

The melliferous plants of Apiaceae from Istanbul and their conservation importance

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Abstract: Melliferous means bearing any substance that is collected by bees to produce honey. Honey properties are different due to floral sources. The major objectives of this project (The Platform of Bees) are to identify the plant sources used for the production of wildflower honey in Istanbul (Turkey) area. The assessment of their conservation status is an important part of the modern concept and practices of sustainable use of plant resources and conservation of plant diversity. Based on field observation, it was established that wild melliferous plants of the family Apiaceae in Istanbul flora are represented by 24 taxa belonging 19 genera. They represent about %10 of melliferous species of Istanbul flora.

Key words: Apiaceae, melliferous, conservation, Istanbul

Introduction

There are nine clearly defined categories into which every taxon in the world (excluding micro-organisms) (Nowak et al. 2011). The first two categories are relatively self-explanatory. Extinct means that there is no reasonable doubt that the last individual has died. Extinct in the Wild means that the taxon is extinct in its natural habitat. The following three categories, *Critically Endangered* (CR), *Endangered* (EN) and *Vulnerable* (VU), are assigned to taxa on the basis of quantitative criteria that are designed to reflect varying degrees of threat of extinction; taxa in any of these three categories are collectively referred to as 'threatened'. The category Near Threatened is applied to taxa that do not qualify as threatened now, but may be close to qualifying as threatened, and to taxa that do not currently meet the criteria for a threatened category, but are likely to do so

if ongoing conservation actions abate or cease. The category *Least Concern* (LC) is applied to taxa that do not qualify (and are not close to qualifying) as threatened or *Near Threatened* (NT). It is important to emphasize that “least concern” simply means that, in terms of extinction risk, these species are of lesser concern than species in other threat categories. It does not imply that these species are of no conservation concern (IUCN 2012). The assessment of conservation status of plant species is one of the most significant tools in biodiversity conservation (Kahraman et al. 2012). Honey bees can take both pollen and nectars from *Apiaceae* species (Özhatay et al. 2012; Sorkun 2008; Sıralı&Deveci 2002).

Melliferous plants are those, whose flowers are naturel food source for honey bee (*Apis mellifera* L.) (Özhatay et al. 2012). The assessment of their conservation status is an important part of the modern concept and practices of sustainable use of plant resources and conservation of plant diversity (Maes et al. 2012).

In this study, based on field observation and Flora of Turkey (Davis et al. 1972), it was established that wild melliferous plants of the family *Apiaceae* in Istanbul flora.

Material and methods

Data were mainly obtained from field studies undertaken 2011 during the project of honey plants in Istanbul. In the study, 6 districts (Silivri, Şile, Sarıyer, Beykoz, Çekmeköy, Çatalca) have been chosen where honey is produced by beekeepers in Istanbul and approximately 850 flowered plants have been collected. They have been kept in ISTE (Herbarium of Istanbul University, Faculty of Pharmacy). The plant sources were identified used for the production of wildflower honey in Istanbul. Data on distribution and habitat were recorded in the field trips, also localities of ISTE specimens and the Flora of Turkey and East Aegean Islands by Davis were added to the distribution maps. GeoCAT programme was used in this study. It can be accessed from the following URL: <http://geocat.kew.org/> (Bachman et al. 2011). Area of occupancy (AOO) is a parameter that represents the area of suitable habitat currently occupied by the taxon. Extent of occurrence (EOO) is a parameter that measures the spatial spread of the areas currently occupied by the taxon. These two measures are the foundation of the ‘B’ criterion of the IUCN Red List system.

Results and discussion

Results of this study reveal that 24 taxa belonging 19 genera of the family Apiaceae were determined in Istanbul. EOO and AOO measures of the taxa were listed with IUCN Status (Table). Also distribution maps of the taxa were presented (Figures 1-6). *Bupleurum tenuissimum* (Figure 1) is known from West Mediterranean, West and Central Europe, but it rarely distributes in NW Turkey (Davis et al. 1972). Two of them were described from Istanbul, where its are locus classicus of *Heptaptera triquetra* and *Peucedanum obtusifolium*, they are rare species (Figure 3 and 5). When risk situation of examined species is considered, it can be seen that they are classified in the following risk categories: 19 LC, 3 NT, 2 EN and 1 VU. The examined taxa belonged to the Irano-Turanian phytogeographical region (3), Mediterranean (4) and Euro-Siberian (10) regions. Six taxa were widespread and *Crithmum maritimum* was followed on coastline. *Turgenia latifolia* has the widest extent of occurrence (663,739.714 km²) (Figure 6) and *Bupleurum tenuissimum*, *Ferulago confusa*, *Heptaptera triquetra* and *Peucedanum obtusifolium* have the narrowest extent of occurrence (Figures 1, 3 and 5).

