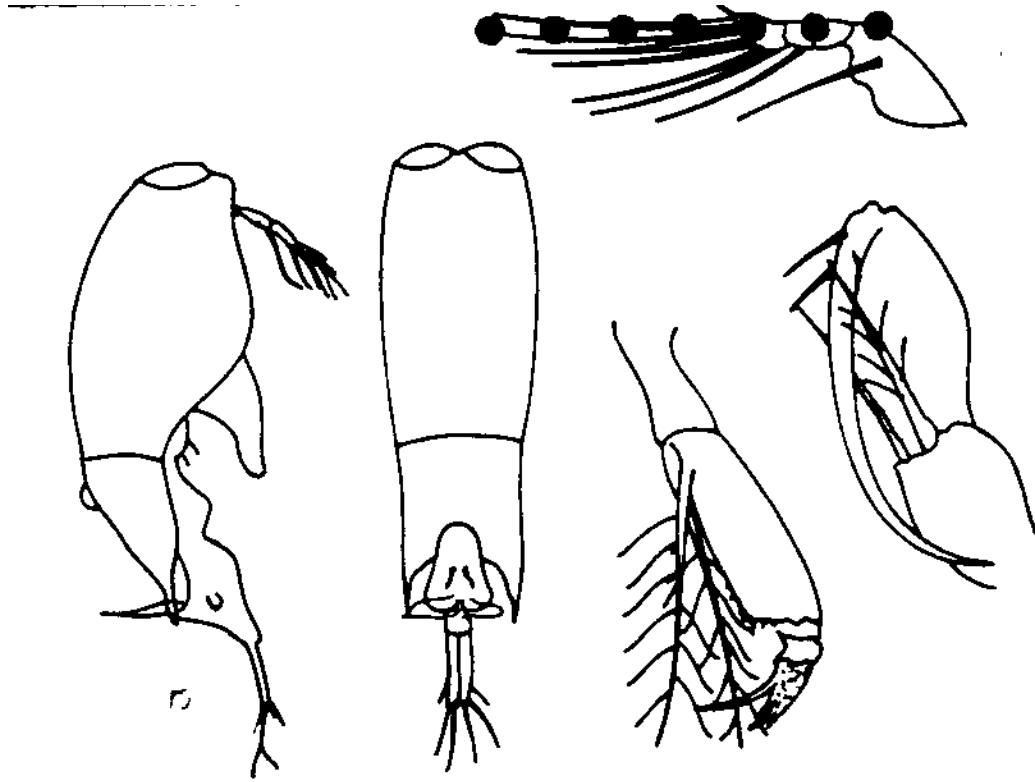
6 ♀

*Corycaeus* *Tanaka*

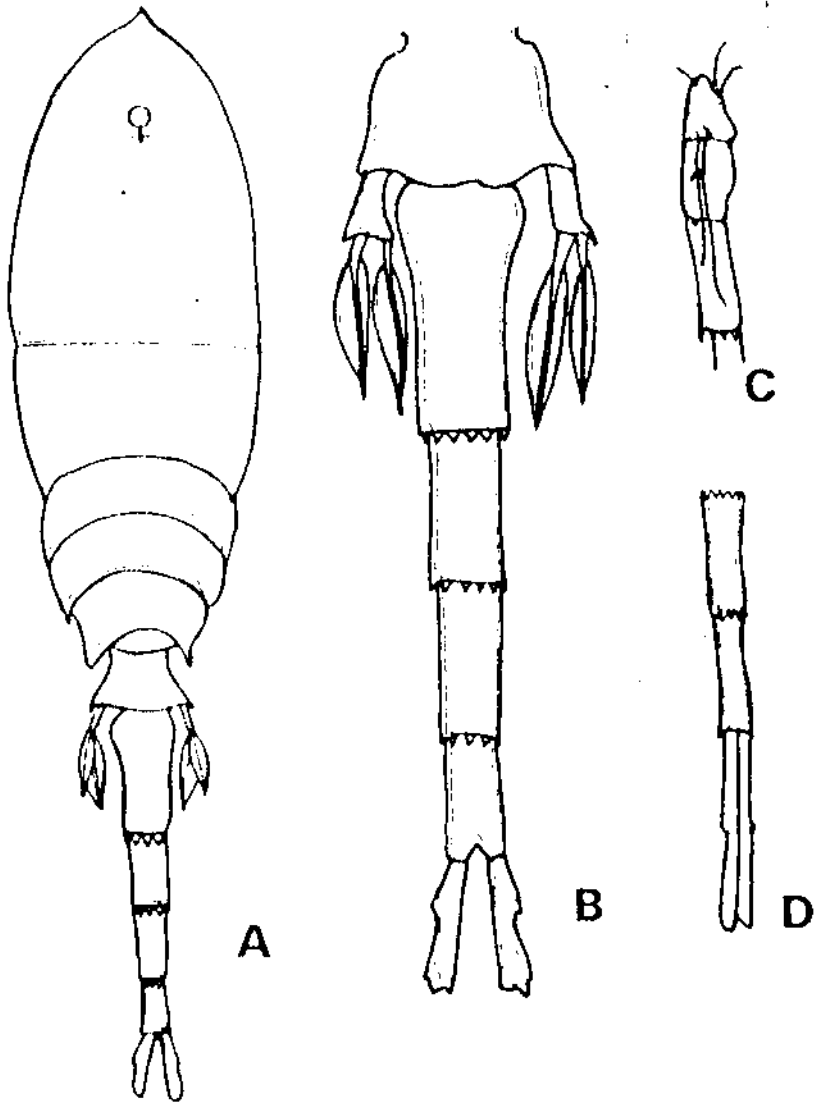


*Caprellidae*

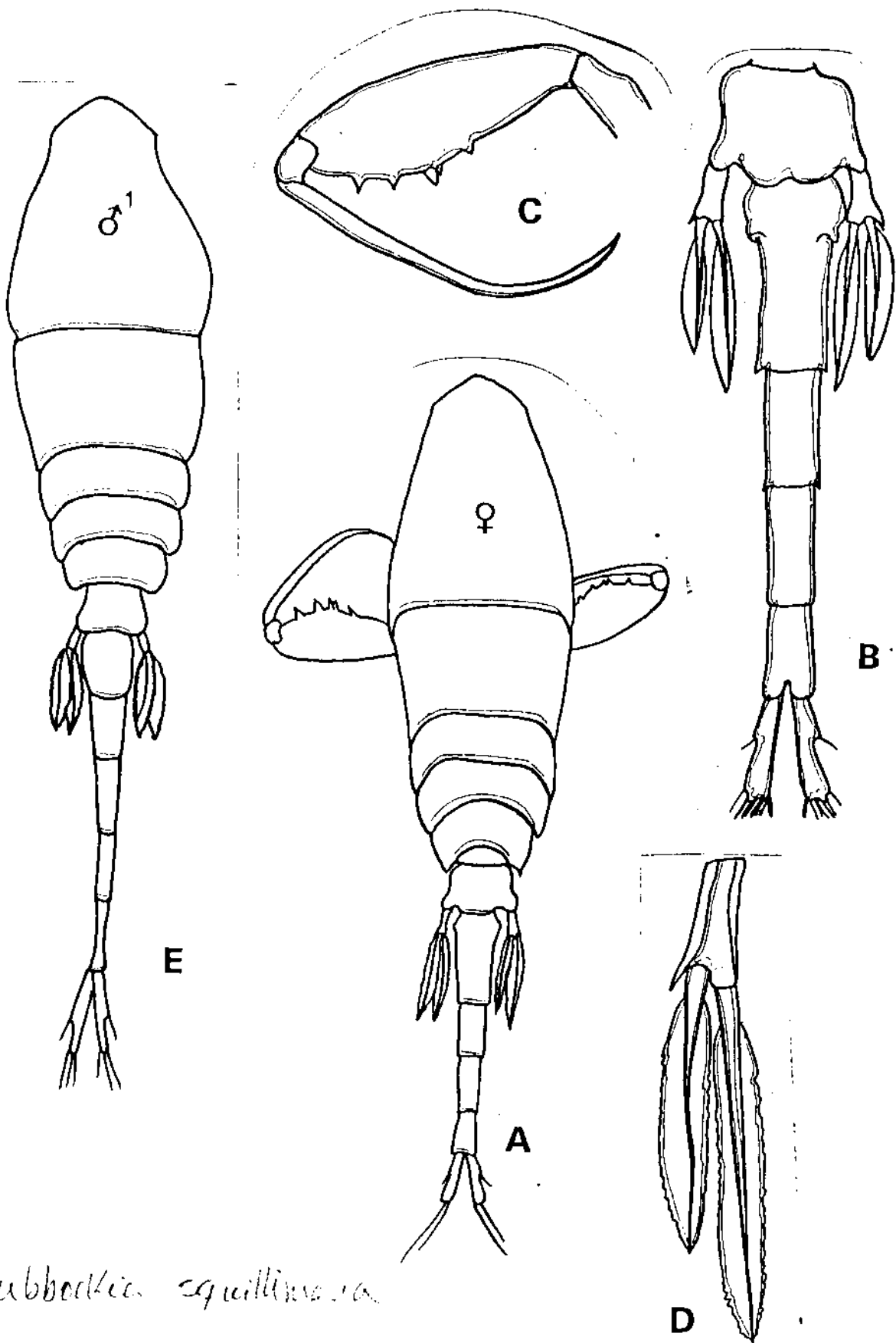




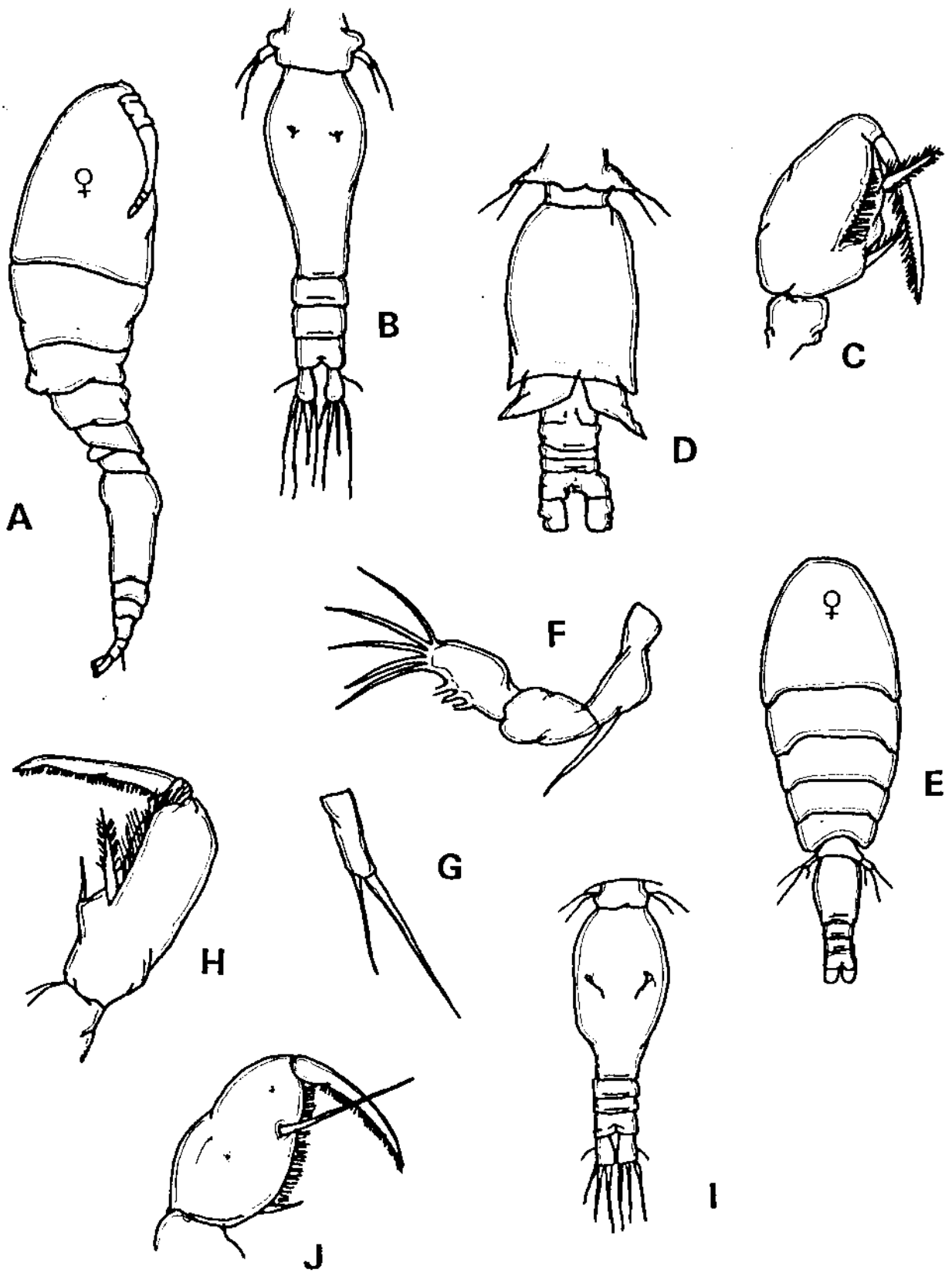
*Fannulus*  
*Fannulus gibbula*



