ANADOLU ÜNİVERSİTESİ BİLİM VE TEKNOLOJİ DERGİSİ
ANADOLU UNIVERSITY JOURNAL OF SCIENCE AND TECHNOLOGY
Cilt/Vol.: 4 - Sayı/No: 2 : 301-322 (2003)

ARAŞTIRMA MAKALESİ/RESEARCH ARTICLE

PLANT DIVERSITY AND GENERAL ECOLOGICAL CHARACTERISTICS OF A PROTECTED AREA OF MUSAÖZÜ DAM AND ITS ENVIRONMENT (ESKİSEHİR,TURKEY)

Meltem ERDİR[1], Cengiz TÜRE[2]

ABSTRACT

Field study was carried out to determine the plant diversity in the dam of Musaözü and its environment during the period between 1996-1998. In terms of species and subspecies, the flora of the area consisted of 302 taxa (1 subspecies) belonging to 208 genera of 62 families. The highest number of taxa were from the families of Asteraceae (12.9%) and Lamiaceae (6.9%). The phytogeographical distribution was as follows: Irano-Turanian elements 13.5%, Euro-Siberian elements 9.2% and Mediterranean elements 8.9%. The rate of endemism was 9.2% compared to the total flora. When the extinction situation of the taxa determined in the study area was examined, it was established that 2 plant taxa were in the Endangered category, 3 were in the Vulnerable, 1 was in Lower risk (conversation dependent), 2 were Lower risk (near threatened), 1 was in Lower risk (least concern), 1 was data deficient category. Most parts of the study field consisted of forests, bushes and steppe vegetation types which are included in Quercetea pubescentis class. When the life forms of plant taxa were analysed, it was determined that hemicriptophytes have the most number of plant taxa with 35.0% and vascular parasites have the less number of plant taxa with 0.6%.

Key Words: Plant diversity, Vegetation ecology, Flora, Protected area, Eskişehir.

MUSAÖZÜ BARAJI VE ÇEVRESİNDEKİ KORUMA ALANININ (ESKİŞEHİR-TÜRKİYE) BİTKİ ÇEŞİTLİLİĞİ VE GENEL EKOLOJİK ÖZELLİKLERİ

ÖZ

Musaözü Gölet (Eskişehir) ve çevresinin bitki çeşitliliğinin belirlenmesi için arazi çalışmaları 1996-1998 yılları arasında yapılmıştır. Alanın florası 62 familya ve 208 cinse ait 302 taksondan (1 alttür) oluşmaktadır. Alanda en fazla taksona % 12.9 ile Asteraceae familyası ve % 6.9 ile Lamiaceae familyaları sahiptir. Türlerin fitocoğrafik dağılımlarına bakıldığında, İran-Turan elementleri % 13.5, Avrupa-Sibirya elementleri % 9.2 ve Akdeniz elementlerinin % 8.9'luk orana sahip oldukları görülmektedir. Toplam floraya göre endemizm oranı % 9.2'dir. Alanda belirlenen bitki taksonlarının risk kategorileri incelendiğinde, 2 taksonun tehlikede (endangered), 3 taksonun zarar görebilir (vulnerable), 1 taksonun koruma önlemi gerektiren (Lr (cd)), 2 taksonun tehdit altına girebilir (Lr (nt)), 1 taksonun en az endişe verici (Lr (lc)), 1 taksonun veri yetersiz (DD) kategorisinde oldukları belirlenmiştir. Araştırma alanının çoğu Quercetea pubescentis sınıfına dahil taksonların oluşturduğu orman, çalı ve step vejetasyonundan oluşmaktadır. Hayat formları değerlendirildiğinde ise, alanda %35 ile en fazla hemikriptofit taksonların, %0.6 ile en az parazit taksonların yer aldığı saptanmıştır.

Anahtar Kelimeler: Bitki çeşitliliği, Vejetasyon ekolojisi, Flora, Korunmuş alan, Eskişehir.

1 Osmangazi University, Faculty of Arts and Sciences, Department of Biology, Eskisehir.
2 Anadolu Unıversiy, Faculty of Science, Department of Biology, Eskisehir.
E-mail: cture@anadolu.edu.tr

Received: 27 Mayıs 2003; **Accepted:** 04 Aralık 2003.

1. INTRODUCTION

According to the Grid system of Davis (1965), the region which is in the B3 (Davis, 1975) square is on the state road between Eskişehir-Kütahya and is 23 km away from the central town. The region is under the safeguard of National Parks and Hunted Animals Engineering which is a branch of Eskişehir Forests District Administration. There is a dam constructed by DSI (General Directorate of State Hydraulic Works) on one of the tributaries of Porsuk River named Mollaoğlu Stream. The height of the study area is 800-1000 m. above sea level. While most of the area is far from human influence, the other parts of the study area are used for recreation (Anonymous, 2002a). (Figure 1).

Among the reasons why this area has been chosen as the study area, it could be said that the area is under protection, has a dam and is situated in a place where Irano-Turanian and Mediterranean phytogeographical regions meet.

2. MATERIAL AND METHOD

The subject of this research is the vascular plants collected from Musaözü dam and its environment between 1996 and 1998. The area has been visited periodically, plant samples have been collected and they have finally been dried in accordance with herbarium techniques.

In determining the plant samples, "Flora of Turkey and the East Aegean Islands" (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2001) and other flora sources that belong to close regions were used (Tutin and Heywood, 1964; Polunin, 1972). In determining the taxa which belong to *Gramineae (Poaceae)* family, Prof. Dr. Musa DOĞAN from METU (Middle East Technical University) Science Faculty, Department of Biology, helped us. Doubtfully identified plant samples have been checked in the herbarium of Gazi University. The plant list gives first taxa for species and subspecies followed by locality number, habitat, collecting date, collector(s), life form, herbarium number, phytogeographic region, endemism and risk category, respectively.

The locality numbers were given to localities not to repeat the same localities in the plant list. Locality numbers refer the following localities.

1. B3 : Eskişehir, Musaözü, Fire security zone.

2. B3 : Eskişehir, Musaözü, north of guest-house.

3. B3 : Eskişehir, Musaözü, Picnic area.

4. B3 : Eskişehir, Musaözü, West of pond.

5. B3 : Eskişehir, Entry of Musaözü.

6. B3 : Eskişehir, Musaözü, Tampon zone of the stone bridge's north.

7. B3 : Eskişehir, Musaözü, the north part of fire security zone road.

8. B3 : Eskişehir, Musaözü, South of guest-house.

9. B3 : Eskişehir, Musaözü, marsh environment to the stone birdge.

10. B3 : Eskişehir, Musaözü, Entry of pond.

11. B3 : Eskişehir, Musaözü, Musaozu village road.

12. B3 : Eskişehir, Musaözü, Exit of Takmak village.

13. B3 : Eskişehir, Musaözü, Takmak village road.

14. B3 : Eskişehir, Musaözü, the south part of fire security zone road.

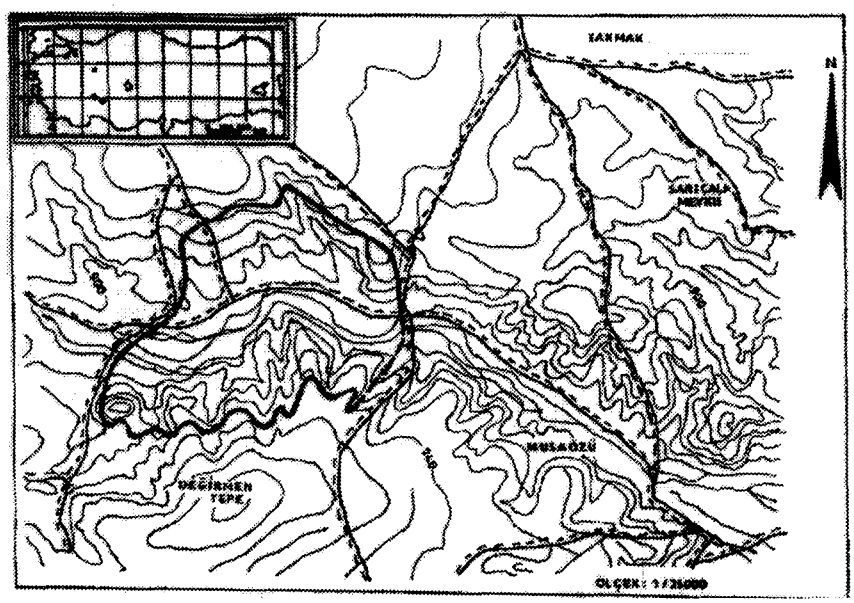

Figure 1.

15. B3: Eskişehir, Musaözü, north of pond.

16. B3: Eskişehir, Musaözü, North of pond.

17. B3: Eskişehir, Musaözü, environment of the guest house.

18. B3: Eskişehir, Musaözü, tampon zone of the stone bridge's north.

19. B3: Eskişehir, Musaözü, Musaozu pond.

20. B3: Eskişehir, Musaözü, Entry of pond.

The plant samples are kept in the herbarium of Anadolu University Science, Faculty, Department of Biology (ANES: 2352-2621).

The plant list of the study field has been arranged according to the Flora of Turkey and the East Aegean Islands (Davis, 1965-1988) and is given as Appendix. Cultivated plant taxa were given as observation in the plant list.

The soil analysis of the study area have been done in the Forest, Soil and Ecology Research Institue, and the information about its geology has been obtained from the General Directorate of State Hydraulic Works.

The information about the climate of the study field has been obtained from Eskişehir Meteorology District Management (Anonymous, 1997).

The meanings of the abrevitions used in the floristic are as follows: Ir.-Tur.: Irano-Turanian; Medit.: Mediterranean; Euro.-Sib.: Euro-Siberian; End.: Endemic.

3. FINDINGS

3.1. Geology

The stratigraphic ranging of the formations of Musaözü Dam and its environment has three different structures. These are; slope rubble (Kuvaterner), alluvion (Kuvaterner) and conglomerate (Neogen). Conglomerates cover all the area and its environment. Although their thickness can not be known for sure, they are estimated to be quite thick. Conglomerates consist of red, grey, green and black round, semi-circle, small and big usually magmatic and metamorphic, and less frequently sediment pebbles and have a reddish colour. Peridotit, gabro serpentine, radyolorit and chalkier pebbles are conglomerate pebbles and are quite hard. Slope rubble is the newest formation of the study field and covers the slopes and hills in it.