Istanbul is one of the richest areas in the middle latitudes for plant diversity. The main reasons for this being so are climatic variation, geomorphological and soil diversities, as well as its location at the junction of three phytogeographical regions (Irano-Turanian, Mediterranean and Euro-Siberian). It has nearly 2500 natural vascular plant taxa, whereas United Kingdom has 1850 and Holland 1600 natural vascular plant taxa (Özhatay & Keskin 2007; Özhatay et al. 2010). The flora of Istanbul threatened in recent years because of irregular construction. Especially constitutions on the coastaline and unsystematic silviculture have damaged to dune flora in Istanbul. Environmental management methods and monitoring of the changes in species diversity are important for species conservation (Türe & Böcük 2008).

The results show the necessity of adopting new environmental methods to conserve the species under threat in Istanbul. Otherwise, both people couldn't find clean air to live and honey bees couldn't find plants to produce honey.

Table: Extent of occurrence, area of occupancy and IUCN status of the examined taxa.

Taxa	Extent of occurrence (EOO) km²	Area of occupancy (AOO) km²	IUCN Status according to EOO
1. <i>Ammi visnaga</i> (L.) Lam.	471,404.322	80.000	LC
2. <i>Berula erecta</i> (Huds.) Coville	456,271.040	68.000	LC
3. <i>Bupleurum tenuissimum</i> L.	966.822	12.000	EN
4. <i>Caucalis platycarpus</i> L.	635,338.478	180.000	LC
5. <i>Crithmum maritimum</i> L.	134,953.073	60.000	LC
6. <i>Daucus carota</i> L.	610,664.163	240.000	LC
7. <i>Daucus guttatus</i> Sibth. & Sm.	352,115.891	64.000	LC
8. <i>Eryngium campestre</i> L.	512,964.184	140.000	LC
9. <i>Ferulago confusa</i> Velen.	22,049.065	188.000	NT
10. <i>Foeniculum vulgare</i> Mill.	569,517.875	140.000	LC
11. <i>Heptaptera triquetra</i> (Vent.) Tutin (type from Istanbul)	5,741.584	19.000	EN
12. <i>Heracleum spondylium</i> L. subsp. <i>ternatum</i> (Velen.) Brummitt	235,442.051	108.000	LC
13. <i>Oenanthe aquatica</i> (L.) Poir.	134,135.545	36.000	LC
14. <i>Oenanthe pimpinelloides</i> L.	201,266.767	156.000	LC
15. <i>Oenanthe silaifolia</i> M.Bieb.	463,108.282	128.000	LC
16. <i>Pimpinella saxifraga</i> L.	177,859.221	72.000	LC
17. <i>Peucedanum obtusifolium</i> Sibth.& Sm. (type from Istanbul)	44,780.483	60.000	NT
18. <i>Scandix pecten-veneris</i> L.	549,639.125	196.000	LC
19. <i>Seseli campestre</i> Besser	26,917.899	16.000	NT
20. <i>Seseli libanotis</i> (L.) W.D.J.Koch	234,980.213	64.000	LC
21. <i>Tordylium apulum</i> L.	303,719.768	140.000	LC
22. <i>Tordylium trachycarpum</i> Holmboe	360,598.571	88.000	LC
23. <i>Torilis japonica</i> (Houtt.) DC.	112,867.387	48.000	LC
24. <i>Turgenia latifolia</i> (L.) Hoffm.	663,739.714	244.000	LC

