



NDF WORKSHOP CASE STUDIES  
WG 4 – Geophytes and Epiphytes  
CASE STUDY 7

*Galanthus elwesii*  
Country – TURQUIA  
Original language – English

## THE DEVELOPMENT OF NON-DETRIMENT FINDINGS FOR *GALANTHUS ELWESII* HOOK. F., IN TURKEY

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### I. BACKGROUND INFORMATION ON THE TAXA

#### 1. BIOLOGICAL DATA

##### 1.1. Scientific and common names:

Scientific name: *Galanthus elwesii* Hook.f. var (Amaryllidaceae)

Common name: Snowdrops (English)

Kardelen, Sümbül, Nergis (Turkish)

##### 1.2. Distribution

*Galanthus elwesii* has a wide natural distribution and can be found in Bulgaria, northeastern Greece, the eastern Aegean Islands, southern Ukraine and Turkey. Within Turkey this species is distributed in north-western, western and southern Anatolia: Adapazari, Bolu, Yozgat, Ankara, Eskisehir, Afyon, Izmir, Isparta, Konya, Karaman, Niğde, Antalya provinces (Figure 1).



Figure 1. Distribution of *Galanthus elwesii* in Turkey

### 1.3. Biological characteristics

#### 1.3.1. Biological and life history

*Galanthus elwesii* is a perennial, herbaceous geophyte which remains entirely subterranean for a large proportion of their life cycle. A large flowered species, *G. elwesii* is characterised by supervolute vernation and glaucous leaves with inner perianth segments bearing apical and basal marks. *Galanthus elwesii* reproduces by seeds or vegetatively by bulbs. It is a highly variable species; in wild populations variety can be seen in width of the leaves, flower size and inner perianth segment markings.

#### 1.3.2. Habitat types

The largest wild populations of *Galanthus elwesii* can be found within limestone areas of the Taurus Mountains, southern Turkey. Within the Taurus Mountains range *G. elwesii* is mostly found in subalpine pastures between 800-1000m (and also up to 1600m) altitude (Figure 2). These habitats are covered by snow during the winter and remain cool during the summer. North western and western populations of *G. elwesii* are also associated with broad-leaved, coniferous woodland and scrub (Figure 3).



Figure 2. Habitat types: Subalpine pasture in Taurus mountain range (1600 m)



Figure 3. Habitat types: Under the shade of shrubs and trees in North western Anatolia

### 1.3.3. *Role of the species in its ecosystem*

*Galanthus elwesii* provides an important nectar source for invertebrates whilst also providing a food source for ant species (species unknown) via a fleshy oil-bearing appendage on the seed (an elaiosome). Clumps of *G. elwesii* may offer microhabitats for invertebrates and other organisms, consequently influencing the physical and biotic composition of the soil. The role of *G. elwesii* in nutrient recycling is currently unknown.

## 1.4. Population:

### 1.4.1. Global Population size:

*Galanthus elwesii* is native to Greece, Bulgaria, Ukraine, Yugoslavia and Turkey. Current estimates of *G. elwesii* abundance in Turkey, particularly within the Taurus Mountain range, indicate that the population is very large. Area of occupancy extends from several square metres to 100's of hectares.

### 1.4.2. Current global population trends:

increasing     decreasing     stable     unknown

Annual visual inspections conducted on harvested populations in Turkey indicate that *Galanthus elwesii* has not declined in these regions.

## 1.5. Conservation status

### 1.5.1. Global conservation status (according to IUCN Red List):

Critically endangered

Endangered

Vulnerable

Near Threatened

Least concern

Data deficient

The IUCN Red List of Threatened Plants does not currently include *Galanthus elwesii*.

### 1.5.2. National conservation status for the case study country

*Galanthus elwesii* is not included in the "Red Data Book of Turkish Plants" due to its abundance and wide distribution.

### 1.5.3. Main threats within the case study country.

No Threats

Habitat Loss/Degradation (human induced)

Invasive alien species (directly affecting the species)

Harvesting [hunting/gathering]

Accidental mortality (e.g. Bycatch)

Persecution (e.g. Pest control)

Pollution (affecting habitat and/or species)

Other: natural die-back and climatic events

Unknown

*Galanthus elwesii* is collected from the wild for commercial purposes. Prior to 1995 this collection presented the greatest threat to the species. However, the current harvesting regime appears to maintain sta-

ble and sustainable populations of *Galanthus elwesii*. Future threats to populations may arise as a result of the impacts of global warming.