During Mesozoic, a series of ophiolite occurred and covered all the area following the magmatic movements under the sea. At the end of Mesozoic and at the beginning of Tarsier, ofiyolits were cut to pieces as a result of tectonic movements, erosion and degeneration and this caused much precipitation. In the middle of Tarsier, after the regressive movement, which caused clay and chalk to combine, the heavy and large precipitation obtained a conglomerate character. These are on the ophiolitic series in an irregular fashion (Atalay, 1987; Karaman and Kibici, 1999).

Because of the massive ophiolite underneath, there was no twisting in the area during the last period of Alpine Orogeny, and elevation and subsidence occurred due to the cracks and fractures on the block beneath. During this subsidence and elevation, conglomerates on the massive ofiolits showed an increase in grade (Anonymous, 1996).

3.2. Major Soil Types

When major soil types are examined, it's understood that a great number of the types consist of brown soil, which also includes agricultural areas (Anonymous, 1984). This is followed by red, brown, alluvial and hidromorhpic soils. Average values belonging to some chemical parameters of the major soil types which have been found in the study area are shown in Table 1.

Brown forest soil types are interzonal (semi-mature) and have good drainage. In these soil types, which include high levels of lime and have developed on the main structure, the profile is in A (B) C form and the horizons fit each other gradually. Horizon A (upper soil) is dark brown, fragmented and porous and organic matter well mixed with mineral matter. Horizon B

Table 1. Average Values Belonging To Some Chemical Parameters of The Major Soil Types Found In The Study Area

Soil Group	pH	Total salt (%)	Chalk (%)	Organic Matter (%)	P_2O_5 Kg/dek.	K_2O Kg/dek.
Brown Forest soil	7.4	0.076	7.73	2.76	6.07	115.6
Alluvial	7.5	0.064	11.86	2.51	10.31	96.5
Hydromorphic Alluvial	7.9	0.217	13.15	1.64	9.17	225
Red Brown Soil	7.6	0.043	16.5	1.04	2.90	46.7

(lower soil) is generally lighter brown, has round edges and is in a blocked condition. It has more clay than Horizon C. It is mostly silicate clays. Base saturation of the clays is middle and high levels. There might be $CaCO_3$ remnants at the lower part of Horizon B.

Alluvial soils cover quite a wide area along Mollaoğlu Stream. Its width ranges from 120 to 200 metres. There are pebbles, still clay and it is generally impenetrable in some parts. There are soil types which have been formed by young conglomerations gathered by water in the influence area of rivers. Generally there are no horizons. But there are mineral layers of different characters. They are always and seasonally wet and are under the influence of ground water.

Red brown soil types have undergone erosion as a result of the disappearance of the vegetation cover in the study area. Their horizon A's are generally washed, rich in skeleton items and consist of shallow soil. They are on steep slopes and flat areas which have bush *Quercus* L. (Fagaceae) and short *Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) *Holmboe* (Pinaceae) taxa. They exist over the flat areas which we can call plain that contain mechanical combinations of red brown clay and sticky mud with clay and they are Zonal (mature) soil types. Calcisification plays a role in their formation. Their natural drainage is good. Because of the oxidation of the iron in the soil, their colour seems to be red. The upper soil contains low quantities of organic substance.

Horizon A is typically reddish brown or red and soft. Horizon B is red or reddish brown, heavier and quite tight. It has horizon C which gradually penetrates to the main material. The area, both on the surface and underneath consists of 10-15% stone and pebble. The main material is marn, chist with clay and chalk.

Hidromorphic alluvial soils are wet and marshy for most of the year because of surface flows and because the ground water level is quite high around the lake shore. There are generally plants in shallow water.

3.3. Climate

Although the climate of Eskişehir seems to a transition climate type between the West Anatolian climate and the Inner Anatolian climate at first glance, in the city there is generally a harsh and territorial climate (Anonymous, 1997). The height of the wide plains such as Porsuk and Upper Sakarya, which lie between the mountains extending from east to west, is 800-1000 m. The city is surrounded by mountains in the north and south and by high plateaus in the west. While this situation hinders the effect of the Mediterranean and Black Sea climates on the city, it allows, though slightly, the West Anatolian climate to permeate into the city (Akman, 1990) (Table 2), (Table 3).

3.4. General Structure of the Vegetation

The study field contains bush, steppe hydrophilous vegetation and especially forest vegetation (Çetik, 1985; Akman and Ketenoğlu, 1992). The forest vegetation consists of *Pinus nigra* subsp. *pallasiana* communities. The bush vegetation consists of *Quercus pubescens* Willd. *(Fagaceae)* and *Juniperus oxycedrus*

Table 2. Bioclimate Stratum of The Study Area According to Emberger's (1952) Formula.

Station	Altitude	P	PE	M	m	S	Q	Bioclimate Stratum
Eskişehir	801 m	379.2	59.52	28.7	-3.7	2.1	40.9	Semi-dry Mediterranean

S=PE / M (S: Value of dry season, PE: Average summer precipitation, M: Average maximum temperature of the hottest month)

Q= 2000.P / (M+m+546.4) . (M-m) (Q: Comparison of temperature-Precipitation, P: Total annual Precipitation,

M: Average maximum temperature of the hottest month m: Average maximum temperature of the coldest month)

Table 3. Annual Precipitation (mm) According to The Seasons and Precipitation Regime Data From Eskişehir Meteorology Station.

	Spring	Summer	Fall	Winter	Annual	Precipitation Regime
Eskişehir	120.68	59.52	74.31	124.67	379.2	W.S.F.S.

Table 4. The life forms of the plant taxa determined in the study area (Raunkiaer 1934).

Life Form	Number	%
Hemicrypophyte	106	35.0
Terophyte	84	27.8
Chamephyte	57	18.8
Geophyte	32	10.5
Fanerophyte	21	6.9
Vascular Parasite	2	0.6
Total	302	100

L. subsp. *oxycedrus* (Cupressaceae) communities. In the dominant structure of both communities, there are characteristic taxa belonging to the *Quercetea pubescentis* classis. This formation can lie to the area under the effect of euxin province of Marmara region (Türe, 2001). These vegetation types tend to spread over brown and red brown forest soil which have developed on marn, chist with clay and chalky main material. Over the flat topographic areas, there are steppe vegetation including xeromorphic taxa some of which generally belong to the *Asteraceae* (Compositae) *Graminae* (Poaceae) *and Fabaceae* (Leguminosae) families.

Hydrophilous vegetation has no agricultural value and seems to spread near marshy areas that are made of alluvial and hidromorphic soils, and along the shore of dams where there are plants like *Typha* L. (Typhaceae), *Phragmites* L. (Gramineae), *Juncus* L. (Juncaceae) and *Cyperus* L. (Cyperaceae), which are natural shelters for wild animals.

3.5. Life Forms

When the life forms of plant taxa were analysed according to Raunkiaer (1934), it was determined that hemicriptophytes have the most number of plant taxa with 35.0% and it is followed by terophytes with 8.4%, chamephytes with 5.7%, geophytes with 3.2% and phanerophytes with 2.1%. Vascular parasites have the less number of plant taxa with 0.6% in the research area (Table 4). In the study area, it can be seen that hemicryptophytes which can preserve underground vegetative parts in bad conditions are dominant.

Table 5. The distribution of the plant taxa which have been found in the study field according to major taxonomic groups

	Family	Genus	Total Taxa
Spermatophyta	62	208	302
Gymnospermae	2	3	3
Angiospermae	60	205	299
Dicotyledonae	51	172	258
Monocotyledonae	9	33	41
Total	62	208	302

3.6. Plant Diversity

During the study, 208 genera belonging to 62 families and 302 taxa species and subspecies belonging to these subspecies have been identified (Table 5). 96 taxa of floristic structures have been determined. The floristic list is given at the end of the paper as an appendix.

According to the results, it has been determined that 41 taxa are Irano-Turanian elements (13.5%), 21 taxa are European-Siberian elements (9.2%), 27 taxa are Mediterranean elements (8.9%). Endemism rate is 9.2.

According to this, *Asteraceae* (Compositae), with 39 taxa (12.9%) is the first in the list containing the most taxa. Secondly *Lamiaceae* (Labiatae) has 21 taxa (6.9%), *Fabaceae* (Leguminosae) family has 23 taxa (7.6%), *Poaceae* (Gramineae) family has 21 taxa (6.9%), *Brassicaceae* (Cruciferae) has 19 taxa (6.2%), *Apiaceae* (Umbelliferae) has 15 taxa (4.9%) and *Caryophyllaceae* has 14 taxa (4.6%). These 7 families form more than half of the total flora with 50.3% rate. Some of these plants also distributes in agricultural areas around the study area (Türe ve Köse 2000).

The types that contain the most species and subspecies taxa are *Centaurea L.* (Compositae) (8), *Alyssum* L. *(Cruciferae)* (6), *Euphorbia* L. (Euphorbiaceae) (6), *Consolida* (DC.) S. F. Gray (Ranunculaceae) (5), *Silene* L. (Caryophyllaceae) (5), *Astragalus* L. (Leguminosae) (4), *Convolvulus* L. (Convolvulaceae) (4), *Veronica* L. (Scrophulariaceae) (4) and *Bromus* L. (Gramineae) (4) (Table 6).

Table 6. Plant species which have the highest number of taxa

Genus	Total Taxa
Centaurea	8
Alyssum	6
Euphorbia	6
Consolida	5
Silene	5
Astragalus	4
Convolvulus	4
Veronica	4
Bromus	4

Table 7. The plant taxa under risk which are considered to be in the various risk categories (EN: Endangered, VU: Vulnerable, LR (cd): Lower risk (conservation dependent), LR (nt): Lower risk (near threatened), LR (lc): Lower risk (least concern), DD: Data deficient).