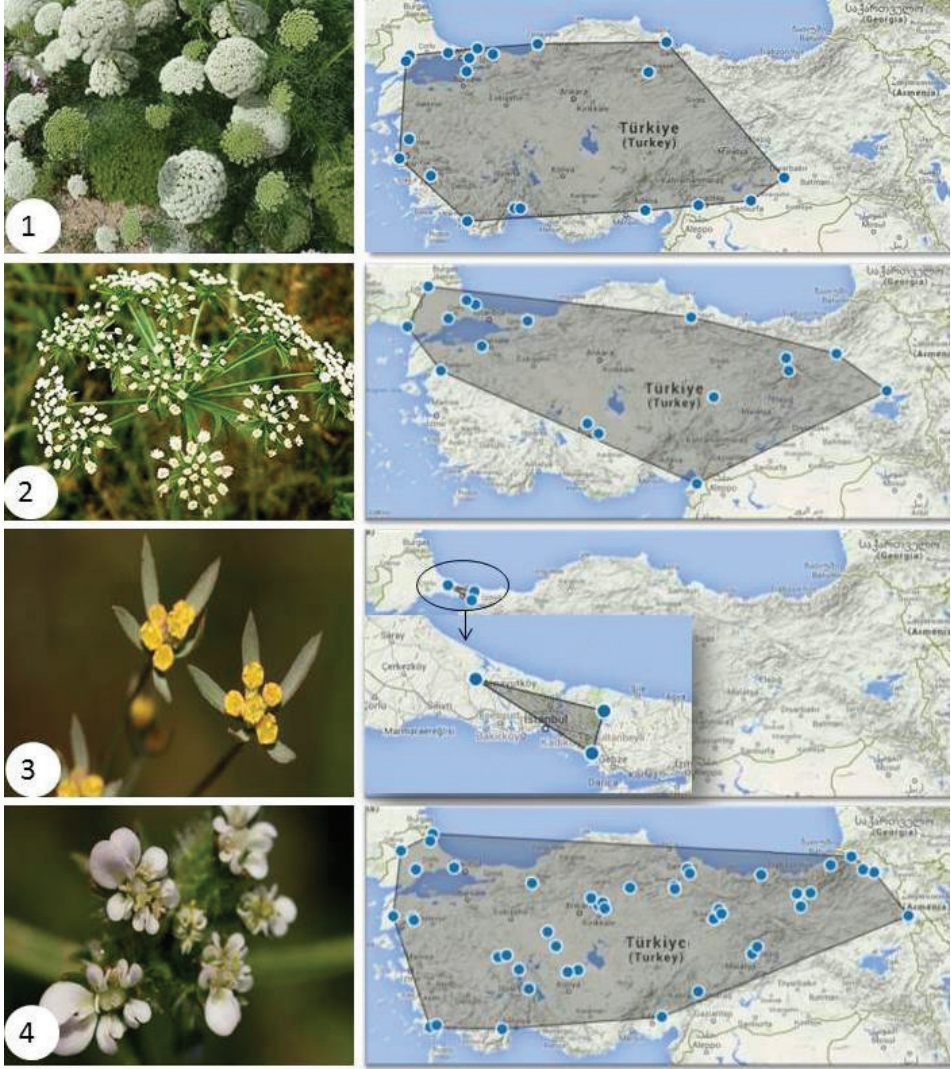


Figure 1: Distribution maps: 1) *Ammi visnaga*, 2) *Berula erecta*, 3) *Bupleurum tenuissimum*, 4) *Caulalis platycarpus*.