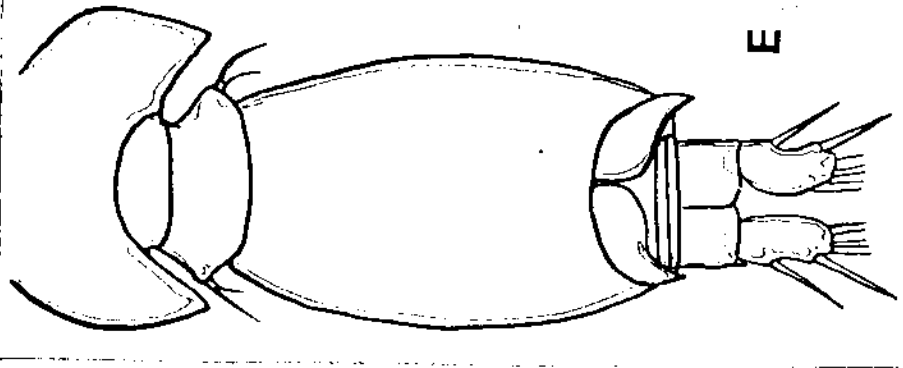
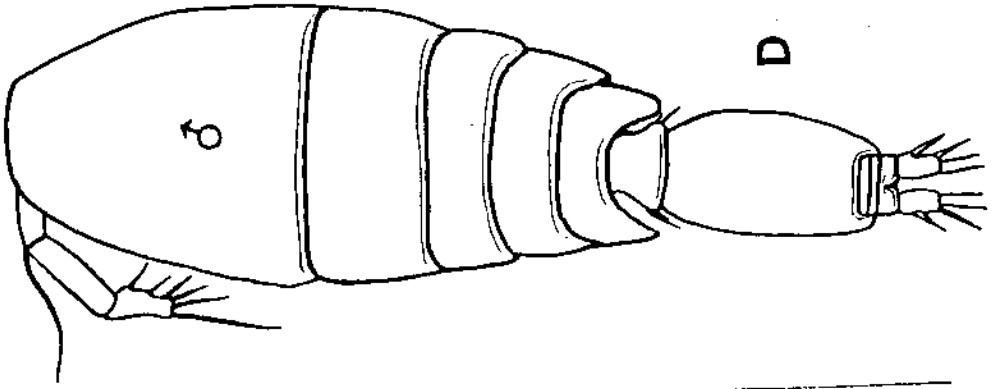
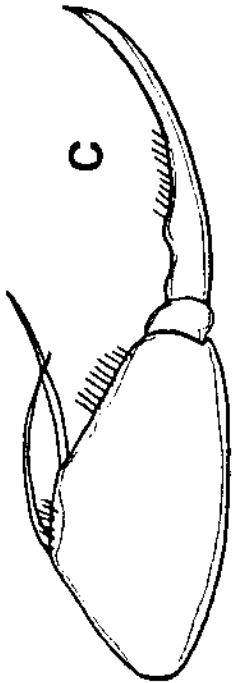
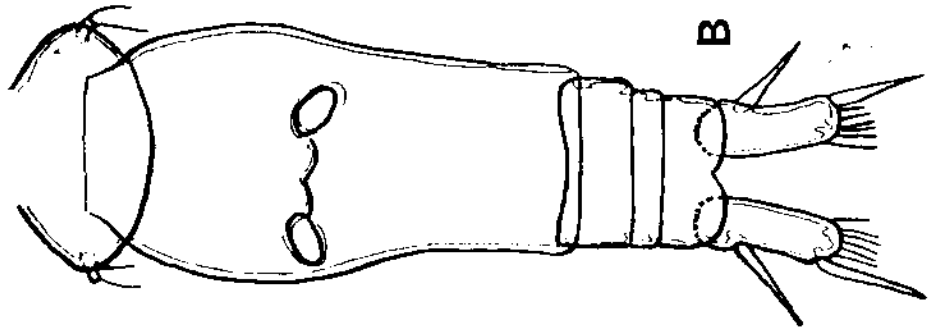
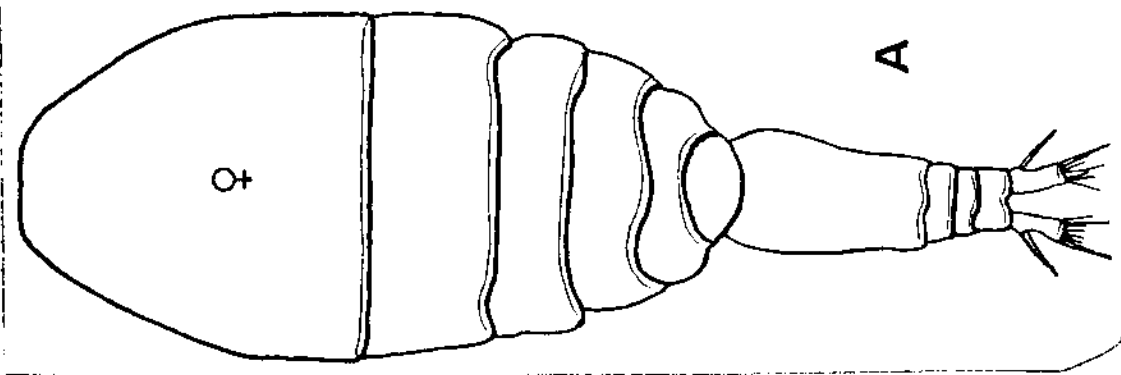
*Lubbockia aculeata*



