

ARAŞTIRMA MAKALESİ/RESEARCH ARTICLE

THE FLORA OF THE ANADOLU UNIVERSITY CAMPUS (ESKİŞEHİR-TURKEY)

Cengiz TÜRE¹, Harun BÖCÜK¹

ABSTRACT

Field studies have been carried out to determine the flora of Yunus Emre campus area of Anadolu University since 1996. The research area consists of 363 taxa (2 varieties) which belonging to 241 genera of 74 families. 151 of them were cultivated plant taxa. *Asteraceae* had the highest number of plant taxa (9.9 %) in the study area, it is followed by *Fabaceae* with 7.9 % and *Lamiaceae* with 6.0 %. The distribution of plant taxa according to the phytogeographical regions was as follows; 28 taxa in the study area were Irano-Turanian elements (7.7 %), 32 taxa were Euro-Siberian elements (8.8 %) and 12 taxa were Mediterranean elements (3.3 %) in the study area. The ratio of endemism was 3.0 %.

Key Words: Flora, Campus, Eskişehir, Turkey.

ANADOLU ÜNİVERSİTESİ KAMPÜS FLORASI (ESKİŞEHİR-TÜRKİYE)

ÖZ

Anadolu Üniversitesi Yunus Emre Kampüsü florasının belirlenmesine yönelik arazi çalışmaları, 1996 yılından bu yana yapılmaktadır. Araştırma alanımızda 74 familya ve 241 cinsle ait 363 bitki taksonu (2 varyete) belirlenmiştir. Bu taksonların 151 i kültür bitkisidir. Alanda en fazla takson içeren familyalar; % 9.9 ile *Asteraceae*, % 7.9 ile *Fabaceae*, % 6.0 ile *Lamiaceae* familyalarıdır. Çalışma alanında belirlenen taksonlardan 28 tanesinin İran-Turan elementi (% 7.7), 32 tanesinin Avrupa-Sibirya elementi (% 8.8) ve 12 tanesinin ise Akdeniz elementi (% 3.3) oldukları belirlenmiştir. Endemizm oranı % 3.0 olarak saptanmıştır.

Anahtar Kelimeler: Flora, Kampüs, Eskişehir, Türkiye.

1. INTRODUCTION

Turkey has very rich biodiversity because three phytogeographic region including; Euro-Siberian, Irano-Turanian and Mediterranean intersects in Turkey. However, it is important factor that Anadolu is the center of gene for many plant taxa (Zohary, 1973; Davis, 1975). Irano-Turanian phytogeographic area, covers center and east of Anadolu, is the widest phytogeographic region in Turkey and is characterized by abundance of steppe vegetation.

It is interesting that places, where three phytogeographic region intersects, have very different species and a number of plant taxa distributed in small areas (İlarslan, 1994). Therefore, endemism ratio in Turkey is very high (Davis, 1975).

Recently, flora studies about city centers, recreation areas and university campus areas have rather spread out in Turkey (Tarımcılar, 1992; Ünal, 1996; Coşkunçelebi and Beyazoğlu, 1996; Erik et al., 1998; Erdir, 1999). Because of lacks of flora studies in these kinds of areas, we cannot compare plant taxa determined in the region to plant taxa in the past. Although it is late, making these flora studies will help us to follow situations of plant taxa in the future and will be database for studies about urban ecology, also.

University campus areas in our country serve natural laboratory for biology students. However, natural flora elements in campus areas are getting down because of construction and landscape studies. Therefore, it is so important to have herbarium material of plant taxa of campus areas.

¹ Anadolu University, Faculty of Sciences, Department of Biology, ESKİŞEHİR-TURKEY.

Until now, there are various studies on the flora and urban ecology of natural areas in Eskişehir (Ekim and Akman, 1991; Ekim, 1978; Türe et. al., 1996; Yücel, 1993; Türe et. al., 1999; Türe, 1993). However, there are some floristic and ecological studies about campus areas in various cities in Turkey (Ocak and Türe, 1998; Tarımcılar, 1992; Ünal, 1996; Coşkunçelebi and Beyazoğlu, 1996).