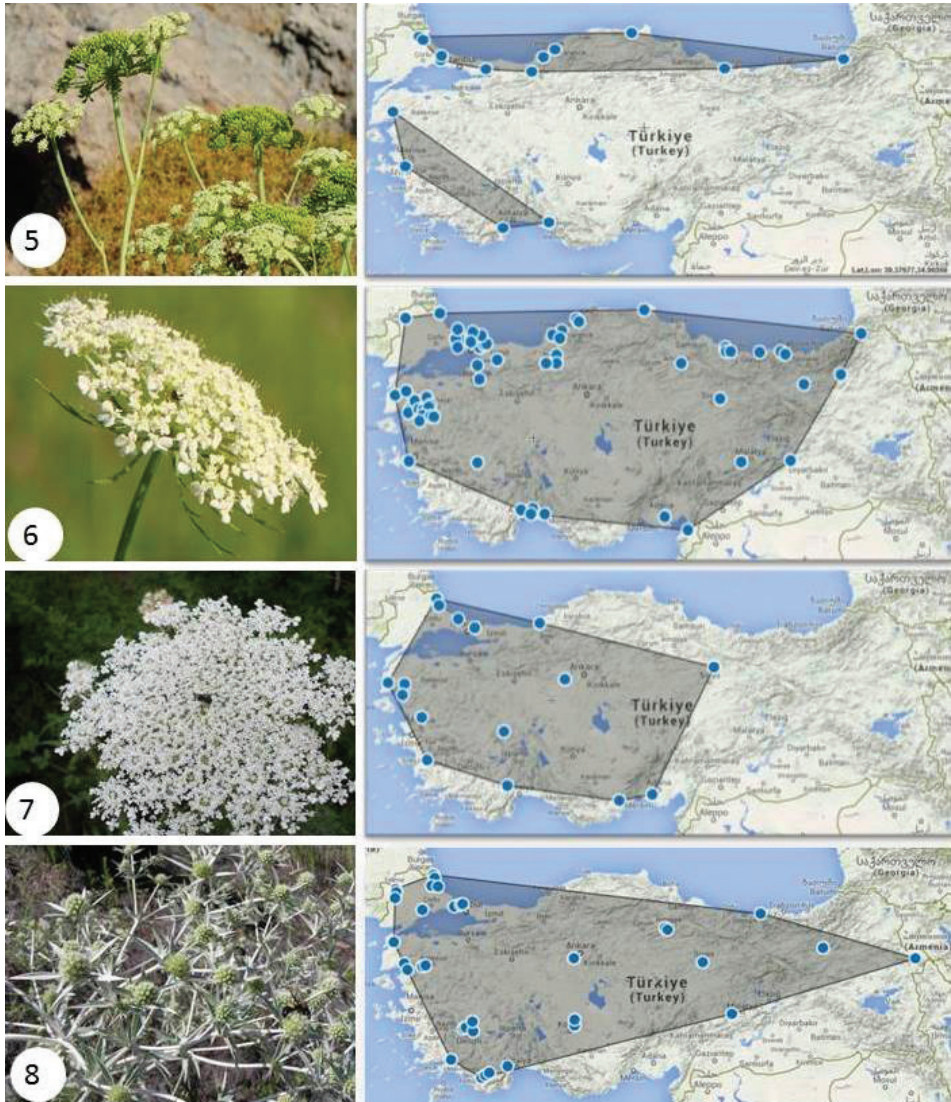


Figure 2: Distribution maps: 5) *Crithmum maritimum*, 6) *Daucus carota*, 7) *Daucus guttatus*, 8) *Eryngium campestre*.