## 2. SPECIES MANAGEMENT WITHIN THE COUNTRY FOR WHICH CASE STUDY IS BEING PRESENTED.

### 2.1. Management measures

#### 2.1.1. Management history

The Turkish export trade in *Galanthus elwesii* bulbs within Europe from Turkey has existed since the 1800s. Since the 1960's this trade has steadily increased until annual bulb exports amounted to millions, reaching 40 million by the mid 1980's (Figure 4).

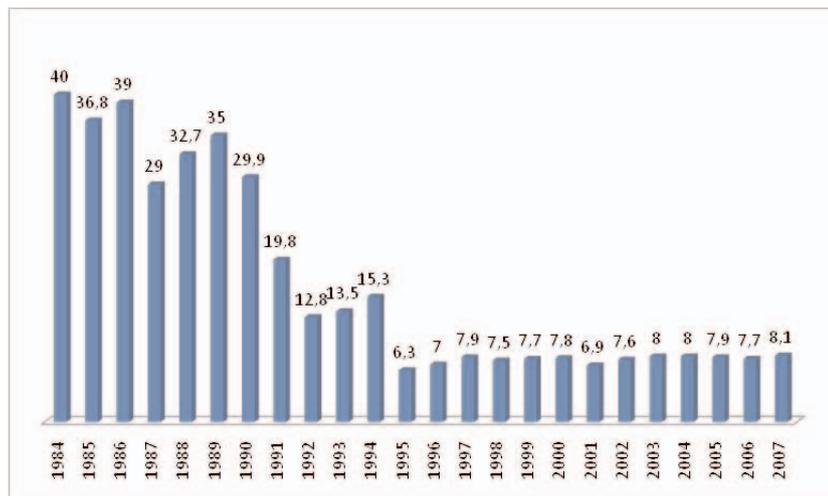


Figure 4. Number (millions) of *Galanthus* spp. bulbs exported from Turkey 1984-2007

Prior to 1990 competition was high between export companies to collect sufficient bulbs for exports. At that time collection periods were longer, beginning in March, and export quantities were driven according to financial gain. However, current management of the trade has reduced the number of companies exporting bulbs (from 15 companies in the 1980's to 4 in 2008) and consequently harvesting impact.

Legislation introduced in 1989 aimed to set up a system to allow sustainable management of geophyte exports. As part of this process a series of committees was set up. An Advisory Committee (consisting of scientists, government representatives and NGOs) and a Technical Committee (consisting of 6 representatives of scientists and of Ministries of Agriculture, Trade, Customs, Environment and Forestry)

were established. Export quotas for each species were set annually by the Technical Committee, following field inspections (of wild habitat and cultivation fields) by scientific teams. Monitoring of collection and storage volume of *Galanthus elwesii* has also been utilised to provide information to determine annual export quotas. This process of Committees, quota setting based on scientific advice, field monitoring and monitoring of harvested material in the processing warehouses prior to export forms a management plan for the species.

### 2.1.2. *Purpose of the management plan in place*

The current management plan aims to ensure the sustainable trade in bulbous plants through regulation of collection, storage and export levels whilst also preserving the Turkish environment.

### 2.1.3. *General elements of the management plan*

- Quotas are set by Technical Committee based on advice of Turkish scientists who are experts on the species and who have detailed knowledge of the species in habitat.
- Long term monitoring of harvesting levels is conducted with experts visiting field sites and monitoring of collection process. Following collection in the field, bulbs are transported to the Interim Warehouse near Serik-Antalya in the Taurus Mountains prior to export. Here, data collected during their storage and mixing are used to monitor and evaluate harvesting levels to determine annual export quotas.
- Regulation of artificial propagation: Additional quotas are not issued to companies for propagation activities, since scientists do not accept that there is successful artificial propagation for most geophytes, only transplantation from the wild to fields. Turkish botanists are in agreement with CITES regarding the concept of true or artificial propagation. Consequently, transplantation or other activities are not accepted as true propagation by Turkish scientists, unless they are proven to be sustainable.

There is a common agreement among Turkish government, scientists, and NGOs that there must be continued efforts to conserve wild populations of commercially important geophytes which are not only important for the species themselves but for the local communities that collect them, providing a highly important livelihood and source of cash income in rural areas.

#### 2.1.4. Restoration or alleviation measures

A rotation system has been implemented, particularly in the Taurus Mountain range, for *Galanthus elwesii*. This requires collectors to allow collection sites to regenerate for 3 years before re-collection at the same site can occur. In addition, whilst some small bulbs are inevitably dug up during the collecting process, these are now sieved in-situ and immediately replanted by the collectors. Sites where *Galanthus elwesii* occurs alongside rarer species are banned from field collection.

