

Plant Diversity in Abant Nature Park (Bolu), Turkey

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Received: 14.08.2002

Accepted: 02.12.2002

Abstract: 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%.

Key Words: Abant, Bolu, Flora, Plant list, Turkey

Abant Tabiat Parkı'nın (Bolu) Bitki Çeşitliliği

Özet: Bu çalışmada 1994-1995 yılları arasında Abant Tabiat Parkı'nın merkez kısmının damarlı bitkiler florası araştırılmıştır. Araştırma sonucunda 1440 bitki örneği toplanmıştır. Abant ile ilgili daha önceki araştırmalar da gözönüne alınarak, bu örneklerin adlandırılması sonucu 84 familyaya ait 332 cins, 664 tür, 150 alttür ve 67 varyete tespit edilmiştir. Araştırma alanında, içerdiği tür sayısına göre en büyük familya *Asteraceae* (68; %10.3) ikincisi ise *Poaceae*'dir (55; %8.3). En büyük cins *Veronica* L. (15; %2.3) ikincisi ise *Ranunculus* L.'dir (12; %1.8). Türlerin fitocoğrafik bölgelere göre dağılımı şöyledir: %29.3' ü Avrupa-Sibirya elementi (%5.3 Öksin elementi ve %0.7 Hirkano-Öksin elementi ile birlikte), %5.6' sı Akdeniz elementi ve %4.7' si İran-Turan elementi. Ayrıca taksonların %3.1' i kozmopolit ve %57.5' sinin de fitocoğrafik bölgesi belli değildir. Abant bölgesi Avrupa-Sibirya fitocoğrafik bölgesindedir. Alanda bulunan endemik taksonların sayısı 55' dir. Dolayısı ile alanın endemizm oranı %8.1' dir.

Anahtar Sözcükler: Abant, Bolu, flora, bitki listesi, Türkiye

Introduction

Abant Nature Park is situated in the Western Black Sea region of Anatolia (Figure 1). It is a touristic part of Bolu province and includes a fresh water lake, Abant Lake. The Abant region lies approximately at the latitude 14°N and longitude 31°E. The lake has an area of 1.25 km² and a maximum depth of 18 m and the perimeter of the lake is 6 km (Mater and Sunay, 1985). Abant Lake lies in a north-west to south-east direction and is somewhat quadrangular shape. It is located in the north of the Abant mountain range and its average altitude is approximately 1320 m. The lake is surrounded by

mountains as high as 1750 m. The research area is about 400 ha.

The main watercourses which feed Abant Lake are Beşpoyra Stream in the west and the Fındıklı Stream in the east. There are also some dry rivers, water sources and springs around the lake. Abant River in the north constitutes the outlet of the lake.

There are no villages within the boundary of Abant Nature Park. The villages near Abant Lake (Dereceören and Akçaalan) are situated on the Abant road near the E-5 highway. There are some yaylas (mountain pastures) near Abant Lake. For example, Sarıyer, Örencik and

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Pelitözü yaylas are located west of the lake and Samat yayla east of the lake.

Lahn (1948) reported that tectonic movements caused the formation of the lake, but according to Erinoç et al. (1961) a landslide caused the formation, and a huge amount of rubble that collapsed from the north-east might be the reason for the formation of the barrier that holds water in the basin. Abant Lake is surrounded by mountains. Because of the geomorphological condition of the lake, there is a serious erosion danger (Mater & Sunay, 1985). Peat development in the west and south-west of the lake is spreading to the wide area and throughout the lake gradually. There is also smaller peat development in the north-east and south-west of the lake (Mater & Sunay, 1985). Abant Lake and vicinity were formed during various formations of the Paleozoic period. The bedrock is formed by schist and serpentine and it dissolved to form sandy, clayey and calcareous soils (Mater & Sunay, 1985).

Abant region shows a transitory character between the Mediterranean climate with a very cold, less rainy winter and oceanic climate. Because of the geographical conditions, Abant Lake is totally closed to the dry southern wind and open to the northern winds, causing a high degree of humidity in the region (Bolu Meteorological Station, pers. comm.). Unfortunately, there is no meteorological station in the area of Abant Lake. The nearest station is in Bolu, which is in the north-east of the region at an altitude of about 742 m. Values from Bolu Meteorological Station were extrapolated for Abant (Mater & Sunay, 1985). According to the meteorological data obtained between 1930 and 2001 (71 years) in Bolu (Figure 2), the mean annual temperature is 10.3 °C. Abant Lake is 600 m higher than Bolu. Therefore, the mean annual temperature of Abant is expected to be 7.3 °C. This value was calculated according to the elevation factor (Mater & Sunay, 1985). The mean annual precipitation in Bolu is 534.4 mm. Of this precipitation, 32% is in winter, 29% in spring, 21% in autumn and 18% in summer. According to the elevation factor, the mean annual precipitation of Abant is expected to be between 800 and 900 mm (Mater & Sunay, 1985).

There are aquatic plants in Abant Lake (such as *Nuphar* Sm. and *Nymphaea* L.) and marshy plants at the edge of the lake (such as *Carex* L., *Eleocharis* R.Br., *Schoenoplectus* (Reichb.) Palla, *Blysmus* Panzer, *Juncus*

L., *Typha* L., *Phragmites* L. and *Salix* L.). There are meadows near the lake and, beyond the meadows, there are forests. To the south, there is a mixed forest (*Fagus* L., *Quercus* L., *Acer* L., *Crataegus* L., *Pyracantha* M.J.Roemer and *Juniperus* L.). In the other regions, *Pinus* L. and *Abies* Miller make up mixed and pure stands. On the tops of the hills, alpine zones are present.

A map was prepared by Davis (1975) after an evaluation of the floristic research about Turkey. In this map, he showed the "well known", "moderately known" and "little known or unknown" regions of Turkey from the floristic point of view. According to Davis (1975), our research area is included in the "moderately known" areas.

S. Kuntay collected some plants from Abant Lake in 1936 (Birand, 1952). According to the Flora of Turkey (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000) and some other publications (Birand, 1952; Davis & Hedge, 1975; Akman et al., 1985) many Turkish and foreign researchers have visited and collected plant specimens from this area. Some plant samples were collected from Abant Lake as a result of botanical excursions and they were deposited at the İstanbul University Herbarium (ISTE) (N.Özhatay, 1986, pers. comm.). In addition, some floristic studies have been carried out in Bolu (Akman & Ketenoğlu, 1979; Akman & Yurdakulol, 1981a; Akman & Yurdakulol, 1981b; Ekim & İlarıslan, 1982) as well as the Flora of Gökçöy Campus (pers. comm.) and the Flora of Gölcük Area (pers. comm.), but no regular floristic research has been performed in the Abant region. Therefore, the objective of this study was to determine the flora of the central part of the Abant Nature Park and categorize the plants according to IUCN Red Data Categories (IUCN Species Survival Commission, 2000). With these objectives, we expect to contribute to the Flora of Bolu planned to be written in the future, and to determine the endemic species, new records for the A3 grid square and IUCN categories of the taxa.

Materials and Methods

Research materials were collected during 1994-1995, between March and November in each year. The research area extended from the surroundings of Abant Lake to the top of the mountains encircling the lake. Field surveys and plant collections lasting 2 to 3 days were performed

every 15 to 20 days by visiting the research area. The peak period of collection was June to July.

During this research 1440 specimens were collected. The Flora of Turkey (Davis, 1965-1985; Davis et al., 1988) was the main source used to identify plant specimens. Some doubtful identifications were checked in Flora Europaea (Tutin et al., 1964-1980), Flora of Cyprus (Meikle, 1977-1985) and Flora of Iraq (Townsend, 1966-1974). The *Poaceae* specimens were either identified or checked by Dr. M. Doğan from Middle East Technical University. The herbaria of Gazi University (GAZI) and the Faculty of Pharmacy, İstanbul (ISTE), were used to check the specimens. Some specimens with identification problems were checked by Dr. H. Duman from Gazi University and Dr. N. Özhatay from İstanbul University.

The flora was listed in the appendix. All taxa in the floristic list were given according to the order in The Flora of Turkey (Davis, 1965-1985; Davis et al., 1988).

Every species in the list is represented in the following order:

- i- The legitimate name and the author of the species.
- ii- The citation (at most two) of the specimens collected from the study area. The area is completely within the A3 grid square and Bolu province, and so "A3 Bolu" has been omitted from the citations.
- iii- Endemism, phytogeographical element, IUCN category (IUCN Species Survival Commission, 2000) and criteria for each taxon to determine the IUCN categories are given (explanations for only "LC" and "NE" categories were not repeated). In addition, if the characters of the specimens are different from the descriptions found in the Flora of Turkey (Davis, 1965-1985), all differences are explained in the list. New records for the A3 grid square were indicated by placing an asterisk in front of species name in the plant list.

Every species were categorized according to IUCN Red Data Categories (IUCN Species Survival Commission, 2000). These abbreviations are as follows:

EX – Extinct; EW – Extinct in the wild; CR – Critically endangered; EN – Endangered; VU – Vulnerable; NT – Near threatened; LC – Least concern; DD – Data deficient; NE – Not evaluated.

Plants included in this list were deposited in the herbarium of the Biology Department of Abant İzzet Baysal University (AIBU).

Results and Discussion

The floristic data relating to the Abant Region was obtained during research carried out over two years; 1440 plant specimens were collected. After the identification of the specimens and the gathering of all relevant data, 332 genera, 664 species, 150 subspecies and 67 varieties belonging to 84 families were determined. Of the 664 species, 12 species belong to the division *Pteridophyta* while 652 species belong to the division *Spermatophyta*. Of the 652 species belonging to the division *Spermatophyta*, the subdivisions *Gymnospermae* and *Angiospermae* have three and 649 species, respectively. One hundred and forty-four species of *Angiospermae* belong to *Monocotyledones*, while the rest (505 species) belong to *Dicotyledones* (Table 1).

The largest 10 families according to their species number in Abant Nature Park are given in Table 2, Survey VII. According to Good (1974), *Asteraceae*, *Poaceae*, *Fabaceae* and *Cyperaceae* are among the first six families almost everywhere according to their representative species number, but thereafter much depends on whether the area concerned is temperate, in which case families such as *Caryophyllaceae*, *Brassicaceae*, and *Scrophulariaceae* rank high, or if it is tropical, in which case families such as *Orchidaceae*, *Euphorbiaceae*, *Ranunculaceae*, *Rosaceae* and *Rubiaceae* are observed (Güner et al., 1996). The Abant region exhibits a transitory character between the Mediterranean climate and oceanic climate; therefore the order of our list below is similar to that of Good (Good, 1974). Comparing with some other floristic research carried out in Bolu (Table 2) (Akman & Ketenoğlu, 1979; Akman & Yurdakulol, 1981a; Akman & Yurdakulol, 1981b; Ekim & İlarıslan, 1982) as well as the Flora of Gökçöy Campus (pers. comm.) and the Flora of Gölçük Area (pers. comm.), our list is more similar to the Flora of Gölçük Area (pers. comm.) (Table 2). This may be because of the geological and ecological similarities between the two areas. The family *Asteraceae* is the largest family in our list. It is also the largest family in the Flora of Turkey (Davis, 1965-1985; Davis et al., 1988) and it is the largest and most widespread family of flowering plants in the world (Good, 1974). There is considerable overgrazing around Abant Lake and most members of this family protect themselves with their spiny structures. Most of them distribute their seeds easily and also the family has a wide ecological tolerance, so the highest number of species was collected

	Spermatophyta				Total
	Pteridophyta	Gymnospermae	Angiospermae		
			Dicotyledones	Monocotyledones	
Families	6	2	62	14	84
Genera	7	3	256	66	332
Species	12	3	505	144	664
Subspecies	1	2	119	28	150
Varieties	-	-	61	6	67
Taxa	12	3	513	149	677
Endemic species	-	1	44	10	55
Irano-Turanian	-	-	25	7	32
Mediterranean	-	-	23	15	38
Euro-Siberian	-	1	115	42	158
Euxine	-	1	27	8	36
Hyrcano-Euxine	1	-	3	1	5
Others	11	1	322	76	410
EX	-	-	-	-	-
EW	-	-	-	-	-
CR	-	-	-	-	-
EN	-	-	-	-	-
VU	-	-	5	3	8
NT	-	1	71	22	94
LC	5	2	359	76	442
DD	-	-	-	-	-
NE	7	-	78	48	133

Table 1. The number of species according to taxonomic categories, the floristic evaluation and the red list data of Abant Nature Park.

Table 2. Comparison of our research with other surveys according to the 10 largest families.

Families	Surveys						
	Family (number of species - ratio to total species number, %)						
	I	II	III	IV	V	VI	VII
1	<i>Fabaceae</i> 26 - 11	<i>Fabaceae</i> 27 - 9.5	<i>Fabaceae</i> 35 - 11.2	<i>Fabaceae</i> 28 - 10.4	<i>Asteraceae</i> 53 - 12.1	<i>Asteraceae</i> 43-9.8	<i>Asteraceae</i> 68 - 10.3
2	<i>Asteraceae</i> 25 -10.6	<i>Rosaceae</i> 21 - 7.4	<i>Asteraceae</i> 26 - 8.3	<i>Asteraceae</i> 25 - 9.3	<i>Fabaceae</i> 39 - 8.9	<i>Poaceae</i> 43-9.8	<i>Poaceae</i> 55 - 8.3
3	<i>Rosaceae</i> 13 - 5.5	<i>Asteraceae</i> 21 - 7.4	<i>Scrophulariaceae</i> 26 - 8.3	<i>Lamiaceae</i> 22 - 7.9	<i>Lamiaceae</i> 30 - 6.8	<i>Fabaceae</i> 38-8.6	<i>Fabaceae</i> 46 - 6.9
4	<i>Lamiaceae</i> 13 - 5.5	<i>Lamiaceae</i> 19 - 6.7	<i>Poaceae</i> 17 - 5.4	<i>Rosaceae</i> 18 - 6.4	<i>Rosaceae</i> 25 - 5.7	<i>Rosaceae</i> 25-5.7	<i>Lamiaceae</i> 45 - 6.8
5	<i>Apiaceae</i> 11 - 4.7	<i>Poaceae</i> 17 - 6	<i>Rosaceae</i> 16 - 5.1	<i>Poaceae</i> 16 - 5.9	<i>Scrophulariaceae</i> 23 - 5.3	<i>Lamiaceae</i> 22-5.0	<i>Rosaceae</i> 35 - 5.3
6	<i>Poaceae</i> 11 - 4.7	<i>Brassicaceae</i> 16 - 5.6	<i>Lamiaceae</i> 16 - 5.1	<i>Ericaceae</i> 10 - 4.3	<i>Poaceae</i> 22 - 5	<i>Brassicaceae</i> 18-4.1	<i>Scrophulariaceae</i> 32 - 4.8
7	<i>Caryophyllaceae</i> 10 - 4.2	<i>Scrophulariaceae</i> 16 - 5.6	<i>Caryophyllaceae</i> 15 - 4.8	<i>Campanulaceae</i> 10 - 3.9	<i>Brassicaceae</i> 21 - 4.8	<i>Caryophyllaceae</i> 17-3.9	<i>Brassicaceae</i> 31 - 4.7
8	<i>Liliaceae</i> 7 - 2.3	<i>Caryophyllaceae</i> 14 - 4.9	<i>Brassicaceae</i> 14 - 4.8	<i>Apiaceae</i> 8 - 2.8	<i>Boraginaceae</i> 17 - 3.9	<i>Apiaceae</i> 17-3.9	<i>Caryophyllaceae</i> 23 - 3.5
9	<i>Brassicaceae</i> 6 - 2.5	<i>Ranunculaceae</i> 11 - 3.9	<i>Boraginaceae</i> 14 - 4.5	<i>Fagaceae</i> 8 - 2.8	<i>Apiaceae</i> 16 - 3.7	<i>Scrophulariaceae</i> 14-3.2	<i>Liliaceae</i> 21 - 3.2
10	<i>Scrophulariaceae</i> 6 - 2.5	<i>Rubiaceae</i> 9 - 3.2	<i>Liliaceae</i> 12 - 3.8	<i>Liliaceae</i> 8 - 2.8	<i>Caryophyllaceae</i> 15 - 3.4	<i>Boraginaceae</i> 13-3.0	<i>Ranunculaceae</i> 21 - 3.2
Other families	6 - 2.5	9 - 3.2	12 - 3.8	8 - 2.8	15 - 3.4	13-3.0	21 - 3.2
	108 - 45.8	113 - 39.8	121 - 38.7	153 - 38.7	176 - 40.3	189-43.0	287 - 43.2

Survey I, Ekim & İlarıslan (1982); Survey II, Akman & Yurdakulol (1981b); Survey III, Akman & Ketenoğlu (1979); Survey IV, Akman & Yurdakulol (1981a); Survey V, Flora of Gökçöy Campus (pers. comm.); Survey VI, Flora of Gölçük Area (pers. comm.); Survey VII, our results.

from this family. *Poaceae* is the second largest family in our list because this family is common in prairie habitats and members of *Poaceae* family are found around marshy, damp places, and wetlands and meadows.

The largest 10 genera found in Abant Nature Park are listed in Table 3, Survey VII. According to Good (1974), *Ranunculus* L., *Carex* L., *Galium* L., *Allium* L., *Poa* L. and *Centaurea* L., which are second, third, fifth, sixth, seventh and tenth in rank respectively in our list, are among the largest and most cosmopolitan or subcosmopolitan genera. *Veronica* L., *Trifolium* L. and *Astragalus* L., which are first, third and eighth in rank respectively in our list, are among the temperate genera. If we compare other floristic studies performed in Bolu (Table 3), generally *Veronica* is among the higher ranks in all surveys. In our research area, most of the *Veronica* species were collected in wet and marshy places near Abant Lake. According to the Flora of Turkey (Davis, 1965-1985; Davis et al., 1988), the largest genus is *Astragalus*, but in our research it is the eighth largest. In other research in Bolu (Table 3), it was also found among also lower ranks.

Generally, *Astragalus* has a wide distribution in the Irano-Turanian phytogeographic region and our research area is within the Euro-Siberian phytogeographic region. This may be the main reason for *Astragalus* being among the lower ranks in Bolu.

The distribution of species according to phytogeographic regions is given in Table 1. In this research, Euro-Siberian elements with 29.3% [together with Euxines (5.3%) and Hyrcano-Euxines (0.7%)] are the most common, because the research area is in the Euro-Siberian phytogeographic region. The Mediterranean elements (5.6%) are second, and the Irano-Turanian elements (4.7%) are third. According to Akman & Ketenoğlu (1986), Turkey comes under the influence of a continental, oceanic and Mediterranean climate. The oceanic climate prevails on the northern slopes along the 1500 km Turkish Black Sea coast, but at some points along this coastal belt, a Mediterranean climatic influence is apparent. This kind of climate with the vegetation occurring as patches in the Black Sea region is also seen in our research area, as Mediterranean

Table 3. Comparison of our research with other surveys according to the 10 largest genera.