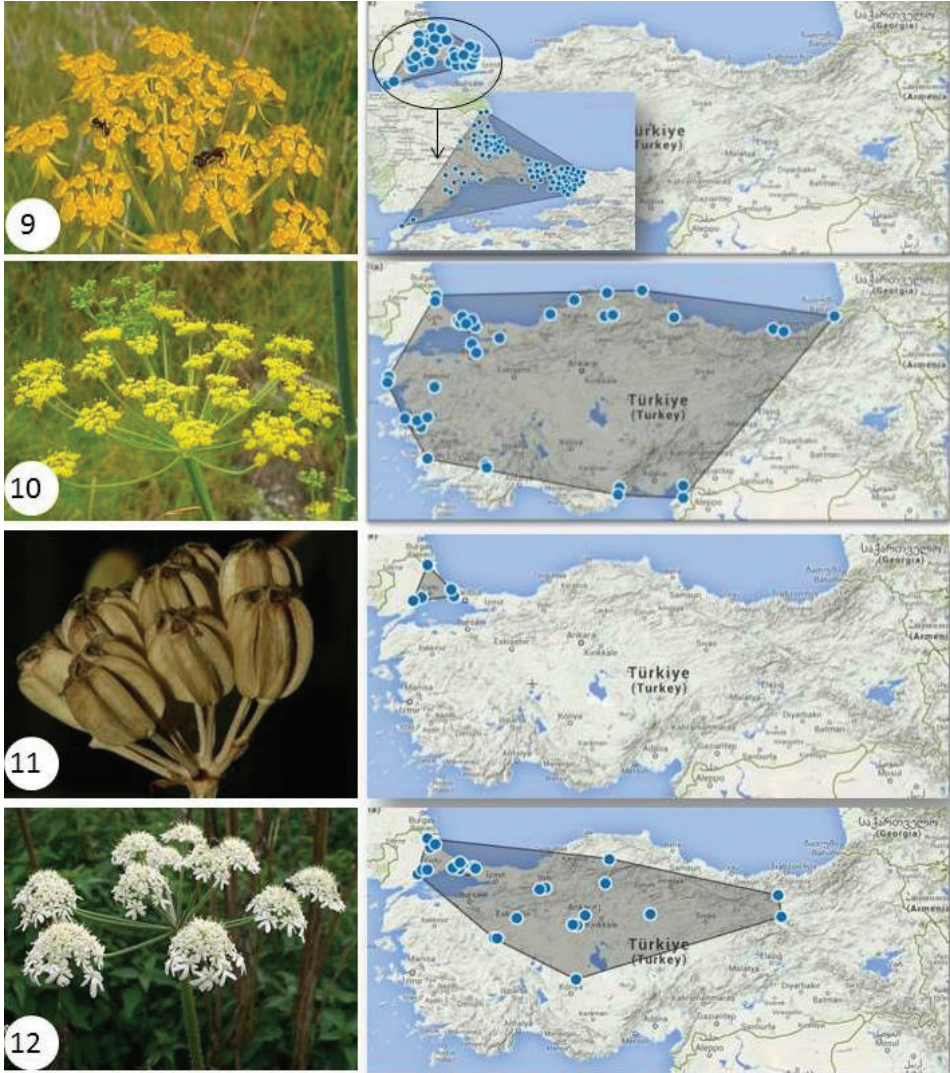


Figure 3: Distribution maps: 9) *Ferulago confusa*, 10) *Foeniculum vulgare*, 11) *Heptaptera triquetra*, 12) *Heracleum spondylium* L. subsp. *ternatum*.