## 2.2. Monitoring system

### 2.2.1. Methods used to monitor harvest

The annual collection quota system in Turkey allows for the evaluation of wild stocks and harvesting levels to be revised according to current information available. Inspections are conducted in the field and the Interim Warehouse (¡Error! No se encuentra el origen de la referencia.) by scientific experts with more than 20 years research experience with populations of *Galanthus elwesii*. These inspections have a very important role in setting harvesting quotas. Information recorded from the wild plants at the Interim Warehouse provides important data for the conservation status of *G. elwesii* habitats and populations from which they have been collected. This information can be assessed through assessing the bulbs (species, size classes, numbers etc) and analysing warehouse records (for example, assessing changing harvest effort based on records held over several years), without going into the field.



Figure 5. Interim Warehouse, Antalya, Serik

For example, currently the defined annual quota of bulbs for export is harvested and delivered to the Interim Warehouse within a two week period. This ability to fill the quota rapidly is one indicator that population sizes are healthy. Harvest time and quality is thus monitored to detect any early warning of possible detrimental harvests.

#### **2.2.2. Confidence in the use of monitoring**

Visual field inspections and the material collected at the Interim Warehouse provide important indicators as to the conservation status of populations of *Galanthus elwesii*; monitoring data regarding bulb size, condition and observation of criteria such as collection time for the export quota. Current legislation of quota size etc and results from visual inspections in the field suggest that current harvesting is not having a negative impact on *G. elwesii* populations.

#### **2.3. Legal framework and law enforcement:**

Prior to 1989 there was no specific legislation for the trade in bulbous plants in Turkey. Some 40 million bulbs were exported per year and visual inspection of harvest sites by experts assessed that this level of harvest was damaging to bulb populations. Consequently, since 1989, exports of all bulbous plants from Turkey have been regulated; managing the collection, storage and exports of bulbs. However, initial legislation was considered inadequate and was therefore revised and refined in October 1991, August 1995 and August 2004.

Current legislation, produced by the Ministry of Agriculture and Rural Affairs (MARA) (effective since August 1995), aims to control the harvesting and export of bulbs through the regulation of collection, propagation and export of wild bulbs. *Galanthus elwesii* exports are permitted subject to the publication of an annual quota of bulbs by the Technical Committee of MARA. As a result this legislation has had a positive impact on populations of *G. elwesii*.

Recent revisions have adapted national legislation to take full account of the terminology of the CITES Convention and a National Scientific Botany Group. The National Scientific Botany Group, officially appointed in 1995 (prior to Turkey becoming a party of CITES), consists of 6 scientists from Science, Pharmacy and Agriculture faculties of different provinces where bulb collection occurs. After becoming a party of CITES (22 December 1996) TUBITAK (Turkish Scientific Research Council) has been named as the Scientific Authority (SA) in Turkey and is fully integrated with the National Scientific Botany Group.

### **3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED.**

#### **3.1. Type of use and destinations**

*Galanthus elwesii* in Turkey is predominantly exported to the Netherlands for commercial horticultural trade.

#### **3.2. Harvest:**

##### **3.2.1. Harvesting regime**

Bulb collection is conducted by local villagers, by hand with small hand-picks. The collection period starts in mid May, lasting approximately 2 weeks. During collection, export size bulbs are harvested and smaller bulbs are left remaining in the ground. The bulbs are then gathered at the Interim Warehouse at Serik and mixed before being sent to companies according to the quota allocated to each company.

##### **3.2.2. Harvest management/ control (quotas, seasons, permits, etc.)**

In October of each year, the Ministry of Agriculture and Rural Affairs (MARA) determines the quota for *Galanthus elwesii* bulb harvest on the advice of the Technical Committee (Figure 6). This figure is published annually in the Official Gazette. The quota is divided among the relevant companies. Allocation of the overall quota to export companies is conducted according to a scoring system. This takes account of the quality and conditions of the storage facilities, past performance per company over the past five years, and whether individual companies have previously managed to sell all or only part of their quota.