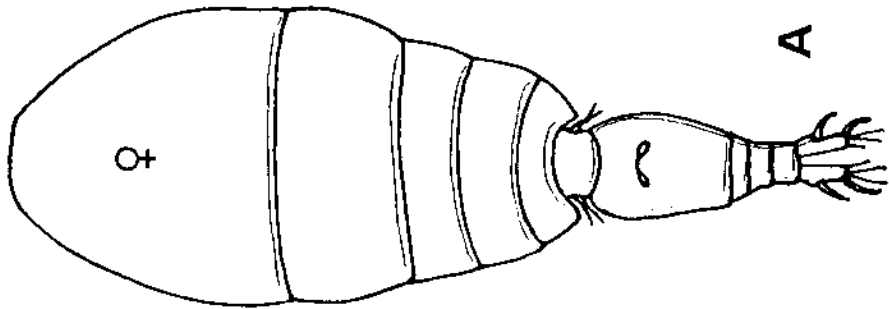
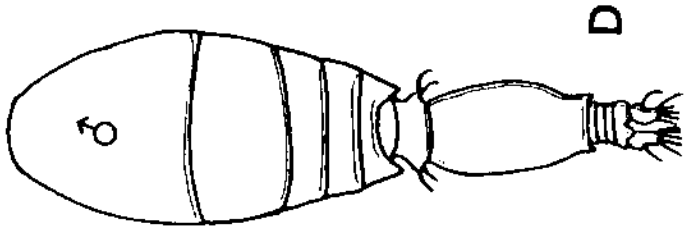
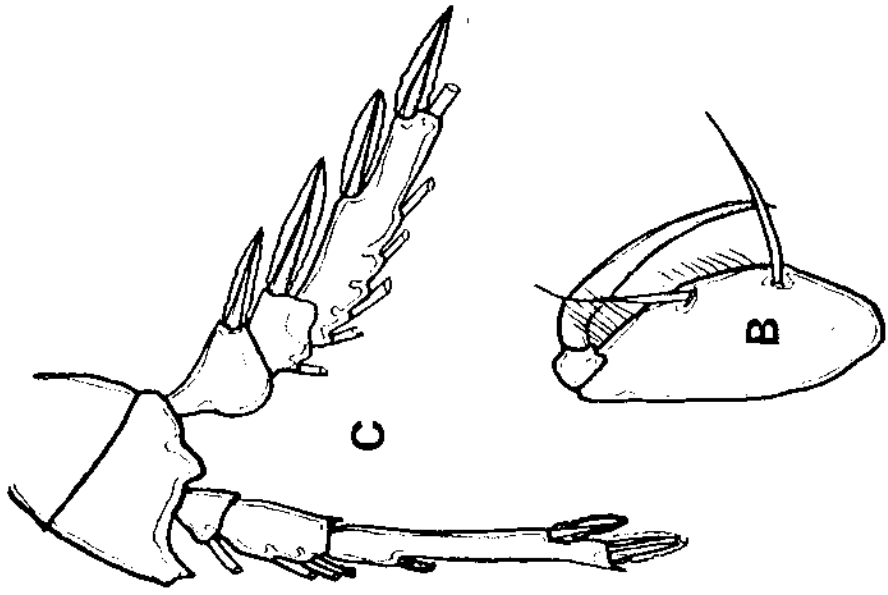
*Tubboeckia squillimana*