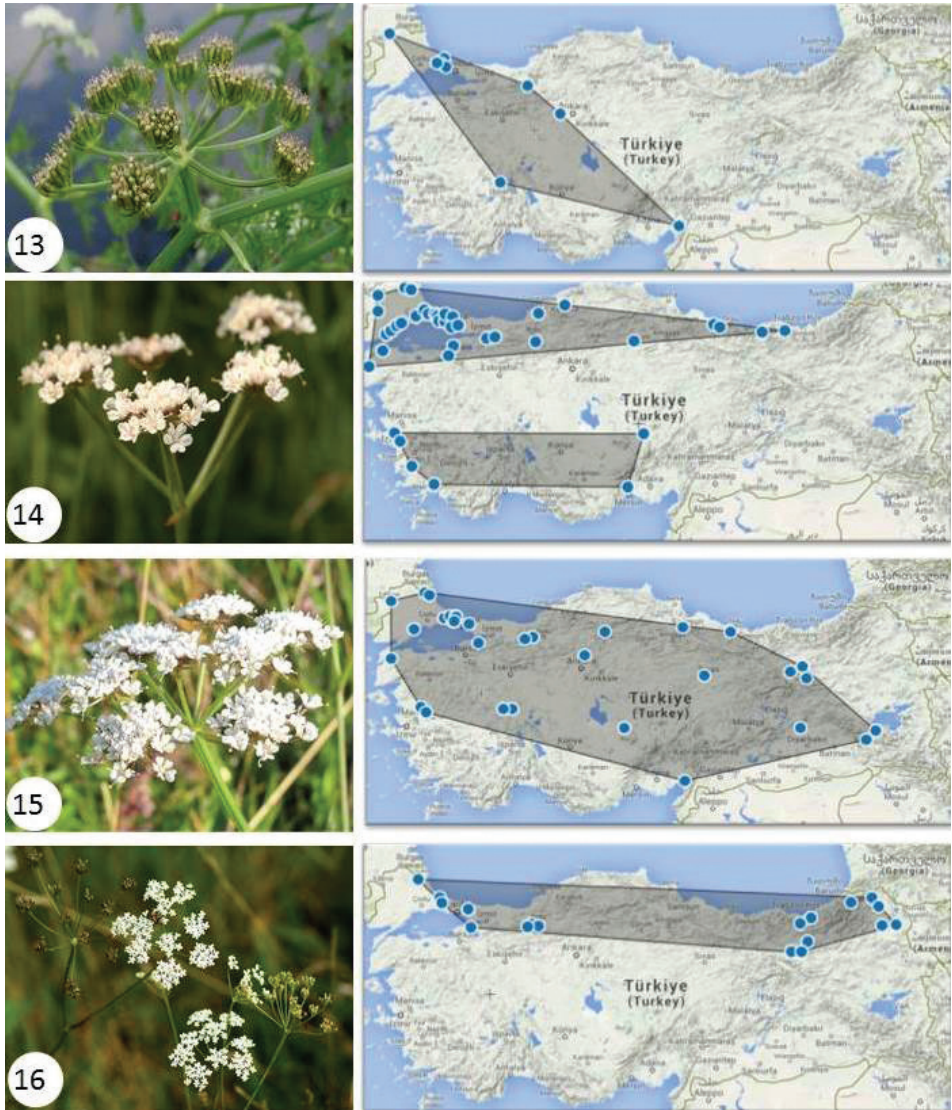


Figure 4: Distribution maps: 13) *Oenanthe aquatica*, 14) *Oenanthe pimpinelloides*, 15) *Oenanthe silaifolia*, 16) *Pimpinella saxifraga*.