Taxa	Risk Category
Alyssum huber-morathii (endemic)	LR (nt)
Minuartia corymbulosa var. *gypsophiloides* (endemic)	EN
Alhagi mannifera	VU
Cephalaria media	VU
Centaurea olympica (endemic)	LR (lc)
Hieracium marmoricola (endemic)	DD
Hieracium tamderense (endemic)	EN
Verbascum basivelatum (endemic)	LR (cd)
Fritillaria fleischeriana (endemic)	LR (nt)
Elymus farctus subsp. *bessarabicus* var. *striatulus*	VU

When the risk categories of the plants which had been found in the study field were analysed, it was determined that 2 plant taxa were in the Endangered category, 3 were in the Vulnerable, 1 was in Lower risk (conversation dependent), 2 were Lower risk (near threatened), 1 was in Lower risk (least concern), 1 was data deficient category (Ekim et al., 2000). (Table 7).

4. DISCUSSION AND RESULTS

Although the study field, Musaözü Dam and its environment, is in the southwest of Eskişehir, where Anatolia Region and Aegean Region meet the area is included in Mediterranean Bioclimate zone from the point of its climatological structure. Its annual precipitation rate is 379.18 mm and the precipitation regime type of the area is W.S.A.S. and there is a dry period between the sixth and the tenth months (Akman 1990). (Figure 2). The region is covered with brown forest soil, alluvial and red brown soil types (Anonymous, 1984).

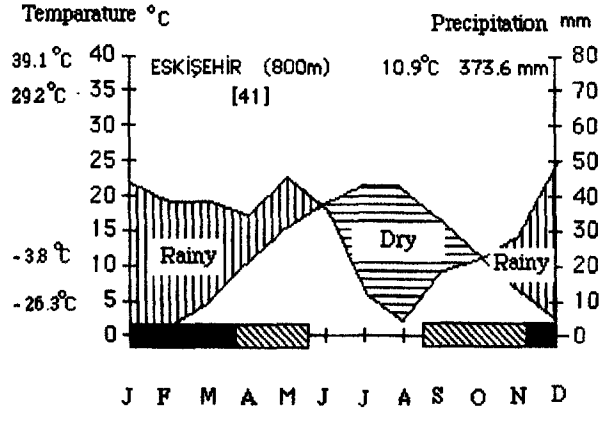

Figure 2.

Table 8. The comparison of the distribution of the taxa which have been determined in the study field to the floristic areas and the studies which have been done in close regions (*Num: Number)

	Euro.-Sib. % (Num*.)	Medit. % (Num*.)	Ir.-Tur. % (Num*.)	Endemizm % (Num*.)
Erdir –Türe (2003)	10.1 (28)	9.7 (27)	14.8 (41)	10.1 (28)
Türe et al. (1996)	14	6	14	10
Ekim-Akman (1991)	20	25	18	10
Çırpıcı (1989)	13 (117)	11.3 (119)	10 (95)	12.8 (114)
Ekim (1978)	8.49 (53)	4.8 (30)	8.01 (50)	10.09 (63)
Türe (2000)	7.3 (24)	6.7 (22)	20.5 (67)	12.5 (41)
Böcük (2002)	6.7 (31)	4.7 (22)	21.2 (98)	12.12 (56)

According to the results which have been obtained from floristic studies, 41 taxa were Irano-Turanian elements (13.5%), which is the largest, 27 taxa were Mediterranean elements (9.2%) and 21 taxa were Euro-Siberian elements (8.9%) (Table 8).

When the distribution of the taxa determined in the study field over floristic areas and the studies done in close areas were compared (Table 8), the most similarity with Euro-Siberian and Mediterranean elements was seen in the study done by Çırpıcı in the Murat Mountains (Çırpıcı, 1989). For Irano-Turanian elements, the study done by Türe et al. (1996) in Balıkdamı is the most similar.

When endemism rates were compared, the study (Ekim and Akman, 1991) in the Sündiken Mountains and the study in Balıkdamı (Türe et al. 1996) had very close values of 10, 9.2%. This could be explained by the fact that the study fields are close to the study field and therefore there are similar climatic and edafic factors. Hence we can say that the endemism rate for Eskişehir and its environment is approximately 10%. Considering the fact that the endemism rate is 31% for Anatolia, this rate is quite important for the region (Türe and Tokur, 2000). We believe that the location of our region in Inner Anatolia, its containing more Irano-Turanian elements than phytogeographical elements play important roles in endemism rates (Seçmen et al. 1995). Besides, the fact that there is a mainly chalky main rock structure and that the region is at the meeting point of three phytogeographical regions play important roles in endemism rates. But the fact that the height is only a narrow margin of 800-1000 m, in the study field has a restrictive role in endemism rates (Akman, 1993).

More than half of the 302 taxa found in the area, which belong to 62 families, belong to 7 families (50.3%). These families are as follows respectively: *Asteraceae* (Compositae) (12.9%), *Lamiaceae* (Labiatae) (6.9%), *Fabaceae* (Leguminosae) (7.6%), *Poaceae* (Gramineae) (6.9%), *Brassicaceae* (Cruciferae) (6.2%), *Apiaceae* (Umbelliferae) (4.9%)

Table 9. The comparison of the families containing the most taxa in the study area and the studies carried out in close regions (*Num: Number)

	Erdir-Türe (2003)	Türe at.al. (1996)	Ekim-Akman (1991)	Çırpıcı (1989)	Ekim (1978)	Türe (2000)	Böcük (2002)
Asteraceae	13.3 (37)	9 (13)	9.7 (65)	12.6 (113)	12.1 (76)	10.4 (20)	12.0 (34)
Lamiaceae	7.5 (21)	9 (13)	5.9 (40)	5.8 (52)	7.2 (45)	5.2 (17)	6.4 (18)
Fabaceae	7.2 (20)	10 (14)	9.5 (64)	7.3 (65)	11.2 (70)	4.1 (13)	8.1 (23)
Poaceae	7.2 (20)	9 (13)	3.7 (25)	3.4 (34)	6.8 (43)	12.5 (24)	9.5 (27)
Brassicaceae	6.1 (17)	14 (23)	4.9 (33)	6.7 (60)	4.9 (31)	9.3 (19)	7.0 (20)
Apiaceae	5.4 (15)	0.7 (1)	4.4 (30)	3.8 (34)	5.2 (33)	0.5 (7)	4.2 (12)
Caryophyllaceae	5.0 (14)	3.5 (5)	3.2 (22)	6.1 (55)	4.3 (27)	4.6 (5)	4.2 (12)
Liliaceae	3.6 (10)	2.1 (3)	3.3 (23)	3.5 (32)	4.4 (28)	4.0 (4)	4.5 (13)
Boraginaceae	3.2 (9)	3.5 (5)	1.5 (10)	3.0 (27)	-	2.8 (3)	4.9 (14)
Rosaceae	3.2 (9)	0.7 (1)	4.1 (28)	4.7 (42)	5.7 (36)	0.9 (1)	4.9 (14)

and *Caryophyllaceae* (4.6%). The rate of Asteraceae family in this study is most similar to those of Çırpıcı (1989), Ekim (1978) and Böcük's study (2002), the rate of Lamiaceae family to that of Ekim's study (1978), the rate of Fabaceae family to that of Çırpıcı's study (1989) and the rate of Poaceae family to that of Ekim's study (1978) (Table 9).

Although the species which contains the most taxa in Turkey is *Astragalus,* the species belonged to genus of *Centaurea, Alyssum* and *Euphorbia* in the study field have the most taxa. The fact that there are many taxa which belong to *Centaurea* species is a similarity to the study by Çırpıcı (1989). The reason for this situation is, probably, that the study field is very close to that study area.

When the general vegetation structure of the study field was examined, there is mostly forest vegetation and in addition to this there are bush, steppe and hydrophyilous vegetation types. Although forest vegetation covers a big area in the study field, it contributes the least to the plant diversity. The biggest contributor to the plant list is from the areas which have steppe, bush and hydrophilous vegetation types.

When the life forms of plant taxa were analysed according to Raunkiaer (1934), it was determined that hemicryptophytes (35.0%) and terophytes (8.4%) had the highest number of taxa in the study area (Table 4). It is thought that having underground productive parts, hemicryptophytes can easily distribute in the area. It is believed that being present in large numbers and in seed form in the area makes the distributions of terophytes easy in the area.

Collecting information about the plant diversity and ecological characteristics of the places where there are now dams or which will possibly be used as dam construction areas is very important considering the fact that the plant vegetation will soon be under water. This information will enable us to know biological diversity and gene sources and to protect them (Çepel, 1997). Nowadays, environmental pollution, unplanned consumption of natural resources, uncontrolled industrialization and urbanization, are increasingly serious. Water pollution cannot be considered apart from the other environmental problems and the main causes of water pollution are unpurified sewage from uncontrolled industrialization and urbanization and pesticides and fertilizers used in agricultural activities (Anonymous, 1983; Anonymous, 2002b). This situation especially causes the pollution of freshwater sources which form barrages and dam (Anonymous, 1983). Therefore it is unavoidable that the plant vegetation in these areas and their environments will be polluted, too. The determining of the flora of these areas is very important as it will help to examine and to follow the effects of pollution on plants.

The existence of such a dam in the study field which is under the control of Forestry General Management National Parks and Hunting-Wild Animals Engineering and General Directorate of State Hydraulic Works make it more important to form a database about the ecological and the floristic characteristics of our region.

REFERENCES

Akman, Y. (1990). *İklim ve Biyoiklim,* Palme Yayınları, No: 103, Ankara.

Akman, Y. (1993). *Biyocoğrafya,* Palme Yayınları, Ankara.

Akman, Y. ve Ketenoğlu, O. (1992). *Vejetasyon Ekolojisi ve Araştırma Metodları,* Ank. Üniv. Döner Ser. İşl. Yayınları, No: 9, Ankara.

Anonymous (1983). *Kurtboğazı Baraj Gölü Kirlilik Araştırması,* DSİ Basım Müdürlüğü, Ankara.

Anonymous (1984). *Esikşehir İli Verimlilik Envanteri ve Gübre İhtiyaç Roporu,* T.C. Tarım Orman ve Köyişleri Bakanlığı, Topraksu Genel Müdürlüğü, Tovep Yay., No: 22, Genel Yay: 754, Ankara.

Anonymous (1996). *General Directorate of State Hydraulic Works (DSİ),* Musaözü Gelişim Planı, Eskişehir.

Anonymous (1997). *Eskişehir Meteorology Station,* Eskişehir.