Genera	Surveys						
	Genus (number of species - ratio to total species number, %)						
	I	II	III	IV	V	VI	VII
1	<i>Trifolium</i> 9 - 3.8	<i>Veronica</i> 7 - 2.5	<i>Veronica</i> 12 - 3.8	<i>Campanula</i> 9 - 3.3	<i>Trifolium</i> 9 - 2.1	<i>Vicia</i> 9-2.0	<i>Veronica</i> 15 - 2.3
2	<i>Lathyrus</i> 4 - 1.7	<i>Ranunculus</i> 6 - 2.1	<i>Trifolium</i> 9 - 2.9	<i>Quercus</i> 7 - 2.5	<i>Veronica</i> 8 - 1.8	<i>Trifolium</i> 8-1.8	<i>Ranunculus</i> 12 - 1.8
3	<i>Silene</i> 4 - 1.7	<i>Poa</i> 6 - 2.1	<i>Lathyrus</i> 7 - 2.2	<i>Trifolium</i> 6 - 2.2	<i>Euphorbia</i> 7 - 1.6	<i>Veronica</i> 7-1.6	<i>Carex</i> 11-1.7
4	<i>Campanula</i> 4 - 1.7	<i>Galium</i> 6 - 2.1	<i>Sedum</i> 7 - 2.2	<i>Astragalus</i> 4 - 1.4	<i>Polygonum</i> 7 - 1.6	<i>Bromus</i> 6-1.4	<i>Trifolium</i> 10 - 1.5
5	<i>Sambucus</i> 3 - 1.3	<i>Crocus</i> 5 - 1.8	<i>Myosotis</i> 6 - 1.9	<i>Silene</i> 4 - 1.4	<i>Linum</i> 6 - 1.4	<i>Poa</i> 6-1.4	<i>Galium</i> 8 - 1.2
6	<i>Sedum</i> 3 - 1.3	<i>Carex</i> 5 - 1.8	<i>Campanula</i> 6 - 1.9	<i>Salvia</i> 4 - 1.4	<i>Potentilla</i> 6 - 1.4	<i>Carex</i> 5-1.1	<i>Allium</i> 8 - 1.2
7	<i>Geranium</i> 3 - 1.3	<i>Cardamine</i> 5 - 1.8	<i>Astragalus</i> 6 - 1.9	<i>Epilobium</i> 3 - 1.1	<i>Centaurea</i> 5 - 1.1	<i>Dianthus</i> 5-1.1	<i>Poa</i> 7-1.0
8	<i>Epilobium</i> 3 - 1.3	<i>Silene</i> 5 - 1.8	<i>Ranunculus</i> 6 - 1.9	<i>Asperula</i> 3 - 1.1	<i>Lathyrus</i> 5 - 1.1	<i>Geranium</i> 5-1.1	<i>Astragalus</i> 7-1.0
9	<i>Festuca</i> 3 - 1.3	<i>Euphorbia</i> 5 - 1.8	<i>Hypericum</i> 5 - 1.6	<i>Poa</i> 3 - 1.1	<i>Salvia</i> 5 - 1.1	<i>Galium</i> 5-1.1	<i>Salvia</i> 7-1.0
10	<i>Lamium</i> 2 - 1.8	<i>Hypericum</i> 4 - 1.4	<i>Geranium</i> 5 - 1.6	<i>Acer</i> 3 - 1.1	<i>Epilobium</i> 5 - 1.1	<i>Viola</i> 5-1.1	<i>Centaurea</i> 7-1.0
Other	2 - 1.8	4 - 1.4	5 - 1.6	3 - 1.1	5 - 1.1	5-1.1	7-1.0
Genera	198 - 83.9	230 - 81	244 - 78	230 - 83.3	374 - 85.6	378-86.1	572 - 86.2

Survey I, Ekim & İlarıslan (1982); Survey II, Akman & Yurdakulol (1981b); Survey III, Akman & Ketenoğlu (1979); Survey IV, Akman & Yurdakulol (1981a); Survey V, Flora of Gölköy Campus (pers. comm.); Survey VI, Flora of Gölçük Area (pers. comm.); Survey VII, our results.

semi-arid and Mediterranean subhumid types. Therefore, the number of Mediterranean elements in our research area is the second highest. In addition, our results agree with the other floristic research carried out in Bolu (Table 4). The number of Euro-Siberian elements (together with Euxines and Hyrcano-Euxines) is higher than the number of elements of other phytogeographic regions in all surveys, but there are no records of Mediterranean elements in the Flora of Yedigöller Milli Parkı survey (Ekim & İlarıslan, 1982) (Table 4).

With 9222 plant species, Turkey has a rich flora. Among these species 2991 plants are endemic to Turkey and the endemism rate is 33.3% (Güner et al., 2000). The endemism rate of the research area is 8.1%. There could be some reasons for the low endemic rates; according to Davis (1975), the endemism rate of the Euro-Siberian phytogeographic region is lower than that of the other two phytogeographic regions. The presence of our research area in the Euro-Siberian phytogeographic region may be one reason for the low endemic rate. In addition, the research area is not in the endemism centre. Central, East and South Anatolia have high endemic rates, but the endemism rate of the Black Sea region is about 5% (Türe & Tokur, 2000). Although the endemism rate in the study area is lower than the rate of Turkey, there are more endemic species in Abant Nature Park than in other research areas in Bolu (Table 4). Having special microclimatic conditions because of the geographic condition of Abant Nature Park might be the reason for the endemism rate being higher than in other research areas (Table 4). In addition, some endemic

species in the study area are found on serpentine and calcareous soils, such as *Thlaspi lilacinum* Boiss. and A.Huet and *T. jaubertii* Hedge.

The threat category of each taxon was determined by examining their distribution both in Abant Nature Park and in Turkey as a whole. The results are shown in Table 1. The populations of eight taxa are vulnerable, 94 taxa are near threatened, and 442 taxa are in the least concern category. We were unable to collect some taxa cited in the Flora of Turkey (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000) and so they have not been assessed against the criteria. These taxa are indicated in the list as not evaluated (NE).

After the migration of villagers to yaylas, Abant Nature Park is invaded by cattle after May. This heavy grazing causes the populations of plant species to decrease. Some conservation measures should be taken and grazing in the Abant Nature Park should be restricted. If this kind of overgrazing continues, some taxa, especially endemic species found in the vulnerable category, may face a very high risk of extinction in the near future. For example, we collected a few specimens of *Tetragonolobus maritimus* (L.) Roth in the first year of our survey around Abant Lake, but were unable to collect this species in the second year. It completely disappeared because of heavy grazing.

Some hotels around Abant Lake disturb habitats when they create some facilities. For example, the conversion of natural fields to lawns causes a number of species to decrease and also causes the introduction of some alien

Table 4. Comparison of the distribution of species according to their phytogeographic region and their endemism rates in our survey to the results of other studies.

Surveys	Species (#)	Taxon (#)	Endemic Species (#)	Endemic Species (%)	Phytogeographic Regions			
					Euro-Siberian	Mediterranean	Irano-Turanian	Pluriregional
I	236	236	16*	6.7	32.4	-	2.3	55.5*
II	286	286	12*	4.1	27.6*	7.6	3.8	36.7*
III	313	315	16*	5	15.6*	7.6	7.6	66*
IV	276	276	14*	5	31.8	5.3	2.6	55.1
V	437	445	19	4.3	24.7	10.1	4.3	61.1
VI	438	451	15	3.4	32.1	5.5	1.6	60.5
VII	664	677	55	8.1	29.3	5.6	4.7	60.6

Survey I, Ekim & İlarıslan (1982); Survey II, Akman & Yurdakulol (1981b); Survey III, Akman & Ketenođlu (1979); Survey IV, Akman & Yurdakulol (1981a); Survey V, Flora of Gököy Campus (pers. comm.); Survey VI, Flora of Gölçük Area (pers. comm.); Survey VII, our results. * Calculated by us, not given in the survey.

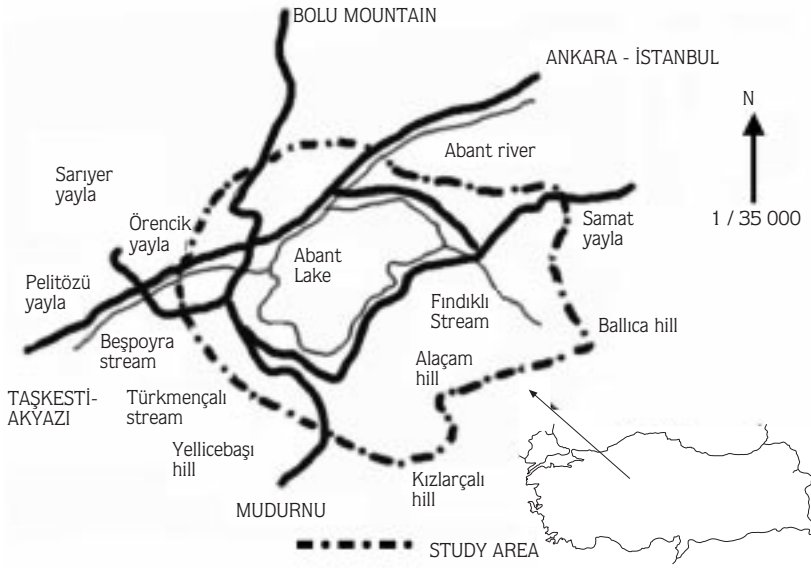


Figure 1. Map of the study area and location of Abant Nature Park (Bolu), Turkey.

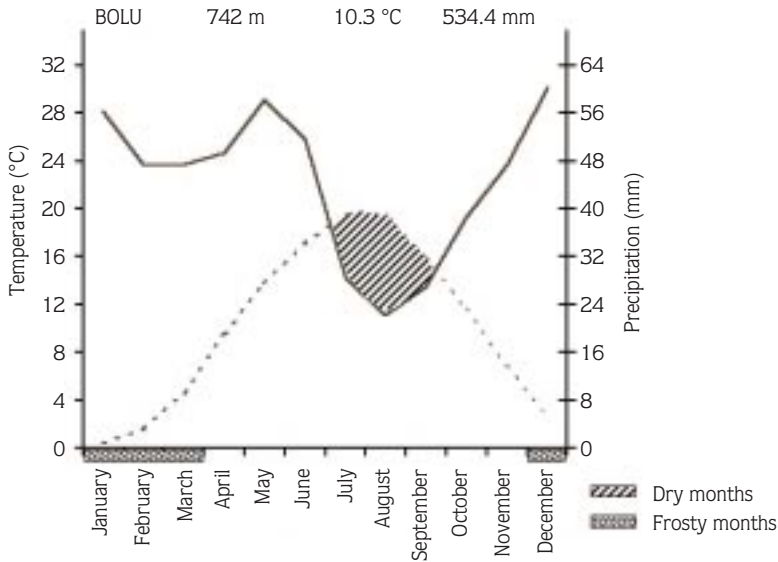


Figure 2. Climatic diagram of Bolu, Turkey.

and weedy species to the area. For instance, *Sonchus oleraceus* L., which is not a record for Bolu and the A3 square, was not collected in the first year of the research, but later it was collected near a grass field created in the second year. A second example was *Centaurea inexpectata* Wagenitz, which is an endemic species. Only one beautiful clump of this species was found in the first year of our survey, but because of the construction of a forest road, this clump was destroyed and disappeared. We think that these kinds of touristic facilities and new constructions around the lake may be dangerous for endemic and other plant species.

Areas around the lake especially on Saturdays and Sundays are exposed to the movement of many people. Such activities bring about the destruction of flora. In addition, picnics also cause environmental pollution.

Some plants with beautiful flowers, for example some species of *Dactylorhiza* Neck. ex Nevski and *Orchis* L., are sold by local people to tourists for commercial purposes. Therefore, the reproduction of these kinds of curious species by seed is decreased. In addition, *Acantholimon acerosum* (Willd.) Boiss. var. *acerosum* forms cushions and individuals of this species are pulled out and sold to

tourists by local villagers because of its decorative shape. Therefore, we assume that the number of this species has decreased.

In this floristic research, 58 new records were obtained for the A3 grid square and a new *Allium* species was recorded, but further studies are needed on these specimens. Consequently, this detailed floristic study contributed to the flora of Bolu, which is planned to be written in the future.

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Acknowledgements

Sincere appreciation is expressed to Dr. M. Dođan for the identification of specimens of the family *Poaceae*, to Dr. H. Duman, Dr. M.T. Babaç and Dr. N. Özhatay for assistance in the identification of several taxa, to N. & N. Uçar for all kinds of support during field work, to Dr. T. Turgut for assisting in data collection and identification, and to Dr. H. Türker for his technical support.

APPENDIX

The Floristic List

PTERIDOPHYTA

EQUISETALES

Equisetaceae

Equisetum hyemale L.

Abant G., D. 37278.

Threat category: NE. Taxon could not be evaluated because it was not collected by the authors, but it is cited in "Flora of Turkey".

E. ramosissimum Desf.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2074 and 1852.

Threat category: LC. Population of this taxon is high in Abant Nature Park. Taxon is not close to qualifying for vulnerable.

E. palustre L.

North of the lake, near the Abant Palace Hotel, 1330 m, 26 v 1995, A.Uçar 1814. South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1968.

Threat category: LC.

E. arvense L.

South-east of the lake, 1320 m, 25 vi 1995, A.Uçar 1765. West of the lake, near the Abant Palace Hotel, 1460 m, 20 iv 1994, A.Uçar 1068.

Threat category: LC.

E. telmateia Ehrh.

North of the lake, near the Abant Palace Hotel, 1330-1340 m, 23 vi 1995, A.Uçar 2042 and 1813.

Threat category: LC.

FILICALES

Hypolepidaceae

Pteridium aquilinum (L.) Kuhn

North of the lake, near the Abant Palace Hotel, 1340 m, 17 viii 1995, A.Uçar 2282. Near the post office, 1350 m, 18 vii 1995, A.Uçar 2085.

Threat category: LC.

Thelypteridaceae

Thelypteris palustris Schott

Abant Lake, D. 37277.

Threat category: NE.

Aspleniaceae

Asplenium trichomanes L.

North slopes facing valley of the ridge behind Abant Palace Hotel, 1350 m, 31 v 1953, M.Özgen 58.

Threat category: NE.

Aspidiaceae

Polystichum aculeatum (L.) Roth

Abant Lake, 25 iv 1947, A.Heilbronn.

Threat category: NE.

Dryopteris filix-mas (L.) Schott

Hills around Abant Lake, 28 viii 1957, T. Baytop ISTE 5060.

Threat category: NE.

D. caucasica Fraser-Jenkins & Corley

Hills around Abant Lake, 28 viii 1957, T. Baytop 5060, (det. M.Coskun).

Hircano-Euxine element. Threat category: NE.

Polypodiaceae

Polypodium vulgare L. subsp. vulgare

Abant Lake, 22 ix 1968, H.Demiriz ISTF 26610.

Threat category: NE.

SPERMATOPHYTA

GYMNOSPERMAE

Pinaceae

Abies nordmanniana (Steven) Spach

subsp. *bornmuelleriana* (Mattf.) Coode & Cullen

North-east of the lake, 1340 m, 07 ix 1994, A.Uçar 1667. South-east of the lake, 1470 m, 20 iv 1994, A.Uçar 1067.

Endemic. Euxine element. Threat category: NT. Taxon is affected by environmental pollution and erosion. It is close to qualifying for vulnerable.

Pinus sylvestris L.

North of the lake, near Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1568. North-east of the lake, 1340 m, 07 ix 1994, A.Uçar 1668.

Euro-Siberian element. Threat category: LC.

Cupressaceae

Juniperus communis L. subsp. *nana* Syme

South of the lake, 1320-1330 m, 17 viii 1995, A.Uçar 2319 and 1146.

Threat category: LC.

ANGIOSPERMAE

DICOTYLEDONES

Ranunculaceae

Helleborus orientalis Lam.

South-west of the lake, 1340 m, 06 v 1994, A.Uçar 1105. North slopes, 1300 m, 22 iii 1994, A.Uçar 1009.

Euxine element. Threat category: LC.

Eranthis hyemalis (L.) Salisb.

Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1082. North slopes, 1390 m, 04 iv 1994, A.Uçar 1018.

Threat category: LC.

Actaea spicata L.

North of the lake, 1330 m, 22 vi 1994, A.Uçar 1401.

Threat category: LC.

Consolida orientalis (Gay) Schröd.

South of the lake, 1330 m, 21 vi 1994, A.Uçar 1369. On, road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2204.

Threat category: LC.

C. regalis Gray subsp. *paniculata* (Host)Soó var. *paniculata*

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2050 and 1884.

Threat category: LC. In all specimens, sepals up to 15 mm long (sepals 9-11 mm long according to the description in the Flora of Turkey).

Anemone blanda Schott & Kotschy

South-east of the lake, 1400 m, 06 v 1994, A.Uçar 1095. North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1754.

Threat category: LC.

Clematis vitalba L.

On road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2382.

Threat category: LC.

Adonis aestivalis L. subsp. *aestivalis*

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1886.

Threat category: LC.

Ranunculus brutius Ten.

North-east of the lake, 1330 m, 14 v 1994, A.Uçar 1135. North of the lake, 1320 m, 25 v 1995, A.Uçar 1735.

Euro-Siberian element. Threat category: LC.

R. repens L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1874. West of the lake, 1330 m, 21 vi 1995, A.Uçar 1926.

Threat category: LC.

R. polyanthemus L.

Surroundings of the lake, 1350 m, 27 viii 1995, N. & E.Özhatay 55920, (det. N.Özhatay) and A. & T.Baytop 32406, (det. A.Baytop).

Threat category: NE.

R. constantinopolitanus (DC.) d'Urv.

Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1084 and 1246. North of the lake, near the Abant Palace Hotel, 1320-1325 m, 26 v 1995, A.Uçar 1789 and 1220.

Threat category: LC.

R. illyricus L. subsp. *illyricus*

On the road to the Antenna tower, 1600 m, 25 v 1995, A.Uçar 1751.

Threat category: LC. In all specimens, plants less than 20 cm long and sepals patent, not reflexed, but according to the description in the Flora of Turkey plants 20-40 cm long and sepals strongly reflexed.

R. gracilis Clarke

West of the lake, 1330-1340 m, 26 v 1995, A.Uçar 1812 and 1832.

Threat category: LC.

R. arvensis L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1847.

Mediterranean and Irano-Turanian element. Threat category: LC.

R. sceleratus L.

Abant Lake, v 1947, Heilbronn & Basarman.

Threat category: NE.

R. lingua L.

Abant Lake, 1350-1400 m, 6 viii 1977, A. aytop and E.Tuzlacı 38304, (det. A.Baytop) and D. 37276.

Threat category: NE.

***R. ficaria** L. subsp. *calthifolius* (Rchb.) Arcang.

North of the lake, near the Abant Palace Hotel, 1320 m, 06 iv 1995, A.Uçar 1695. North slopes, 1340 m, 04 iv 1994, A.Uçar 1025.

Threat category: LC.

***R. trichophyllus** Chaix

West of the lake, 1320 m, 26 v 1995, A.Uçar 1828 and 1827. North of the lake, 1325 m, 04 vi 1994, A.Uçar 1229.

Threat category: LC.

Thalictrum lucidum L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2064 and 1447.

Euro-Siberian element. Threat category: LC.

Nymphaeaceae

Nuphar lutea (L.) Sm.

South-west of the lake, 1320 m, 21 vi 1994, A.Uçar 1384. North-east of the lake, 1320 m, 23 vi 1995, A.Uçar 2041 and 1312.

Threat category: NT. Hotels and picnics around the lake cause water pollution and this taxon may qualify for one of the threatened categories in the future.

Nymphaea alba L.

South-west of the lake, 1320 m, 21 vi 1994, A.Uçar 1383.

Threat category: NT. Hotels and picnics around the lake cause water pollution and this taxon may qualify for one of the threatened categories in the future.

Papaveraceae

Papaver lacerum Popov

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1885.

Threat category: LC.

P. rhoeas L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1883. East of the lake, 1370 m, 04 vi 1994, A.Uçar 1311.

Threat category: LC.

Corydalis solida (L.) Sw. subsp. *solida*

North slopes, 1320 m, 04 iv 1994, A.Uçar 1022. West of the lake, 1325 m, 06 iv 1995, A.Uçar 1697.

Threat category: LC.

C. caucasica DC. subsp. *abantensis* Lidén & Zetterlund

Abant Road, Baytop (ISTE 21359).

Endemic. Threat category: NE.

C. wendelboi Lidén subsp. *congesta* Lidén & Zetterlund

Abant Lake, Baytop (ISTE 24198).

Endemic. Threat category: NE.

***Fumaria microcarpa** Boiss. ex Hausskn.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1773.

Threat category: LC.

Brassicaceae / Cruciferae

***Brassica nigra** (L.) K.Koch

On road to the Antenna tower, 1600 m, 06 ix 1994, A.Uçar 1637.

Threat category: LC.

Sinapis arvensis L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2404 and 2269. East of the lake, 1320 m, 12 xi 1994, A.Uçar 1687.

Threat category: LC.

Conringia orientalis (L.) Andrz.

Abant Lake, 1320-1350 m, 9 vii 1940, Post.

Threat category: NE.

Lepidium campestre (L.) R.Br.

Northwest of the lake, 1350 m, 14 v 1994, A.Uçar 1118. North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1902.

Threat category: LC.

Cardaria draba (L.) Desv. subsp. *draba*

Near the Abant Palace Hotel, 1320 m, 29 v 1994, A.Uçar 1168. East of the lake, 1320-1340 m, 04 vi 1994, A.Uçar 1306 and 1845.

Threat category: LC.

Isatis tinctoria L. subsp. *tomentella* (Boiss.) P.H.Davis

Around the Abant Lake, 1320-1350 m, vii 1956, Şükran Tarcan 4633, (det. A.Baytop).

Threat category: NE.

Aethionema iberideum (Boiss.) Boiss.

Abant Lake, 1700-1720 m, Heilbronn.

Threat category: NE.

Thlaspi perfoliatum L.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1785. West of the lake, 1320 m, 27 iv 1995, A.Uçar 1714.

Threat category: LC.

T. lilacinum Boiss. & A.Huet

North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1758. South-east of the lake, 1400 m, 06 v 1994, A.Uçar 1096.