*Callibaetis*



*Calala nuda*

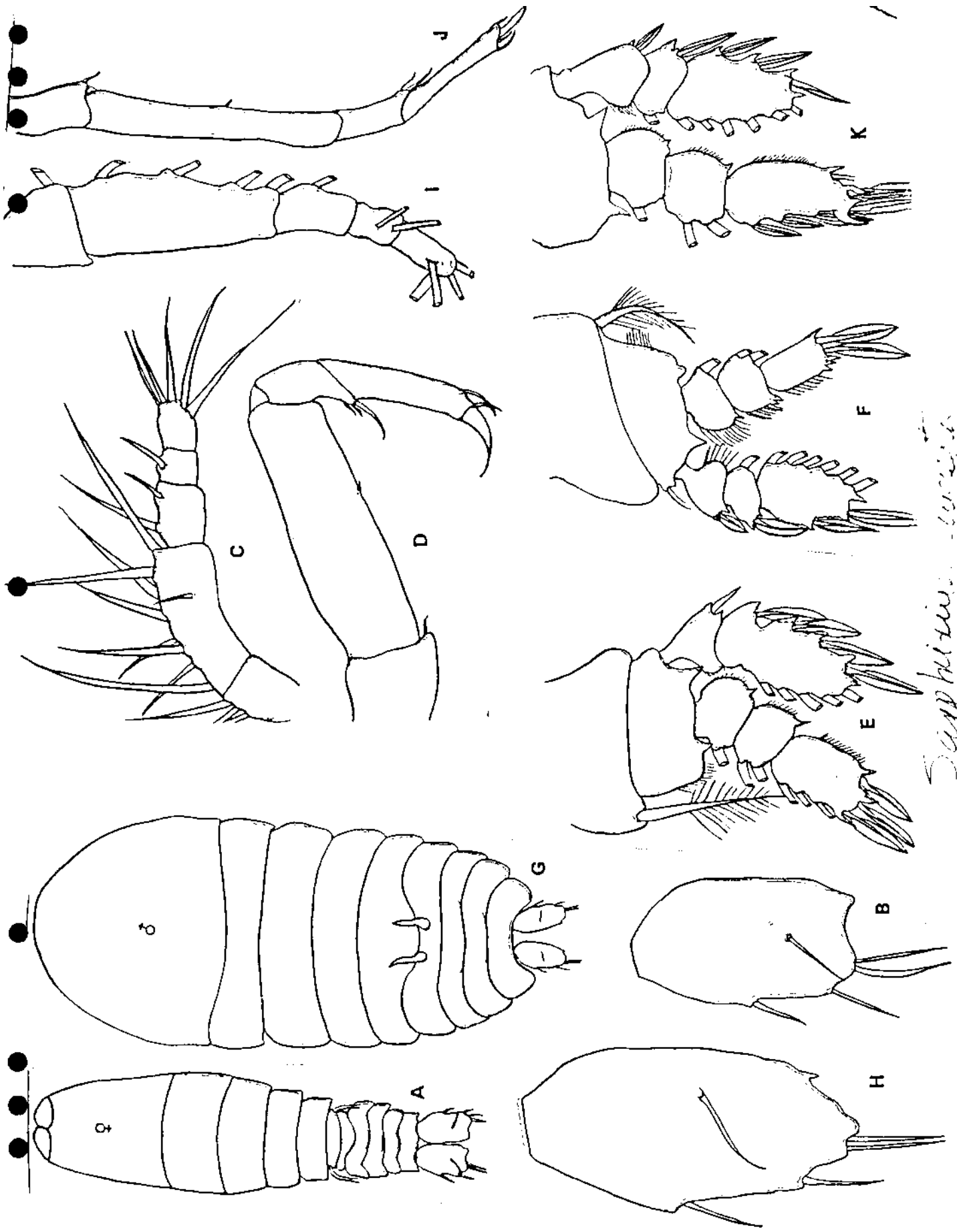


*Culex venusta*

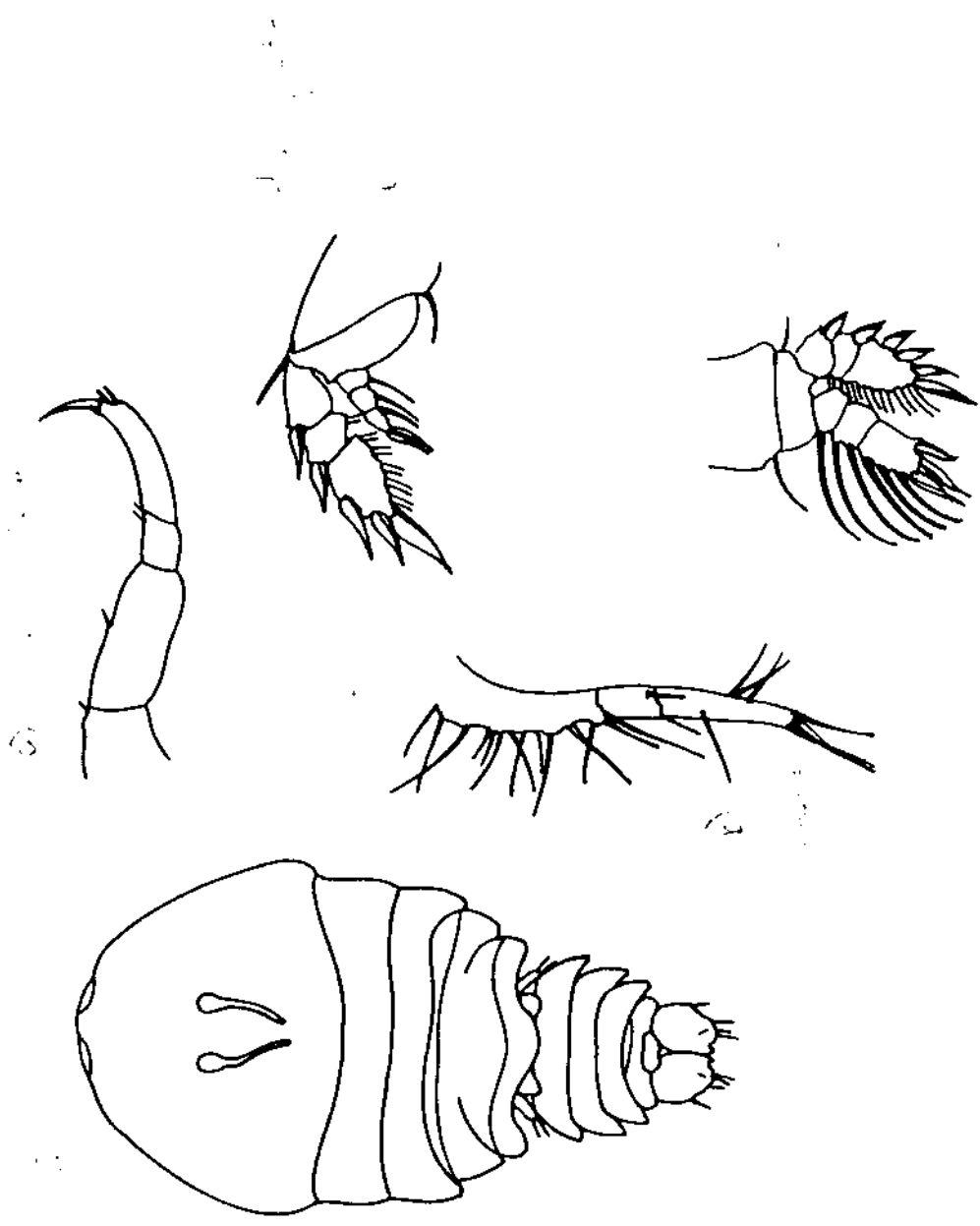


*Pecten uncinatus*

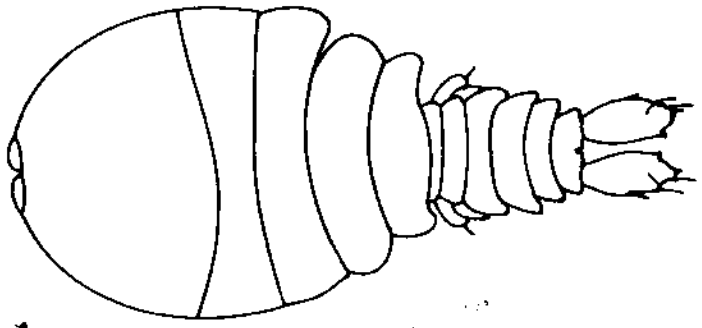
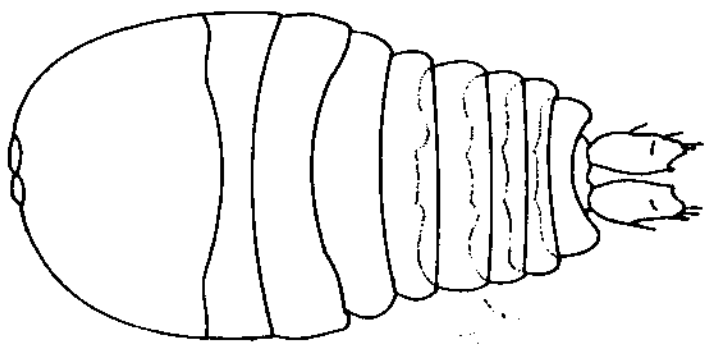
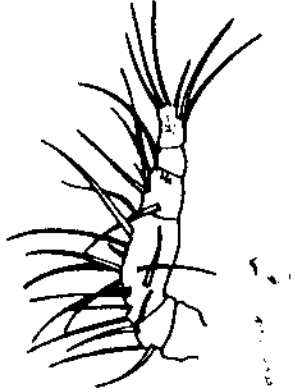
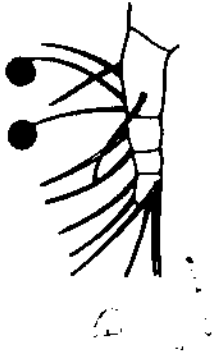