Anonymous (2002a). *Kentimiz Eskişehir,* Eskişehir Ticaret Odası Yayınları, No 16, Eskişehir.

Anonymous (2002b). *Çevresel Etki Değerlendirmesi "ÇED",* Kılavuz Paz. Tic. ve San. Ltd. Şti., Ankara.

Atalay, İ. (1987). *Türkiye Jeomorfolojisine Giriş,* Ege Üniv. Edebiyat Fak. Yayınları, No: 9, İzmir.

Böcük, H. (2002). *Sivrihisar Dağları'nın (Eskişehir) Floristik ve Ekolojik Yönden İncelenmesi,* Yüksek Lisans Tezi, Anadolu Üniv. Fen Bilimleri Enst., Eskişehir.

Çepel , N. (1997). *Biyoçeşitlilik Önemi ve Korunması,* TEMA Vakfı Yayınları, No: 15, İstanbul.

Çetik, A. (1985). *Türkiye Vejetasyonu I, İç Anadolu'nun Vejetasyonu ve Ekolojisi,* Selçuk Üniversitesi Yayınları: 7, Fen-Edeb. Fak. Yay: 1, Konya.

Çırpıcı, A. (1989). Murat Dağı (Kütahya-Afyon)'nın Florası, *Doğa Türk Botanik Dergisi.* 12(2), 157-222.

Davis, P.H. (1965-1988). *Flora of Turkey and the East Aegean Islands.* Vol. I-IX Univ. Press., Edinburgh.

Davis, P.H., Miller R.R., Tan, K. (1988). *Flora of Turkey and the East Aegean Islands.* Vol. X Univ. Press., Edinburgh.

Davis, P.H. (1975). *Turkey Present State of Floristic Knowledge. Dep. of Botany of Royal Botanic Garden.* Edinburgh Univ., Edinburgh.

Ekim, T. and Akman, Y. (1991). Eskişehir İli Sündiken Dağları'ndaki Orman Vejetasyonunun Bitki Sosyolojisi Bakımından Araştırılması. *Doğa Türk Bot. Derg.* 15 (1), 28-40.

Ekim, T., Koyuncu, M., Vural M., Duman H., Aytaç, Z. ve Adıgüzel N. (2000). *Türkiye'nin Türkiye Bitkileri Kırmızı Kitabı (Eğrelti ve Tohumlu Bitkiler),* Türkiye Tabiatını Koruma Derneği-Van Yüzüncü Yıl Üniversitesi Yayınları, Ankara.

Güner, A., Özhatay, N., Ekim, T., Başer K.H.C. (2001). *Flora of Turkey and the East Aegean Islands,* Vol. XI, Edinburgh.

Karaman M. and Kibici Y. (1999). *Temel Jeoloji Prensipleri,* Ankara.

Polunin, O. (1972). *The Concise Flowers of Europea. London,* Oxford Univ. Press. New York-Toronto.

Raunkiaer, C. (1934). *The life forms of plants and statistical plant geography,* Oxford, Clarendon Press.

Seçmen, Ö. (1996). *Türkiye Florası (Ders Notları),* Ege Üniv. Fen Fakültesi Teksirler Serisi, No: 120, Bornova-İzmir.

Seçmen, Ö., Gemici, Y., Görk, G., Bekât, L. ve Leblebici E. (1995). *Tohumlu Bitkiler Sistematiği,* 4. Baskı, Ege Ünv. Fen. Fak. Kitaplar Serisi No:116, Bornova-İzmir.

Tutin, T. G. and Heywood, V. H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. and Webb. D.A. (1964). *Flora Europaea,* Vol I, Cambridge University Press, Cambridge.

Türe, C., Ocak, A. and Mısırdalı, H. (1996). *Balıkdamı'nın (Gökada) Florası, Anadolu Üniv. Fen Fak. Derg.* 2, 55-69.

Türe, C. (2000). *Floristic and General Ecological Characters of Arayıt Mountain and Its Environs (Central Anatolia, Eskişehir--TURKEY),* The Scientific and Pedagogical News of Odlar Yourdu University, No:4, p. 108-132, Baku.

Türe C. ve Köse Y. B. (2000). *Eskişehir ve Çevresindeki Bazı Tarım Alanlarında Yayılış Gösteren Yabancı Ot Florası Üzerinde Bir Araştırma,* Turkish Journal of Agriculture and Forestry, Tübitak, 24, 327-331.

Türe, C. ve Tokur, S. (2000). The Flora of the Forest Series of Yirce-Bürmece-Kömürsu and Muratdere (Bilecik-Bursa-Turkey), *Tr. J. of Botany.* 24, 47-66.

Türe C. (2001). A Description of the Vegetation Mosaic of the Forests of Yirce and Muratdere (Bilecik-Bursa, Turkey) by Satellite Remote Sensing. *Tr. J. of Botany,* 25, 131-136.

Cengiz Türe, was born in Eskişehir in 1965. He completed his first and high education in Eskişehir. He graduated from Anadolu University, the Faculty of Arts and Sciences in 1987. He completed his Master Degree in 1990 and PHd in 1996 and became a Doctor of Sciences. In the same year, he was appointed to Botany branch of Biology Department, Anadolu University as a Assistant Professor. He still works for Department of Biology, Anadolu University as an education staff.

Meltem Erdir, was born in Eskişehir in 1975. She completed her first and high education in Eskişehir. She graduated from Osmangazi University, the Faculty of Arts and Sciences in 1996. She completed her Master Degree in 2001. In the same year, she started to doctorate in the Graduate School of Natural and Applied Sciences, Osmangazi University. She has been working for Department of Biology, Osmangazi University as a Research Assistant since July, 1998.

APPENDIX

PLANT LIST

Divisio: SPERMATOPHYTA

Classis: GYMNOSPERMAE

PINACEAE

Pinus nigra Arn. subsp. ***pallasiana*** (Lamb.) Holmboe

1, woodland area, 28.09.1997, 940 m, Erdir and Türe, Ph., ANES: 2352.

CUPRESSACEAE

Juniperus oxycedrus L. subsp. ***oxycedrus***

1, woodland area, 26.08.1997, 940 m, Erdir and Türe, Ph., ANES: 2353

Thuja orientalis L.

2, 12.05.1997, 910 m, Erdir and Türe, Ph., ANES: 2354.

Classis: ANGIOSPERMAE

Subclassis: DICOTYLEDONAE

RANUNCULACEAE

Consolida thirkeana (Boiss.) Schröd.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, T., ANES: 2355, End

C. orientalis (Gay) Schröd.

4, field edge, 02.07.1997, 900 m, Erdir and Türe, T., ANES:2356

C. regalis S. F. Gray subsp. ***paniculata*** (Host) Soo' var. ***paniculata***

4, road edge, 26.08.1997, 900 m, Erdir and Türe, T., ANES:2357

C. glandulosa (Boiss.& Huet) Bornm

1, road edge, 26.06.1998, 930 m, Erdir and Türe, T., ANES:2358, Ir.-Tur. El., End, Nr.

C. tomentosa (Aucher) Schröd. subsp. ***oligantha*** (Boiss.) Davis.

1, road edge, 26.06.1998, 930 m, Erdir and Türe, T., ANES:2359, Ir.-Tur. El., Nr.

Adonis flammea Jacq.

5, road edge, 16.05.1997, 920 m, Erdir and Türe, T., ANES: 2360.

Ranunculus constantinopolitanus (DC.) d'Urv

4, stone bridge and edges, 14.06.1997, 900 m, Erdir and Türe, G., ANES:2361.

Ceratocephalus testiculatus (Crantz) Roth.

2, water edge, 21.04.1997, 906 m, Erdir and Türe, T., ANES:2362, Nr.

BERBERIDACEAE

Berberis vulgaris L.

5, Beginning of afforestation, road edge, 16.05.1997, 926 m, Erdir and Türe, Ph., ANES:2363, Nr.

B. crataegina DC

2, 03.08.1997, 906 m, Erdir and Türe, Ph., ANES:2364, Ir.- Tur. El.

PAPAVERACEAE

Glaucium leiocarpum Boiss.

5, erosion zone, road edge, 14.06.1997 , Erdir and Türe, H., ANES:2365

Roemeria hybrida (L.) DC.

5, road edge, 28.09.1997, Erdir and Türe, T, ANES: 8901.

Papaver rhoeas L.

6, 28.09.1997, Erdir and Türe, T., ANES:2366

Hypecoum imberbe Sibth. & Sm

8, *Pinus-Quercus* woodland area, 21.04.1997, 906 m, Erdir and Türe, T., ANES:2367

Fumaria vaillantii Lois.

7, road edge, 31.05.1997, 920 m, Erdir and Türe, T., ANES:2368, Nr.

CRUCIFERAE (Brassicaceae)

Lepidium latifolium L.

2, water edge, 26.08.1997,906 m, Erdir and Türe, G., ANES:2369

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

9, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2370

Isatis glauca Aucher ex Boiss. subsp. ***glauca***

7, road edge, 27.04.1997, 930 m, Erdir and Türe, T., ANES: 8902.

Iberis taurica DC.

1, flat places at the road edge, 31.05.1997, 930 m, Erdir and Türe, T., ANES:2371

Aethionema arabicum (L.) Andrz. ex DC.

7, 16.05.1997, 920 m, Erdir and Türe, T., ANES:2372, Nr.

Thlaspi perfoliatum L.

10, southeast sides, 27.04.1997, 930 m, Erdir and Türe, T., ANES:2373

Capsella bursa-pastoris (L.) Medik.

11, road edge, 21.04.1997, 916 m, Erdir and Türe, T., ANES:2374

Fibigia clypeata (L.) Medik.

7, 16.05.1997, 26.06.1998, 920 m, Erdir and Türe, H., ANES:2375

Alyssum linifolium Steph. ex Willd. var. ***theranicum*** Bornm

10, southeast sides, 27.04.1997, 930 m, Erdir and Türe, T., ANES:2376

A. huetii Boiss.

1, woodland area, 27.04.1997, 940 m, Erdir and Türe, T., ANES:2377, Ir.-Tur. El., End, Nr.