Endemic. Almost confined to the junction of the Euxine and Irano-Turanian territories. Threat category: NT. Because of overgrazing, this taxon is close to qualifying for vulnerable.

T. jaubertii Hedge

Abant Lake, 1350 m, 9 vii 1940, Post and A. Baytop 37410, (det. A.Baytop).

Endemic. Threat category: NE.

**Capsella bursa-pastoris* (L.) Medik.

Abant Nature Park entrance, 1325 m, 27 iv 1995, A.Uçar 1709. South of the lake, 1425 m, 06 iv 1994, A.Uçar 1034.

Threat category: LC.

Berteroa mutabilis (Vent.) DC.

Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2359.

Threat category: NT. Population of this taxon is very low. All specimens with 3 mm styles (styles 1-2 mm according to the description in the Flora of Turkey).

Alyssum repens Baumg. var. *stenophyllum* Hal.

Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1249. On the road to the Antenna tower, 1750 m, 4 vi 1994, A.Uçar 1270.

Threat category: LC.

A. armenum Boiss.

South-west of the lake, 1320 m, 2 vi 1995, A.Uçar 1962. On the road to the Antenna tower, 1500 m, 19 viii 1995 A.Uçar 2388.

Threat category: LC.

A. sibiricum Willd.

On road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2381.

Threat category: LC.

Draba muralis L.

Abant, 1350 m, 25 v 1977, A.Baytop 36841, (det. A.Baytop).

Threat category: NE.

Erophila verna (L.) Chevall. subsp. *verna*

West of the lake, 1300-1440 m, 04 iv 1994, A.Uçar 1016 and 1045.

Threat category: LC.

Arabis caucasica Willd. subsp. *caucasica*

Near the Abant Göl Gazinosu, 1325 m, 06 iv 1994, A.Uçar 1033. South of the lake, 1320 m, 20 iv 1994, A.Uçar 1039.

Threat category: LC.

A. sagittata (Bertol.) DC.

On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1285.

Threat category: LC.

A. nova Vill.

South-east of the lake, 1450 m, 25 v 1995, A.Uçar 1764. North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1756.

Threat category: LC.

Rorippa sylvestre (L.) Bessey

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1858 and 2049. North of the lake, 1325-1330 m, 22 vi 1994, A.Uçar 1385 and 1644.

Threat category: LC.

Barbarea vulgaris R.Br.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1788-B.

Threat category: LC.

B. trichopoda Hausskn. ex Bornm.

North of the lake, near the Abant Palace Hotel, 1320 m, 06 v 1994, A.Uçar 1071 and 1788-B.

Endemic. Threat category: NT. Taxon is affected by overgrazing.

B. plantaginea DC.

On the road to the Antenna tower, 1750 m, 04 vi 1994 A.Uçar 1267. North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1788-A.

Threat category: LC.

Cardamine bulbifera (L.) Crantz

South of the lake, 1330 m, 26 v 1995, A.Uçar 1809. South-west of the lake, 1340 m, 29 v 1994, A.Uçar 1186.

Euro-Siberian element. Threat category: NT. Distribution and population of this taxon are low.

C. uliginosa M.Bieb.

Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1086.

Threat category: LC.

C. impatiens L. var. *pectinata* (Pall.) Trautv.

Abant Lake, up to 1800 m, Post.

Euro-Siberian element. Threat category: NE.

C. hirsuta L.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1775 and 1069. North-east of the lake, 1325 m, 25 v 1995, A.Uçar 1746.

Threat category: LC. In all specimens, petals 1-1.5 mm and exceeding the sepals but according to the description in the Flora of Turkey, petals 3 mm long and not exceeding the sepals. Further studies are needed.

Sisymbrium officinale (L.) Scop.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2076 and 1891.

Threat category: LC.

**S. altissimum* L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2071.

Threat category: LC.

S. loeselii L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2261.

Threat category: LC.

Resedaceae

Reseda luteola L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 20721. East of the lake, 1330 m, 23 vi 1995, A.Uçar 2030.

Threat category: LC.

Cistaceae

Helianthemum nummularium (L.) Mill. subsp. *nummularium*

Left field at the entrance, 1325 m, 14 vii 1994, A.Uçar 1522. South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1967.

Threat category: LC.

Violaceae

Viola odorata L.

North slopes, 1350 m, 04 iv 1994, A.Uçar 1011-B. West of the lake, 1440 m, 20 iv 1994, A.Uçar 1044.

Threat category: LC.

V. alba Besser subsp. *dehnhardtii* (Ten.) W.Becker

North slopes, 1350 m, 04 iv 1994, A.Uçar 1011-A.

Threat category: LC.

V. sieheana W.Becker

West of the lake, 1320-1440 m, 27 iv 1995, A.Uçar 1715 and 1043. (det. H.Duman).

Threat category: LC.

V. parvula Tineo

North slopes, 1380 m, 04 iv 1994, A.Uçar 1024.

Threat category: LC.

V. kitaibeliana Roem. & Schult.

North of the lake, near the Abant Palace Hotel, 1340 m, 27 iv 1995, A.Uçar 1710. Northwest of the lake, 1340 m, 14 v 1994, A.Uçar 1124. (det. H.Duman).

Threat category: NT. Distribution and population of the taxon are very low.

Polygalaceae

Polygala supina Schreb.

North of the lake, 1340 m, 06 v 1994, A.Uçar 1091. East of the lake, On the road to the Antenna tower, 1700 m, 04 vi 1994, A.Uçar 1273.

Threat category: LC.

P. anatolica Boiss. & Heldr.

North of the lake, near the Abant Palace Hotel, 1320 m, 06 v 1994, A.Uçar 1073. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1209 and 1210.

Threat category: LC.

Caryophyllaceae

Arenaria serpyllifolia L.

North of the lake, near the Abant Palace Hotel, 1350 m, 26 v 1995, A.Uçar 1826. On the road to the Antenna tower, 1650 m, 19 viii 1995, A.Uçar 2367.

Threat category: LC.

Minuartia hirsuta (M.Bieb.) Hand.-Mazz. subsp. *falcata* (Gris.) Mattf.

On the road to the Antenna tower, 1590-1700 m, 04 vi 1994, A.Uçar 1275 and 1974.

Threat category: LC.

M. anatolica (Boiss.) Woron. var. *anatolica*

Around the lake, 1350 m, 27 viii 1995, E. & N.Özhatay 55948, (det. N.Özhatay).

Endemic. Threat category: NE.

Moehringia trinervia (L.) Clairv.

Abant Lake, 1000-1300 m, 4 vi 1977, A.Baytop 37384, (det. A.Baytop).

Threat category: NE.

Stellaria media (L.) Vill. subsp. *media*

South of the lake, 1420 m, 06 iv 1994, A.Uçar 1030. North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1783.

Threat category: LC.

***Cerastium anomalum** Waldst. & Kit.

Northwest of the lake, 1325 m, 14 v 1994, A.Uçar 1120.

Threat category: LC.

C. fontanum Baumg. subsp. *triviale* (Link) J alas

Behind the football pitch, 1320 m, 26 v 1995, A.Uçar 1793.

Threat category: LC.

C. glomeratum Thuill.

Abant Lake, 1350 m, 4 vi 1977, A.Baytop 31402, (det. A.Baytop).

Threat category: NE.

Holosteum marginatum C.A.Mey.

North of the lake, 1340 m, 06 v 1994, A.Uçar 1092. North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1755.

Threat category: LC.

Moenchia mantica (L.) Bartl. subsp. *mantica*

Near the Abant Palace Hotel, 1325 m, 29 v 1994, A.Uçar 1152. (det. H.Duman). West of the lake, 1340 m, 21 vi 1995, A.Uçar 1951.

Threat category: LC.

Dianthus leucophaeus Sibth. & Sm. var. *leucophaeus*

On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1206. (det. H.Duman) and 1294.

Endemic. Threat category: NT. Population of taxon is very low. In all specimens, stem leaves not imbricate.

D. corymbosus Sibth. & Sm.

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2099. North-east of the lake, 1325 m, 19 vii 1995, A.Uçar 2166.

Threat category: LC.

D. carmelitarum Reut. ex Boiss.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2354. Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2365.

Endemic. Euxine element. Threat category: NT. Overgrazing affects the population of this taxon.

In all specimens, bracts shorter than the capitulum, not longer, but all other characters agree with the description of the Flora of Turkey. A lot more specimens should be collected and further studies are necessary.

D. giganteus d'Urv.

Behind the post office, 1330 m, 18 vii 1995, A.Uçar 2089. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2188.

Euro-Siberian element. Threat category: LC. In all specimens, the width of the leaves not more than 1.5 mm and bracts not equal to the capitulum (leaves 2-6 mm broad and bracts usually equalling the capitulum according to the description in the Flora of Turkey).

Petrorhagia alpina (Habl.) Ball & Heywood subsp. *alpina*

Abant Lake, 1350-1700 m, G.Soyerman.

Threat category: NE.

Saponaria glutinosa M.Bieb.

On the road to the Antenna tower, 1600 m, 20 vii 1995, A.Uçar 2213 and 1591.

Threat category: LC.

**Gypsophila pilosa* Huds.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1890.

Irano-Turanian element. Threat category: LC.

Silene italica (L.) Pers.

North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1680. On the road to the Antenna tower, 1600 m, 20 vii 1995, A.Uçar 2210.

Threat category: LC.

**S. marschalli* C.A.Mey.

On the road to Mudurnu, 1450 m, 21 vi 1994, A.Uçar 1375. (det. H.Duman) and 1286. (det. H.Duman).

Threat category: LC.

S. vulgaris (Moench) Garcke var. *vulgaris*

On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1280. South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2297.

Threat category: LC.

S. alba (Mill.) Krause subsp. *divaricata* (Rchb.) Walters

Below Abant Lake, D.37250.

Threat category: NE.

S. noctiflora L.

Abant Lake, 1350 m, 27 vii 1975, A.Baytop 32325, (det. A.Baytop).

Threat category: NE.

Lychnis coronaria (L.) Desr.

Abant, 6 viii 1977, E.Tuzlacı, A.Baytop 38292, (det. A.Baytop).

Euro-Siberian element. Threat category: NE.

Illecebraceae

Herniaria incana Lam.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2349.

Threat category: LC.

Paronychia chionaea Boiss.

On the road to Mudurnu, 1400-1450 m, 14 v 1994, A.Uçar 1149. (det. H.Duman) and 1995.

Endemic. Threat category: LC.

**Scleranthus annuus* L. subsp. *verticillatus* (Tausch) Arcang.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1915.

Threat category: LC.

Polygonaceae

Polygonum amphibium L.

Abant Lake, 1400 m, D. 37289.

Threat category: NE.

P. lapathifolium L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2402 and 2265. South of the lake, 1320 m, 17 viii 1995, A.Uçar 2311.

Threat category: LC.

**P. cognatum* Meissn.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1908.

Threat category: LC.

P. aviculare L.

North-east of the lake, 1320 m, 19 vii 1995, A.Uçar 2151.

Threat category: LC.

**P. bellardii* All.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1888 and 1881.

Threat category: LC.

P. convolvulus L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2077.

Threat category: NT. Taxon has a small distribution and may be affected by environmental pollution.

Rumex acetosella L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1855.

Threat category: LC.

R. tuberosus L. subsp. *tuberosus*

North of the lake, near the Abant Palace Hotel, 1350 m, 29 v 1994, A.Uçar 1166. Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1083.

Threat category: LC.

R. crispus L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2262 and 2267. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 22 vi 1994, A.Uçar 1414.

Threat category: LC.

R. conglomeratus Murray

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2264.

Threat category: LC.

R. hydrolapathum Huds.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1854. North-east of the lake, 1340 m, 04 viii 1994, A.Uçar 1622.

Euro-Siberian element. Threat category: LC.

R. obtusifolius L. subsp. *subalpinus* (Schur) Celak.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2266.

Threat category: LC.

R. nepalensis Spreng.

Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2361.

Threat category: LC.

Chenopodiaceae

Beta trigyna Waldst. & Kit.

South-west of the lake, 1330 m, 21 vi 1994, A.Uçar 1367. East of the lake, 1330 m, 21 vi 1995, A.Uçar 1934.

Threat category: LC.

B. vulgaris L.

Abant road, 1300-1500 m, 1970, A.Baytop 19002, (det. A.Baytop).

Threat category: NE.

Chenopodium botrys L.

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2385.

- Threat category: LC.
- C. foliosum** (Moench) Aschers.
- On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1593. North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2252 and 2075.
- Threat category: LC.
- C. album** L. subsp. **album** var. **album**
- North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2277.
- Threat category: LC.
- Kochia scoparia** (L.) Schrad.
- Abant Lake, 1350 m, ix 1940, B. Post.
- Threat category: NE.
- Amaranthaceae**
- *Amaranthus chlorostachys** Willd.
- North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2259.
- Threat category: LC.
- Hypericaceae / Guttiferae**
- Hypericum lydium** Boiss.
- East of the lake, 1330 m, 23 vi 1995, A.Uçar 2038-A. (det. H.Duman). South-east of the lake, on the road to Mudurnu, 1340 m, 29 v 1994, A.Uçar 1192. (det. H.Duman).
- Irano-Turanian element. Threat category: LC.
- H. venustum** Fenzl
- Abant Lake, 1400 m, D. 37139.
- Threat category: NE.
- H. linarioides** Bosse
- North-east of the lake, 1320 m, 04 vi 1994, A.Uçar 1254. On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1972.
- Threat category: LC.
- H. montbretii** Spach
- Abant Nature Park entrance, 1320 m, 26 vi 1975, A.Baytop 32259, (det. A.Baytop).
- Threat category: NE.
- H. bithynicum** Boiss.
- West of the lake, 1320 m, 21 vi 1995, A.Uçar 1938. North of the lake, 1330 m, 22 vi 1994, A.Uçar 1399.
- Euxine element. Threat category: LC.
- H. originifolium** Willd.
- East of the lake, 1320 m, 18 viii 1995, A.Uçar 2351. On the road to Mudurnu, 1450 m, 21 vi 1994, A.Uçar 1370 and 1292.
- Threat category: LC.
- H. perforatum** L.
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2067. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1331.
- Threat category: LC.
- Malvaceae**
- Malva neglecta** Wallr.
- North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1840 and 1913.
- Threat category: LC.
- Lavatera thuringiaca** L.
- South-east of the lake, near the Abant Köşk Hotel, 1330 m, 14 vii 1994, A.Uçar 1536. Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2363.
- Threat category: LC. In all specimens, stem (not tomentose) differs from the description in the Flora of Turkey (tomentose).
- Alcea pallida** Waldst. & Kit.
- On the road to the Antenna tower, 1600 m, 20 vii 1995, A.Uçar 2216. South-west of the lake, 1330 m, 12 vii 1994, A.Uçar 1477.
- Threat category: LC.
- Linaceae**
- Linum catharticum** L.
- East of the lake, 1320 m, 18 viii 1995, A.Uçar 2345.
- Euro-Siberian element. Threat category: LC.
- Geraniaceae**
- Geranium robertianum** L.
- Left field at the entrance, 1325-1330 m, 22 vi 1994, A.Uçar 1392 and 2142.
- Threat category: LC.
- *G. macrostylum** Boiss.
- On the road to the Antenna tower, 1750 m, 04 vi 1994, A.Uçar 1272.
- Mediterranean element. Threat category: NT. Distribution of this taxon is restricted to high altitudes and there is heavy grazing around this area.
- G. asphodeloides** Burm.f.
- subsp. **asphodeloides**
- Left field at the entrance, 1325 m, 19 vii 1995, A.Uçar 2133. South-west of the lake, 1320 m, 18 vii 1995, A.Uçar 2103.
- Euro-Siberian element. Threat category: LC.
- subsp. **sintenisii** (Freyn) P.H.Davis
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2053. Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1237.
- Endemic. Euxine element. Threat category: LC.
- G. pyrenaicum** Burm.f.
- North of the lake, near the Abant Palace Hotel, 1320 m, 06 v 1994, A.Uçar 1076 and 1905. South-west of the lake, 1330-1340 m, 29 v 1994, A.Uçar 1187 and 1366.
- Threat category: LC.
- *Erodium acaule** (L.) Bech. & Thell.
- Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1080.
- Mediterranean element. Threat category: LC.
- Aceraceae**
- *Acer pseudoplatanus** L.
- North of the lake, near the Abant Palace Hotel, 1320-1325 m, 17 viii 1995, A.Uçar 2288 and 1726.
- Euro-Siberian element. Threat category: LC.
- A. platanoides** L.
- South-east of the lake, near the Abant Köşk Hotel, 1330 m, 06 v 1994, A.Uçar 1112.
- Euro-Siberian element. Threat category: LC.
- A. campestre** L. subsp. **campestre**
- South of the lake, 1330 m, 17 viii 1995, A.Uçar 2316.
- Euro-Siberian element. Threat category: LC.
- Celastraceae**
- Euonymus latifolius** (L.) Mill. subsp. **latifolius**

On the road to Mudurnu, 1380 m, 20 vii 1995, A.Uçar 2217. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 04 viii 1994, A.Uçar 1618.

Euro-Siberian element. Threat category: NT. Population of this taxon is low and it faces overgrazing.

E. europaeus L.

Abant Lake, 1350 m, 28 vii 1975, A.Baytop, A. Meriçi 33661, (det. A.Baytop).

Euro-Siberian element. Threat category: NE.

Fabaceae / Leguminosae

Chamaecytisus hirsutus (L.) Link

South of the lake, 1320 m, 26 v 1995, A.Uçar 1808. South-east of the lake, 1340 m, 06 v 1994, A.Uçar 1103.

Threat category: LC.

C. supinus (L.) Link

East of the lake, 1320 m, 19 vii 1995, A.Uçar 2160. On the road to Mudurnu, 1450 m, 20 vii 1995, A.Uçar 2222-B.

Euro-Siberian element. Threat category: LC. Calyx (in ours 10-11 mm long) differs from the description in the Flora of Turkey (12 mm long or more). Further studies should be performed on these specimens.

Genista lydia Boiss. var. *lydia*

South of the lake, 1340 m, 06 v 1994, A.Uçar 1109. North of the lake, near the Abant Palace Hotel, 1350 m, 29 v 1994, A.Uçar 1167.

Threat category: LC.

Galega officinalis L.

Left field at the entrance, 1325 m, 07 ix 1994, A.Uçar 1645. East of the lake, 1330 m, 03 viii 1994, A.Uçar 1557.

Euro-Siberian element. Threat category: LC.

***Astragalus depressus** L. subsp. *depressus*

South-east of the lake, 1400 m, 06 v 1994, A.Uçar 1097. (det. H.Duman). North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1759.

Threat category: LC. In all specimens, corolla light pink (corolla white according to the description in the Flora of Turkey).

A. glycyphyllos L. subsp. *glycyphylloides* (DC.) Matthews

Left field at the entrance, 1325 m, 22 vi 1994, A.Uçar 1396. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 29 v 1994, A.Uçar 1223.

Euro-Siberian element. Threat category: LC.

A. ptilodes Boiss. var. *ptilodes*

Abant Lake, 14 vii 1946, B. Post.

Endemic. Mediterranean element. Threat category: NE.

A. condensatus Ledeb.

Abant Lake, 1600 m, 15 vii 1978, Akman 9774-İlarslan.

Endemic. Irano-Turanian element. Threat category: NE.

A. brachypterus Fisch.

North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2018. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1216.

Endemic. Threat category: LC. In all specimens, bracteole 12-13 mm long, but, according to the description in the Flora of Turkey, bracteole 10 mm long.

A. squalidus Boiss. & Noë

On the road to the Antenna tower, 1700 m, 04 vi 1994, A.Uçar 1274.

Endemic. Threat category: NT. Distribution and population of this taxon are low. Bracteole 2 in all specimens, but bracteole absent or 1 according to the description in the Flora of Turkey.

A. gymnolobus Fisch.

On the road to the Antenna tower, 1750 m, 04 vi 1994, A.Uçar 1266.

Endemic. Irano-Turanian element. Threat category: NT. Distribution and population of this taxon are low.

Vicia cracca L. subsp. *gerardii* Gaudin

North of the lake, near the Abant Palace Hotel, 1350 m, 26 v 1995, A.Uçar 1819.

Threat category: LC.

V. truncatula Fisch. ex M.Bieb.

North of the lake, near the Abant Palace Hotel, 1325-1350 m, 26 v 1995, A.Uçar 1820 and 1231.

Euro-Siberian element. Threat category: LC.

V. pannonica Crantz

var. *pannonica*

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2249.

Threat category: LC. All specimens with mucronate leaflets (leaflets obtuse, truncate or retuse according to the description in the Flora of Turkey).

var. *purpurascens* (DC.) Ser.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1893.