In this study, it was tried to determine the flora of Anadolu University campus area which studied cultivated woody plants by Yücel et. al. (1995). We hope these informations will contribute to general and urban flora of Eskişehir.

2. STUDY AREA

Yunus Emre campus area of Anadolu University is in Eskişehir located between 29°58' and 32° 04' E longitudes and 39° 06' and 40° 09' N. Altitude of our campus area is about 800 m (Figure 1).

There is no important altitude variations and habitat variations in the region. Barren fields around the buildings and a irrigation canal just outside the region are only the habitat variations in the campus area.

Native vegetation structure of our campus area is steppe. And there are lots of cultivated trees and shrubs in the region.

Mean annual temperature is 10.8 °C, mean annual precipitation is 378.78 mm. July is the hottest month with 21.3 °C, January is the coldest month with -0.2 °C in Eskişehir. December is the rainiest month and August is the driest month in the region (Eskişehir Meteorology Station).

When examining the meteorological data, our study area can be included in Mediterranean bioclimate zone (Table 1).

Table 2 shows the mean precipitation of seasons. According to this table, it can be concluded that precipi-

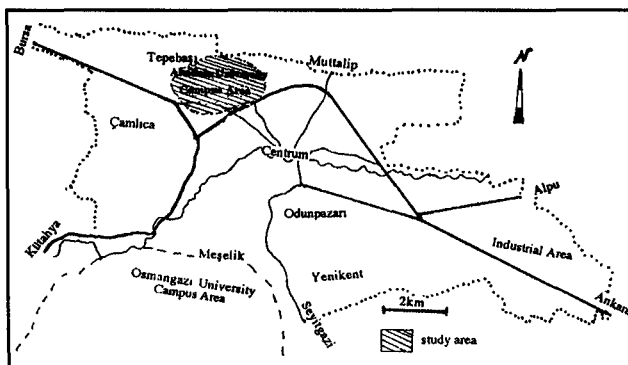


Figure 1. The Location of The Study Area In The City of Eskişehir.

Table 1. Bioclimate Stratum of Our Study Area According to Emberger (1952) Formula.

Station	Altitude	P	PE	M	m	S	Q	Bioclimate
Eskişehir	800 m	378,78	59,74	28,7	-3,7	2,1	40,9	Semi-Dry Medit.

(P: Annual average precipitation (mm/m²), PE: Annual summer precipitation mm/m²), M: Average temperature of the hottest month (°C), m: Average temperature of the coldest month (°C), S: Value of dry season (PE/M), Q: Comparison of temperature-precipitation (2000.P.(M+m+546,4) . (M-m)).

Table 2. Mean Rainfall (mm) of Seasons In Eskişehir.

	Spring	Summer	Autumn	Winter	Precipitation Regime
Eskişehir	121.92	59.74	73.51	123.61	W.S.A.S.

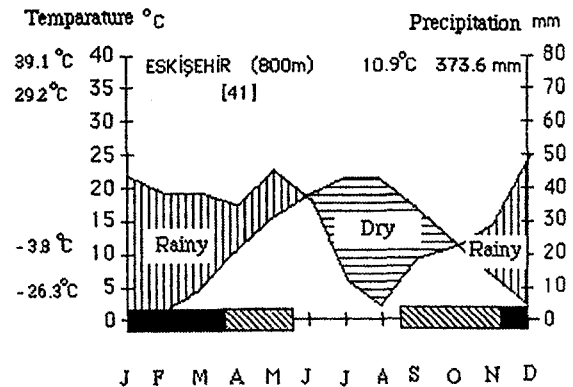


Figure 2. The Climatographic Diyagram of Eskişehir.

itation regime in the region is W.S.A.S.

Figure 2 shows the climate diyagram of Eskişehir. According to these data, the driest period of our city is between June and October. Other months are rainer in comparison with June-October.