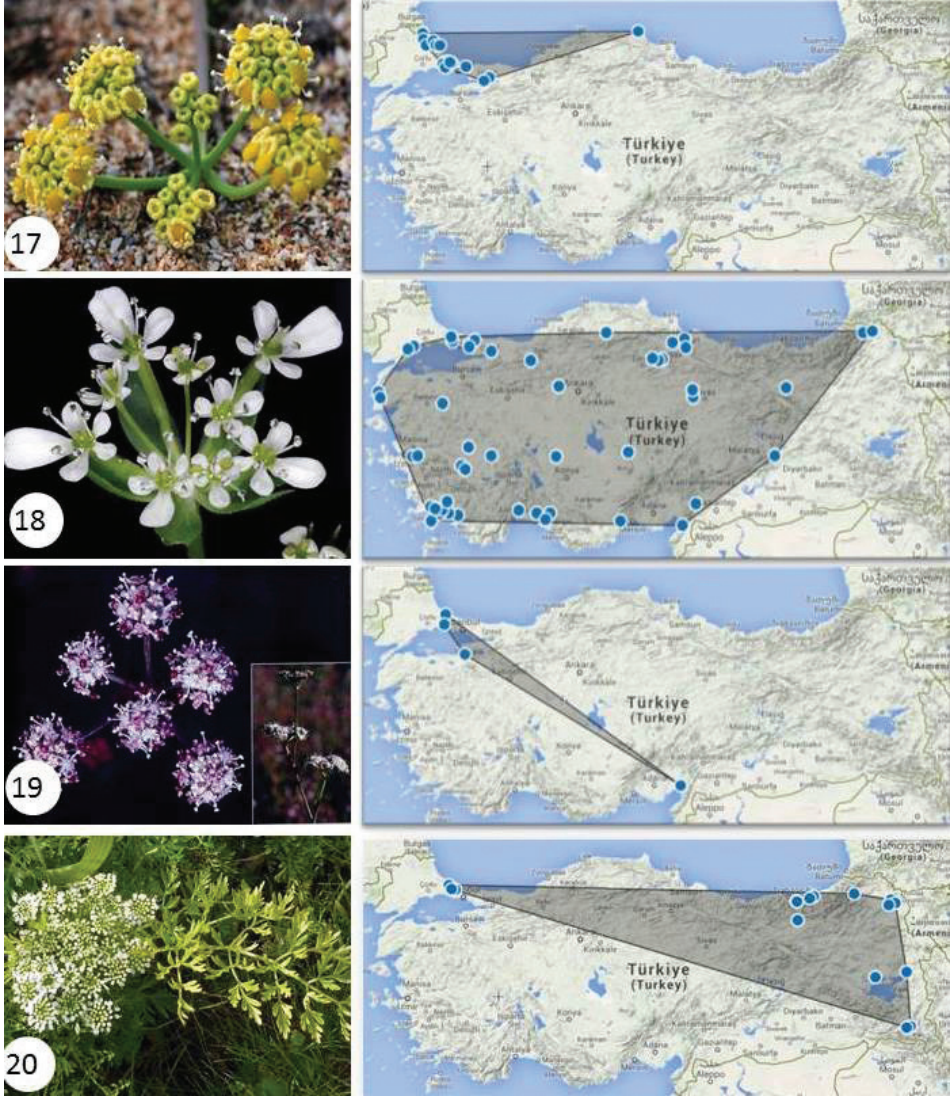


Figure 5: Distribution maps: 17) *Peucedanum obtusifolium*, 18) *Scandix pecten-veneris*, 19) *Seseli campestre*, 20) *Seseli libanotis*.

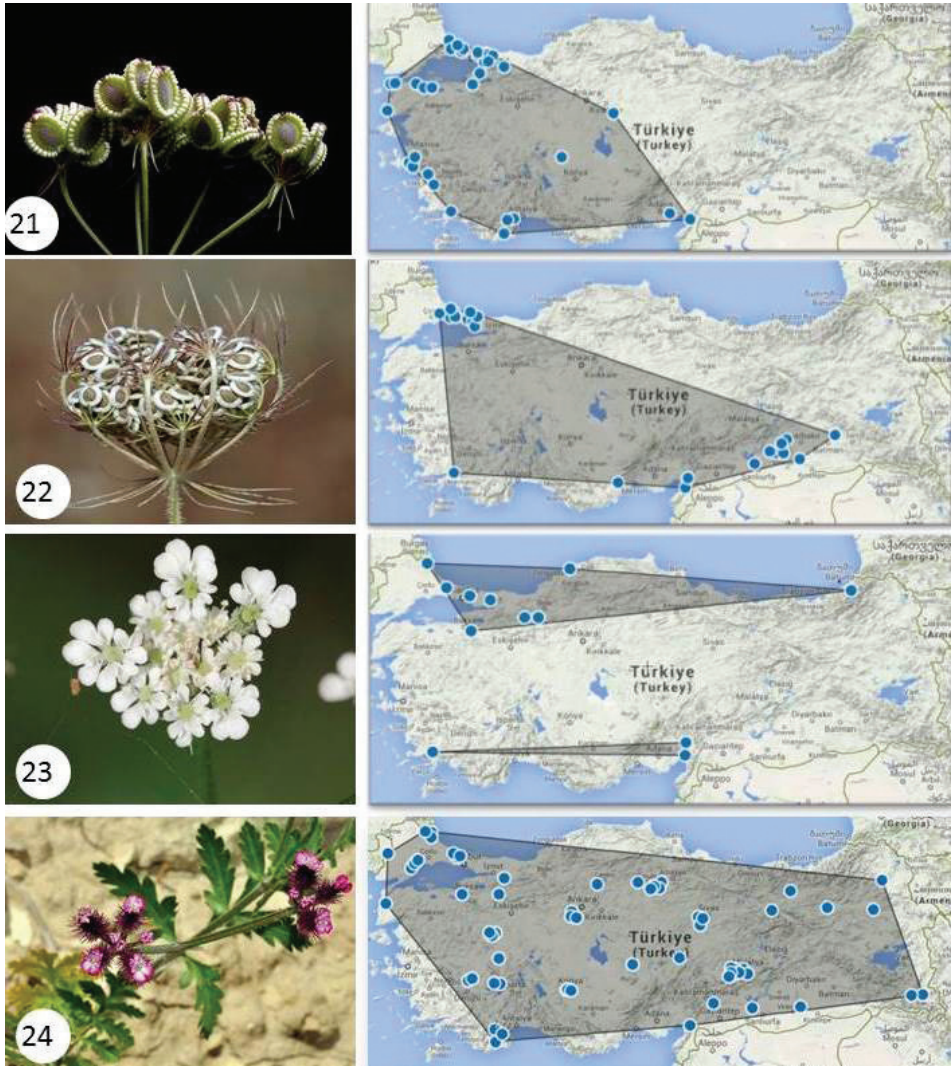


Figure 6: Distribution maps: 21) *Tordylium apulum*, 22) *Tordylium trachycarpum*, 23) *Torilis japonica*, 24) *Turgenia latifolia*.

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