Threat category: LC. All specimens with mucronate leaflets (leaflets obtuse, truncate or retuse according to the description in the Flora of Turkey).

***V. sativa** L. subsp. *nigra* (L.) Ehrh. var. *nigra*

Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1340.

Threat category: LC.

Lathyrus aureus (Steven) D.Brândza

On the road to Mudurnu, 1370 m, 29 v 1994, A.Uçar 1195.

Euxine element. Threat category: LC.

L. digitatus (M.Bieb.) Fiori

West of the lake, 1330 m, 26 v 1995, A.Uçar 1811. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1203.

Mediterranean element. Threat category: LC.

L. tukhtensis Czecczott

Abant Lake, 1360 m, 27 vi 1975, A.Baytop 32363, (det. A.Baytop).

Endemic. Threat category: NE.

L. pratensis L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21/06/95, A. Uçar 1859. Left field at the entrance, 1325 m, 22 vi 1994, A.Uçar 1390.

Euro-Siberian element. Threat category: LC.

L. laxiflorus (Desf.) Kuntze subsp. *laxiflorus*

Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1248. East of the lake, 1330 m, 21 vi 1995, A.Uçar 1936.

- Threat category: LC.
- L. nissolia** L.
- North of the lake, 1320 m, 21 vi 1994, A.Uçar 1352.
- Threat category: NT. Population of this taxon is low and affected by heavy grazing.
- Ononis spinosa** L. subsp. **leiosperma** (Boiss.) Sirj.
- On the road to the Antenna tower, 1600 m, 06 ix 1994, A.Uçar 1633. North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1456.
- Threat category: LC.
- Trifolium repens** L. var. **repens**
- North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1679. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2194.
- Threat category: LC.
- T. hybridum** L. var. **hybridum**
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1906.
- Threat category: LC.
- T. rytidosemium** Boiss. & Hohen. var. **rytidosemium**
- Abant Lake, 1350-1500 m, 9 vi 1940, B.Post.
- Hyrcano-Euxine element. Threat category: NE.
- T. spadiceum** L.
- Left field at the entrance, 1325 m, 04 viii 1994, A.Uçar 1609. East of the lake, 1320 m, 18 viii 1995, A.Uçar 2341.
- Euro-Siberian element. Threat category: LC.
- T. campestre** Schreb.
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2052. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1329.
- Threat category: LC.
- T. fragiferum** L. var. **fragiferum**
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1889.
- Threat category: NT. Taxon will become vulnerable if heavy grazing continues.
- T. physodes** Steven ex M.Bieb. var. **physodes**
- West of the lake, 1350 m, 29 v 1994, A.Uçar 1180.
- Mediterranean element. Threat category: LC.
- T. pannonicum** Jacq. subsp. **elongatum** (Willd.) D.Zohary
- West of the lake, 1320 m, 21 vi 1995, A.Uçar 1944. North-east of the lake, 1340 m, 04 vi 1994, A.Uçar 1262.
- Endemic. Threat category: NT. Population of this taxon is decreasing each year because of overgrazing.
- T. pratense** L. subsp. **pratense**
- West of the lake, 1320 m, 21 vi 1995, A.Uçar 1945. North of the lake, near the Abant Palace Hotel, 1320-1325 m, 18 vii 1995, A.Uçar 2066 and 1158.
- Threat category: LC.
- T. arvense** L. var. **arvense**
- North of the lake, 1320 m, 21 vi 1994, A.Uçar 1380.
- Threat category: LC.
- Melilotus officinalis** (L.) Desr.
- Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1339. On the road to Mudurnu, 1380-1400 m, 20 vii 1995, A.Uçar 2219 and 1641.
- Threat category: LC.
- ***Medicago orbicularis** (L.) Bartal.
- North of the lake, near the Abant Palace Hotel, 1320-1325 m, 21 vi 1995, A.Uçar 1850 and 1159.
- Threat category: LC. Stem more than 40 cm long in all specimens, but according to the description in the Flora of Turkey stem 10-40 cm long.
- M. lupulina** L.
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2054 and 1875. East of the lake, 1340 m, 22 vi 1994, A.Uçar 1420.
- Threat category: LC.
- M. sativa** L. subsp. **sativa**
- Near the Turban Hotel, 1320 m, 12 xi 1994, A.Uçar 1690. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2193.
- Threat category: LC.
- M. x varia** Martyn
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2068.
- Threat category: NT. Heavy grazing has caused the distribution and population of this taxon to decrease.
- Dorycnium graecum** (L.) Ser.
- South-east of the lake, near the Abant Köşk Hotel, 1330 m, 22 vi 1994, A.Uçar 1409.
- Euxine element. Threat category: LC.
- D. pentaphyllum** Scop. subsp. **herbaceum** (Vill.) Rouy
- South-west of the lake, 1320, 17 viii 1995, A.Uçar 2295. On the road to Mudurnu, 1450 m, 21 vi 1994, A.Uçar 1373 and 1581.
- Threat category: LC.
- Lotus corniculatus** L.
- var. **corniculatus**
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1914. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2208.
- Threat category: LC. In all specimens, umbels 2-5-flowered and leaflets c. 7 x 3 mm (umbels (3)4-7-flowered and leaflets larger than the 7 x 3 mm according to the description in the Flora of Turkey).
- var. **alpinus** Ser.
- Abant Lake, 1350-1500 m, 6 vii 1940, B. Post.
- Threat category: NE.
- Tetragonolobus maritimus** (L.) Roth
- West of the lake, 1340 m, 29 v 1994, A.Uçar 1169. (det. H.Duman).
- Threat category: VU. Distribution and population of this taxon are very low. Overgrazing and environmental pollution will cause a high risk of extinction of this taxon in the Abant Nature Park in the medium-term future. Corolla much longer than the calyx but corolla slightly shorter than calyx according to the description in the Flora of Turkey.
- Anthyllis vulneraria** L. subsp. **boissieri** (Sageret) Bornm.
- East of the lake, 1330 m, 22 vi 1994, A.Uçar 1416. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1293.

- Threat category: LC.
- *Coronilla scorpioides** (L.) K.Koch
- North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2276.
- Threat category: LC.
- C. varia** L. subsp. *varia*
- South-west of the lake, 1330 m, 21 vi 1994, A.Uçar 1364. Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2002.
- Threat category: LC.
- Onobrychis oxyodonta** Boiss.
- Near the Antenna tower, 1750 m, 04 vi 1994, A.Uçar 1265.
- Threat category: LC.
- O. montana** DC. subsp. *cadmea* (Boiss.) P.W.Ball
- Abant, 1650 m, 15 vi 1979, Akman 9693-İlarslan.
- Threat category: NE.
- Rosaceae**
- Prunus x domestica** L.
- East of the lake, 1330 m, 18 viii 1995, A.Uçar 2328 and 2029. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 04 viii 1994, A.Uçar 1617 and 1224.
- Threat category: LC.
- Cerasus avium** (L.) Moench
- North of the lake, near the Turban Hotel, 1330 m, 9 vii 1995, A.Uçar 2138.
- Threat category: LC.
- *C. vulgaris** Mill.
- Left field at the entrance, 1325 m, 06 v 1994, A.Uçar 1088. West of the lake, 1330 m, 20 iv 1994, A.Uçar 1065.
- Threat category: LC.
- Filipendula vulgaris** Moench
- West of the lake, 1340 m, 21 vi 1995, A.Uçar 1950. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1337.
- Euro-Siberian element. Threat category: LC.
- F. ulmaria** (L.) Maxim.
- North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2070 and 2263.
- Euro-Siberian element. Threat category: LC.
- Rubus caesius** L.
- East of the lake, 1330 m, 22 vi 1994, A.Uçar 1437. On the road to Mudurnu, 1450 m, 21 vi 1994, A.Uçar 1376.
- Threat category: LC.
- R. canescens** DC. var. *canescens*
- South-west of the lake, 1320 m, 18 vii 1995, A.Uçar 2129.
- Euro-Siberian element. Threat category: LC. All specimens with hirsute turions (turions pubescent or glabrescent according to the description in the Flora of Turkey).
- R. hirtus** Waldst. & Kit.
- South-west of the lake, 1320-1330 m, 18 vii 1995, A.Uçar 2128 and 1368. Left field at the entrance, 1325 m, 19 vii 1995, A.Uçar 2135.
- Euro-Siberian element. Threat category: LC.
- R. canescens** DC. X **R. discolor** Weihe & Nees
- Abant Lake, Sorger 70 iii 1925.
- Threat category: NE.
- Potentilla palustris** (L.) Scop.
- North-east of the lake, 1320 m, 23 vi 1995, A.Uçar 2010 and 1378.
- Threat category: NT. Distribution of this taxon is low.
- P. argentea** L.
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1916. North of the lake, 1320 m, 21 vi 1994, A.Uçar 1347.
- Threat category: LC.
- P. astracantha** Jacq.
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1900 and 1466. On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1976.
- Euro-Siberian element. Threat category: LC.
- P. humifusa** Willd.
- Abant, 1500 m, 15 vii 1978, Akman 9760-İlarslan.
- Euro-Siberian element. Threat category: NE.
- P. reptans** L.
- Right field at the entrance, 1325 m, 03 viii 1994, A.Uçar 1547. West of the lake, 1330 m, 12 vii 1994, A.Uçar 1473.
- Threat category: LC.
- P. micrantha** Ramond ex DC.
- North slopes, 1380 m, 04 iv 1994, A.Uçar 1014. Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1079.
- Threat category: LC.
- Fragaria vesca** L.
- North of the lake, near the Abant Palace Hotel, 1360 m, 29 v 1994, A.Uçar 1164. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1282.
- Threat category: LC.
- Geum urbanum** L.
- Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2003. East of the lake, 1340 m, 21 vi 1995, A.Uçar 1925 and 1419.
- Euro-Siberian element. Threat category: LC.
- Agrimonia eupatoria** L.
- South-west of the lake, 1330 m, 18 vii 1995, A.Uçar 2104. North-east of the lake, 1330 m, 07 ix 1994, A.Uçar 1649.
- Threat category: LC.
- A. repens** L.
- Left field at the entrance, 1325 m, 04 viii 1994, A.Uçar 1606. North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2065 and 1443.
- Threat category: LC.
- Aremonia agrimonoides** (L.) DC.
- Abant Lake, up to 1600 m, Demiriz 4848.
- Euro-Siberian element. Threat category: NE.
- Sanguisorba minor** Scop. subsp. *muricata* (Spach) Briq.
- South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1970.
- Threat category: LC.
- Alchemilla compactilis** Juz.
- North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1796. East of the lake, 1330 m, 21 vi 1995, A.Uçar 1927.

Threat category: LC. In all specimens, stem up to and including the main inflorescence-branches and all petioles with patent hairs (stem up to and including the main inflorescence-branches and all petioles with deflexed hairs according to the description in the Flora of Turkey).

A. mollis (Buser) Rothm.

Northwest of the lake, 1325-1340 m, 21 vi 1995, A.Uçar 1955-B and 1482. Near the post office, 1330 m, 18 vii 1995, A.Uçar 2093.

Threat category: LC.

A. stricta Rothm.

West of the lake, on the yayla road, 1350 m, 26 v 1995, A.Uçar 1833. Northwest of the lake, 1340 m, 21 vi 1995, A.Uçar 1955-A.

Threat category: LC. In all specimens, stem is shorter (up to 10 cm long) than the 17 cm that is described in the Flora of Turkey.

Rosa horrida Fisch.

Abant Lake, 1700 m, Sorger 69 v 1929.

Threat category: NE.

R. canina L.

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1565. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1300.

Threat category: LC.

Mespilus germanica L.

North-east of the lake, 1330 m, 04 viii 1994, A.Uçar 1619.

Hyrano-Euxine element. Threat category: LC.

Pyracantha coccinea Roem.

North of the lake, 1325 m, 22 vi 1994, A.Uçar 1397. On the road to Mudurnu, 1320 m, 12 xi 1994, A.Uçar 1692.

Threat category: LC.

Crataegus tanacetifolia (Lam.) Pers.

South of the lake, 1320 m, 2 vii 1994, A.Uçar 1492. Left field at the entrance, 1325 m, 15 ix 1995, A.Uçar 2431 and 1315.

Endemic. Threat category: NT. Population of this taxon is low.

**C. rhipidophylla* Gand., Bull. Soc. Bot. France 18: 447 1871

var. *rhipidophylla*

Syn.: *C. curvisepala* Lindman, Svensk Fanerogamfl. 307, t.189(1918).

Northwest of the lake, 1325 m, 29 v 1994, A.Uçar 1225. South of the lake, 1320 m, 12 vii 1994, A.Uçar 1493.

Threat category: LC. All specimens have red fruits, which differs from the description of *C. curvisepala* in the Flora of Turkey (fruits dark purple in *C. curvisepala*). In *C. rhipidophylla*, fruits may be red or purple (Christensen, 1992).

Sorbus umbellata (Desf.) Fritsch var. *umbellata*

South of the lake, 1320 m, 07 ix 1994, A.Uçar 1665. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1299.

Threat category: LC.

S. torminalis (L.) Crantz var. *torminalis*

North-east of the lake, 1325 m, 07 ix 1994, A.Uçar 1662. On the road to Mudurnu, 1370 m, 29 v 1994, A.Uçar 1194.

Euro-Siberian element (?). Threat category: LC.

Malus sylvestris Mill. subsp. *orientalis* (Uglitzk.) Browicz var. *orientalis*

East of the lake, 1330 m, 03 viii 1994, A.Uçar 1561. South-west of the lake, 1320 m, 12 xi 1994, A.Uçar 1693.

Threat category: LC.

Pyrus communis L.

subsp. *caucasica*

South of the lake, 1320 m, 14 v 1994, A.Uçar 1145.

Threat category: LC.

subsp. *sativa* (DC.) Hegi

North of the lake, near the Turban Hotel, 1330 m, 18 viii 1995, A.Uçar 2334.

Threat category: LC.

P. elaeagnifolia Pall. subsp. *elaeagnifolia*

East of the lake, 1325 m, 07 ix 1994, A.Uçar 1661. South of the lake, 1325 m, 14 v 94, A.Uçar 1143.

Threat category: LC.

Lythraceae

Lythrum salicaria L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 vii 1994, A.Uçar 1541 and A.Uçar 1450. West of the lake, 1320 m, 19 vii 1995, A.Uçar 2175.

Euro-Siberian element. Threat category: LC.

Onagraceae

Epilobium angustifolium L.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2245. North of the lake, near the Abant Palace Hotel, 1330 m, 22 vi 1994, A.Uçar 1413.

Threat category: LC.

E. hirsutum L.

North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1448.

Threat category: NT. Taxon is affected by the construction of facilities and roads, and heavy grazing.

E. parviflorum Schreb.

West of the lake, 1320 m, 19 vii 1995, A.Uçar 2174. East of the lake, 1330 m, 03 viii 1994, A.Uçar 1553.

Threat category: LC.

E. montanum L.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1423. North-east of the lake, 1325 m, 19 vii 1995, A.Uçar 2172.

Euro-Siberian element. Threat category: LC.

E. tetragonum L. subsp. *tetragonum*

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2047 and 2062. North-east of the lake, 1320 m, 19 vii 1995, A.Uçar 2150.

Threat category: LC. In all specimens, stem crisped hairy (stem glabrous according to the description in the Flora of Turkey).

E. algidum M.Bieb.

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2100. North-east of the lake, 1325 m, 19 vii 1995, A.Uçar 2173.

Euxine element. Threat category: LC.

Haloragidaceae

Myriophyllum spicatum L.

Abant Lake, D. 32875.

Threat category: NE.

Crassulaceae

Sedum sartorianum Boiss. subsp. **sartorianum**

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1436. On the road to Mudurnu, 1325 m, 12 vii 1994, A.Uçar 1495.

Threat category: LC.

S. album L.

On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2189.

Threat category: LC.

S. pallidum M.Bieb. var. **pallidum**

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 22 vi 1994, A.Uçar 1410. North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1460 and 1894.

Threat category: LC.

Saxifragaceae

Saxifraga rotundifolia L.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1429.

Euro-Siberian element. Threat category: NT. Distribution and population of this taxon are very low.

S. cymbalaria L. var. **cymbalaria**

South of the lake, 1325 m, 04 viii 1994, A.Uçar 1612.

Threat category: NT. Distribution and population of this taxon are very low.

Parnassiaceae

Parnassia palustris L.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2344.

Threat category: NT. Picnics and environmental pollution affect the population, and this taxon may become threatened in the near future.

Apiaceae / Umbelliferae

Sanicula europaea L.

West of the lake, 1320 m, 21 vi 1995, A.Uçar 1948. South-west of the lake, 1340 m, 29 v 1994, A.Uçar 1199.

Euro-Siberian element. Threat category: LC.

Astrantia maxima Pall. subsp. **haradjianii** (I.Grint.) Rech.f.

South-west of the lake, 1320 m, 18 vii 1995, A.Uçar 2125. South of the lake, 1320 m, 12 vii 1994, A.Uçar 1488.

Endemic. Threat category: NT. Environmental pollution affects this taxon. Population is low.

Eryngium giganteum M.Bieb.

Abant Nature Park entrance, 1325 m, 05 ix 1995, A.Uçar 2440.

Euxine element. Threat category: LC.

E. bithynicum Boiss.

On the road to Mudurnu, 1450 m, 03 viii 1994, A.Uçar 1582 and A.Uçar 2225.

Endemic. Irano-Turanian element. Threat category: NT. Population of this taxon is low and is restricted to high altitudes.

E. campestre L. var. **virens** Link

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2398.

Endemic. Threat category: NT. Taxon is affected by the construction of touristic facilities and roads. Some bracteoles c. 3 mm, but bracteoles usually 1-2 mm broad according to the description in the Flora of Turkey.

Chaerophyllum byzantinum Boiss.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2240. South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2293 and 2118.

Euxine element. Threat category: LC.

Scandix pecten-veneris L.

West of the lake, 1320, 26 v 1995, A.Uçar 1839. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1208.

Threat category: LC.

Bifora radians M.Bieb.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1844.

Threat category: LC.

Smyrniium perfoliatum L.

East of the lake, 1330 m, 21 vi 1995, A.Uçar 1924. Around Samat yayla, 1330 m, 13 vii 1995, A.Uçar 2044.

Threat category: LC.

Pimpinella saxifraga L.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 15 ix 1995, A.Uçar 2438. North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2406.

Threat category: LC.

Sium sisarum L. var. **lancifolium** (M.Bieb.) Thell.

Left field at the entrance, 1325 m, 18 viii 1995, A.Uçar 2330.

Threat category: LC.

Oenanthe silaifolia M.Bieb.

North of the lake, near the Abant Palace Hotel, 1320-1325 m, 14 ix 1995, A.Uçar 2399 and 1395.

Threat category: LC.

Physospermum cornubiense (L.) DC.

South-west of the lake, 1320 m, 21 vi 1994, A.Uçar 1362. (det. H.Duman).

Threat category: LC.

Bupleurum falcatum L. subsp. **cernuum** (Ten.) Arcang.

On the road to Mudurnu, 1380 m, 19 viii 1995, A.Uçar 2394.

Threat category: LC.

Angelica sylvestris L. var. **sylvestris**

Left field at the entrance, 1325 m, 04 viii 1994, A.Uçar 1608 and 2329. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 15 ix 1995, A.Uçar 2439.

Euro-Siberian element. Threat category: LC.

Peucedanum aegopodioides (Boiss.) Vandas

Abant, 1350 m, 8 viii 1970, A & T.Baytop 18417.

Euro-Siberian element. Threat category: LC.

Pastinaca sativa L. subsp. **urens** (Req. ex Godr.) Celak.

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 15731 and 2256. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2246.

Threat category: LC.