*Sapphirina curvata*



*Sappinia domini*



*Supradiscus gauthieri*

1

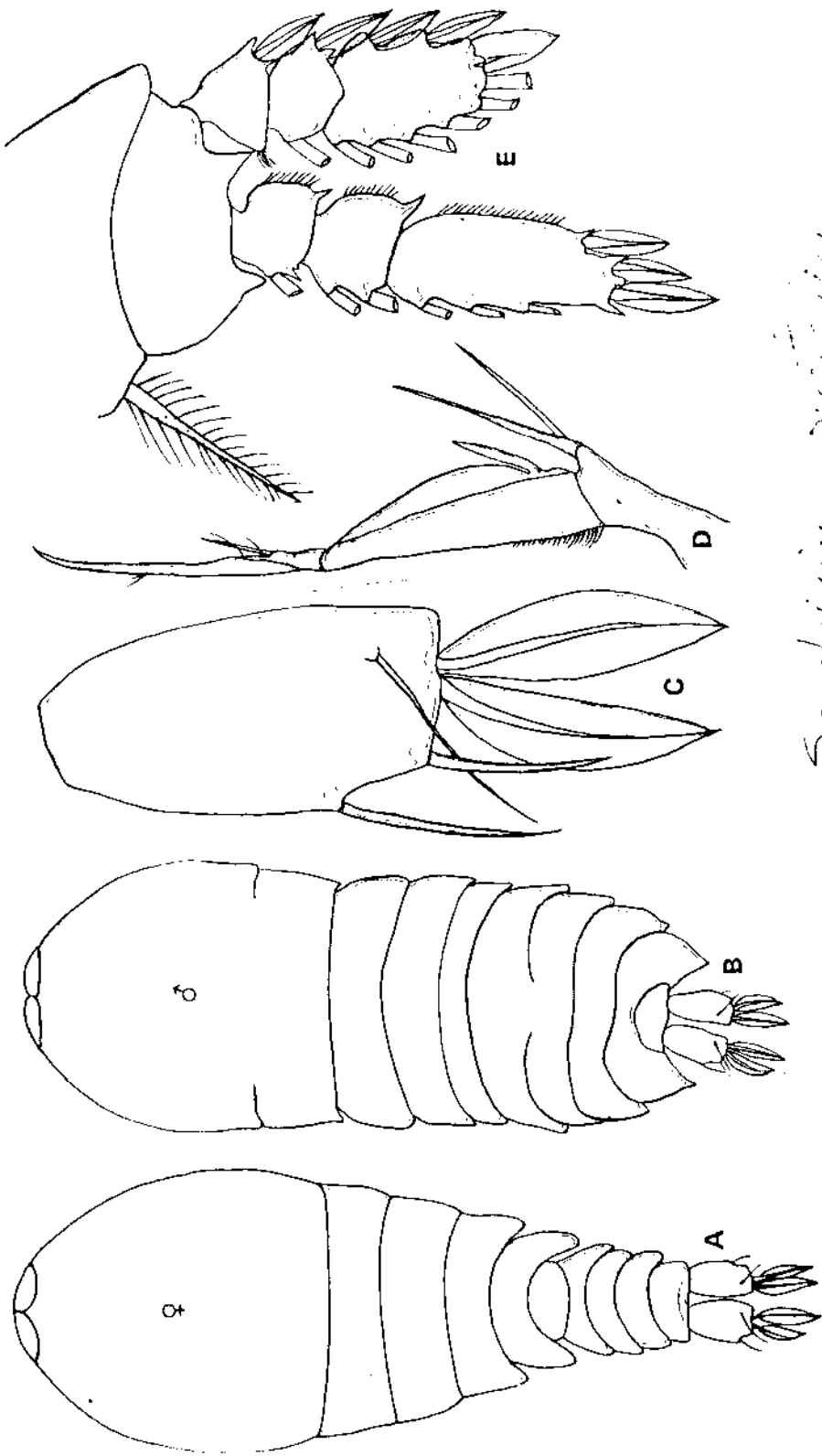
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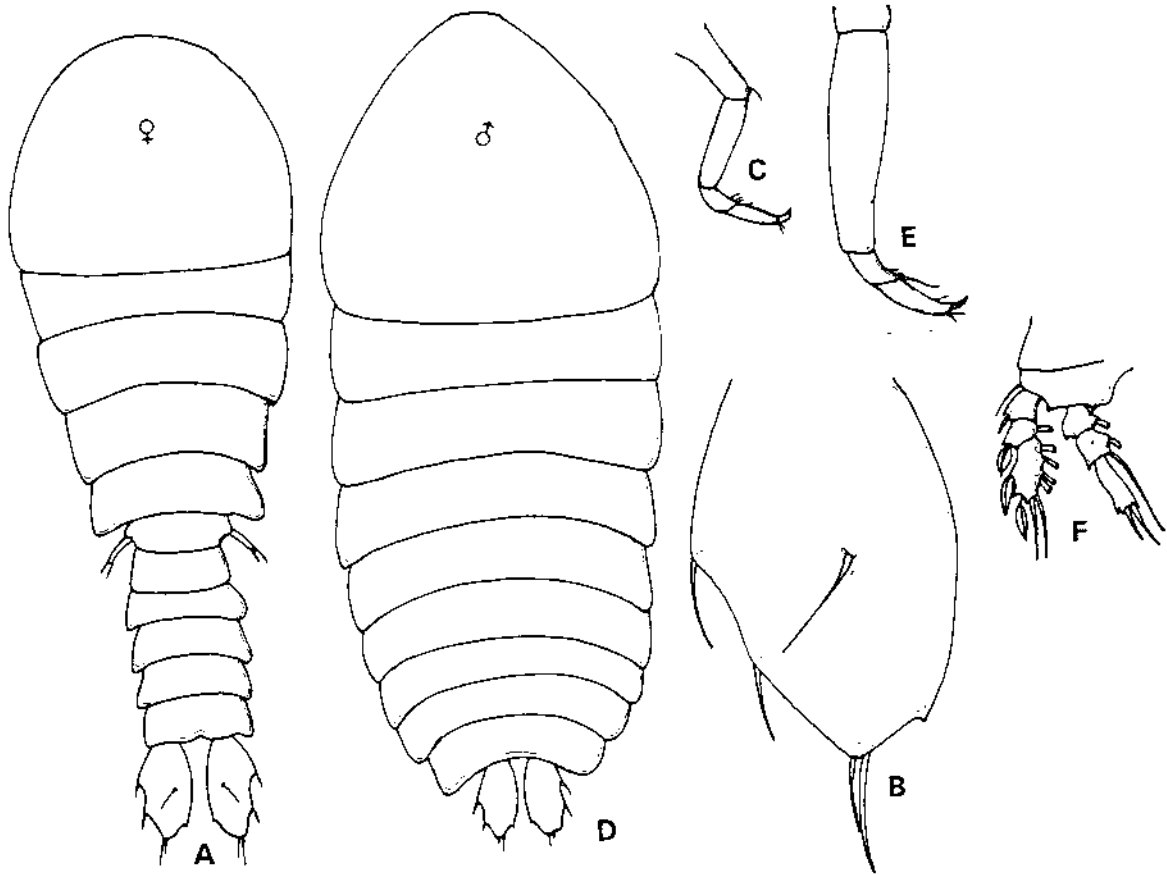
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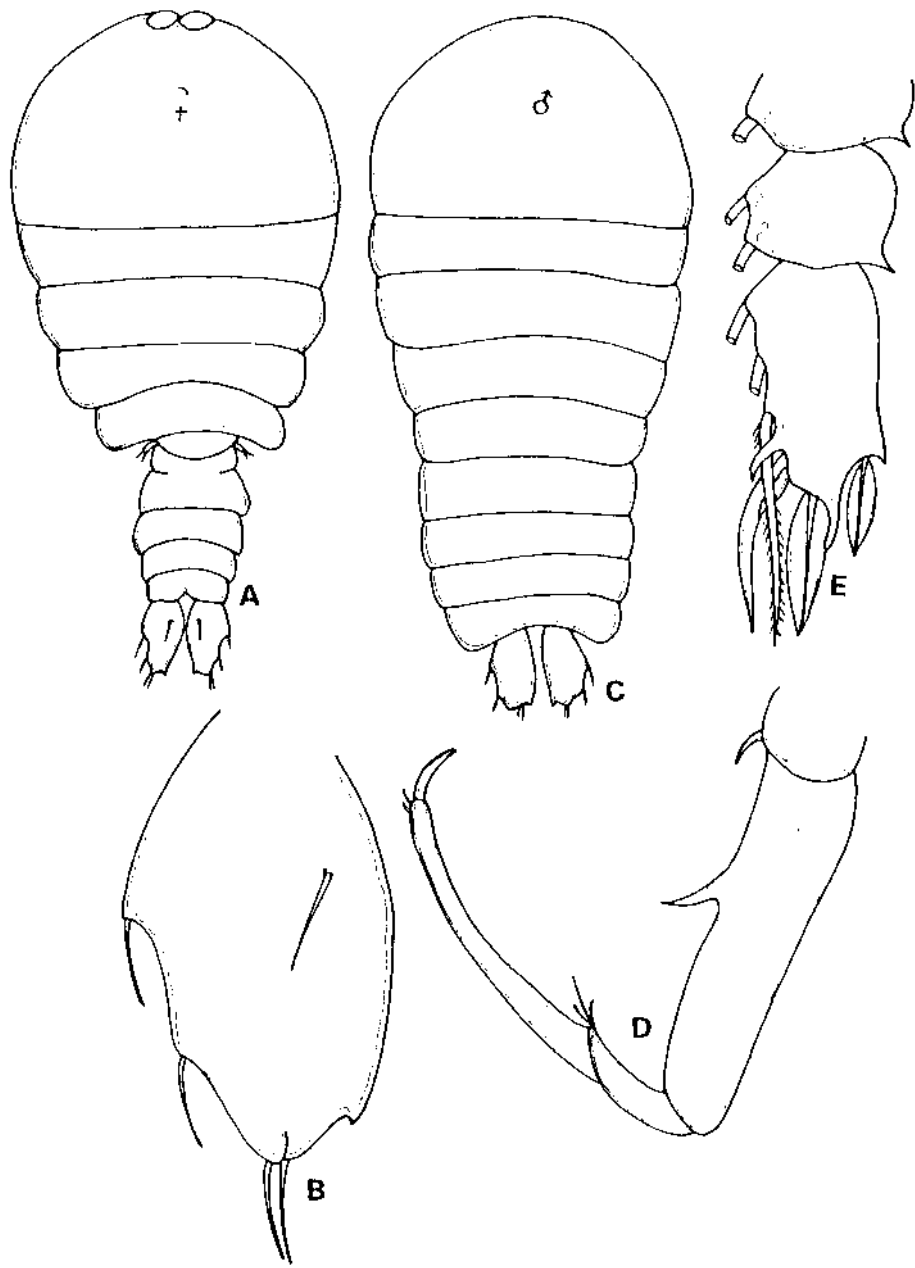
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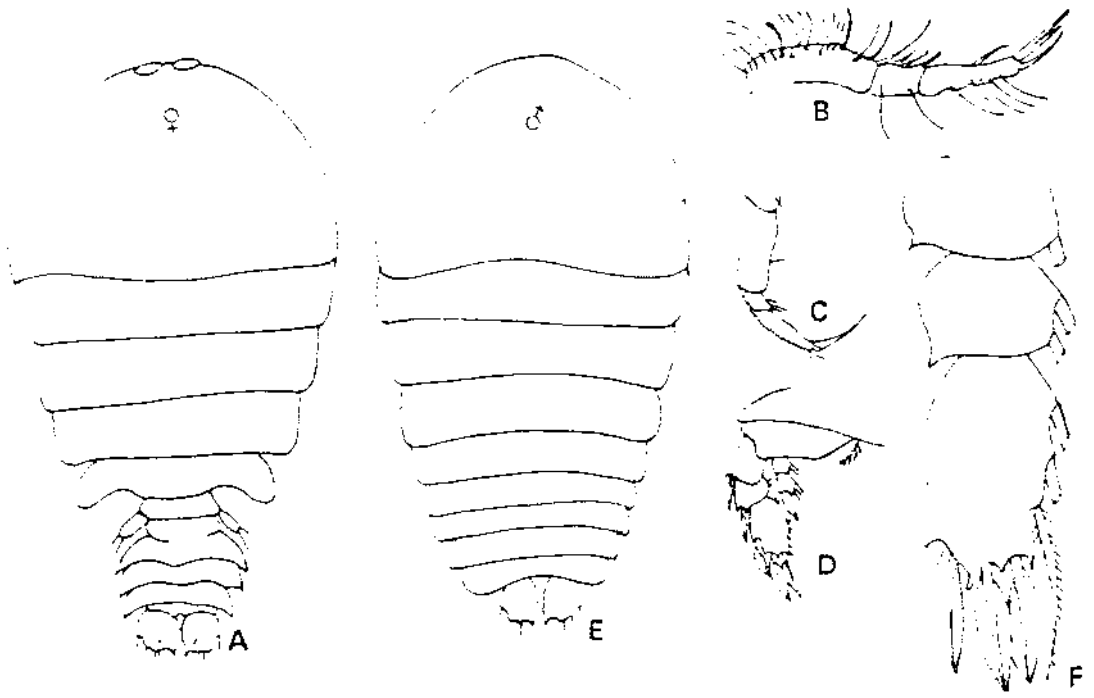
*Sapphirina nana*