3. MATERIAL AND METHOD

Vascular plants have been collected from Yunus Emre campus area of Anadolu University since 1996. Davis's "Flora of Turkey and the East Aegean Islands" (Davis, 1965-1985; Davis et. al., 1988) and the other flora books (Heywood et. Tutin, 1963-1980; Altınayar, 1987; Tokur, 1992; Stearn, 1967; Seçmen et al., 1995; Polunin, 1972) were used for identifying plant samples. Other flora studies in B3 square (Erdır, 1999; Ekim and Akman, 1991; Ekim, 1978; Türe et al., 1996) and flora of university campus areas (Tarımcılar, 1992; Ünal, 1996; Coşkunçelebi and Beyazoğlu, 1996) were used for comparing.

Woody and some cultivated plant taxa in the study area were identified by Yücel et. al. "*" symbol in the

floristic list represents the woody cultivated plant taxa determined by Yücel et al. in the study area (Yücel et al., 1995). However, alien herbaceous plant taxa is indicated as "***" in the floristic list. Floristic list is given at the end of the paper in alphabetic order.

We gave just endemism, phytogeographic region, collecting date, collectors' name and collector number after the name of species, if there is, subspecies and varieties for avoiding unnecessary repetitions. Abbreviations were used to indicate the phytogeographic regions of taxa if known, Irano-Turanian as Ir.-Tur., Euro-Siberian as Euro.-Sib., Mediterranean as Medit., East Mediterranean as E. Medit., Euxine as Eux. and endemic as End.

The plant samples collected from the region were kept in the herbarium of Anadolu University, Faculty of Science, Department of Biology (CT 400-609). These register numbers just belong to collected and kept plant samples in the herbarium. Register numbers were not given to other cultivated plant taxa in the study area. Because cultivated plant taxa did not collect from the study area (observation).

4. RESULTS AND DISCUSSION

363 taxa including natural or cultivated plants (2 varieties) belonging to 241 genera of 74 families were determined in the research area. 151 plant taxa of them were cultivated in the study area. 29 of them were *Gymnosperm* and the others were *Angiosperm*. 24 plant taxa of *Angiosperm* were *Monocotyles* and the others were *Dicotyles*. *Pinus* L. (7), *Centaurea* L. (6), *Juniperus* L. (6), *Populus* L. (6) had the highest number of plant taxa in the area.

Phytogeographic areas of 72 plant taxa were determined. According to these results, dominant elements in the region were Euro-Siberian elements with 32 plant taxa (8.8 %) and it is followed by Irano-Turanian elements with 28 plant taxa (7.7 %) and Mediterranean elements with 12 plant taxa (3.3 %).

The reason that Euro-Siberian elements were more than Mediterranean elements was because of our study area was near Bozdağ mountain which is continuation of Sündiken mountain which consists of high number of Euro-Siberian elements (Ekim and Akman, 1991). The ratio of Irano-Turanian elements were high in the study area because it is influenced by Irano-Turanian phytogeographic region. Endemism ratio of the campus area was determined as 3.0 %. This ratio was less and it is because of lacks of habitat variations in the region.

There are some studies about the flora of university campus areas in Turkey. Therefore, comparison with the flora of different university campus areas will

help to see similarity and differences between phytogeographical region elements and families. Table 3 gives some informations about the flora of different university campus areas.

In addition, distribution of the largest 5 families of different university campus areas is given in Table 4 (Tarımcılar, 1992; Ünal, 1996; Coşkunçelebi and Beyazoğlu, 1996).

Anadolu University campus area and Osmangazi University campus area were similar because of short distance of university campus areas. According to the Table 4, it was seen that *Asteraceae* (*Compositae*) family was rich in different university campus areas. *Fabaceae* (*Leguminosae*) and *Brassicaceae* (*Cruciferae*) families' rates in Anadolu and Osmangazi University campus areas, *Poaceae* (*Graminae*) and *Lamiaceae* (*Labiatae*) families' rates in Osmangazi and Karadeniz Technical University campus areas were very similar.

Our campus area is effected by some factors including; very high human population, landscape, construction, wild plant eliminating studies, etc. We think wild plant taxa eliminated before maturing seeds our campus area may be abolished. In addition, animal manures given to soil cause unnature competition for wild plant taxa whereas they stimulate cultivated plant growing.