- Torilis leptophylla** (L.) Rchb.
West of the lake, Örencik yayla road, 1320 m, 21 vi 1995, A.Uçar 1923.
Threat category: LC.
- Turgenia latifolia** (L.) Hoffm.
North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1846.
Threat category: LC.
- Daucus carota** L.
North of the lake, near the Abant Palace Hotel, 1340 m, 17 viii 1995, A.Uçar 2283. Near the Turban Hotel, 1330 m, 14 vii 1994, A.Uçar 1515.
Threat category: LC.
- Cornaceae**
- Cornus mas** L.
Abant road, 6 x 1961, A. & T.Baytop 6894, (det. F.Yalırık, 1966).
Threat category: NE.
- Caprifoliaceae**
- Sambucus ebulus** L.
North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1549 and 1463. South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2294.
Euro-Siberian element. Threat category: LC.
- S. nigra** L.
East of the lake, 1330 m, 22 vi 1994, A.Uçar 1415 and 1552.
Euro-Siberian element. Threat category: NT. Distribution of this taxon is low.
- Viburnum lantana** L.
On the road to Mudurnu, 1450 m, 14 v 1994, A.Uçar 1148. On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1592.
Euro-Siberian element. Threat category: LC.
- Lonicera caucasica** Pall. subsp. **orientalis** (Lam.) Chamb. & Long
Above Mudurnu, D. 37023.
Endemic. Threat category: NE.
- Rubiaceae**
- Asperula pestalozzae** Boiss.
On the road to Mudurnu, 1325-1400 m, 12 vii 1994, A.Uçar 1494 and 1984.
Endemic. Euxine element. Threat category: NT. Taxon should be protected from heavy grazing.
- A. taurina** L. subsp. **taurina**
North-east of the lake, 1340 m, 04 vi 1994, A.Uçar 1258.
Threat category: LC.
- A. involucrata** Wahlenb.
East of the lake, 1330 m, 21 vi 1995, A.Uçar 1933. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1212.
Euxine element. Threat category: LC.
- Galium rotundifolium** L.
Left field at the entrance, 1320-1325 m, 23 vi 1995, A.Uçar 2007 and 1391.
Euro-Siberian element. Threat category: LC.
- G. odoratum** (L.) Scop.
North of the lake, 1320 m, 25 v 1995, A.Uçar 1736. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 14 v 1994, A.Uçar 1129.
Euro-Siberian element. Threat category: LC.
- G. debile** Desf.
North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2056 and 1873.
Mediterranean element. Threat category: LC.
- G. elongatum** C. Presl
North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1454.
Euro-Siberian element. Threat category: LC.
- G. verum** L. subsp. **verum**
West of the lake, 1320 m, 12 vii 1994, A.Uçar 1472 and 1943.
Euro-Siberian element. Threat category: LC.
- G. album** Mill. subsp. **prusense** (C.Koch) Ehrend. & Krendl
East of the lake, 1330 m, 23 vi 1995, A.Uçar 2037 and 1528. On the road to Mudurnu, 1400-1450 m, 20 vii 1995, A.Uçar 2233 and 1982.
Threat category: LC. In all specimens, leaves 7 x 1 mm (leaves 10-30(-40) x 1-6 mm according to the description in the Flora of Turkey).
- G. paschale** Forssk.
Mudurnu to Abant, Akman 9375.
Mediterranean element. Threat category: NE.
- G. aparine** L.
North of the lake, near the Abant Palace Hotel, 1320-1325 m, 21 vi 1995, A.Uçar 1907 and 1240. North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2017.
Threat category: LC.
- Cruciata laevipes** Opiz
Abant Lake, 1400 m, Sorger 69-4-108.
Euro-Siberian element. Threat category: NE.
- C. taurica** (Pall. ex Willd.) Ehrend.
On the road to the Antenna tower, 1600-1750 m, 25 v 1995, A.Uçar 1752 and 1269. On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1213.
Irano-Turanian element. Threat category: LC.
- Valerianaceae**
- Valeriana alliarifolia** Adams
Abant, 04 vi 1977, A.Baytop 37389, (det. A.Baytop).
Threat category: NE.
- V. officinalis** L.
Abant Lake, 1400 m, D.37141.
Threat category: NE.
- Centranthus longiflorus** Steven subsp. **longiflorus**
Around Abant Lake, vii/1956, Şükran Tarcan 4642, (det. N.Özhatay).
Irano-Turanian element. Threat category: NE.
- *Valerianella locusta** (L.) Laterr.
North of the lake, near the Abant Palace Hotel, 1350 m, 26 v 1995, A.Uçar 1823.
Euro-Siberian element. Threat category: LC.
- *V. carinata** Loisel.
South-east of the lake, near the Abant Köşk Hotel, 1330 m, 14 v 1994, A.Uçar 1130. (det. H.Duman).

- Threat category: LC.
- Dipsacaceae**
- Dipsacus laciniatus** L.
- North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1564 and 1458.
- Threat category: LC.
- Scabiosa columbaria** L.
- subsp. *ochroleuca* (L.) Celak. var. *ochroleuca* (L.) Coult.
- On the road to Mudurnu, 1400-1450 m, 12 vii 1994, A.Uçar 1497 and 1580. On the road to the Antenna tower, 1600 m, 14 ix 1995, A.Uçar 2424.
- Threat category: LC.
- Asteraceae / Compositae**
- Inula oculus-christi** L.
- East of the lake, 1320 m, 21 vi 1995, A.Uçar 1942. South-west of the lake, 1400 m, 21 vi 1994, A.Uçar 1360.
- Euro-Siberian element(?). Threat category: LC.
- I. thapsoides** (M.Bieb. ex Willd.) Spreng. subsp. *thapsoides*
- On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2380.
- Threat category: LC.
- Pulicaria dysenterica** (L.) Bernh.
- North of the lake, near the Turban Hotel, 1330 m, 18 viii 1995, A.Uçar 2337. Northwest of the lake, 1330 m, 06 ix 1994, A.Uçar 1629.
- Threat category: LC.
- Helichrysum graveolens** (M.Bieb.) Sweet
- Abant Lake, 1300-1700 m, vii/1956, Şükran Tarcan 4639, (det. A.Baytop).
- Threat category: NE.
- H. plicatum** DC. subsp. *plicatum*
- On the road to the Antenna tower, 1750 m, 12 vii 1994, A.Uçar 1505 and 1506.
- Threat category: NT. Distribution and population of this taxon are very low and it is restricted to high altitudes.
- H. arenarium** (L.) Moench subsp. *aucheri* (Boiss.) P.H.Davis & Kupicha
- West of the lake, 1320 m, 18 vii 1995, A.Uçar 2102. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2195.
- Endemic (?). Irano-Turanian element.
- Threat category: NT. This taxon can only be found at high altitudes and it is facing overgrazing.
- Erigeron acer** L. subsp. *acer*
- West of the lake, 1320 m, 29 v 1994, A.Uçar 1176. On the road to the Antenna tower, 1600 m, 14 ix 1995, A.Uçar 2425.
- Threat category: NT. Population of this taxon is very low because of pollution and the construction of facilities.
- Bellis perennis** L.
- North of the lake, near the Abant Palace Hotel, 1320-1410 m, 12 xi 1994, A.Uçar 1681 and 1013. East of the lake, 1320-1560 m, 07 ix 1994, A.Uçar 1654 and 1032.
- Euro-Siberian element. Threat category: LC.
- Doronicum orientale** Hoffm.
- South of the lake, 1320 m, 26 v 1995, A.Uçar 1807. West of the lake, 1490 m, 20 iv 1994, A.Uçar 1052.
- Threat category: LC.
- Senecio paludosus** L.
- North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1449.
- Euro-Siberian element. Threat category: LC.
- S. dorio** L. subsp. *umbrosus* (Waldst. & Kit.) Soó
- East of the lake, 1330 m, 18 viii 1995, A.Uçar 2327.
- Euro-Siberian element. Threat category: NT. Population of this taxon is found only in one specific area in Abant Nature Park. Capitula less than 1 cm wide but, capitula 2-2.5 cm wide according to the description in the Flora of Turkey. Further studies should be carried out on these specimens.
- S. vulgaris** L.
- East of the lake, 1330 m, 03 viii 1994, A.Uçar 1556. North-east of the lake, 1320 m, 19 vii 1995, A.Uçar 2145 and 2012.
- Threat category: LC.
- S. vernalis** Waldst. & Kit.
- Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1327.
- Threat category: LC.
- Tussilago farfara** L.
- Örencik yayla road, 1460 m, 20 iv 1994, A.Uçar 1058. North slopes, 1300 m, 22 iii 1994, A.Uçar 1007.
- Euro-Siberian element. Threat category: LC.
- Petasites hybridus** (L.) Gaertn.
- East of the lake, 1320 m, 27 iv 1995, A.Uçar 1725. South-west of the lake, 1320 m, 20 iv 1994, A.Uçar 1064.
- Euro-Siberian element. Threat category: LC.
- Anthemis cotula** L.
- North of the lake, near the Abant Palace Hotel, 1320-1340 m, 17 viii 1995, A.Uçar 2285 and 2248.
- Threat category: LC.
- A. tinctoria** L.
- var. *discoidea* (All.) DC.
- North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1676 and 1912. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2191.
- Threat category: LC.
- var. *pallida* DC.
- North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1892.
- Threat category: LC.
- Achillea grandifolia** Friv.
- On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1971.
- Threat category: NT. Population and distribution of this taxon are very low. Stem velutinous and leaves villous (stem and leaves pubescent according to the description in the Flora of Turkey).
- A. millefolium** L. subsp. *millefolium*
- Around the Abant Lake, 1350 m, 6 x 1972, A.&T.Baytop 23591, (det. A.Baytop).
- Euro-Siberian element. Threat category: NE.
- A. setacea** Waldst. & Kit.
- Around the Abant Lake, 1300-1700 m, vii/1956, Şükran Tarcan 4634, (det. A.Baytop).
- Euro-Siberian element. Threat category: NE.

A. nobilis L. subsp. *neilreichii* (A.Kern.) Formáneek

North of the lake, near the Abant Palace Hotel, 1335-1340 m, 14 ix 1995, A.Uçar 2407 and 2284. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2202.

Euro-Siberian element. Threat category: LC.

Tripleurospermum rosellum (Boiss. & Orph.) Hayek var. *album* E.Hossain

Left field at the entrance, 1320 m, 25 v 1995, A.Uçar 1729. On the road to the Antenna tower, 1590-1600 m, 25 v 1995, A.Uçar 1766 and 1978.

Endemic. Threat category: NT. This species should be protected from heavy grazing.

T. conoclinium (Boiss. & Balansa) Hayek

North-east of the lake, 1320 m, 03 viii 1994, A.Uçar 1570. Around the Antenna tower, 1740 m, 19 viii 1995, A.Uçar 2373.

Endemic. Threat category: NT. Species is subjected to heavy grazing.

T. tenuifolium (Kit.) Freyn

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2272.

Euro-Siberian element. Threat category: LC.

T. sevanense (Manden.) Pobed.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1865 and 1909. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2203.

Threat category: LC.

T. callosum (Boiss. & Heldr.) E.Hossain

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2097. On the road to the Antenna tower, 1700 m, 19 viii 1995, A.Uçar 2395.

Endemic. Threat category: NT. Taxon is facing overgrazing.

Arctium minus (Hill) Bernh. subsp. *minus*

Abant Lake, 1400 m, Sorger 69-4-21.

Threat category: NE.

Onopordum tauricum Willd.

On the road to the Antenna tower, 1600 m, 14 ix 1995, A.Uçar 2414.

Euro-Siberian element. Threat category: LC.

Cirsium ligulare Boiss.

Left field at the entrance, 1325 m, 07 ix 1994, A.Uçar 1659. Near the Turban Hotel, 1330 m, 14 vii 1994, A.Uçar 1516.

Threat category: LC. In all specimens, width of the appendage of the median phyllaries less than 2 mm, but appendage (1.6-) 2-3.5 mm wide according to the description in the Flora of Turkey.

C. vulgare (Savi) Ten.

Left field at the entrance, 1325 m, 07 ix 1994, A.Uçar 1658.

Threat category: LC.

C. hypoleucum DC.

Left field at the entrance, 1325 m, 22 vi 1994, A.Uçar 1393.

Euxine element. Threat category: LC.

C. canum (L.) All.

Left field at the entrance, 1325 m, 07 ix 1994, A.Uçar 1650. South-west of the lake, 1320 m, 07 ix 1994, A.Uçar 1669.

Euro-Siberian element. Threat category: LC.

C. arvense (L.) Scop.

subsp. *arvense*

On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1588.

Threat category: LC.

subsp. *vestitum* (Wimmer & Grab.) Petrak

South of the lake, 1320 m, 17 viii 1995, A.Uçar 2314. North of the lake, near the Turban Hotel, 1330 m, 18 viii 1995, A.Uçar 2339.

Threat category: LC.

**Picnomon acarna* (L.) Cass.

On the road to the Antenna tower, 1600 m, 19 viii 1995, A.Uçar 2375.

Mediterranean element. Threat category: NT. Distribution of this species is very low and restricted to high altitudes.

**Ptilostemon afer* (Jacq.) Greuter subsp. *eburneus* Greuter

On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1600.

Endemic. Threat category: NT. Distribution of this species is very low and is restricted to high altitudes.

Carduus nutans L. subsp. *nutans* sensu lato

East of the lake, 1320 m, 21 vi 1994, A.Uçar 1382. On the road to the Antenna tower, 1600-1700 m, 14 ix 1995, A.Uçar 2419 and 1596.

Threat category: LC.

C. acanthoides L. subsp. *acanthoides*

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1563 and 1689. On the road to the Antenna tower, 1650 m, 03 viii 1994, A.Uçar 1584.

Euro-Siberian element. Threat category: LC.

Jurinea consanguinea DC.

On the road to Mudurnu, 1400-1450 m, 12 vii 1994, A.Uçar 1498 and 2231. On the road to the Antenna tower, 1500-1600 m, 03 viii 1994, A.Uçar 1589 and 2389.

Threat category: LC.

Centaurea virgata Lam.

On the road to the Antenna tower, 1600 m, 20 vii 1995, A.Uçar 2215 and 1586.

Irano-Turanian element. Threat category: LC.

C. inexpectata Wagenitz

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 4 vii 1994, A.Uçar 1533 and 2305. North-east of the lake, 1320 m, 03 viii 1994, A.Uçar 1571.

Endemic. Euxine element. Threat category: VU. This endemic taxon will be endangered in the near future in Abant Nature Park because of the construction of touristic facilities.

C. stenolepis A.Kern.

Near the Turban Hotel, 1325-1330 m, 07 ix 1994, A.Uçar 1646 and 2333.

Euro-Siberian element. Threat category: LC.

C. solstitialis L. subsp. *solstitialis*

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2377.

Threat category: LC.

C. urvillei DC. subsp. *urvillei*

On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1587. On the road to Mudurnu, 1450 m, 12 vii 1994, A.Uçar 1501.

Mediterranean element. Threat category: LC.

C. triumfettii All.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1917. On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1980.

Threat category: LC.

C. depressa M.Bieb.

Abant Lake, 1300-1700 m, 8 vii 1940, B.Post.

Threat category: NE.

Xeranthemum cylindraceum Sm.

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2109.

Threat category: NT. Population and distribution of this taxon are very low.

***Echinops pungens** Trautv. var. **pungens**

On the road to Mudurnu, 1450 m, 03 viii 1994, A.Uçar 1583.

Irano-Turanian element. Threat category: NT. Distribution of this taxon is very low.

Cichorium intybus L.

Near the Turban Hotel, 1330 m, 14 vii 1994, A.Uçar 1507. North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1461.

Threat category: LC.

Scorzonera cana (C.A.Mey.) Hoffm. var. **jacquiniana** (W.Koch) D.F.Chamb.

Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2006. North of the lake, near the Abant Palace Hotel, 1325 m, 29 v 1994, A.Uçar 1154.

Threat category: LC.

***Tragopogon aureus** Boiss.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2350. South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2300.

Endemic. Threat category: NT. Population of this taxon has been reduced because of overgrazing. In all specimens, stem branched from near base (stem

unbranched according to the description in the Flora of Turkey).

Leontodon hispidus L. var. **hispidus**

On the road to the Antenna tower, 1500-1600 m, 03 viii 1994, A.Uçar 1590 and 2197. Near the Turban Hotel, 1330 m, 14 vii 1994, A.Uçar 1513.

Euro-Siberian element. Threat category: LC.

L. crispus Vill. subsp. **asper** (Waldst. & Kit.) Rohlena var. **asper**

On the road to Mudurnu, 1400 m, 22 vi 1995, A.Uçar 1988. On the road to the Antenna tower, 1500-1650 m, 19 viii 1995, A.Uçar 2366 and 2199.

Threat category: LC.

Sonchus asper (L.) Hill subsp. **glaucescens** (Jord.) Ball

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1851. East of the lake, 1320 m, 12 xi 1994, A.Uçar 1685.

Threat category: LC.

***S. oleraceus** L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2403.

Threat category: LC.

Hieracium oblongum Jord.

Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2009.

Euro-Siberian element. Threat category: LC. Capitula more than 8, but capitula 4-8 according to the description in the Flora of Turkey.

H. lasiochaetum (Bornm. & Zahn) P.D.Sell & West

On the road to the Antenna tower, 1700 m, 14 ix 1995, A.Uçar 2420.

Endemic. Threat category: NT. Population of this taxon is very low.

Pilosella hoppeana (H.Schult.) C.H. & F.W.Schultz

subsp. **troica** (Zahn) P.D.Sell & West

On the road to the Antenna tower, 1500-1600 m, 06 ix 1994, A.Uçar 1636 and 2198. Near the post office, 1330 m, 18 vii 1995, A.Uçar 2090.

Threat category: LC.

P. x ruprechtii (Boiss.) P.D.Sell & West
Abant Lake, 1700 m, Sorger, 69-5-8.

Threat category: NE.

P. x auriculoides (Láng) P.D.Sell & West

Left field at the entrance, 1320-1325 m, 23 vi 1995, A.Uçar 2008 and 1398. North of the lake, near the Turban Hotel, 1330 m, 8 viii 1995, A.Uçar 2336.

Threat category: LC.

***Lactuca serriola** L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2400.

Euro-Siberian element. Threat category: LC.

Scariola viminea (L.) F.W.Schmidt

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2347 and 1684. On the road to the Antenna tower, 1500-1600 m, 19 viii 1995, A.Uçar 2392 and 2209.

Threat category: LC.

Lapsana communis L. s.l.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2254 and 1567. On the road to Mudurnu, 1380 m, 20 vii 1995, A.Uçar 2218.

Euxine element. Threat category: LC.

Taraxacum serotinum (Waldst. & Kit.) Poir.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2324. North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1677.

Threat category: LC.

T. mirabile Wagenitz

Abant Lake, 1300 m, Wagenitz & Beug 59.

Endemic. Threat category: NE.

***T. macrolepium** Schischk.

North slopes, 1300 m, 04 iv 1994, A.Uçar 1012.

Threat category: LC. Outer phyllaries with gibbosities (outer phyllaries without gibbosities according to the description in the Flora of Turkey. Further studies at genetic level on these specimens (and also other *Taraxacum* species) are needed.

***T. aznavouri** Soest

Örencik yayla road, 1490 m, 20 iv 1994, A.Uçar 1055. North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1673.

Endemic. Threat category: LC. All specimens with 9 mm beak (beak 7-8 mm long according to the description in the Flora of Turkey). This may be due to the immaturity of specimens.

***Chondrilla juncea** L. var. *juncea*

On the road to the Antenna tower, 1600 m, 06 ix 1994, A.Uçar 1628.

Threat category: NT. Distribution of this taxon is very low and is only found at high altitudes.

Crepis alpina L.

Abant Lake, 1350 m, 27 vi 1975, A. Baytop 32336, (det. A.Baytop).

Threat category: NE.

Campanulaceae

Campanula rapunculoides L.

subsp. *cordifolia* (C.Koch) Damboldt.

North-east of the lake, 1360 m, 04 viii 1994, A.Uçar 1615.

Threat category: LC.

subsp. *rapunculoides*

On the road to Mudurnu, 1380 m, 20 vii 1995, A.Uçar 2220.

Euro-Siberian element. Threat category: LC.

C. glomerata L.

West of the lake, 1330 m, 12 vii 1994, A.Uçar 1474. Near the post office, 1350 m, 18 vii 1995, A.Uçar 2084.

Euro-Siberian element. Threat category: LC.

C. olympica Boiss.

Left field at the entrance, 1325 m, 19 vii 1995, A.Uçar 2132. Örencik yayla road, 1350 m, 12 vii 1994, A.Uçar 1485.

Euxine element. Threat category: LC.

Asyneuma amplexicaule (Willd.) Hand.-Mazz.

subsp. *amplexicaule* var. *amplexicaule*

East of the lake, 1330-1360 m, 22 vi 1994, A.Uçar 1427 and 1531. South-west of

the lake, 1320 m, 18 vii 1995, A.Uçar 2126 and 1964.

Threat category: LC.

A. limonifolium (L.) Janch.

On the road to Mudurnu, 1450 m, 03 viii 1994, A.Uçar 1576. Near the post office, 1330 m, 18 vii 1995, A.Uçar 2091.

Threat category: LC.

A. lobelioides (Willd.) Hand.-Mazz.

Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2364.

Irano-Turanian element. Threat category: LC. Pedicels 3 mm long or more, but pedicels 4-10 mm long according to the description in the Flora of Turkey. A lot more specimens are necessary for reliable identification.

***Legousia pentagonia** (L.) Thell.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1849. North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2019.

Mediterranean element. Threat category: LC.

Ericaceae

Monotropa hypopithys L.