A. desertorum Stapf. var. ***desertorum***

10, 27.04.1997, 930 m, Erdir and Türe, T., ANES:2378

A. minus (L.) Rothm var. ***micranthum*** (Meyer) Dudley

12, Musaozu pond road, sides, 04.05.1997, 31.05.1997, 920 m, Erdir and Türe, T., ANES:2379

A. cypricum Nya`r

12, Musaozu pond road, sides, 02.07.1997, 920 m, Erdir and Türe, ANES:2380, Nr.

A. huber-morathii Dudley

4, field edge, 28.09.1997, 03.11.1997, 900 m, Erdir and Türe, Ch., ANES:2381, E. Medit. El., End, Nr.

Alyssum sibiricum Willd.

7, road edge, 14.06.1997, 900 m, Erdir and Türe, H., ANES: 8903.

Erophila verna (L.) Chevall. subsp. ***praecox*** (Stev.) Walters

3, *Pinus-Quercus* woodland area, 21.04.1997, 910 m, Erdir and Türe, T., ANES:2382

Sisymbrium altissimum L.

4, stone bridge and edges, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2383

Descurainia sophia (L.) Webb ex Prantl

4, stone bridge and edges, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2384

Camelina hispida Boiss. var. ***hispida***

7, 16.05.1997, 31.05.1997, 920 m, Erdir and Türe, T., ANES:2385

RESEDACEAE

Reseda lutea L. var. ***lutea***

13, road edge, 28.09.1997, 926 m, Erdir and Türe, H., ANES:2386

Reseda luteola L.

7, road edge, 28.09.1997, 926 m, Erdir and Türe, H., ANES: 8904.

CISTACEAE

Helianthemum canum (L.) Baumg.

1, woodland area, 31.05.1997, 26.08.1997, 940 m, Erdir and Türe, Ch., ANES:2387

Fumana aciphylla Boiss.

1, woodland area, 14.06.1997, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2388, Ir.-Tur. El.

VIOLACEAE

Viola occulta Lehm

10, southeast sides, 27.04.1997, 31.05.1997, 930 m, Erdir and Türe, T., ANES:2389

POLYGALACEAE

Polygala pruinosa Boiss. subsp. ***pruinosa***

1, woodland area, 31.05.1997, 14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2390

Polygala anatolica Boiss. & Heldr.

1, woodland area, 31.05.1997, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2391

PORTULACACEAE

Portulaca oleracea L.

7, road edge, 16.05.1997, 02.07.1997, 920 m, Erdir and Türe, T., ANES: 8905.

CARYOPHYLLACEAE

Minuartia corymbulosa (Boiss. &Bal.) Mc. Neill var. ***gypsophiloides*** Mc. Neill

7, 16.05.1997, 02.07.1997, 920 m, Erdir and Türe, Ch., ANES:2392, Ir.-Tur. El., End, Nr.

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

5, 16.05.1997, 02.07.1997, 920 m, Erdir and Türe, T., ANES: 8906.

Cerastium anomalum Waldst.& Kit.

1, woodland area, 31.05.1997, 940 m, Erdir and Türe, T., ANES:2393

C. perfoliatum L.

1, woodland area, 04.05.1997, 940 m, Erdir and Türe, T., ANES:2394, Nr.

Dianthus ancyrensis Hausskn. & Bornm.

1, woodland area, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2395, Ir.- Tur. El., End, Nr.

Dianthus zonatus Fenzl var. ***zonatus***

2, woodland area, 03.08.1997, 920 m, Erdir and Türe, Ch., ANES:2396

Saponaria glutinosa Bieb.

1, road edge, 31.05.1997, 940 m, Erdir and Türe, Ch., ANES:2397

S. prostrata Willd. subsp. ***prostrata***

1, road edge, 14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2398, Ir.- Tur. El., End

Vaccaria pyramidata Medik. var. ***pyramidata***

1, road edge, 14.06.1997, 940 m, Erdir and Türe, T., ANES:2399

Silene otites (L.) Wibel

1, road edge, 02.07.1997, 940 m, Erdir and Türe, H., ANES:2400

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

1, road edge, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2401

S. alba (Miller) Krause subsp. ***divaricata*** (Reichb.) Walters

14, 14.06.1997, 904 m, Erdir and Türe, H., ANES:2402

S. macrodonta Boiss.

1, 31.05.1997, 940 m, Erdir and Türe, T., ANES:2403, Nr.

S. subconica Friv.

1, road edge, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2404

Agrostemma githago L.

1, road edge, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2405

ILLECEBRACEAE

Paronychia carica Chaudhri

1, road edge, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2406, End.

POLYGONACEAE

Polygonum cognatum Meissn.

4, field edge, 02.07.1997, 900 m, Erdir and Türe, Ch., ANES:2407

P. pulchellum Lois.

4, field edge, 26.08.1997, 900 m, Erdir and Türe, T., ANES:2408, Nr.

Rumex acetosella L.

7, road edge, 21.04.1997, 916 m, Erdir and Türe, H., ANES: 8907.

R. crispus L.

11, road edge, 21.04.1997, 916 m, Erdir and Türe, H., ANES:2620

R. conglomeratus Murray

7, water edge, 02.07.1997, 906 m, Erdir and Türe, Ch., ANES:2409

R. dentatus L. subsp. ***halacsyi*** (Rech. pat.) Rech. fil.

11, road edge, 21.04.1997, 916 m, Erdir and Türe, T., ANES:2410.

CHENOPODIACEAE

Beta vulgaris L.

4, field edge, 26.08.1997, 900 m, Erdir and Türe, G., ANES:2411.

Chenopodium chenopodioides (L.) Aellen

4, field edge, 28.09.1997, 900 m, Erdir and Türe, T., ANES:2412, Nr.

Chenopodium album L. subsp. ***album*** var. ***album***

4, field edge, 26.08.1997, 900 m, Erdir and Türe, T.,

ANES:2413

Salsola ruthenica Iljin

4, field edge, 26.08.1997, 900 m, Erdir and Türe, Ch., ANES:2414

AMARANTHACEAE

Amaranthus retroflexus L.

4, field edge, 26.08.1997, 900 m, Erdir and Türe, T.,

ANES:2415, Nr.

A. albus L.

1, road edge, 28.09.1997, 926 m, Erdir and Türe, T., ANES:2416, Nr.

TAMARICACEAE

Tamarix smyrnensis Bunge

3, water edge, 26.08.1997, 900 m, Erdir and Türe, Ph.,

ANES:2417.

GUTTIFERAE (Hypericaceae)

Hypericum perforatum L.

1, road edge, 14.06.1997, 926 m, Erdir and Türe., H., ANES: 8908.

Hypericum aviculariifolium Jaub.& Spach subsp. ***aviculariifolium*** var. ***avicularifolium***

1, road edge, 14.06.1997, 926 m, Erdir and Türe, Ch., ANES:2418, E. Medit. El., End

MALVACEAE

Malva neglecta Wallr.

4, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES: 8909.

Malva parviflora L.

4, field edge, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2419

Althaea officinalis L.

7, water edge, 03.08.1997, 900 m, H., Erdir and Türe, ANES:2420

TILIACEAE

Tilia rubra DC. subsp. ***caucasica*** (Rupr.) V.Engler

11, road edge, 21.04.1997, 916 m, Erdir and Türe, Ph., Observation, Euxine El..

LINACEAE

Linum hirsutum L. subsp. ***pseudoanatolicum*** Davis

15, *Pinus-Quercus* woodland area, 14.06.1997, 930 m, Erdir and Türe, H., ANES:2421, Ir.- Tur. El., End.

GERANIACEAE

Geranium tuberosum L. subsp. ***tuberosum***

7, road edge, 16.05.1997, 920 m, Erdir and Türe, G., ANES: 2422

Erodium cicutarium (L.) L'Hérit. subsp. ***cicutarium***

7, road edge, 14.06.1997, 920 m, Erdir and Türe, T., ANES: 2423

E. acaule (L.) Becherer & Thell.

10, the sides on the southeast, 27.04.1997, 930 m, Erdir and Türe, H., ANES:2424, Medit. El., Nr.

ZYGOPHYLLACEAE

Peganum harmala L.

7, road edge, 14.06.1997, 926 m, Erdir and Türe, T., ANES: 8910.

RUTACEAE

Haplophyllum thesioides (Fisch. ex DC.) G. Don

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2425, Nr.

CELASTRACEAE

Euonymus europaeus L.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, Ph., ANES:2426, Euro.-Sib. El.

LEGUMINOSAE (Fabaceae)

Lotononis genistoides (Fenzl) Benth.

1, under the *Quercus*, 02.07.1997, 03.08.1997, 940 m, Erdir and Türe, Ch., ANES:2427, Ir.-Tur. El.

Galega officinalis L.

7, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES: 8911.

Astragalus densifolius Lam

1, *Pinus-Quercus* woodland area, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2428, Ir.-Tur. El., End, Nr.

A. lydius Boiss.

1, *Pinus-Quercus* woodland area,14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2429, Ir.-Tur. El., End

A. elongatus Willd. subsp. ***elongatus***

7, road edge, 16.05.1997, 14.06.1997, 920 m, Erdir and Türe, Ch., ANES:2430

A. vulnerariae DC.

1, *Pinus-Quercus* woodland area, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2431, End.

Vicia villosa Roth subsp. ***villosa***

5, road edge, 14.06.1997, 916 m, Erdir and Türe, H., ANES:2432

V. cypria Kotschy ex Unger & Kotschy

9, 14.06.1997, 904 m, Erdir and Türe, T., ANES:2433, Nr.

V. pannonica Crantz var. ***pannonica***

2, stone bridge and edges, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2434

Ononis spinosa L. subsp. ***leiosperma*** (Boiss.) Sirj.

7, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES: 8912.

Trifolium repens L. var. ***repens***

7, road edge, 02.07.1997, 904 m, Erdir and Türe, H., ANES: 8913.

Trifolium pratense L. var.***pratense***

9, 14.06.1997, 904 m, Erdir and Türe, H., ANES:2435

Trifolium fragiferum L. var. ***fragiferum***

9, 02.07.1997, 904 m, Erdir and Türe, Ch., ANES:2436

Melilotus officinalis (L.) Desr.

2, 14.06.1997, 904 m, Erdir and Türe, T., ANES:2437

M alba Desr.