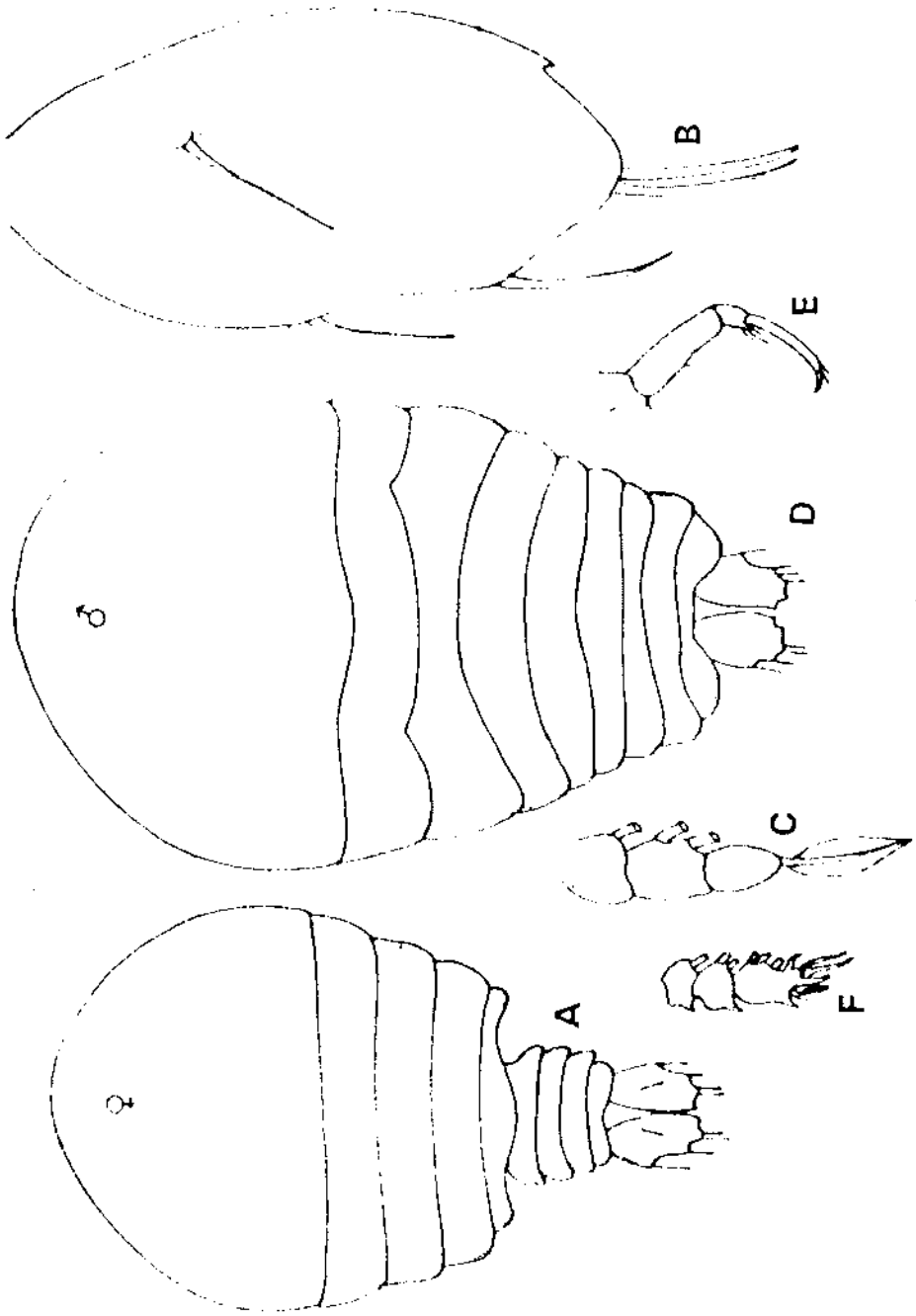
*Scudella ovum* (Linn.)  
1860



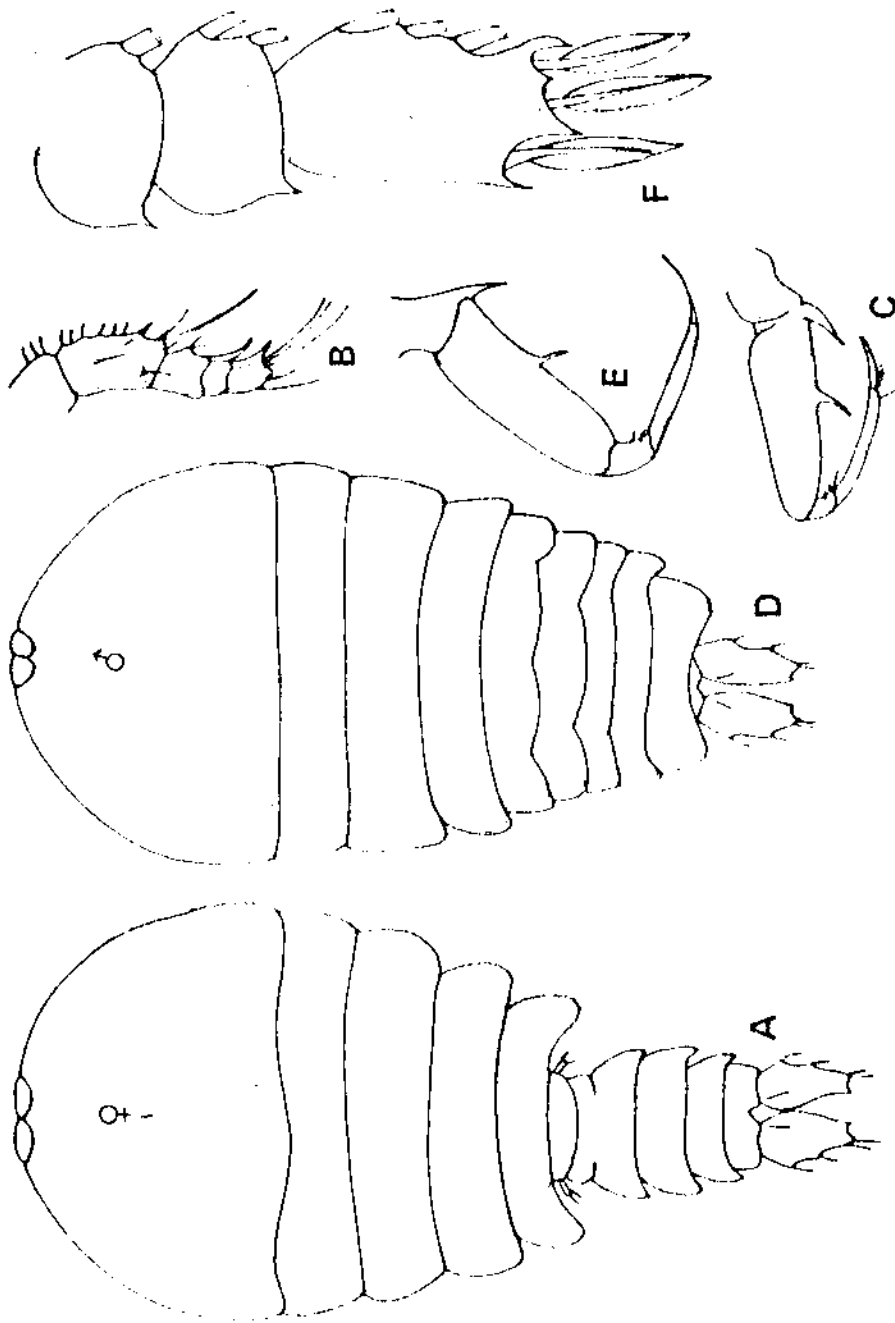
*Sapphixius nigrescens*