South-west of the lake, 1320 m, 18 vii 1995, A.Uçar 2124.

Threat category: NT. Distribution of this taxon is very low.

Lentibulariaceae

Utricularia vulgaris L.

Abant Lake, 1350 m, 6 viii 1977, A. Baytop, E. Tuzlacı 38299, (det. A. Baytop) and D. 32878.

Euro-Siberian element. Threat category: NE.

Primulaceae

Primula vulgaris Huds.

North slopes, 1310 m, 04 iv 1994, A.Uçar 1027.

Euro-Siberian element. Threat category: LC.

Androsace maxima L.

On the road to Mudurnu, 1450 m, 19 viii 1995, A.Uçar 2396.

Threat category: NT. Population is very low.

Cyclamen coum Mill. subsp. *coum*

Örencik yayla road, 1460 m, 20 iv 1994, A.Uçar 1059. North slopes, 1300 m, 22 iii 1994, A.Uçar 1008.

Threat category: LC.

Lysimachia vulgaris L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2063 and 1446. Near the Turban Hotel, 1325 m, 07 ix 1994, A.Uçar 1652.

Threat category: LC.

Anagallis arvensis L.

var. *arvensis*

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2045.

Threat category: LC.

***var. caerulea** (L.) Gouan

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2057.

Threat category: LC.

Oleaceae

Fraxinus excelsior L. subsp. *excelsior*

Abant Lake, D. 37116.

Euro-Siberian element. Threat category: NE.

Apocynaceae

Vinca herbacea Waldst. & Kit.

South-east of the lake, 1450 m, 25 v 1995, A.Uçar 1761. On the road to Mudurnu, 1490 m, 14 v 1994, A.Uçar 1134.

Threat category: LC.

V. minor L.

Abant road, 17 x 1974, A. & T. Baytop 31163, (det. A. Baytop).

Threat category: NE.

Menyanthaceae

Menyanthes trifoliata L.

North-east of the lake, 1325 m, 25 v 1995, A.Uçar 1750.

Threat category: NT. Distribution is very low.

Gentianaceae

Centaurium pulchellum (Sw.) Druce

Near the post office, 1350 m, 18 vii 1995, A.Uçar 2086.

Threat category: NT. Population is affected by heavy grazing.

Gentiana cruciata L.

Around the Antenna tower, 1740 m, 19 viii 1995, A.Uçar 2374.

Euro-Siberian element. Threat category: VU. Population is found only at high altitudes and it is facing overgrazing.

Convolvulaceae

Convolvulus arvensis L.

South-east of the lake, 1325 m, 07 ix 1994, A.Uçar 1664. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1296.

Threat category: LC.

C. cantabrica L.

West of the lake, Örencik yayla road, 1320 m, 21 vi 1995, A.Uçar 1922. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1320.

Threat category: LC. All specimens with 1.5-2 cm long corolla (corolla 2-2.5 cm long according to the description in the Flora of Turkey and corolla 1.5-2.5 cm long according to the description in the Flora of Europaea).

Calystegia silvatica (Kit.) Griseb.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1424. On the road to Mudurnu, 1450 m, 21 vi 1994, A.Uçar 1377.

Threat category: NT. Taxon is affected from heavy grazing.

Cuscutaceae

Cuscuta epithymum (L.) L. var. **epithymum**

West of the lake, 1330 m, 12 vii 1994, A.Uçar 1481 and 2115. East of the lake, 1330-1340 m, 19 vii 1995, A.Uçar 2157 and 1555.

Threat category: LC.

Boraginaceae

Heliotropium europaeum L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2253 and 2082. On the road to the Antenna tower, 1600 m, 14 ix 1995, A.Uçar 2416.

Mediterranean element (?). Threat category: NT. Taxon is affected by environmental pollution and overgrazing.

Asperugo procumbens L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2046.

Euro-Siberian element. Threat category: NT. Population is very low.

Myosotis ramosissima Rochel ex H.Schult. subsp. **ramosissima**

North of the lake, near the Abant Palace Hotel, 1350 m, 26 v 1995, A.Uçar 1824. West of the lake, 1320 m, 29 v 1994, A.Uçar 1179.

Threat category: LC.

M. arvensis (L.) Hill subsp. **arvensis**

Left field at the entrance, 1320-1325 m, 04 vi 1994, A.Uçar 1235 and 1801. South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1963.

Euro-Siberian element. Threat category: LC.

M. alpestris F.W.Schmidt subsp. **alpestris**

On the road to the Antenna tower, 1750 m, 04 vi 1994, A.Uçar 1271. North-east of the lake, 1400 m, 25 v 1995, A.Uçar 1753.

Threat category: LC.

M. laxa Lehm. subsp. **caespitosa** (Schultz) Hyl. ex Nordh.

West of the lake, 1320 m, 21 vi 1995, A.Uçar 1946. North-east of the lake, 1320 m, 19 vii 1995, A.Uçar 2149.

Threat category: LC.

Cynoglossum montanum L.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2243. On the road to Mudurnu, 1370 m, 29 v 1994, A.Uçar 1193.

Euro-Siberian element. Threat category: LC.

Lithospermum purpurocaeruleum L.

On the road to Mudurnu, 1450 m, 29 v 1994, A.Uçar 1215.

Euro-Siberian element. Threat category: LC.

Buglossoides arvensis (L.) I.M.Johnst.

North of the lake, near the Abant Palace Hotel, 1350 m, 26 v 1995, A.Uçar 1825. On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1597. (det. H.Duman).

Threat category: LC

Echium orientale L.

East of the lake, 1320-1340 m, 21 vi 1994, A.Uçar 1381 and 1309.

Endemic. Euxine element. Threat category: NT. Taxon should be protected from environmental pollution.

E. vulgare L.

South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2303 and 1440. On the road to Mudurnu, 1450 m, 03 viii 1994, A.Uçar 1577.

Euro-Siberian element. Threat category: LC.

E. angustifolium Mill.

South-west of the lake, 1330 m, 21 vi 1994, A.Uçar 1365.

Mediterranean element. Threat category: LC.

Onosma mutabile Boiss.

Abant Lake, 1300-1500m, 27 viii 1972, Schimida&Lev-Ari.

Endemic. Threat category: NE.

O. tauricum Pall. var. **tauricum**

Abant Lake, 1300-1500 m, H. & E.Walter 4662.

Threat category: NE.

O. heterophyllum Griseb.

West of the lake, 1350 m, 26 v 1995, A.Uçar 1835. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2185.

Euro-Siberian element. Threat category: LC.

Cerinth minor L. subsp. **auriculata** (Ten.) Domac

Abant Lake, 1350 m, 27 vi 1975, A.Baytop 32352, (det. A.Baytop).

Threat category: NE.

Trachystemon orientalis (L.) G.Don

West of the lake, 1460 m, 20 iv 1994, A.Uçar 1057. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1283.

Euxine element. Threat category: LC.

Anchusa leptophylla Roem. & H.Schult. subsp. **leptophylla**

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2242. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2206.

Threat category: LC.

Solanaceae

Solanum dulcamara L.

East of the lake, 1330 m, 22 vi 1994, A.Uçar 1438.

Euro-Siberian element. Threat category: NT. Population and distribution are very low.

Atropa belladonna L.

North-east of the lake, 1330 m, 22 vi 1994, A.Uçar 1408. On the road to Mudurnu, 1380 m, 19 viii 1995, A.Uçar 2393.

Euro-Siberian element. Threat category: VU. Heavy grazing and environmental pollution have caused the population of this taxon to decrease. If conservation measures not taken, this taxon will become endangered in the near future.

Hyoscyamus niger L.

Abant Lake, 1300-1500 m, 25 ix 1950, A. & T.Baytop 2515.

Threat category: NE.

Scrophulariaceae

Verbascum bithynicum Boiss.

South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2298 and 1996. North-east of the lake, 1320 m, 03 viii 1994, A.Uçar 1572.

Endemic. Euro-Siberian element. Threat category: NT. Distribution of this taxon is low and is affected by the construction of facilities.

V. abieticum Bornm.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 17 viii 1995, A.Uçar 2304 and 2312. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1279.

Endemic. Euxine element. Threat category: NT. Taxon is affected by the construction of facilities.

V. speciosum Schrad.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1434. On the road to the Antenna tower, 1500-1590 m, 20 vii 1995, A.Uçar 2236 and 1997.

Threat category: LC. In all specimens, pedicels up to 20 mm long and calyx up to 6 mm long (pedicels to 12 mm and calyx to 5 mm according to the description in the Flora of Turkey).

Scrophularia scopolii (Hoppe ex) Pers. var. *scopolii*

South-west of the lake, 1340 m, 29 v 1994, A.Uçar 1190. North of the lake, 1325 m, 14 v 1994, A.Uçar 1140.

Threat category: LC.

S. variegata M.Bieb.

Abant, 11 vi 1978, Akman 9807-İlarslan.

Irano-Turanian element. Threat category: NE.

S. canina L. subsp. *bicolor* (Sm.) Greuter

South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1969.

Mediterranean element. Threat category: LC.

Chaenorhinum minus (L.) Lange subsp. *minus*

On the road to the Antenna tower, 1600 m, 14 ix 1995, A.Uçar 2423.

Threat category: NT. Distribution of this taxon is very low.

Digitalis ferruginea L. subsp. *ferruginea*

East of the lake, 1360 m, 14 vii 1994, A.Uçar 1524. On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1594.

Euro-Siberian element. Threat category: LC.

D. cariensis Boiss. ex Jaub. & Spach

Abant, Samrut yayla, 1300 m, 15 vii 1978, Akman 9804-İlarslan.

Endemic. Mediterranean element. Threat category: NE.

D. lamarckii Ivan.

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2387.

Endemic. Irano-Turanian element. Threat category: NT. Distribution is very low.

Veronica gentianoides Vahl

Near the football pitch, 1320 m, 26 v 1995, A.Uçar 1797-A.

Hyrcano-Euxine element. Threat category: LC.

V. serpyllifolia L.

Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1078. Northwest of the lake, 1325 m, 14 v 1994, A.Uçar 1119.

Threat category: LC.

V. bozakmanii M.A.Fisch.

North of the lake, near the Abant Palace Hotel, 1320 m, 06 v 1994, A.Uçar 1074. North of the lake, 1325 m, 27 iv 1995, A.Uçar 1708.

Irano-Turanian element. Threat category: LC.

V. acinifolia L.

Left field at the entrance, 1320 m, 25 v 1995, A.Uçar 1727. West of the lake, 1320 m, 26 v 1995, A.Uçar 1830.

Threat category: LC.

V. arvensis L.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1782 and 1794.

Euro-Siberian element. Threat category: LC.

**V. biloba* Schreb.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1781.

Irano-Turanian element. Threat category: LC.

V. persica Poir.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1778 and 1705.

Threat category: LC.

V. triloba (Opiz) A.Kern.

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1779 and 1706. West of the lake, 1390 m, 04 iv 1994, A.Uçar 1015.

Threat category: LC.

V. anagallis-aquatica L.

Right field at the entrance, 1325 m, 03 viii 1994, A.Uçar 1543. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1341.

Threat category: LC.

V. beccabunga L.

North-east of the lake, 1340 m, 04 vi 1994, A.Uçar 1263. North of the lake, near the Turban Hotel, 1330 m, 18 viii 1995, A.Uçar 2335.

Threat category: NT. Taxon is affected from heavy grazing because the population is low.

V. chamaedrys L.

North of the lake, 1320 m, 26 v 1995, A. Uçar 1797-B. North of the lake, near the Abant Palace Hotel, 1325 m, 29 v 1994, A. Uçar 1163 and 1241.

Euro-Siberian element. Threat category: LC.

V. jacquinii Baumg.

On the road to the Antenna tower, 1590 m, 22 vi 1995, A. Uçar 1973.

Euro-Siberian element. Threat category: LC.

V. thymoides P.H.Davis subsp. **pseudocinerea** M.A.Fisch.

North of the lake, near the Abant Palace Hotel, 1325 m, 29 v 1994, A. Uçar 1160. On the road to the Antenna tower, 1750 m, 04 vi 1994, A. Uçar 1268.

Endemic. Irano-Turanian element. Threat category: NT. Taxon is affected by grazing.

V. pectinata L. var. **pectinata**

North of the lake, near the Abant Palace Hotel, 1320-1340 m, 06 v 1994, A. Uçar 1072 and 1093. North-east of the lake, 1320 m, 25 v 1995, A. Uçar 1739.

Threat category: LC.

***V. scutellata** L.

North-east of the lake, 1320 m, 19 vii 1995, A. Uçar 2148.

Threat category: NT. Distribution of this taxon is low.

Euphrasia pectinata Ten.

Near the post office, 1350 m, 18 vii 1995, A. Uçar 2087. On the road to the Antenna tower, 1500 m, 20 vii 1995, A. Uçar 2201.

Threat category: LC.

Odontites glutinosa (M.Bieb.) Benth.

On the road to the Antenna tower, 1740 m, 19 viii 1995, A. Uçar 2369.

Threat category: LC.

O. verna (Bellardi) Dumort. subsp. **serotina** (Dumort.) Corb.

Abant Lake, D. 32889, E. Tuzlacı 30828 and A. Baytop, A. Meriçli 33660.

Euro-Siberian element. Threat category: NE.

Pedicularis comosa L. var. **sibthorpii** (Boiss.) Boiss.

West of the lake, 1340 m, 29 v 1994, A. Uçar 1172. North-east of the lake, 1400 m, 25 v 1995, A. Uçar 1757.

Threat category: LC.

Rhinanthus angustifolius C.C.Gmel.

West of the lake, 1320-1340 m, 29 v 1994, A. Uçar 1173 and 1949. Left field at the entrance, 1325 m, 04 vi 1994, A. Uçar 1234.

Threat category: LC.

Rhynchosorys elephas (L.) Griseb. subsp. **elephas**

West of the lake, 1320 m, 19 vii 1995, A. Uçar 2178. Around Samat yayla, 1330 m, 13 vii 1995, A. Uçar 2043.

Threat category: LC.

Lathraea squamaria L.

South-west of the lake, 1340-1530 m, 06 v 1994, A. Uçar 1115 and 1060.

Threat category: NT. Distribution is very low.

Orobanchaceae**Orobanche alba** Stephan

Abant, 1450 m, 27 vi 1975, A. Baytop 32383, (det. A. Baytop).

Threat category: NE.

O. minor Sm.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A. Uçar 2279. On the road to Mudurnu, 1400-1450 m, 22 vi 1995, A. Uçar 1987 and 2223.

Threat category: LC.

***O. caryophyllacea** Sm.

On the road to Mudurnu, 1400-1450 m, 20 vii 1995, A. Uçar 2183 and 1371.

Threat category: LC.

O. lutea Baumg.

Abant Lake, 1300-1500 m, 27 vii 1941, B. Post.

Threat category: NE.

O. elatior Sutton

Abant Lake, 1350 m, 8 viii 1970, A. & T. Baytop 18433.

Threat category: NE.

Globulariaceae**Globularia trichosantha** Fisch. & C.A.Mey.

North-east of the lake, 1340 m, 04 vi 1994, A. Uçar 1257. West of the lake, Örencik yayla road, 1520 m, 20 iv 1994, A. Uçar 1054.

Irano-Turanian element. Threat category: LC.

Verbenaceae**Verbena officinalis** L.

North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A. Uçar 2048. Near the Turban Hotel, 1325 m, 07 ix 1994, A. Uçar 1651.

Threat category: LC.

Lamiaceae / Labiatae**Ajuga orientalis** L.

North slopes, 1375 m, 04 iv 1994, A. Uçar 1023.

Threat category: LC.

A. reptans L.

West of the lake, 1320 m, 21 vi 1995, A. Uçar 1920. South-west of the lake, 1340-1350 m, 29 v 1994, A. Uçar 1185 and 1184.

Euro-Siberian element. Threat category: LC. All specimens with pink corolla (corolla blue according to the description in the Flora of Turkey and corolla pink or blue according to the description in the Flora of Europaea).

A. chamaepitys (L.) Schreb. subsp. **chia** (Schreb.) Arcang. var. **ciliata** Briq.

On the road to Mudurnu, 1450 m, 29 v 1994, A. Uçar 1211. On the road to the Antenna tower, 1600 m, 20 vii 1995, A. Uçar 2211.

Threat category: LC.

Teucrium scordium L. subsp. **scordioides** (Schreb.) Maire & Petitm.

Abant Lake, 1350 m, 28 viii 1975, A. Baytop, A. Meriçli 33655, (det. A. Baytop).

Euro-Siberian element. Threat category: NE.

T. chamaedrys L. subsp. **chamaedrys**

West of the lake, 1320-1330 m, 18 vii 1995, A. Uçar 2111 and 2291. On the road to

the Antenna tower, 1650 m, 19 viii 1995, A.Uçar 2368.

Euro-Siberian element. Threat category: LC.

T. polium L.

South-west of the lake, 1330 m, 18 vii 1995, A.Uçar 2105. Near the Turban Hotel, 1330 m, 14 vii 1994, A.Uçar 1508.

Threat category: LC.

Scutellaria galericulata L.

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1548 and 1872. South of the lake, 1320 m, 17 viii 1995, A.Uçar 2309.

Threat category: LC.

S. albida L. subsp. *albida*

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2348.

Mediterranean element. Threat category: LC.

S. velenovskiyi Rech.f.

Below Abant Lake, D. 37270.

Mediterranean element(?). Threat category: NE.

***S. orientalis** L. subsp. *alpina* (Boiss.) O.Schwarz var. *alpina*

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2384.

Threat category: NT. Distribution is very low.

Phlomis russeliana (Sims) Benth.

South-west of the lake, 1400 m, 21 vi 1994, A.Uçar 1358.

Endemic. Euxine element. Threat category: NT. Distribution is affected by heavy grazing.

Lamium garganicum L. subsp. *laevigatum* Arcang.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2356.

Euxine element. Threat category: LC.

L. purpureum L. var. *purpureum*

West of the lake, 1460 m, 20 iv 1994, A.Uçar 1050. North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1768.

Euro-Siberian element. Threat category: LC.

L. crinitum Montbret & Aucher ex Benth.

Left field at the entrance, 1320-1325 m, 25 v 1995, A.Uçar 1730 and 1139.

Euxine element. Threat category: LC.

Galeobdolon luteum Huds. subsp. *montanum* (Pers.) R.R.Mill

East of the lake, 1340 m, 04 vi 1994, A.Uçar 1307.

Euro-Siberian element. Threat category: LC.

Leonurus quinquelobatus Gilib.

Abant Lake, 1350-1500 m, 17 ix 1940, B.Post.

Euro-Siberian element. Threat category: NE.

Marrubium astracanicum Jacq. subsp. *astracanicum*

On the road to the Antenna tower, 1600 m, 06 ix 1994, A.Uçar 1635. North-east of the lake, 1325 m, 19 vii 1995, A.Uçar 2165.

Threat category: LC.

***Sideritis montana** L. subsp. *remota* (d'Urv.) P.W.Ball ex Heywood

On the road to Mudurnu, 1600 m, 29 v 1994, A.Uçar 1205, (det. H.Duman). On the road to the Antenna tower, 1450 m, 20 vii 1995, A.Uçar 2212.

Mediterranean element. Threat category: NT. Population is very low.

Stachys byzantina C.Koch

South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2302. On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1598.

Euro-Siberian element. Threat category: LC.

S. thirkei C.Koch

North of the lake, near the Abant Palace Hotel, 1320-1340 m, 17 viii 1995, A.Uçar 2286 and 2273. North of the lake, near the Turban Hotel, 1330 m, 18 viii 1995, A.Uçar 2331.

Threat category: LC. In all specimens, calyx teeth 1/4 x calyx tube, but according to the description in the Flora of Turkey, calyx teeth 1/2 x calyx tube.

S. sylvatica L.

Abant Lake, 1350 m, 22 vi 1979, A. & T.Baytop, N.Sevindik 42051, (det. E.Tuzlaci).

Euro-Siberian element. Threat category: NE.

S. iberica M.Bieb. subsp. *iberica* var. *densipilosa* Bhattacharjee

Abant Lake, 1300-1500, 17 vii 1906, B. Post.

Endemic. Irano-Turanian element. Threat category: NE.

S. annua (L.) L. subsp. *annua* var. *annua*

On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1290. On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2383.

Threat category: LC.

S. officinalis (L.) Trevis. subsp. *balcanica* (P.W.Ball) Bhattacharjee

Left field at the entrance, 1320 m, 14 vii 1994, A.Uçar 1511. West of the lake, 1320 m, 18 vii 1995, A.Uçar 2110.

Euro-Siberian element. Threat category: LC.