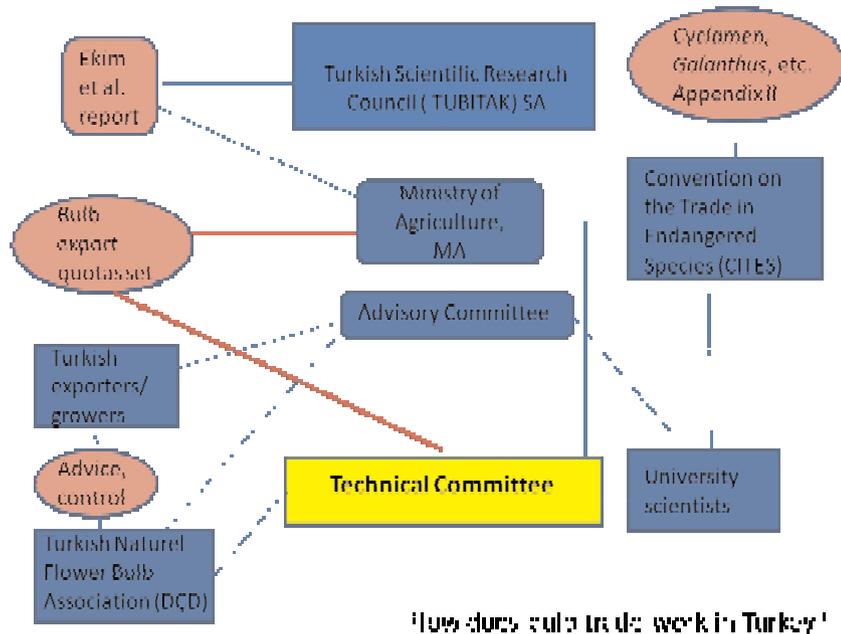


Figure 6. The management process for the bulb trade in Turkey

### 3.3. Legal and illegal trade levels:

National export levels of *Galanthus elwesii* are determined and controlled by the Ministry of Agriculture and Rural Affairs. The current export quota for *G. elwesii* is 8 million bulbs per year. There is no evidence of illegal trade in *Galanthus* in or from Turkey.

## II. NON-DETRIMENTAL FINDING PROCEDURE (NDFs)

### 1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFs?

The methodology does not strictly follow the IUCN checklist for NDFs. A NDF Radar Chart has been prepared to illustrate the situation in the mid 1980's prior to the implementation of a management plan (Figure 7) and the situation after the implementation of the management plan (Figure 8). This shows the impact of the adaptive management process and the use of a precautionary quota system.

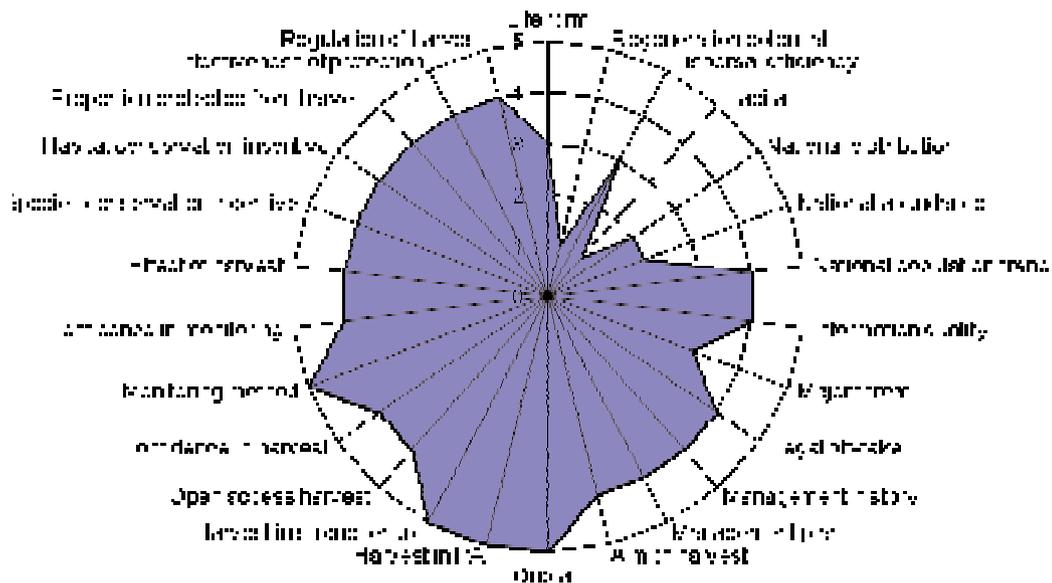


Figure 7. Non-Detriment Finding Radar Chart for *Galanthus elwesii* in Turkey prior to legislation/management plan implementation

