FLORA OF TURKEY: RICHNESS, UPDATES, THREATS*

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The flora of Turkey is rich and diverse with over 11 000 flowering taxa recorded in the 9-volume set of Prof. P.H. Davis‟ monumental work and its two supplements. Turkey is situated at the junction of three important phytogeographic regions, namely Mediterranean, IranoTuranian, and Euro-Siberian. The Black Sea‟s coastal areas are in the Euro-Siberian region. Areas surrounding the Mediterranean, Aegean, and Marmara Seas enjoy the characteristics of the Mediterranean regions, and finally, the large part of Turkey stretching from the Central Anatolian Plateau to the borders with Iran and Iraq to the East and Southeast lies in the IranoTuranian region. Endemic species are largely found in the Mediterranean and Irano-Turanian

regions. The Anatolian flora, especially in the steppe areas, is said to be in an active state of diversification. According to the Flora of Turkey, the flora contains just over 11000 infrageneric taxa, of which 34.5 % are endemic. In the flora of Turkey, percentage endemism is high in some families: *Boraginaceae (61%), Campanulaceae (60%), Scrophulariaceae (52%), Rubiaceae (48%), Caryophyllaceae (46%), Labiatae (45%), Leguminosae (40%), Compositae (37%). At generic level, examples of the rate of endemism are: Bolanthus (90%), Ebenus (90%), Alkanna (8l%), Sideritis (78%), Acantholimon (76%), Paronychia (75%), Verbascum and Gypsophila (71%), Paracaryum (70%), Cousinia (68%), Centaurea (65%), Astragalus (63%).* The flora of Turkey contains over 11 000 vascular plant taxa, a considerable number of which are used by humans. Non-food uses of plants include medicinal, aromatic, ornamental, pesticides as well as raw materials for making household goods, toys, musical instruments. The flora of Turkey is estimated to contain over 3000 aromatic plants. The wide biodiversity of the flowering plants of Turkey is reflected in the 11-volume set of books titled Flora of Turkey and the East Aegean Islands. The second supplement (Vol. 11) reported 532 new taxa for the flora of the region. Recently, publications reported that 48 new recorded and 135 new species are added to the Flora of Turkey and the following genus were recently included : *Clastopus, Adenostyles, Araujia, Perilla, Oreopoa, Diplachne, Asperuginoides, Leptaleum, Stroganowia, Loncomelos, Scopolia, Oclopoa, Chamaespartium, Lophanthus, Clerodendrum, Cymbopogon , Schistophyllidium, Sicyos,* etc. If the alien and cultivated taxa are included, the number of taxa occurring in the Flora of Turkey then rises to 11 500. Of 3504 endemic plants in Turkey, 12 are known to have been extinct and 3492 (99 %) are still being threatened. The main threats to the survival of Turkey‟s endemic plants are: clearing grounds for fields, overgrazing and reform of barren lands, construction of dams, industrialization and urbanization, exportation and domestic use, plant protection and pollution, tourism, forestation and fires.

* **N. Aksoy, 2010. Flora of Turkey: Richness, updates, threats, International Workshop on Invasive Plants in the Mediterranean Type Regions of the World, Book of Abstracts, p.33, 02-06 August 2010,Trabzon-Turkey**

FLORA AND VEGETATION DIVERSITY OF DUZCE AND BOLU

Prepared by Dr Necmi AKSOY

DUZCE PROVINCE

Düzce province is located in a floristically important junction point containing different ecosystems with its seaside, high mountains, wetlands, running waters and agriculture lands. The provincial borders of Düzce involves almost all of the project of Büyük Melen that will provide İstanbul with potable water. There are important industrial areas and facilities between İstanbul and Düzce. The industrial development in Düzce, which started in 1976, has accelerated in recent years. Even though the Düzce plain has first class agricultural lands, a considerable part of the plain is covered with residences and industrial facilities. The influent running waters of Büyük Melen river are Asarsuyu, Küçük Melen, Uğursuyu and Aksu. The last three running waters composes Büyük Melen river by joining around Efteni lake, which is the most important wetland of the province. Efteni lake is an important ecological nodal point that collects the main running waters of the province and transmits them to Black Sea.