Nepeta nuda L. subsp. *albiflora* (Boiss.) Gams

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1904. Near the Turban Hotel, 1330 m, 04 vi 1994, A.Uçar 1251.

Threat category: LC.

Prunella vulgaris L.

Left field at the entrance, 1325 m, 07 ix 1994, A.Uçar 1657. North of the lake, near the Turban Hotel, 1330 m, 19 vii 1995, A.Uçar 2139.

Euro-Siberian element. Threat category: LC.

P. laciniata (L.) L.

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2101. Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1318.

Euro-Siberian element. Threat category: LC.

Origanum vulgare L. subsp. *vulgare*

On the road to Mudurnu, 1325 m, 12 vii 1994, A.Uçar 1496. South-west of the lake, 1320 m, 17 viii 1995, A.Uçar 2290.

Euro-Siberian element. Threat category: LC.

Calamintha grandiflora (L.) Moench

South-west of the lake, 1330 m, 18 vii 1995, A.Uçar 2106 and 1477. South of the lake, 1325 m, 04 viii 1994, A.Uçar 1611.

Euro-Siberian element. Threat category: LC.

Clinopodium vulgare L. subsp. **arundanum** (Boiss.) Nyman

West of the lake, 1330 m, 18 vii 1995, A.Uçar 2112. East of the lake, 1360 m, 14 vii 1994, A.Uçar 1530.

Threat category: LC.

***Acinos rotundifolius** Pers.

On the road to Mudurnu, 1400 m, 22 vi 1995, A.Uçar 1990.

Threat category: NT. This taxon has a low distribution.

***Thymus praecox** Opiz subsp. **skorpilii** (Velen.) Jalas var. **skorpilii**

On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1977. West of the lake, 1350 m, 29 v 1994, A.Uçar 1182.

Threat category: LC.

***T. longicaulis** C.Presl subsp. **longicaulis** var. **subisophyllus** (Borbás) Jalas

Around the Antenna tower, 1725 m, 19 viii 1995, A.Uçar 2360.

Threat category: LC.

Thymbra spicata L. var. **spicata**

Abant Lake, 1300-1400 m, vii/1956, Şükran Tarcan 24637, (det. E.Tuzlacı).

Mediterranean element. Threat category: NE.

Mentha aquatica L.

North of the lake, near the Abant Palace Hotel, 1320 m, 14 ix 1995, A.Uçar 2401 and 1631.

Threat category: LC.

M. x piperita L.

Abant Lake, 1300 m, 7 ix 1957, D. 32887.

Threat category: NE.

M. longifolia (L.) Huds. subsp. **typhoides** (Briq.) Harley var. **typhoides**

West of the lake, 1320 m, 12 vii 1994, A.Uçar 1470. North of the lake, near the

Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2274 and 2255.

Threat category: LC.

Lycopus europaeus L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2268. Near the Turban Hotel, 1325 m, 07 ix 1994, A.Uçar 1648.

Euro-Siberian element. Threat category: LC.

Salvia tomentosa Mill.

On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2187. West of the lake, 1320 m, 12 vii 1994, A.Uçar 1469.

Mediterranean element. Threat category: LC.

S. sclarea L.

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2378.

Threat category: NT. Distribution is very low at high altitudes.

S. aethiopsis L.

On the road to the Antenna tower, 1500 m, 19 viii 1995, A.Uçar 2379 and 2391.

Threat category: NT. Distribution is very low at high altitudes.

S. forskahlei L.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1422. North-east of the lake, 1325 m, 04 viii 1994, A.Uçar 1613 and 1647.

Euxine element. Threat category: LC.

S. virgata Jacq.

North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1678. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2207.

Irano-Turanian element, penetrating into Mediterranean territories. Threat category: LC.

S. dichroantha Stapf

On the road to Mudurnu, 1450 m, 03 viii 1994, A.Uçar 1578.

Endemic. Irano-Turanian element. Threat category: VU. Population and distribution of this taxon are very low and it is facing heavy grazing. In all specimens, stem and leaves tomentose beneath, but stem and leaves pubescent according to the description in the Flora of Turkey.

S. verticillata L. subsp. **amasiaca** (Frey & Bornm.) Bornm.

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 14 vii 1994, A.Uçar 1534. East of the lake, 1320 m, 18 viii 1995, A.Uçar 2353.

Irano-Turanian element (?). Threat category: LC.

Plumbaginaceae

Acantholimon acerosum (Willd.) Boiss. var. **acerosum**

On the road to Mudurnu, 1450 m, 12 vii 1994, A.Uçar 1504. On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1595.

Irano-Turanian element. Threat category: NT. Individuals of this species are pulled up and sold to tourists by local villagers and thus the population decreases each year.

Plantaginaceae

Plantago major L. subsp. **major**

Left field at the entrance, 1325 m, 03 viii 1994, A.Uçar 1546. North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2055.

Threat category: LC.

P. lanceolata L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1901. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2192.

Threat category: LC.

Thymelaeaceae

Daphne pontica L.

North of the lake, near the Abant Palace Hotel, 1320-1330 m, 26 v 1995, A.Uçar 1816 and 1733. North-east of the lake, 1320 m, 25 v 1995, A.Uçar 1740.

Euxine element. Threat category: LC.

D. oleoides Schreb. subsp. **oleoides**

East of the lake, 1330 m, 21 vi 1995, A.Uçar 1895.

Threat category: LC.

Loranthaceae

Viscum album L. subsp. **abietis** (Wiesb.) Abrom.

Abant Lake, 1400 m, 12 xi 1973, A.Baytop, E.Tuzlacı 27125, (det. A.Baytop).

Threat category: NE.

- Aristolochiaceae**
Asarum europaeum L.
 Abant, 1200 m, 25 v 1977, A.Baytop 36814, (det. A.Baytop).
 Euro-Siberian element. Threat category: NE.
- Aristolochia pontica** Lam.
 Abant, Markgraf.
 Euxine element. Threat category: NE.
- Euphorbiaceae**
Mercurialis perennis L.
 North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2021. North of the lake, 1320 m, 25 v 1995, A.Uçar 1732.
 Euro-Siberian element. Threat category: LC.
- Euphorbia cardiophylla** Boiss. & Heldr.
 On the road to Mudurnu, 1400-1450 m, 22 vi 1995, A.Uçar 1986 and 1202.
 Endemic. Threat category: NT. Distribution and population of this taxon are low.
- E. stricta** L.
 North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2073 and 1848. On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2186.
 Euro-Siberian element. Threat category: LC.
- E. falcata** L. subsp. *falcata* var. *falcata*
 On the road to the Antenna tower, 1500-1600 m, 06 ix 1994, A.Uçar 1634 and 2247.
 Threat category: NT. Distribution is restricted to one area.
- E. anacampseros** Boiss. var. *anacampseros*
 South-east of the lake, 1340 m, 06 v 1994, A.Uçar 1100. On the road to Mudurnu, 1380-1450 m, 29 v 1994, A.Uçar 1201 and 2181.
 Endemic. Threat category: NT. Population of this taxon is decreasing because of the construction of roads and facilities.
- E. seguieriana** Necker subsp. *niciana* (Borbás ex Novák) Rech.f.
 South-east of the lake, near the Abant Köşk Hotel, 1330 m, 20 vii 1995, A.Uçar 2239. North-east of the lake, 1320 m, 17 viii 1995, A.Uçar 2320 and 2015.
 Threat category: LC
- E. amygdaloides** L. var. *amygdaloides*
 Near the Turban Hotel, 1340 m, 06 v 1994, A.Uçar 1107. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 29 v 1994, A.Uçar 1228.
 Euro-Siberian element. Threat category: LC.
- Urticaceae**
Urtica dioica L.
 North of the lake, 1320 m, 21 vi 1994, A.Uçar 1379.
 Euro-Siberian element. Threat category: LC.
- Ulmaceae**
Ulmus minor Mill. subsp. *minor*
 North of the lake, near the Abant Palace Hotel, 1335 m, 14 ix 1995, A.Uçar 2409.
 Mediterranean element. Threat category: LC.
- Fagaceae**
Fagus orientalis Lipsky
 South-west of the lake, 1320-1340 m, 06 v 1994, A.Uçar 1113 and 1151. On the road to Mudurnu, 1400-1450 m, 06 ix 1994, A.Uçar 1639 and 1301.
 Euro-Siberian element. Threat category: LC.
- Quercus robur** L. subsp. *robur*
 Abant Lake, D. 32898.
 Euro-Siberian element. Threat category: NE.
- Q. petraea** (Matt.) Liebl. subsp. *petraea*
 On the road to the Antenna tower, 1590 m, 14 ix 1995, A.Uçar 2417 and 2418. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1298.
 Threat category: LC.
- Q. pubescens** Willd.
 South-west of the lake, 1320 m, 14 ix 1995, A.Uçar 2411. On the road to Mudurnu, 1400-1450 m, 06 ix 1994, A.Uçar 1640 and 1218.
 Threat category: LC.
- Q. virgiliana** Ten.
 Abant Lake, D. 32897.
 Threat category: NE.
- Corylaceae**
Carpinus betulus L.
 South-west of the lake, 1320 m, 22 vi 1995, A.Uçar 1960.
 Euro-Siberian element. Threat category: LC.
- Ostrya carpinifolia** Scop.
 South-west of the lake, 1320 m, 20 iv 1994, A.Uçar 1063. (det. H.Duman).
 Mediterranean element. Threat category: LC.
- Corylus avellana** L. var. *avellana*
 South of the lake, 1320 m, 07 ix 1994, A.Uçar 1666.
 Euro-Siberian element. Threat category: LC.
- Salicaceae**
Salix pentandra L.
 North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2079 and 1841.
 Euro-Siberian element. Threat category: LC.
- S. alba** L.
 West of the lake, 1320 m, 18 vii 1995, A.Uçar 2116. Near the post office, 1330 m, 18 vii 1995, A.Uçar 2094.
 Threat category: LC.
- S. fragilis** L.
 Abant Lake, 1320-1325 m, 13 x 1970, A.Baytop 18680, (det. A.Baytop).
 Euro-Siberian element. Threat category: NE.
- S. cinerea** L.
 South-west of the lake, 1320 m, 29 v 1994, A.Uçar 1196. South-east of the lake, near the Abant Köşk Hotel, 1320 m, 27 iv 1995, A.Uçar 1723.
 Threat category: LC.
- S. elaeagnos** Scop.
 Abant road, 1200 m, 8 viii 1970, A. & T.Baytop 18452, (det. A.Baytop).

Euro-Siberian element. Threat category: NE.

S. amplexicaulis Bory & Chaub.

Abant Lake, 1400 m, D. 37162.

Mediterranean element. Threat category: NE.

Populus tremula L.

East of the lake, 1330 m, 26 v 1995, A.Uçar 1837 and 1838.

Euro-Siberian element. Threat category: LC.

P. nigra L. subsp. *nigra*

East of the lake, 1330 m, 26 v 1995, A.Uçar 1836.

Threat category: LC.

ANGIOSPERMAE

MONOCOTYLEDONES

Alismataceae

Sagittaria sagittifolia L.

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1551.

Threat category: LC.

Alisma plantago-aquatica L.

North-east of the lake, 1320 m, 19 vii 1995, A.Uçar 2146. North of the lake, near the Abant Palace Hotel, 1320 m, 12 vii 1994, A.Uçar 1451 and 1465.

Euro-Siberian element. Threat category: LC.

Potamogetonaceae

Potamogeton natans L.

West of the lake, 1320 m, 18 vii 1995, A.Uçar 2117 and 1958.

Threat category: LC.

P. nodosus Poir.

Abant Lake, 1320 m, 28 viii 1957, T.Baytop 5063, (det. P.Uotila, 1978).

Threat category: NE.

P. gramineus L.

Abant Lake, 1300 m, 5 vii 1976, A.Baytop, K.Alpınar 35132, (det. P.Uotila) and Wagenitz & Beug 253.

Threat category: NE.

P. perfoliatus L.

Abant Lake, 1350 m, 8 viii 1970, A. & T. Baytop 18397, (det. A.Baytop).

Threat category: NE.

P. berchtoldii Fieber

Abant Lake, 1350 m, 28 viii 1975, A.Baytop, A.Meriçli 33669, (det. P.Uotila) and D. 32876.

Threat category: NE.

P. pectinatus L.

Abant Lake, 1300 m, 28 viii 1957, T.Baytop 5062, (det. A.Baytop) and D. 32873.

Threat category: NE.

Groenlandia densa (L.) Fourr.

Abant Lake, 1400 m, D. 37148.

Euro-Siberian element. Threat category: NE.

Araceae

Arum euxinum R.R.Mill

North of the lake, 1325 m, 14 v 1994, A.Uçar 1141 and 1607.

Endemic. Euxine element. Threat category: NT. Population is low. In all specimens, tuber horizontal, not vertical.

A. det truncatum C.A.Mey. ex Schott

var. *virescens* (Stapf) Alpınar & R.R.Mill

Mudurnu road, 5 vi 1983, K.Alpınar, 50598, (det. K.Alpınar).

Irano-Turanian element. Threat category: NE.

Lemnaceae

**Lemna trisulca* L.

North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1694.

Threat category: LC.

L. gibba L.

Abant Lake road, 13 x 1970, A.Baytop 18689, (det. A.Baytop).

Threat category: NE.

Liliaceae

Polygonatum orientale Desf.

North of the lake, 1330 m, 22 vi 1994, A.Uçar 1400. Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1245.

Euxine element (?). Threat category: LC.

Allium cupani Raf. subsp. *hirtovaginatatum* (Kunth) Stearn

Around the Antenna tower, 1740 m, 19 viii 1995, A.Uçar 2370.

Mediterranean element. Threat category: NT. Distribution is restricted to one area.

**A. paniculatum* L. subsp. *fuscum* (Waldst. & Kit.) Arcang.

North of the lake, near the Abant Palace Hotel, 1340 m, 17 viii 1995, A.Uçar 2281.

Mediterranean element. Threat category: VU. Distribution and population of this taxon are very low because of heavy grazing, the construction of facilities and environmental pollution. It will become endangered in the Abant area in the near future.

A. pseudoflavum Vved.

Abant Lake, 1300 m, Sorger 69-4-71.

Irano-Turanian element. Threat category: NE.

A. olympicum Boiss.

South-east of the lake, 1330 m, 18 vii 1995, A.Uçar 2108. On the road to Mudurnu, 1400 m, 14 vii 1994, A.Uçar 1539-B and 1487.

Endemic. Euxine element. Threat category: NT. Distribution is very low.

A. scorodoprassum L. subsp. *rotundum* (L.) Stearn

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1853. On the road to Mudurnu, 1400-1450 m, 22 vi 1995, A.Uçar 1992 and 2235.

Mediterranean element. Threat category: LC.

A. vineale L.

Abant Lake, (obs. N.Özhatay).

Threat category: NE.

A. guttatum Steven

subsp. *guttatum*.

North of the lake, near the Abant Palace Hotel, 1335 m, 17 viii 1995, A.Uçar 2280.

Threat category: NT. Taxon is affected by heavy grazing.

subsp. *sardoum* (Moris) Stearn

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 04 vii 1994, A.Uçar 1537. (det. N.Özhatay). Near the Turban Hotel, 1330 m, 19 vii 1995, A.Uçar 2141.

Mediterranean element. Threat category: NT. Taxon is affected by heavy grazing.

A. sp. nov.

On the road to Mudurnu, 1400-1450 m, 22 vi 1995, A.Uçar 1991 and 1200. On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1981.

Threat category: NT. Population is low. These specimens show an affinity to both *A. schoenoprasum* L. and *A. lycanicum* Siehe ex Hayek according to the description in the Flora of Turkey. It is similar to *A. schoenoprasum* L. in its hollow stem, 1.5-2 cm long spathe, 2-15 mm long pedicels. However, it differs from *A. schoenoprasum* L. in some of its bulb properties (ovoid; oblong cylindrical in *A. schoenoprasum* L.), and leaf properties (at least 4, more than 6 mm broad, flat; 1-2, 2-6 mm broad, fistulose in *A. schoenoprasum* L.). There are many more differences and similarities between *A. schoenoprasum* L. and our specimens not mentioned here. In addition, these specimens are similar to *A. lycanicum* Siehe ex Hayek in its ovoid bulb, 2-6 leaves with 10-20 mm broad, hemispherical or spherical umbel 3-6 cm in diameter. However, it differs from *A. lycanicum* Siehe ex Hayek in some of its leaf properties (longer than 1/2 x stem; 1/3 x stem in *A. lycanicum* Siehe ex Hayek), spathe properties (whitish; purple at base in *A. lycanicum* Siehe ex Hayek), filament properties (as broad as perianth segments; broader than perianth segments in *A. lycanicum* Siehe ex Hayek). There are many more differences and similarities present between *A. lycanicum* Siehe ex Hayek and our specimens not mentioned here.

Consequently, these specimens may be samples of a new species and further studies are needed on these specimens.

Scilla bifolia L.

North of the lake, near the Abant Palace Hotel, 1320 m, 06 iv 1995, A.Uçar 1696. On the road to Mudurnu, 1450 m, 06 iv 1994, A.Uçar 1031.

Mediterranean element(?). Threat category: LC.

Ornithogalum oligophyllum E.D.Clarke

East of the lake, 1400 m, 06 v 1994, A.Uçar 1094. North of the lake, near the Abant Palace Hotel, 1340 m, 27 iv 1995, A.Uçar 1712.

Threat category: LC.

O. sigmoideum Freyn & Sint.

North of the lake, near the Abant Palace Hotel, 1320 m, 27 iv 1995, A.Uçar 1713. West of the lake, 1320-1325 m, 06 iv 1995, A.Uçar 1699 and 1020.

Euro-Siberian element. Threat category: LC. In all specimens, fruiting pedicels 4-12 mm long (fruiting pedicels 16-25 mm long according to the description in the Flora of Turkey).

O. pascheanum Speta

Abant Lake, c. 1300 m, E.Pasche & Vitzthum 7603a. Abant, c. 1400 m, Hoppe & E.Pasche 7701b.

Endemic. Threat category: NE.

Muscari aucheri (Boiss.) Baker

West of the lake, 1320 m, 27 iv 1995, A.Uçar 1717. North of the lake, near the Turban Hotel, 1330 m, 27 iv 1995, A.Uçar 1718.

Endemic. Threat category: NT. Population is low.

M. armeniacum Leichtlin ex Baker

North of the lake, 1325-1330 m, 06 v 1994, A.Uçar 1089 and 1153.

Threat category: LC.

Fritillaria pontica Wahlenb.

Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1244. Örencik yayla road, 1490 m, 20 iv 1994, A.Uçar 1047.

Euro-Siberian element. Threat category: LC.

Gagea fistulosa Ker Gawl.

West of the lake, 1325 m, 06 iv 1995, A.Uçar 1698. North slopes, 1300 m, 04 iv 1994, A.Uçar 1019.

Threat category: LC.

Colchicum szovitsii Fisch. & Mey.

North slopes, 1300 m, 22 iii 1994, A.Uçar 1003.

Irano-Turanian element. Threat category: LC.

C. umbrosum Steven

South-east of the lake, near the Abant Köşk Hotel, 1330 m, 05 ix 1995, A.Uçar 2437. Left field at the entrance, 1325 m, 15 ix 1995, A.Uçar 2433 and 1656.

Euxine element. Threat category: LC.

C. kotschy Boiss.

South-east of the lake, 1320 m, 14 ix 1995, A.Uçar 2428.

Irano-Turanian element. Threat category: LC.

C. bivonae Guss.

South-east of the lake, 1320 m, 14 ix 1995, A.Uçar 2430. Northwest of the lake, 1330 m, 06 ix 1994, A.Uçar 1626.

Mediterranean element. Threat category: LC.

Amaryllidaceae

Sternbergia colchiciflora Waldst. & Kit.

Left field at the entrance, 1325 m, 14 ix 1995, A.Uçar 2427. Northwest of the lake, 1330 m, 06 ix 1994, A.Uçar 1627.

Threat category: LC.

Galanthus plicatus M.Bieb. subsp. **byzantinus** (Baker) D.A.Webb

South of the lake, 1400 m, 06 iv 1994, A.Uçar 1029. South-west of the lake, 1335-1360 m, 20 iv 1994, A.Uçar 1040 and 1703.

Endemic. Euxine element. Threat category: VU. Individuals of this species are collected by local people and tourists.

Iridaceae

Iris sintenisii Janka

North of the lake, 1350 m, 29 v 1994, A.Uçar 1165.

Euro-Siberian element. Threat category: LC.

Crocus abantensis T.Baytop & B.Mathew

South-east of the lake, 1710 m, 06 iv 1994, A.Uçar 1036. On the road to Mudurnu, 1420 m, 22 iii 1994, A.Uçar 1010.