The purpose of this study was to give information about city flora and be database for other flora studies about campus areas.

Table 3. Comparison of Phytogeographical Distribution and Endemism Among Different University Campus Areas.

	Irano-Turanian		Euro-Siberian		Mediterranean		Endemism	
	%	taxa	%	taxa	%	taxa	%	taxa
This study (1999)	7.7	28	8.8	32	3.3	12	3	11
Osmangazi Univ. Campus area (1998)	17.8	63	4.8	17	6.4	22	8.8	31
Karadeniz Technical Univ. Campus area (1996)	3.7	7	25.1	4.7	9.6	18	0.5	1
Akdeniz Univ. Campus area (1996)	2.8	12	1.6	7	44.5	188	6.8	30

Table 4. Comparison of The Largest 5 Families of Different University Campus Areas.

	This study (1999)		Osmangazi Univ. Campus area (1998)		Karadeniz Technical Univ. Campus area (1996)		Akdeniz Univ. Campus area (1996)	
	%	taxa	%	taxa	%	taxa	%	taxa
<i>Asteraceae</i> (<i>Compositae</i>)	9.9	36	14.9	52	14.7	27	14	59
<i>Fabaceae</i> (<i>Leguminosae</i>)	7.9	29	9.9	34	10.6	20	11	46
<i>Poaceae</i> (<i>Graminae</i>)	4.6	17	4.2	15	4.2	8	6	25
<i>Brassicaceae</i> (<i>Cruciferae</i>)	4.9	18	8.5	30	6.4	12	4	18
<i>Lamiaceae</i> (<i>Labiatae</i>)	6	22	7	24	6.9	13	6	27

FLORISTIC LIST

*: Cultivated (shrubs and trees)

** : Cultivated (herbs)

ACERACEAE

**Acer negundo* L.

**A. pseudoplatanus* L.

APOCYNACEAE

**Vinca major* L.

AMARANTHACEAE

Amaranthus albus L.

18.05.1998 / Türe and Böcük / CT-478.

A. blitoides S. Wats.

12.05.1999 / Türe and Böcük / CT-603.

A. retroflexus L.

10.06.1998 / Türe and Böcük / CT-523.

***Celosia argentea* L. var. *cristata* (L.) O. Kuntze

***Gomphrena globosa* L.

ANACARDIACEAE

**Cotinus coggyria* Scop.

**Rhus coraria* L.

APIACEAE (UMBELLIFERAE)

Bunium microcarpum (Boiss.) Freyn subsp. *microcarpum*

Medit. Element / 18.06.1998 / Türe and Böcük / CT-550.

Bupleurum heldreichii Boiss. & Bal.

End. / Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-456.

Daucus carota L.

22.05.1997 / Türe and Böcük / CT-409.

D. guttatus Sm.

18.06.1998 / Türe and Böcük / CT-552.

Echinophora tournefortii Jaub. & Spach

Ir.-Tur. Element / 06.07.1998 / Türe and Böcük / CT-579.

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

05.08.1998 / Türe and Böcük / CT-594.

Eryngium bithynicum Boiss.

End./ Ir.-Tur. Element / 06.07.1998 / Türe and Böcük / CT-578.

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

25.05.1998 / Türe and Böcük / CT-503.

Falcaria vulgaris Bernh.

18.06.1998 / Türe and Böcük / CT-551.

Pimpinella tragiium Vill. subsp. *polyclada* (Boiss. & Heldr.) Tutin

12.05.1998 / Türe and Böcük / CT-455.

Turgenia latifolia (L.) Hoffm.

12.05.1998 / Türe and Böcük / CT-457.

AQUIFOLIACEAE

**Ilex aquifolium* L.

ARALIACEAE

**Hedera helix* L.

**H. canariensis* Willd.

ASTERACEAE (COMPOSITAE)

Achillea wilhelmsii C.Koch

Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-459.

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

22.05.1997 / Türe and Böcük / CT-411.

A. tinctoria L. var. *tinctoria*

22.05.1997 / Türe and Böcük / CT-410.

A. triumfettii (L.) All.

18.05.1998 / Türe and Böcük / CT-486.