2, road edge, 28.09.1997, 906 m, Erdir and Türe, T., ANES:2438

Medicago lupulina L.

9, 02.07.1997, 904 m, Erdir and Türe, Ch., ANES:2439

M. sativa L. subsp. ***sativa***

3, water edge, 16.08.1997, 900 m, Erdir and Türe, H., ANES:2440

Dorycnium graecum (L.) Ser.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, Ch., ANES.2441, Euxine El.

Lotus corniculatus L. var. ***corniculatus***

2, road edge, 03.08.1997, 26.08.1997, 910 m, Erdir and Türe, H., ANES:2442.

Coronilla varia L. subsp. ***varia***

2, field edge, 14.06.1997, 900 m, Erdir and Türe, H.,

ANES:2443

Hedysarum varium Willd.

1, *Pinus-Quercus* woodland area, 26.06.1998, 940 m, Erdir and Türe, Ch., ANES:2444, Ir.-Tur. El.

Onobrychis oxyodonta Boiss.

2, Pinus-Quercus woodland area, 14.06.1997, 930 m, Erdir and Türe, H., ANES:2445

Alhagi mannifera Desv.

2, road edge, 02.04.1997, 900 m, Erdir and Türe, Ch., ANES:2446, Nr.

ROSACEAE

Prunus spinosa L. subsp. ***dasyphylla*** (Schur) Domin

3, water edge, 03.08.1997, 900 m, Erdir and Türe, Ph., ANES:2447, Euro.-Sib. El.

Amygdalus communis L. subsp. communis

11, road edge, 21.04.1997, 916 m, Erdir and Türe, Ph., Observation, Cultivated.

Rubus caesius L.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, Ph., ANES: 2448

Potentilla recta L.

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2449

Potentilla reptans L.

2, 02.07.1997, 904 m, Erdir and Türe, H., ANES: 8914.

Sanguisorba minor Scop. subsp. **lasiocarpa** (Boiss. & Hausskn.) Nordb.

2, road edge, 26.06.1998, 906 m, Erdir and Türe, H., ANES:2450

Rosa canina L.

9, 14.06.1997, 28.09.1997, 904 m, Erdir and Türe, Ph., ANES: 2451

Crataegus monogyna Jacq. subsp. ***monogyna***

3, south sides, 26.08.1997, 920 m, Erdir and Türe, Ph., ANES:2452

Malus sylvestris Miller subsp. ***orientalis*** (A.Uglitzkich) Browicz var. ***orientalis***

11, road edge, 21.04.1997, 916 m, Erdir and Türe, Ph., Observation, Cultivated.

Pyrus communis L. subsp. ***communis***

11, road edge, 21.04.1997, 916 m, Erdir and Türe, Ph., Observation, Cultivated.

ONAGRACEAE

Epilobium lanceolatum Seb.& Mauri

1, road edge, 14.06.1997, 930 m, Erdir and Türe, G., ANES:2453

CRASSULACEAE

Sedum acre L.

7, road edge, 02.07.1997, 904 m, Erdir and Türe, H., ANES: 8915.

Sedum album L.

7, road edge, 03.11.1997, 926 m, Erdir and Türe, H., ANES: 8916.

UMBELLIFERAE (Apiaceae)

Eryngium campestre L. var. ***virens*** Link

1, road edge, 03.11.1997, 926 m, Erdir and Türe, H., ANES:2454, Nr.

Echinophora tournefortii Jaub. & Spach.

1, road edge, 03.11.1997, 926 m, Erdir and Türe, H., ANES: 8917, Nr.

Echinophora tenuifolia L. subsp. ***sibthorpiana*** (Guss.) Tutin

4, road edge, 28.08.1997, 906 m, Erdir and Türe, H., ANES:2455, Ir.-Tur. El.

Anthriscus caucalis Bieb.

4, field edge, 14.06.1997, 900 m, Erdir and Türe, Ch., ANES:2456, Nr.

Bifora radians Bieb.

4, field edge, 02.07.1997, 900 m, Erdir and Türe, T., ANES:2457

Pimpinella cappadocica Boiss.& Bal var. ***cappadocica***

1, *Pinus-Quercus* woodland area, 03.08.1997, 940 m, Erdir and Türe, H., ANES:2458, Ir.- Tur. El., End, Nr.

Seseli tortuosum L.

1, 28.09.1997, 940 m, Erdir and Türe, Ch., ANES:2459

Conium maculatum L.

4, field edge, 02.07.1997, 900 m, Erdir and Türe, H., ANES:2460

Bupleurum rotundifolium L.

1, road edge, Erdir and Türe, T., ANES:2461

Falcaria vulgaris Bernh.

4, field edge, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2462

Ferulago macrosciadia Boiss.& Ball.

1, road edge, 14.06.1997, 930 m, Erdir and Türe, Ch., ANES:2463, E. Medit. El., End

Torilis arvensis (Huds.) Link subsp. neglecta (Sprengel) Thellung

4, sides, 02.07.1997, 900 m, Erdir and Türe, T., ANES: 2464

T. leptophylla (L.) Reichb.

4, road edge, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2465

Caucalis platycarpos L.

4, road edge, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2466

Turgenia latifolia (L.) Hoffm

4, field edge, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2467

Daucus carota L.

1, road edge, 26.06.1998, 916 m, Erdir and Türe, H., ANES:2468

CAPRIFOLIACEAE

Lonicera etrusca Santi var. ***etrusca***

1, *Pinus-Quercus* woodland area, 02.07.1997, 28.09.1997, 940 m, Erdir and Türe, Ph., ANES:2469, Medit. El.

VALERIANACEAE

Valerianella lasiocarpa (Stev.) Betcke

1, road edge, 16.05.1997, 930 m, Erdir and Türe, T., ANES:2470, Ir.-Tur. El., Nr.

DIPSACACEAE

Cephalaria transsylvanica (L.) Schrader

4, sides, 26.08.1997, 900 m, Erdir and Türe, T., ANES:2471, Nr.

C. media Litv.

1, road edge, 03.08.1997, 930 m, Erdir and Türe, Ch., ANES:2472, Ir.-Tur. El., Nr.

Scabiosa argentea L.

4, sides, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2473

Scabiosa persica Boiss.

1, road edge, 26.06.1998, 930 m, Erdir and Türe, H., ANES:2474, Ir.-Tur. El., Nr.

Pterocephalus plumosus (L.) Coluter

16, road edge, 03.11.1997, 926 m, Erdir and Türe, H., ANES: 8918.

COMPOSITAE (Asteraceae)

Helianthus annuus L.

2, water edge, 28.09.1997, 906 m, Erdir and Türe, T., ANES:2475

Xanthium spinosum L.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, T., ANES:2476

Inula ensifolia L.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, G., ANES:2477, Euro.-Sib. El.

I. britannica L.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, G., ANES:2478, Euro.-Sib. El.

I. montbretiana DC.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, G., ANES:2479, Ir.-Tur. El.

Filago pyramidata L.

1, road edge, 14.06.1997, 930 m, Erdir and Türe, T., ANES:2480

Senecio vernalis Waldst. & Kit.

1, *Pinus-Quercus* woodland area, 27.04.1997, 940 m, Erdir and Türe, T., ANES:2481

Anthemis cretica L. subsp. ***anatolica*** (Boiss.) Grierson

7, 16.05.1997, 920 m, Erdir and Türe, H., ANES:2482, Nr.

A. tinctoria L. var. ***discoidea*** (All.) DC.

7, 31.05.1997, 920 m, Erdir and Türe, H., ANES:2483

Artemisia santonicum L.

4, field edge, 26.08.1997, 900 m, Erdir and Türe, Ch.,ANES:2484, Euro.-Sib. El.

Cirsium vulgare (Savi) Ten.

1, road edge, 03.08.1997, 930 m, Erdir and Türe, H., ANES:2485

C. arvense (L.) Scop. subsp. ***vestitum*** (Wimmer & Grab.) Petrak

4, water edge, sides, 02.07.1997, 900 m, Erdir and Türe, Ch., ANES:2486

Picnomon acarna (L.) Cass.

17, road edge, 03.08.1997, 910 m, Erdir and Türe, H., ANES: 8919.

Carduus nutans L. subsp. ***leiophyllus*** (Petr.) Stoj. & Stef.

7, 31.05.1997, 920 m, Erdir and Türe, H., ANES:2487

Jurinea consanguinea DC.

18, 03.08.1997, 910 m, Erdir and Türe, H., ANES:2488

Centaurea olympica C. Koch

17, 03.08.1997, 910 m, Erdir and Türe, H., ANES:2489

C. virgata Lam

4, water edge, sides, 28.09.1997, 900 m, Erdir and Türe, Ch., ANES:2490, Ir.-Tur. El.

C. diffusa Lam

1, road edge, 26.08.1997, 926 m, Erdir and Türe, H., ANES:2491, Medit. El., Nr.

C. solstitialis L. subsp. ***solstitialis***

4, water edge, sides, 02.07.1997, 900 m, Erdir and Türe, T., ANES:2492

C. calcitrapa L. subsp. ***calcitrapa***

4, stone bridge and edges, 02.07.1997, 900 m, Erdir and Türe, H., ANES:2493, Medit. El., Nr.

C. urvillei DC. subsp. ***stepposa*** Wagenitz

1, road edge and woodland area, 26.06.1998, 926 m, Erdir and Türe, Ch., ANES:2494, Ir.-Tur. El.

C. cheiranthifolia Willd. var. ***cheiranthifolia***

14, road edge, 16.05.1997, 920 m, Erdir and Türe, G., ANES:2495, Euxine El., Nr.

C. depressa Bieb.

7, road edge, 31.05.1997, 920 m, Erdir and Türe, T., ANES:2496

Xeranthemum annuum L.

2, road edge, 03.08.1997, 906 m, Erdir and Türe, T., ANES:2497

Echinops ritro L.

1, *Pinus-Quercus* woodland area, 28.09.1998, 940 m, Erdir and Türe, H., ANES:2498

Scolymus hispanicus L.

5, Beginning of afforestation, road edge, 26.08.1997, 926 m, Erdir and Türe, H., ANES:2499, Medit. El.

Cichorium intybus L.