Figure: (●); Duzce University, Efteni Lake, Guzledre Water Fall Abant Natura Park and Gölcük Parks, (http://www.maps.google.com).

There are aquatic plants in Efteni Lake (such as *Nuphar lutea* (L.)Sm, *Nymphaea alba* L., *Trapa natans* L.) and marshy plants at the edge of the lake (such as *Carex vesicaria* L., *Eleocharis quinqueflora* (Hartmann) O. Schwarz, *Schoenoplectus litoralis* (Schrader) Palla, *Juncus effusus* L., *Typha latifolia* L., *Phragmites australis* (Cav.)Trin. ex Steudel). There are meadows near the lake and, beyond the meadows, there are maquis (*Arbutus andrachne* L., *Phillyrea latifolia* L., *Pistacia terebinthus* L. ssp. *palaestina* (Boiss.) Engler, *Erica arborea* L., *Cistus creticus* L. and beyond the maquis, there are forests to the northern slope of Elmacık Mountain, there is a mixed forest (*Fagus orientalis* Lipsky, *Quercus petraea* Liebl. ssp. *iberica* (Steven ex Bieb.) Krassiln, *Acer platanoides* L., *Carpinus betulus* L., *Castanea sativa* Miller, *Tilia argentea* Desf. ex DC., *Ulmus glabra* Hudson, *Fraxinus excelcior* L. ssp. *excelcior* and *Cerasus avium* (L.) Moench). In the other regions, *Pinus sylvestris* L. var. *hamata* Steven and *Abies nordmanniana* (Stev) Spach. ssp. *bornmuelleriana* (Mattf.) Coode & Cullen make up mixed and pure stands. On the tops of the hills, alpine zones are present.

Recent flora and vegetation investigations of Düzce region (The Vegetation of Elmacık Mountain (Düzce), Flora and Ethnobotany of the Akcakoca District (Koca 2003), *Cephalaria duzceënsis* (Dipsacaceae), a new species from the western Black Sea region, Turkey, *Centaurea yaltirikii* sp. nov. (Asteraceae, *C*. sect. Pseudoseridia) from Turkey and The Flora of Hasanlar Dam Lake and Its surroundings, the number of total vascular plant is reached to more than one thousand taxa. There are 71 endemic taxas in Düzce Region and the endemism ratio is approximately 7%.

The latest conservation status of 71 endemic vascular plants of Düzce Region, eight species (*Silene sangaria* Coode et Cullen, *Centaurea kilaea* Boiss., *Centaurea yaltirikii* N. Aksoy, H. Duman & A. Efe, *Cephalaria duzceënsis* N. Aksoy & R.S. Göktürk, *Festuca rubra* L. ssp. *pseudorivularis* Markgr-Dannenb, *Lythrum anatolicum* Leblebici & Seçmen, *Lamium purpureum* L. var. *aznavourii* Gand. ex Aznav., *Verbascum degenii* Hal.) are categorized as Critically Endangered, one species (*Cirsium boluënse* P.H. Davis & Parris) Endangered, two species (*Lathyrus undulatus* Boiss., *Seseli resinosum* Freyn & Sint.) Vulnerable and sixty as Lower Risk (47 as Least Concern and 13 as Near Threatened) when subjected to the IUCN Red List criteria (Table 1).

Table : The number of endemic plants of Düzce in IUCN categories.

IUCN Categories	Endangered (EN)	Critic (CR)	Vulnerable (VU)	Near Threatened (NT)	Least Concern (LC)
Number of Taxa	1	8	2	13	47

PLANT DIVERSITY IN ELMACIK MOUNTAIN (DÜZCE), TURKEY

The vascular flora the Elmacık Mountain (Düzce, Turkey) was assessed during 2002-2005. Plants (1350 specimens) were collected from the research area and by the evaluation of them and the relevant literature it was determined that there are 631 taxa belonging to 100 families and 331 genera. The largest family is Asteraceae (84 ; 13.33 %) and the second largest is Fabaceae (44; 6.98 %). The largest genus is Trifolium L. spp. (9; 2.2%) and the second largest is Hypericum L. spp. (9; 1.4%). The rates of species belonging to certain phytogeographical regions are as follows: 212 taxa (33.59 %) Euro- Siberians, 53 taxa (8.41 %) Mediterraneans, 41 taxa (6.51 %) Irano-Turanians. The rates of wide spreaded and phytogeographically unknown taxa are 325 (51. 50 %). The research area is in the Euro-Siberian phytogeographical region. There are 59 endemic taxa in the research area and the endemism ratio is 9.35%.