Endemic. Euro-Siberian element. Threat category: VU. Individuals of this taxon are collected by tourists and local people.

C. ancyrensis (Herb.) Maw

On the road to the Antenna tower, 1500 m, 06 iv 1995, A.Uçar 1702.

Endemic. Irano-Turanian element. Threat category: NT. Individuals of this taxon are collected by tourists and local people.

C. biflorus Mill. subsp. *pulchricolor* (Herb.) B.Mathew

West of the lake, 1325 m, 06 iv 1995, A.Uçar 1700. North slopes, 1300 m, 22 iii 1994, A.Uçar 1005.

Endemic. Euro-Siberian element. Threat category: NT. Individuals of this taxon are collected by tourists and local people.

C. olivieri Gay subsp. *olivieri*

West of the lake, 1325 m, 06 iv 1995, A.Uçar 1701. South-east of the lake, 1710 m, 06 iv 1994, A.Uçar 1037.

Threat category: LC.

C. speciosus M.Bieb. subsp. *speciosus*

North of the lake, near the Abant Palace Hotel, 1320 m, 12 xi 1994, A.Uçar 1671. North-east of the lake, 1325 m, 15 ix 1995, A.Uçar 2434.

Threat category: LC.

Orchidaceae

Neottia nidus-avis (L.) L.C.M.Rich.

Abant Lake, 1500 m, Renz 10668.

Euro-Siberian element. Threat category: NE.

Cephalanthera rubra (L.) L.C.M.Rich.

Abant Lake, 1500 m, Price 840.

Threat category: NE.

C. damasonium (Mill.) Druce

North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2016. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1297.

Euro-Siberian element. Threat category: NT. Population and distribution of this taxon are very low.

Epipactis palustris (L.) Crantz

Abant Lake, 1400 m, D. 37143.

Euro-Siberian element. Threat category: NE.

E. microphylla (Ehrh.) Sw.

East of the Abant Lake, Pasche & Taub. 7520.

Euro-Siberian element. Threat category: NE.

Coeloglossum viride (L.) Hartm.

West of the lake, 1320 m, 29 v 1994, A.Uçar 1174.

Threat category: NT. Distribution is restricted to one area.

Ophrys mammosa Desf.

Abant Lake, Davidson 335.

Mediterranean element. Threat category: NE.

Anacamptis pyramidalis (L.) L.C.M.Rich.

Abant road, 1100 m, 06 viii 1977, A.Baytop, E.Tuzlacı 38290, (det. Taubenheim, 1979).

Threat category: NE.

Steniella satyrioides (Spreng.) Schltr.

East of the Abant Lake, 1150-1300 m, A.Baytop 36837, (det. A.Baytop).

Hyrcano-Euxine element. Threat category: NE.

Orchis coriophora L.

West of the lake, 1320 m, 29 v 1994, A.Uçar 1175.

Threat category: NT. Individuals of this species are sold by local people to tourists.

O. tridentata Scop.

Abant Lake, 1100 m, 25 v 1977, A.Baytop 36830, (det. A.Baytop).

Mediterranean element. Threat category: NE.

O. mascula (L.) L. subsp. *pinetorum* (Boiss. & Kotschy) Camus

North of the lake, 1320 m, 25 v 1995, A.Uçar 1737. North-east of the lake, 1330 m, 04 vi 1994, A.Uçar 1264.

Mediterranean element. Threat category: NT. Individuals of this species are collected by tourists and local people.

O. pallens L.

South-east of the lake, 1340 m, 06 v 1994, A.Uçar 1102. South-east of the lake, near the Abant Köşk Hotel, 1330 m, 14 v 1994, A.Uçar 1131.

Euro-Siberian element(?). Threat category: NT. Individuals of this species are collected by tourists and local people.

Dactylorhiza iberica (M.Bieb. ex Willd.) Soó

West of the lake, 1320 m, 19 vii 1995, A.Uçar 2176 and 1468. Near the Turban Hotel, 1330 m, 19 vii 1995, A.Uçar 2140.

Mediterranean element. Threat category: NT. Individuals of this species are collected by tourists and local people.

D. saccifera (Brongn.) Soó

Abant valley, 800 m, Davidson 936.

Mediterranean element. Threat category: NE.

D. nieschalkiorum H.Bauman & Künkele

East of the lake, 1330 m, 21 vi 1995, A.Uçar 1935.

Endemic. Threat category: NT. Individuals of this species are collected by tourists and local people.

D. incarnata (L.) Soó

Abant Lake, 1350 m, Taub. 76.12.

Threat category: NE.

D. incarnata x *D.nieschalkiorum* (L.) Soó x H. Baumann & Künkele

West of the lake, 1320 m, 21 vi 1995, A.Uçar 1937 and 2177. North-east of the lake, 1320 m, 23 vi 1995, A.Uçar 2025.

Threat category: NT. Population and distribution are low.

D. iberica (M.Bieb. ex Willd.) Soó x *D. incarnata* (L.) Soó

Abant lake, 1200 m, 9 vii 1982, H.Baumann.

Threat category: NE.

D. iberica (M.Bieb. ex Willd.) Soó x *D. nieschalkiorum* H.Baumann & Künkele

Abant Lake, 14 vii 1978, H.Baumann, Renz & Taub. 12191.

Threat category: NE.

D. bithynica H.Baumann

Abant Lake, 1350 m, 1988, Kreutz s.n.

Endemic. Euxine element. Threat category: NE.

Dioscoreaceae

Tamus communis L. subsp. *communis*

North of the lake, 1330 m, 22 vi 1994, A.Uçar 1403.

Threat category: NT. Distribution of this taxon is restricted to one area.

Sparganiaceae

Sparganium erectum L.

subsp. *erectum*

Around Abant Lake, 1350 m, 27 viii 1886, N. & E. Özhatay 55932, (det. N. Özhatay).

Euro-Siberian element. Threat category: NE.

subsp. *microcarpum* (Neuman) Domin

North of the lake, near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1550.

Euro-Siberian element. Threat category: LC.

Typhaceae

Typha latifolia L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2278.

Threat category: LC.

T. shuttleworthii W.Koch & Sond.

East of the lake, 1340 m, 04 viii 1994, A.Uçar 1625.

Threat category: LC.

T. angustifolia L.

Abant Lake, 1350 m, 28 viii 1975, A.Baytop, A.Meriçli 33672, (det. A.Baytop).

Threat category: NE.

T. domingensis Pers.

Abant Lake, 13 v 1970, A.Baytop 18690, (det. A.Baytop).

Threat category: NE.

Juncaceae

Juncus inflexus L.

East of the lake, 1320 m, 18 viii 1995, A.Uçar 2346. North of the lake, 1320 m, 21 vi 1994, A.Uçar 1354.

Threat category: LC.

J. effusus L.

Abant Lake, 1200 m, D. 37265.

Threat category: NE.

J. compressus Jacq.

Abant Lake, 1400 m, D. 37150.

Threat category: NE.

J. gerardi Loisel. subsp. *gerardi*

Abant Lake, 1300-1350 m, Strid 14491.

Threat category: NE.

J. bufonius L.

Right field at the entrance, 1325 m, 03 viii 1994, A.Uçar 1542. East of the lake, 1320 m, 18 viii 1995, A.Uçar 2326.

Threat category: LC.

J. articulatus L.

East of the lake, 1320 m, 8 viii 1995, A.Uçar 2325.

Euro-Siberian element. Threat category: LC.

Cyperaceae

Eleocharis palustris (L.) Roem. & Schult.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1870.

Threat category: LC.

Schoenoplectus lacustris (L.) Palla

subsp. *lacustris*

North of the lake, 1320 m, 21 vi 1994, A.Uçar 1346. East of the lake, 1340 m, 04 viii 1994, A.Uçar 1623.

Threat category: LC.

subsp. *tabernaemontani* (C.C.Gmel.) Á. & D.Löve

Abant Lake, 1400 m, D. 37273.

Threat category: NE.

Blysmus compressus (L.) Panz. ex Link

Abant Lake, 1400 m, D. 37133.

Threat category: NE.

**Carex diandra* Schrank

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1864 and 1869. North-east of the lake, 1330 m, 14 v 1994, A.Uçar 1132.

Euro-Siberian element. Threat category: LC.

C. otrubae Podp.

Abant Lake, 1350 m, 22 vi 1979, A Baytop 42053, (det. O.Nilsson).

Euro-Siberian element. Threat category: NE.

C. divulsa Stokes

*subsp. *divulsa*

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1868.

Euro-Siberian element (?). Threat category: LC.

subsp. *leersii* (Kneuck.) W.Koch

South-west of the lake, 1320 m, 21 vi 1994, A.Uçar 1361. East of the lake, 1330 m, 03 viii 1994, A.Uçar 1554.

Euro-Siberian element. Threat category: LC.

C. hirta L.

North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1876.

Euro-Siberian element. Threat category: LC.

C. flacca Schreb. subsp. *serrulata* (Biv.) Greuter

North of the lake, 1320 m, 25 v 1995, A.Uçar 1738.

Mediterranean element. Threat category: LC.

C. panicea L.

Abant Lake, 1400 m, D. 37161 a.

Euro-Siberian element. Threat category: LC.

C. distans L.

Abant Lake, 1350 m, 26 vi 1975, A.Baytop 32294, (det. Ö.Nilsson).

Euro-Siberian element. Threat category: NE.

C. tomentosa L.

Abant Lake, 1350 m, 26 vi 1975, A.Baytop 32304, (det. Ö.Nilsson).

Euro-Siberian element. Threat category: NE.

C. acuta L.

Abant Lake, 1350 m, 27 vi 1975, A.Baytop 32330, (det. Ö.Nilsson).

Euro-Siberian element. Threat category: NE.

C. nigra (L.) Reichard

subsp. *dacica* (Heuff.) Soó

North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1790 and 1803. East of the lake, 1330 m, 22 vi 1994, A.Uçar 1432.

Euxine element(?). Threat category: LC.

*subsp. *nigra*

East of the lake, 1340 m, 25 v 1995, A.Uçar 1762. North-east of the lake, 1325 m, 25 v 1995, A.Uçar 1747.

Threat category: LC.

C. lasiocarpa Ehrh.

Abant Lake, SW. end of lake, 1450 m, Byfield 87.

Euro-Siberian element. Threat category: NE.

Poaceae / Gramineae

Brachypodium pinnatum (L.) P.Beauv.

On the road to the Antenna tower, 1600 m, 03 viii 1994, A.Uçar 1585. (det. M.Doğan) and 2214.

Euro-Siberian element. Threat category: LC.

***Elymus elongatus** (Host) Runemark subsp. **turcicus** (McGuire) Melderis

On the road to the Antenna tower, 1700 m, 14 ix 1995, A.Uçar 2421. (det. M.Doğan).

Threat category: LC.

Aegilops geniculata Roth

On the road to Mudurnu, 1450 m, 20 vii 1995, A.Uçar 2221. (det. M.Doğan).

Mediterranean element. Threat category: NT. Population is very low.

***Triticum aestivum** L.

On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1289. (det. M.Doğan).

Threat category: LC.

***Hordeum geniculatum** All.

On the road to Mudurnu, 1400 m, 22 vi 1995, A.Uçar 1994. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

H. bulbosum L.

West of the lake, 1320 m, 21 vi 1995, A.Uçar 1945. (det. M.Doğan). On the road to Mudurnu, 1400 m, 20 vii 1995, A.Uçar 2184. (det. M.Doğan).

Threat category: LC.

Bromus japonicus Thunb. subsp. **japonicus**

On the road to the Antenna tower, 1500 m, 20 vii 1995, A.Uçar 2205. (det. M.Doğan).

Threat category: LC.

B. fasciculatus C.Presl.

North of the lake, 1325 m, 04 vi 1994, A.Uçar 1232. (det. M.Doğan).

Mediterranean element. Threat category: LC.

B. cappadocicus Boiss. & Balansa subsp. **cappadocicus**

Above Abant Lake, 17 vii 1940, B.Post.

Threat category: NE.

***B. tomentellus** Boiss.

On the road to the Antenna tower, 1590-1700 m, 04 vi 1994, A.Uçar 1276. (det. M.Doğan) and 1979.

Irano-Turanian element. Threat category: LC.

B. ramosus Huds.

Around the Abant Lake, 1360 m, 8 viii 1970, A. & T.Baytop 18384. (det. A.Baytop).

Threat category: NE.

***Avena sterilis** L. subsp. **sterilis**

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2251. (det. M.Doğan).

Threat category: LC.

Helictotrichon compressum (Heuff.) Henrard

Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1323. (det. M.Doğan).

Euxine element(?). Threat category: LC.

Trisetum flavescens (L.) P.Beauv.

South-east of the lake, 1320 m, 22 vi 1994, A.Uçar 1961. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

Koeleria nitidula Velen.

Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2004. (det. M.Doğan).

Threat category: LC.

K. cristata (L.) Pers.

East of the lake, 1360 m, 22 vi 1994, A.Uçar 1433. (det. M.Doğan). On the road to Mudurnu, 1400 m, 22 vi 1995, A.Uçar 1993. (det. M.Doğan).

Threat category: LC.

Deschampsia caespitosa (L.) P.Beauv.

Around the Abant Lake, 1350 m, 8 viii 1970, A. & T.Baytop 18446. (det. A.Baytop).

Threat category: NE.

Calamagrostis epigejos (L.) Roth

North of the lake, near the Turban Hotel, 1325 m, 04 viii 1994, A.Uçar 1601. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

C. pseudophragmites (Haller f.) Koeler

Abant Lake, Khan et al. 534.

Euro-Siberian element. Threat category: NE.

Apera spica-venti (L.) P.Beauv.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2260. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

Agrostis canina L.

Abant Lake, 1320 m, 10 x 1964, N.Tanker 7860. (det. A.Baytop).

Euro-Siberian element. Threat category: NE.

***A. capillaris** L. var. **capillaris**

Left field at the entrance, 1325 m, 04 vi 1994, A.Uçar 1250. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

A. stolonifera L.

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2258. (det. M.Doğan). East of the lake, 1320 m, 23 vi 1995, A.Uçar 2027. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

Zingeria pisidica (Boiss.) Tutin

West of the lake, 1320 m, 26 v 1995, A.Uçar 1829. (det. M.Doğan). Örencik yayla road, 1350 m, 26 v 1995, A.Uçar 1834. (det. M.Doğan).

Irano-Turanian element(?). Threat category: LC.

Alopecurus arundinaceus Poir.

West of the lake, 1320 m, 21 vi 1995, A.Uçar 1947. (det. M.Doğan).

Euro-Siberian element. Threat category: LC.

A. myosuroides Huds. var. **myosuroides**

North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2270. (det. M.Doğan) and 1777.

Euro-Siberian element. Threat category: LC.

- Phleum bertoloni** DC.
North of the lake, near the Turban Hotel, 1325 m, 04 viii 1994, A.Uçar 1602. (det. M.Doğan). North-east of the lake, 1325 m, 19 vii 1995, A.Uçar 2164. (det. M.Doğan).
Threat category: LC.
- P. montanum** C.Koch subsp. **montanum**
Near the Abant Palace Hotel, 1320 m, 03 viii 1994, A.Uçar 1575. (det. M.Doğan). Northwest of the lake, 1330 m, 21 vi 1994, A.Uçar 1322. (det. M.Doğan).
Threat category: LC.
- ***P. phleoides** (L.) H.Karst.
West of the lake, 1320 m, 21 vi 1995, A.Uçar 1941. (det. M.Doğan).
Euro-Siberian element. Threat category: LC.
- Festuca heterophylla** Lam.
East of the lake, 1330 m, 23 vi 1995, A.Uçar 2038-B. (det. M.Doğan).
Euro-Siberian element. Threat category: LC.
- F. valesiaca** Schleich. ex Gaudin
Abant Lake, 1350 m, 27 vi 1975, A.Baytop 32324, (det. A.Baytop).
Threat category: NE.
- F. airoides** Lam.
Abant Lake, 1700 m, Sorger 69-5-12.
Euro-Siberian element. Threat category: NE.
- Lolium multiflorum** Lam.
North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1842. (det. M.Doğan) and 1843.
Threat category: LC
- L. rigidum** Gaudin var **rigidum**
North of the lake, near the Abant Palace Hotel, 1320 m, 18 vii 1995, A.Uçar 2061. (det. M.Doğan).
Threat category: LC.
- Poa annua** L.
Near the Turban Hotel, 1325 m, 06 v 1994, A.Uçar 1081. (det. M.Doğan). North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1791. (det. M.Doğan).
- Threat category: LC.
- ***P. infirma** Kunth
North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1867. (det. M.Doğan) and 1877. East of the lake, 1330 m, 21 vi 1995, A.Uçar 1932. (det. M.Doğan) and 929.
Threat category: LC
- P. trivialis** L.
Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2005. (det. M.Doğan). North of the lake, 1320 m, 21 vi 1994, A.Uçar 1350. (det. M.Doğan) and 1353.
Threat category: LC.
- P. pratensis** L.
Left field at the entrance, 1320 m, 25 v 1995, A.Uçar 1728. (det. M.Doğan). North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1903. (det. M.Doğan) and 1911.
Threat category: LC.
- P. compressa** L.
North of the lake, 1330 m, 22 vi 1994, A.Uçar 1405. (det. M.Doğan). On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1288. (det. M.Doğan).
Threat category: LC.
- P. nemoralis** L.
North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1861. (det. M.Doğan).
Threat category: LC.
- P. bulbosa** L.
North of the lake, near the Abant Palace Hotel, 1320 m, 26 v 1995, A.Uçar 1776. (det. M.Doğan) and 1770. On the road to the Antenna tower, 1590 m, 22 vi 1995, A.Uçar 1975. (det. M.Doğan).
Threat category: LC.
- ***Catabrosa aquatica** (L.) P.Beauv.
North of the lake, 1320 m, 21 vi 1994, A.Uçar 1349. (det. M.Doğan).
Threat category: NT. Population is affected by overgrazing.
- Dactylis glomerata** L. subsp. **glomerata**
Left field at the entrance, 1320-1325 m, 14 vii 1994, A.Uçar 1520. (det. M.Doğan)
- and 1670. On the road to Mudurnu, 1450 m, 04 vi 1994, A.Uçar 1287. (det. M.Doğan).
Threat category: LC.
- Cynosurus cristatus** L.
Around the Abant Lake, 1350 m, 8 viii 1970, A. & T.Baytop 18389, (det. A.Baytop).
Euro-Siberian element. Threat category: NE.
- C. echinatus** L.
North of the lake, near the Abant Palace Hotel, 1320 m, 17 viii 1995, A.Uçar 2257. (det. M.Doğan). Left field at the entrance, 1320 m, 23 vi 1995, A.Uçar 2000. (det. M.Doğan).
Mediterranean element. Threat category: LC.
- Briza media** L.
Left field at the entrance, 1325 m, 14 vii 1994, A.Uçar 1521. (det. M.Doğan).
Threat category: LC.
- Melica uniflora** Retz.
North-east of the lake, 1330 m, 23 vi 1995, A.Uçar 2022. (det. M.Doğan).
Euro-Siberian element. Threat category: LC.
- ***M. ciliata** L. subsp. **ciliata**
East of the lake, 1320 m, 18 viii 1995, A.Uçar 2358. (det. M.Doğan).
Threat category: LC.
- Glyceria fluitans** (L.) R.Br.
North of the lake, near the Abant Palace Hotel, 1320 m, 21 vi 1995, A.Uçar 1862. (det. M.Doğan).
Threat category: LC.
- Molinia caerulea** (L.) Moench
Abant Lake, 1350 m, 8 viii 1970, A. & T.Baytop 18427, (det. A.Baytop).
Threat category: NE.
- Phragmites australis** (Cav.) Trin. ex Steud.
South of the lake, 1320 m, 17 viii 1995, A.Uçar 2313. (det. M.Doğan). East of the lake, 1340 m, 04 viii 1994, A.Uçar 1624, (det. M.Doğan).
Euro-Siberian element. Threat category: LC.

Danthonia alpina Vest

Abant Lake, 1350 m, A.Baytop 18388.

Threat category: NE.

Cynodon dactylon (L.) Pers. var. *villosus*
Regel

West of the lake, 1320 m, 18 vii 1995,
A.Uçar 2098. (det. M.Doğan).

Threat category: NT. Distribution is
restricted to one area.

Setaria viridis (L.) P.Beauv.

South-east of the lake, 1320 m, 17 viii
1995, A.Uçar 2301. (det. M.Doğan).

Threat category: NT. Distribution is
restricted to one area.

S. verticillata (L.) P.Beauv. var.
ambigua (Guss.) Parl.

Abant, 1100 m, A.Martin.

Threat category: NE.