4, water edge, sides, 03.08.1997, 900 m, Erdir and Türe, Ch., ANES:2500

Scorzonera cana (C. A. Meyer) Hoffm var. cana

1, *Pinus-Quercus* woodland area, 14.06.1997, 940m, Erdir and Türe, G., ANES:2501

Tragopogon pratensis L. subsp. ***pratensis***

4, stone bridge and edges, 26.08.1997, 900 m, Erdir and Türe, H., ANES:2502, Euro.-Sib. El., Nr.

Leontodon crispus Vill. subsp. ***asper*** (Waldst.& Kit.) Rohl. var. ***asper***

1, *Pinus-Quercus* woodland area, 31.05.1997, 940 m, Erdir and Türe, H., ANES:2503

Hieracium marmoricola Sell & West

1, *Pinus-Quercus* woodland area, 02.07.1997, 940m, Erdir and Türe, H., ANES:2504, End, Nr.

H. tamderense Hub.- Mor.

4, stone bridge and edges, 28.09.1997, 900 m, Erdir and Türe, H., ANES:2505, Euxine El., End, Nr.

Pilosella piloselloides (Vill.) Sojak subsp. megalomastix (NP.) Sell & West

5, Beginning of afforestation, road edge, 26.08.1997, 926 m, Erdir and Türe, H., ANES:2506

P. cymosa (L.) C. H. & F. W. Schultz

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2507, Euro.–Sib. El.

Lactuca serriola L.

1, *Pinus-Quercus* woodland area, 21.04.1997, 940 m, Erdir and Türe, T., ANES: 8920.

Scariola viminea (L.) F. W. Schmidt

2, road edge, 03.08.1997, 906 m, Erdir and Türe, H., ANES:2508, Nr.

Taraxacum officinale Weber

1, *Pinus-Quercus* woodland area, 21.04.1997, 940 m, Erdir and Türe, T., ANES:2509

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

2, road edge, 03.08.1997, 906 m, Erdir and Türe, H., ANES:2510

Crepis foetida L. subsp. ***rhoeadifolia*** (Bieb.) Celak.

1, *Pinus-Quercus* woodland area, 28.09.1997, 940 m, Erdir and Türe, T., ANES:2511

CAMPANULACEAE

Asyneuma limonifolium (L.) Janchen subsp. ***limonifolium***

1, *Pinus-Quercus* woodland area, 02.07.1997, 940 m, Erdir and Türe, H., ANES:2512

A. rigidum (Willd.) Grossh. subsp. ***rigidum***

1, *Pinus-Quercus* woodland area, 03.08.1997, 940 m, Erdir and Türe, H., ANES:2513, Ir.-Tur. El.

PRIMULACEAE

Primula vulgaris Huds. subsp. ***vulgaris***

3, water edge, 12.03.1997, 900 m, Erdir and Türe, G., ANES:2514, Euro.-Sib. El.

P. vulgaris Huds. subsp. ***sibthorpii*** Hort. ex. Reichb.

3, water edge, 25.03.1997, 900 m, Erdir and Türe, G., ANES:2515, Euxine El.

ASCLEPIADACEAE

Vincetoxicum fuscatum (Hornem) Reichb. fil. subsp. ***fuscatum***

1, *Pinus-Quercus* woodland area, 02.07.1997, 940 m, Erdir and Türe, Ch., ANES:2516

CONVOLVULACEAE

Convolvulus lineatus L.

1, road edge, 26.06.1998, 926 m, Erdir and Türe, H., ANES:2517

C. holosericeus Bieb. subsp. ***holosericeus***

1, *Pinus-Quercus* woodland area, 14.06.1997, 940m, Erdir and Türe, H., ANES:2518

C. compactus Boiss.

1, *Pinus-Quercus* woodland area, 14.06.1997, 940m, Erdir and Türe, Ch., ANES:2519

C. arvensis L.

4, water edge, sides, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2520

Calystegia sepium (L.) R. Br. subsp. ***sepium***

3, water edge, 26.08.1997, 900 m, Erdir and Türe, H., ANES:2521, Nr.

BORAGINACEAE

Heliotropium europaeum L.

1, *Pinus-Quercus* woodland area, 21.04.1997, 940 m, Erdir and Türe, H., ANES: 8921.

Lappula barbata (Bieb.) Gürke

1, *Pinus-Quercus* woodland area, 14.06.1997, 940m, Erdir and Türe, H., ANES:2522, Ir.-Tur. El.

Rochelia disperma (L. fil.) C. Koch var. ***disperma***

1, *Pinus-Quercus* woodland area, 31.05.1997, 940m, Erdir and Türe, T., ANES:2523

Myosotis discolor Pers.

1, *Pinus-Quercus* woodland area, 04.05.1997, 940m, Erdir and Türe, T., ANES: 2524, Euro.-Sib. El., Nr.

Echium italicum L.

4, water edge, sides, 02.07.1997, 900 m, Erdir and Türe, H., ANES:2525, Medit. El.

Moltkia coerulea (Willd.) Lehm

7, road edge, 31.05.1997, 920 m, Erdir and Türe, Ch., ANES:2526, Ir.-Tur. El.

Onosma tauricum Pallas ex Willd. var. ***tauricum***

1, *Pinus-Quercus* woodland area, 31.05.1997, 940m, Erdir and Türe, H., ANES:2527

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

1, *Pinus-Quercus* woodland area, 21.04.1997, 940 m, Erdir and Türe, T., ANES: 8922.

Anchusa leptophylla Roemer & Schultes subsp. ***leptophylla***

1, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES:2528

A. undulata L. subsp. ***hybrida*** (Ten.) Coutinho

2, road edge, 24.12.1997, 906 m, Erdir and Türe, H., ANES:2529, Medit. El.

A. azurea Miller var. ***azurea***

1, *Pinus-Quercus* woodland area, 21.04.1997, 940 m, Erdir and Türe, H., ANES: 8923.

Nonea macrosperma Boiss.& Heldr.

1, road edge, 16.05.1997, 930 m, Erdir and Türe, Ch., ANES:2530, Ir. –Tur. El., End

SOLANACEAE

Hyoscyamus niger L.

1, road edge, 16.05.1997, 930 m, Erdir and Türe, Ch., ANES:8924.

SCROPHULARIACEAE

Verbascum flavidum (Boiss.) Freyn & Bornm

10, 31.05.1997, 926 m, Erdir and Türe, H., ANES:2531, Euro.-Sib. El.

V. basivelatum Hub.-Mor.

1, road edge, 02.07.1997, 930m, Erdir and Türe, H.,

ANES:2532, Ir.-Tur. El., End

Linaria corifolia Desf.

1, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES:2533, Ir.-Tur. El., End

L. simplex (Willd.) DC.

1, road edge, 14.06.1997, 930m, Erdir and Türe, H., ANES:2534, Medit. El., Nr.

Veronica praecox All.

10, the sides on the southeast, 04.05.1997, 930 m, Erdir and Türe, T., ANES:2535

V. triphyllos L.

4, water edge, sides, 21.04.1997, 900 m, Erdir and Türe, T., ANES:2536

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

10, the sides on the southeast, 31.05.1997, 920 m, Erdir and Türe, H., ANES:2537

V. multifida L.

10, the sides on the southeast, 31.05.1997, 920 m, Erdir and Türe, H., ANES: 2538, Ir.-Tur. El., End

OROBANCHACEAE

Orobanche ramosa L.

1, road edge, 14.06.1997, 930m, Erdir and Türe, Pr., ANES:2539

ACANTHACEAE

Acanthus hirsutus Boiss.

5, erosion zone, sides, 14.06.1997, Erdir and Türe, H., ANES:2540, End

GLOBULARIACEAE

Globularia orientalis L.

15, *Pinus- Quercus* woodland area, 02.07.1997, 930 m, Erdir and Türe, Ch., ANES:2541, Ir.-Tur. El.

G. trichosantha Fisch. & Mey.

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2542

LABIATAE (Lamiaceae)

Ajuga chamaepitys (L.) Schreber subsp. ***chia*** (Schreber) Arcangeli var. ***chia***

1, road edge, 14.06.1997, 926 m, Erdir and Türe, H., ANES:2543

Teucrium scordium L. subsp. ***scordium***

4, water edge, sides, 26.08.1997, 900 m, Erdir and Türe, H., ANES:2544, Euro.-Sib. El.

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

1, road edge, 03.08.1997, 930 m, Erdir and Türe, H., ANES:2545, Euro.-Sib. El.

T. polium L.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, Ch., ANES:2546

Scutellaria salviifolia Bentham

1, road edge, 14.06.1997, 926 m, Erdir and Türe, Ch., ANES:2547, End

Lamium amplexicaule L.

12, Musaozu pond road, sides, 27.04.1997, 920 m, Erdir and Türe, T., ANES:2548, Euro.-Sib. El.

L. purpureum L. var. ***purpureum***

4, field edge, 31.05.1997, 900 m, Erdir and Türe, T., ANES:2549, Euro.-Sib. El.

Marrubium vulgare L.

5, Beginning of afforestation, road edge, 03.11.1997, 926 m, Erdir and Türe, H., ANES: 2550

M. parviflorum Fisch. & Mey. subsp. ***parviflorum***

4, road edge, 03.11.1997, 900 m, Erdir and Türe, H., ANES:2551, Ir.-Tur. El.

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

1, road edge, 02.07.1997, 930 m, Erdir and Türe, T., ANES:2552, E. Medit. El..

Stachys byzantina C. Koch

1, road edge, 02.07.1997, 930 m, Erdir and Türe, H., ANES:2553, Euro.-Sib. El.

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

9, 02.07.1997, 904 m, Erdir and Türe, Ch., ANES:2554

Origanum vulgare L. subsp. ***hirtum*** (Link) Ietswaart

1, road edge, 28.09.1997, 926 m, Erdir and Türe, H., ANES:2555, E. Medit. El., Nr.

Acinos arvensis (Lam) Dandy

7, 31.05.1997, 920 m, Erdir and Türe, Ch., ANES:2616, Euro.-Sib. El.

Mentha aquatica L.

4, water edge, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2621

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

4, water edge, sides, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2617

Ziziphora capitata L.

1, road edge, 26.06.1998, 930 m, Erdir and Türe, T., ANES.2618, Ir.-Tur. El.