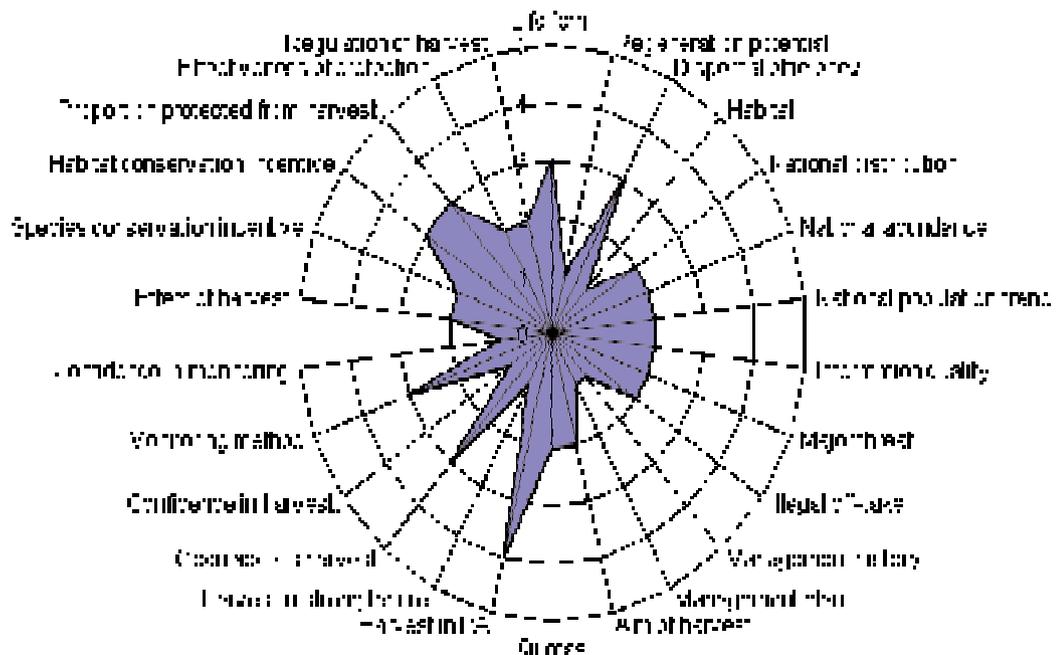


Figure 8. Non-Detriment Finding Radar Chart for *Galanthus elwesii* in Turkey post legislation/management plan implementation

**2. CRITERIA, PARAMETERS AND/OR INDICATORS USED**

*Galanthus elwesii* has a relatively widespread distribution in Turkey and an overall population which, currently, is at very high levels. At their peak exports reached some 40 million bulbs per year. At that time Turkish scientists raised concern at the level of exports and reported, based on field visits that such levels were damaging. Thus the initial indicators of damage were reduced population size and number of flowering plants. Other indicators include greater harvest effort to collect the same quantity of bulbs and a disparity in size class of the bulbs being collected. By means of an adaptive management process quotas were reduced to levels, well below where no indication of population damage was or is occurring. Thus an NDF process evolved in close association with a management and legal structure to ensure compliance.

**3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED.**

Field inspections are carried out on a regional basis by scientists. The majority of field inspections are carried out on a visual basis with limited collection of hard scientific data. However, the scientists visiting the wild habitat have experience built up over some 20 years of monitoring sites. This information is reviewed by the scientists of the scientific authority and contributes to the setting of a precautionary quota. Scientists also check the bulbs after collection as they are cleared through the Interim Warehouse. At the this warehouse information is recorded on the collection site of the bulbs, species, numbers and size class of the bulbs, weight and time taken to collect. The variation in this information over collection years is used as an indicator of population health. The fact that all of the bulbs are cleared through this warehouse process facilitates monitoring by the Turkish scientists. In the past, bulbs have also been grown on to check identification to ensure that rare species have not been included in the harvest.

**4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT**

To date the NDF's have been based for the greater part on a qualitative process and not using quantitative scientific collected data. For a widely distributed, relatively common species in habitat, this has proved to be effective when combined with a precautionary quota system. This process may need to be reviewed in the future.

**5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND ON THE ELABORATION OF NDF**

A management process has evolved and been adopted to deliver a sustainable trade in *Galanthus elwesii* from Turkey. A considerable effort would be required to collect scientific data on an ongoing basis from the collection sites for this species. To date the resources have not been available to collect such data. If a simple process could be designed to collect, review and manage such data this would greatly facilitate the further evolution of the NDF process in Turkey.

**6. RECOMMENDATIONS**

- Further research into the ecology and population dynamics of *Galanthus elwesii* is required within Turkey.
- Guidelines on the type of work that should be carried out to produce robust NDF's for geophytes would greatly assist in the planning of future work.
- A manual and training on producing NDF's for geophytes would be of major benefit to scientific authorities.
- The use of population modelling should be explored to assist in population sampling, quota setting and population monitoring.