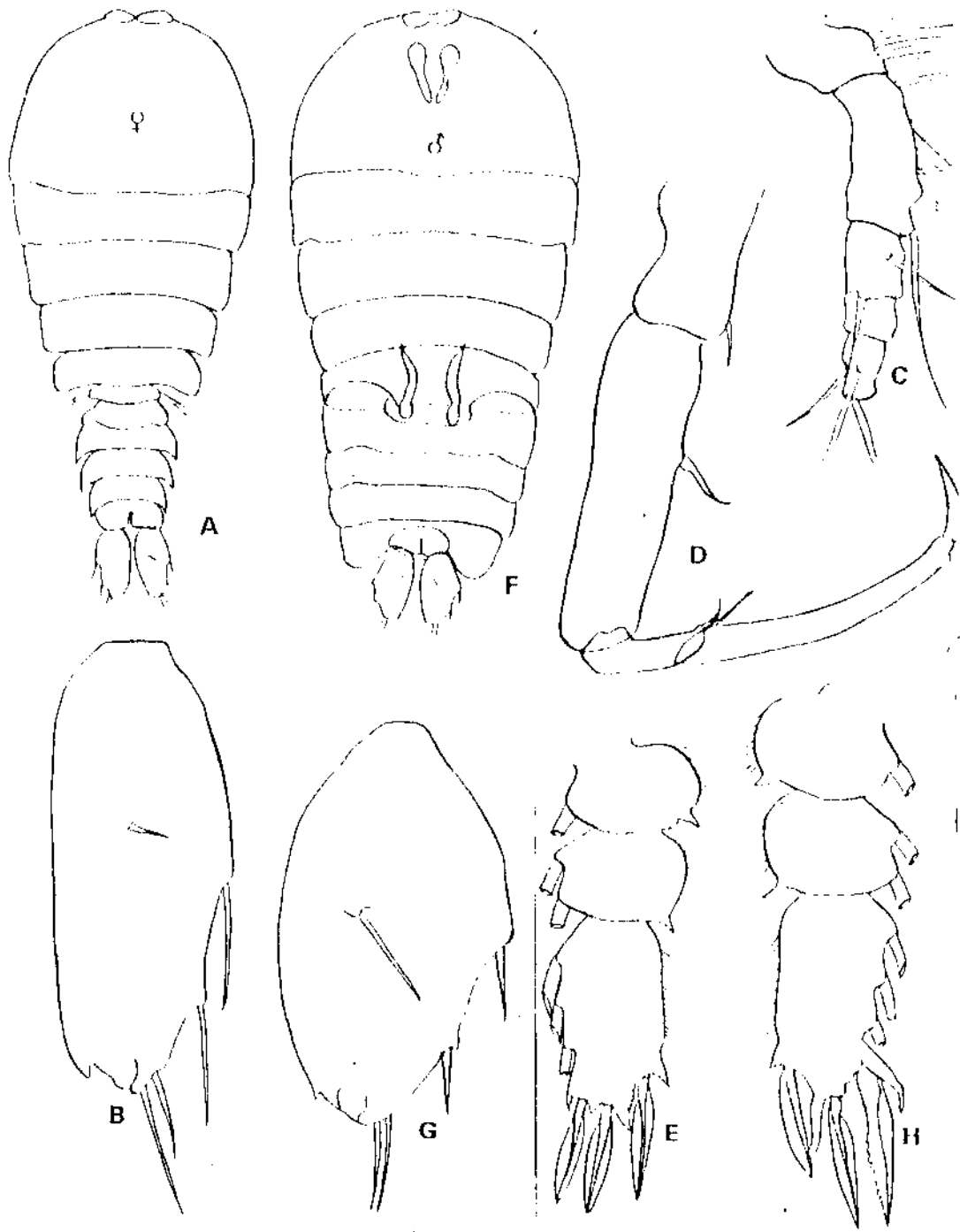
*Sappinia murina*



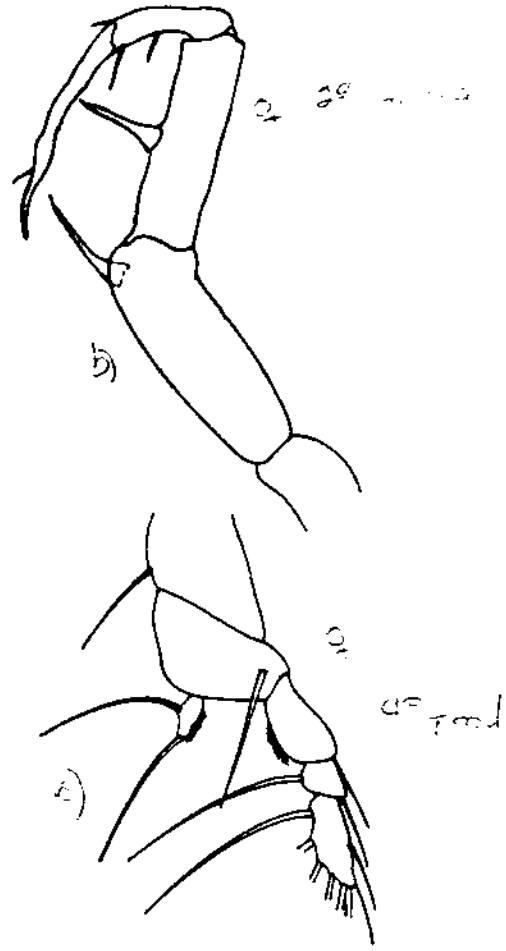
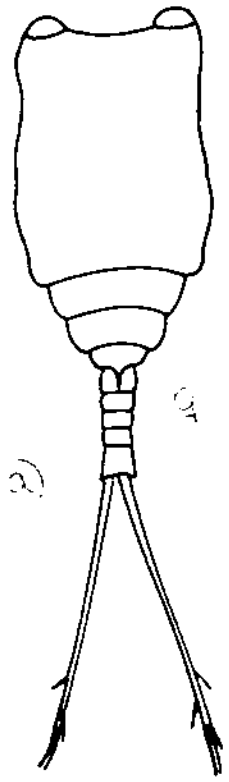