Z. tenuior L.

1, road edge, 31.05.1997, 930 m, Erdir and Türe, T., ANES:2619, Ir.-Tur. El.

Salvia aethiopis L.

4, stone bridge and edges, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2556

S. candidissima Vahl subsp. ***occidentalis*** Hedge

5, road edge, 26.06.1998, 916 m, Erdir and Türe, H., ANES:2557, Ir.-Tur. El.

S. virgata Jacq.

1, road edge, 28.09.1997, 926 m, Erdir and Türe, H., ANES:2558, Ir.-Tur. El.

PLUMBAGINACEAE

Acantholimon venustum Boiss. var. ***venustum***

5, Beginning of afforestation, road edge, 26.08.1997, 926 m, Erdir and Türe, Ch., ANES:2559, Ir.-Tur. El.

PLANTAGINACEAE

Plantago major L. subsp. ***intermedia*** (Gilib.) Lange

3, water edge, 26.08.1997, 900 m, Erdir and Türe, H., ANES:2560

P. lanceolata L.

4, water edge, sides, 03.08.1997, 900 m, Erdir and Türe, H., ANES:2561

SANTALACEAE

Thesium billardieri Boiss.

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, H., ANES:2562, Ir.-Tur. El., Nr.

LORANTHACEAE

Viscum album L. subsp. ***austriacum*** (Wiesb.) Vollman

1, on the *Pinus nigra*, 28.09.1997, 940 m, Erdir and Türe, Pr., ANES:2563

EUPHORBIACEAE

Euphorbia apios L.

3, south sides, *Pinus-Quercus* woodland area, 21.04.1997, 910 m, Erdir and Türe, G., ANES:2564, E. Medit. El., Nr.

E. oblongata Griseb.

4, water edge, 03.08.1997, 900 m, Ch., 2565, Erdir and Türe, E. Medit. El., Nr.

E. falcata L. subsp. ***macrostegia*** (Bornm) O. Schwarz

4, road edge, 28.09.1997, 900 m, Erdir and Türe, T., ANES:2566, E. Medit. El., End

E. herniariifolia Willd. var. ***herniariifolia***

5, erosion zone, sides, 27.04.1997, Erdir and Türe, Ch., ANES:2567

E. myrsinites L.

1, road edge, 12.03.1997, 930 m, Erdir and Türe, H., ANES:2568

E. macroclada Boiss.

1, road edge, 31.05.1997, 930 m, Erdir and Türe, H., ANES:2569, Ir.-Tur. El.

FAGACEAE

Fagus orientalis Lipsky

13, 920 m, Erdir and Türe, Ph., Observation, Euro.-Sib. El.

Quercus pubescens Willd.

1, woodland area, 16.05.1997, 940 m, Erdir and Türe, Ph., ANES:2570

SALICACEAE

Salix alba L.

4, water edge, 03.08.1997, 900 m, Erdir and Türe, Ph., ANES:2571, Euro.-Sib. El.

Populus tremula L.

4, water edge, 03. 05.1997, 03.08.1997, 900 m, Erdir and Türe, Ph., Observation, Euro.-Sib. El.

RUBIACEAE

Asperula lilaciflora Boiss. subsp. ***phrygia*** (Bornm) Schönb.-Tem

1, road edge, 31.05.1997, 930 m, Erdir and Türe, Ch., ANES:2572, End

A. arvensis L.

1, road edge, 16.05.1997, 930 m, Erdir and Türe, T., ANES:2573, Medit. El.

Galium verum L. subsp. ***verum***

4, stone bridge and edges, 02.07.1997, 900 m, Erdir and Türe, T., ANES:2574, Euro.-Sib. El.

G. tricornutum Dandy

4, road edge, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2575, Medit. El.

Cruciata taurica (Pallas ex Willd.) Ehrend.

5, erosion zone, sides, 27.04.1997, Erdir and Türe, Ch., ANES:2576, Ir.-Tur. El.

Alt Sınıf: MONOCOTYLEDONAE

ALISMATACEAE

Alisma gramineum Lej.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, G., ANES:2577

LEMNACEAE

Lemna minor L.

19, 900 m, 13. 07.1996, Erdir and Türe, Observation.

LILIACEAE

Asphodeline taurica (Pallas) Kunth

5, Beginning of afforestation, road edge, 16.05.1997, 926 m, Erdir and Türe, Ch., ANES:2578, E. Medit. El.

Allium cupani Rafin. subsp. ***hirtovaginatum*** (Kunth) Stearn

1, road edge, 26.08.1997, 930 m, Erdir and Türe, G., ANES:2579, Medit. El.

A. sibthorpianum Schultes & Schultes fil.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, G., ANES:2580, E. Medit. (mt.) El., End

Ornithogalum umbellatum L.

1, road edge, 16.05.1997, 930 m, Erdir and Türe, G., ANES:2581

Muscari comosum (L.) Miller

1, road edge, 31.05.1997, 930 m, Erdir and Türe, G., ANES:2582, Medit. El.

M. armeniacum Leichtlin ex Baker

1, road edge, 31.05.1997, 930 m, Erdir and Türe, G., ANES:2583

M. neglectum Guss.

10, the sides on the southeast, 27.04.1997, 930 m, Erdir and Türe, G., ANES:2584

Hyacinthella lineata (Steudel) Chouard

3, south sides, 21.04.1997, 920m, Erdir and Türe, G., ANES:2585, E. Medit. El., End

Fritillaria fleischeriana Steudel & Hochst. ex Schultes & Schultes fil.

1, woodland area, 27.04.1997, 940 m, Erdir and Türe, G., ANES:2586, Ir.-Tur. El., End

Gagea granatellii (Parl.) Parl.

8, *Pinus-Quercus* woodland area, 12.03.1997, 906 m, Erdir and Türe, G., ANES:2587, Medit. El.

IRIDACEAE

Iris attica Boiss. & Heldr.

1, woodland area, 04.05.1997, 940 m, Erdir and Türe, G., ANES:2588, E. Medit. El.

Crocus chrysanthus (Herbert) Herbert

7, 20.02.1997, 940 m, Erdir and Türe, G., ANES: 2589

C. olivieri Gay subsp. ***olivieri***

8, *Pinus-Quercus* woodland area, 12.03.1997, 906 m, Erdir and Türe, G., ANES:2590

ORCHIDACEAE

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

1, woodland area, 26.06.1998, 940 m, Erdir and Türe, G., ANES:2591

TYPHACEAE

Typha angustifolia L.

4, water edge, 02.07.1997, 900 m, Erdir and Türe, G., ANES:2592

JUNCACEAE

Juncus maritimus Lam

4, water edge, 03.08.1997, 900 m, Erdir and Türe, G., ANES:2593

CYPERACEAE

Cyperus longus L.

3, water edge, 26.08.1997, 900 m, Erdir and Türe, G., ANES:2594

Carex distans L.

1, woodland area, 26.06.1998, 940 m, Erdir and Türe, ANES:2595, Euro.-Sib. El.

GRAMINAE (Poaceae)

Elymus farctus (Viv.) Runemark ex Melderis subsp. ***bessarabicus*** (Savul. & Rayss)

Melderis var. *striatulus* (Runemark) Melderis

4, road edge, 03.08.1997, 900 m, Erdir and Türe, G., ANES:2596, E. Medit. El., Nr.

Aegilops triuncialis* L.** subsp. ***triuncialis

4, field edge, 02.07.1997, 900 m, Erdir and Türe, T., ANES:2597

Aegilops geniculata Roth

1, road edge, 31.05.1997, 930 m, Erdir and Türe, T., ANES:2598, Medit. El., Nr.

Triticum baeoticum Boiss. subsp. ***baeoticum***

9, 02.07.1997, 904 m, Erdir and Türe, T., ANES:2599

Hordeum murinum L. subsp. ***leporinum*** (Link.) Arc. var. ***leporinum***

4, 16.05.1997, 910 m, Erdir and Türe, T., ANES:2600, Nr.

Taeniatherum caput-medusae (L.) Nevski subsp. ***crinitum*** (Schreber) Melderis

1, road edge, 02.07.1997, 930 m, Erdir and Türe, T., ANES:2601, Ir.-Tur. El.

Bromus japonicus Thunb. subsp. ***japonicus***

4, road edge, 14.06.1997, 900 m, Erdir and Türe, T., ANES:2602

B. danthoniae Trin.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, T., ANES:2603, Nr.

B. sterilis L.

1, road edge, 14.06.1997, 930 m, Erdir and Türe, T., ANES:2604

Bromus tomentellus Boiss.

1, road edge, 02.07.1997, 930 m, Erdir and Türe, Ch., ANES:2605, Ir.-Tur. El.

Koeleria cristata (L.) Pers.

1, road edge, 31.05.1997, 930 m, Erdir and Türe, H., ANES:2606

Festuca valesiaca Schleicher ex Gaudin

1, woodland area, 26.06.1998, 940 m, Erdir and Türe, Ch., ANES:2607

Lolium perenne L.

4, water edge, 14.06.1997, 900 m, Erdir and Türe, H., ANES:2608, Euro.-Sib. El.

Poa bulbosa L.

4, 16.05.1997, 910 m, Erdir and Türe, H., ANES: 2609

Dactylis glomerata L. subsp. ***hispanica*** (Roth) Nyman

1, road edge, 02.07.1997, 930 m, Erdir and Türe, H., ANES:2610

Stipa capillata L.

1, *Pinus-Quercus* woodland area, 14.06.1997, 940 m, Erdir and Türe, Ch., ANES:2611, Nr.

Phragmites australis (Cav.) Trin. ex Steudel

4, water edge, 03.08.1997, 900 m, Erdir and Türe, Ch., ANES:2612, Euro.-Sib. El.

Crypsis aculeata (L.) Aiton

4, water edge, sides, 28.09.1997, 900 m, Erdir and Türe, T., ANES: 2613, Nr.

Sorghum halepense (L.) Pers. var. ***halepense***

1, woodland area, 14.06.1997, 940 m, Erdir and Türe, G., ANES:2614

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

4, water edge, 03.08.1997, 900 m, Erdir and Türe, H., ANES: 8925

Chrysopogon gryllus (L.) Trin. subsp. ***gryllus***

1, woodland area, 02.07.1997, 940 m, Erdir and Türe, H., ANES:2615