Photo.: Aksu Valley Elmacık Mountain (N. Aksoy)

Photo.: ***Cephalaria duzcëensis*** **N.Aksoy & R. S. Göktürk (N. Aksoy)**

Photo.: ***Centaurea yaltirikii*** **N. Aksoy, H. Duman & A. Efe (N. Aksoy)**

Photo.: ***Trapa natans*** **L. in Efteni Lake (N. Aksoy)**

Photo.: ***Lythrum anatolicum*** **Leblebici & Seçmen (N. Aksoy)**

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PLANT DIVERSITY IN ABANT NATURE PARK (BOLU), TURKEY*

The vascular flora of the central part of the Abant Nature Park (Bolu, Turkey) was assessed during 1994-1995. Plants (1440 specimens) were collected from the research area and by the evaluation of them and the relevant literature it was determined that there are 664 species in the area including 150 subspecies and 67 varieties, belonging to 84 families and 332 genera. The largest family is Asteraceae (68; 10.3%) and the second largest is Poaceae (55; 8.3%). The largest genus is Veronica L. (15; 2.3%) and the second largest is Ranunculus L. (12; 1.8%). The rates of species belonging to certain phytogeographical regions are as follows: Euro-Siberians 29.3% (together with Euxines 5.3% and Hyrcano-Euxines 0.7%), Mediterraneans 5.6% and Irano-Turanians 4.7%. The numbers of cosmopolitan and phytogeographically unknown species are 3.1% and 57.5%, respectively. The research area is in the Euro-Siberian phytogeographical region. There are 55 endemic taxa in the research area and the endemism ratio is 8.1%.

Photo.: Abant Lake (N. Aksoy)

*** Uçar, A. 2003. Plant Diversity in Abant Nature Park (Bolu), Turkey, *Turkish Journal* of Botany**, Vol. 27, iss. 3, pp. 185-222.

FLORA OF THE GÖLCÜK AREA (BOLU, TURKEY) *

Field studies were carried out to determine the vascular flora of the Golcuk area (Bolu) during 1997-1998. At the end of the evaluation of the identification of the collected specimens and the results of previous studies, 80 families, 277 genera, 461 species and 475 taxa in total were determined. The rates of species belonging to certain phytogegraphical regions are as follows:the Euro-Siberians 30.8% (142 spp.), the Irano-Turanians 1.5% (7 spp.), the Mediterraneans 5.2% (24 spp.), and phytogeographically unknown 58.4% (269 spp.). The number of endemic taxa found in the research area is 16; thus the endemism rate is 3.5%. The largest 3 families are Asteraceae (43 spp.; 9.3%), Poaceae (43 spp.; 9.3%), and Fabaceae (40 spp.; 8.7%). Thelargest 3 genera are Vicia L. (10 spp.; 2.2%), Trifolium L. (8 spp.; 1.7%), and Veronica L. (7 spp.; 1.5%).

Photo.: Bolu Gölcük, Fir Forets (Abies bournmuelleriana) (N. Aksoy)

*** İkinci, N. 2000. The Flora of Gölcük Area (Bolu), Department of Biology, Institute of Natural Science of The Abant İzzet Baysal Univesity, (MSc. Thesis) pp. 120.**

Photo. : Yew Forest and Trees in Yıgılca, Duzce (N. Aksoy)

Photo.: Yew Forest and Trees in Alaplı, Zonguldak (N. Aksoy)

Photo. : Yew Trees in Yenice, Karabuk (N. Aksoy)