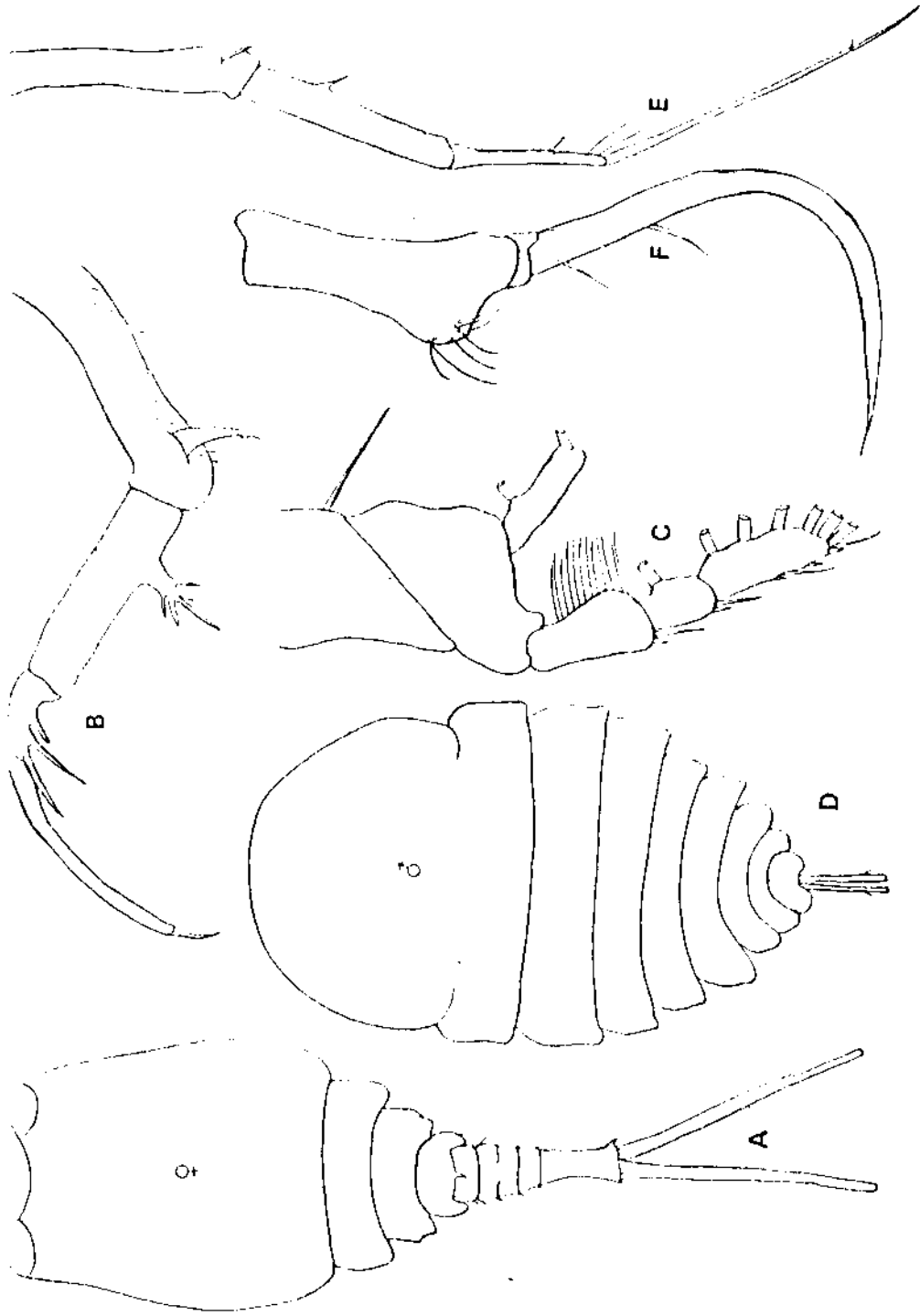
*Sapirobium fulvipes*



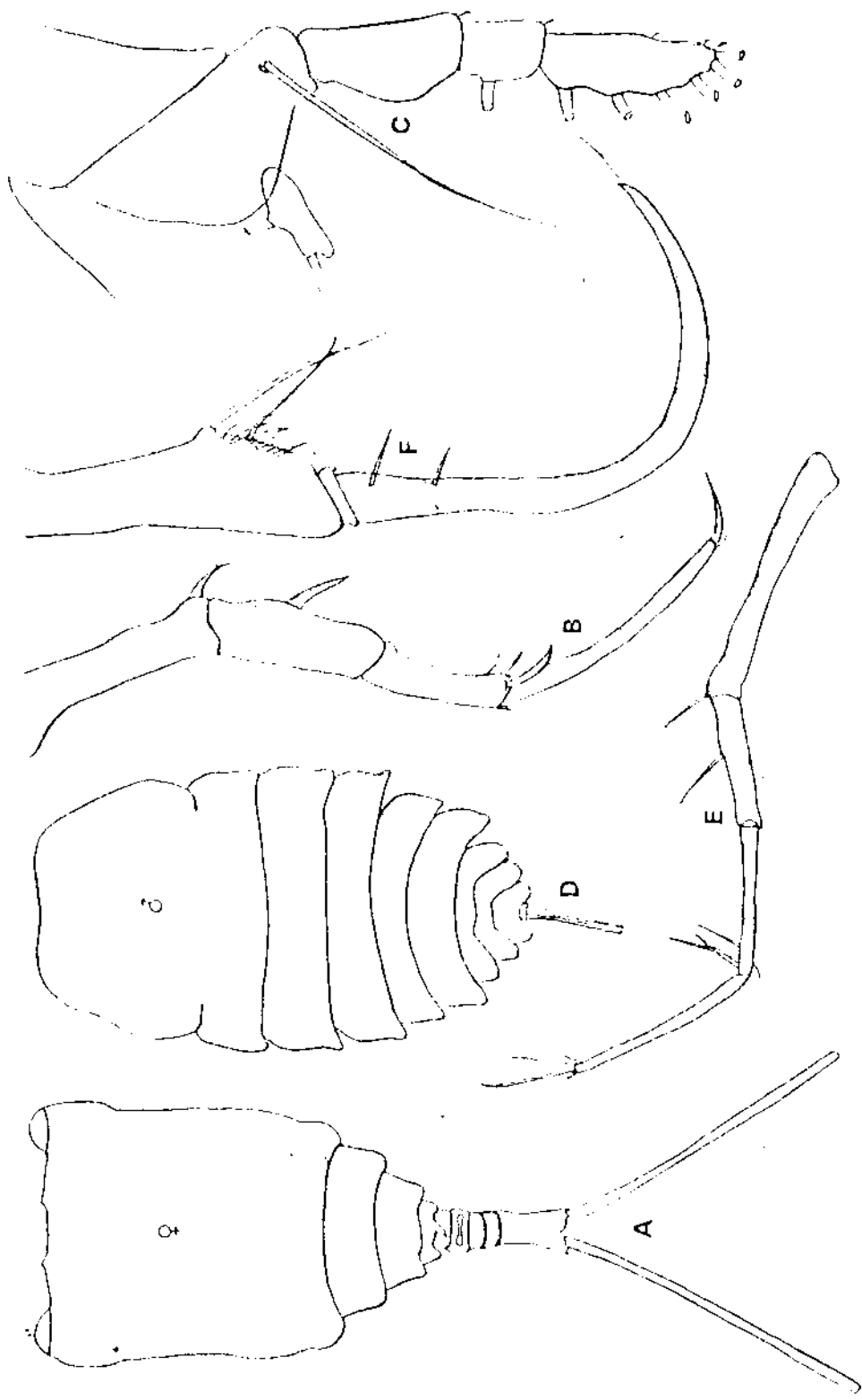
*Sappinia serotina*



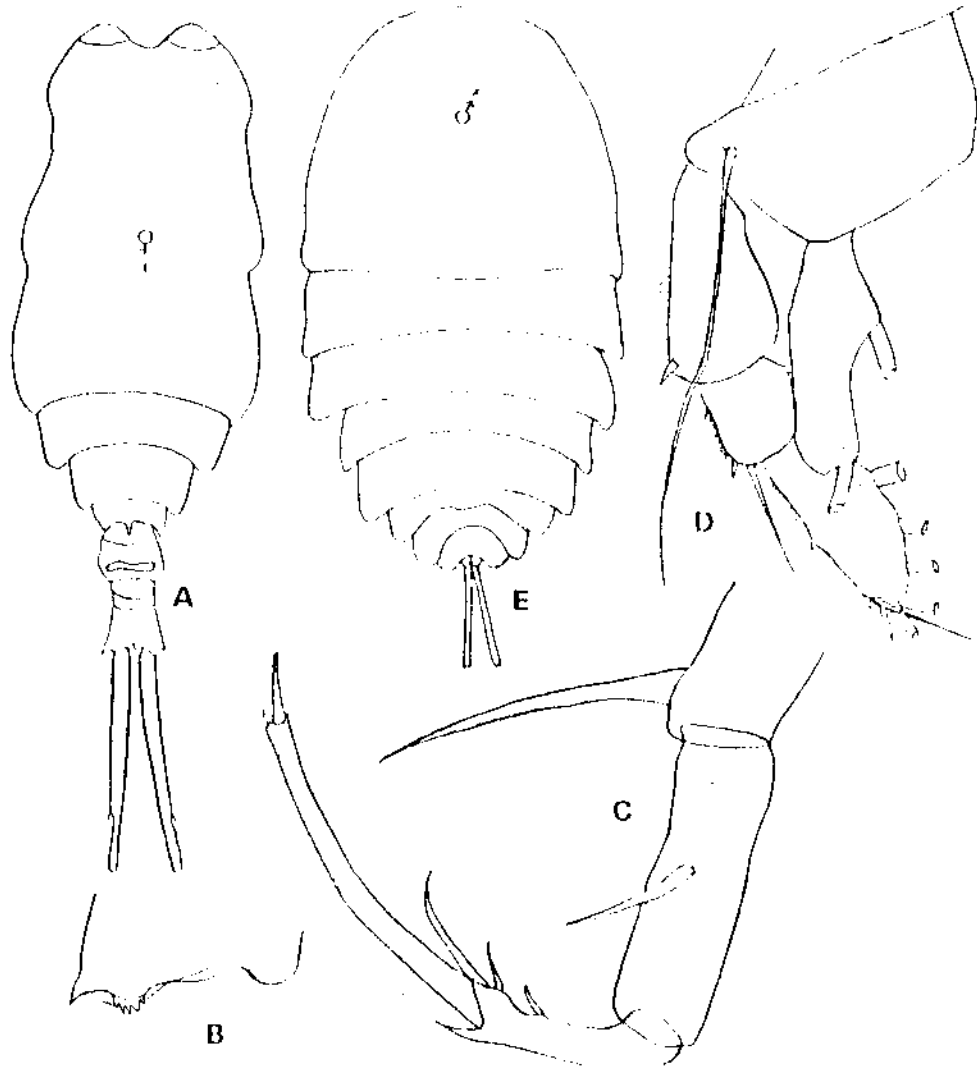
*Copepoda longicauda*



*Copula minor*



*Urolophus subulatus*



*Copula setosa*