***Aster novibelgi* L.

***Bellis perennis* L.

Euro.-Sib. Element.

***Calendula officinalis* L.

Carduus nutans L. subsp. *nutans*

06.07.1998 / Türe and Böcük / CT-581.

C. pycnocephalus L. subsp. *albidus* (Bieb.) Kazmi

16.04.1998 / Türe and Böcük / CT-440.

Centaurea depressa Bieb.

12.05.1998 / Türe and Böcük / CT-460.

C. iberica Trev. ex Sprengel

18.05.1998 / Türe and Böcük / CT-487.

C. solstitialis L. subsp. *solstitialis*

18.06.1998 / Türe and Böcük / CT-556.

C. triumfetti All.

18.06.1998 / Türe and Böcük / CT-557.

C. urvillei DC subsp. *stepposa* Wagenitz

Ir.-Tur. Element / 10.06.1998 / Türe and Böcük / CT-527.

C. virgata Lam

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-555.

Cichorium intybus L.

18.06.1998 / Türe and Böcük / CT-559.

Cirsium hypoleucum DC.

Euro.-Sib. Element / 25.05.1998 / Türe and Böcük / CT-505.

Crepis foetida L. subsp. **commutata** (Spreng.) Babcock

05.08.1998 / Türe and Böcük / CT-595.

C. macropus Boiss. & Heldr.

End. / 04.06.1997 / Türe and Böcük / CT-422.

Echinops ritro L.

18.06.1998 / Türe and Böcük / CT-558.

Filago pyramidata L.

18.06.1998 / Türe and Böcük / CT-553.

****Gaillardia aristata** Pursh.**Jurinea consanguinea** DC.

06.07.1998 / Türe and Böcük / CT-582.

Lactuca serriola L.

Euro.-Sib. Element / 10.06.1998 / Türe and Böcük / CT-530.

Leontodon asperrimus (Willd.) J.Ball

Ir.-Tur. Element / 25.05.1998 / Türe and Böcük / CT-506.

Onopordum tauricum Willd.

Euro.-Sib. Element / 18.06.1998 / Türe and Böcük / CT-554.

Picris strigosa Bieb. 18.06.1998

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-561.

Scolymus hispanicus L.

Medit. Element / 10.06.1998 / Türe and Böcük / CT-529.

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

12.05.1999 / Türe and Böcük / CT-605.

Senecio vernalis Waldst. & Kit.

25.05.1998 / Türe and Böcük / CT-504.

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

18.05.1998 / Türe and Böcük / CT-488.

Taraxacum officinale Weber

10.06.1998 / Türe and Böcük / CT-531.

Trogopogon latifolius Boiss. var. **angustifolius** Boiss.

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-560.

Xanthium spinosum L.

12.05.1998 / Türe and Böcük / CT-458.

X. strumarium L. subsp. **cavanillesii** (Schouw) D.Löve & P.Dansereau

16.04.1998 / Türe and Böcük / CT-439.

Xeranthemum annuum L.

10.06.1998 / Türe and Böcük / CT-528.

BERBERIDACEAE***Berberis julianae** Schneid.***B. thunbergii** DC.***B. vulgaris** L.***Mahonia aquifolium** Nutt.**BETULACEAE*****Alnus glutinosa** (L.) Gaertn. subsp. **glutinosa**

Euro.-Sib. Element.

Betula pendula** Roth.**BIGNONIACEAE**Campsis radicans** (L.) Seem.***Catalpa bignonioides** Walt.**BORAGINACEAE****Anchusa azurea** Miller var. **azurea**

05.08.1998 / Türe and Böcük / CT-597.

A. leptophylla Roemer & Schultes subsp. **leptophylla**

10.06.1998 / Türe and Böcük / CT-535.

A. officinalis L.

10.06.1998 / Türe and Böcük / CT-536.

A. stylosa Bieb.

06.07.1998 / Türe and Böcük / CT-584.

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

Medit. Element / 25.05.1998 / Türe and Böcük / CT-507.

Buglossoides arvensis (L.) Johnston

04.06.1997 / Türe and Böcük / CT-423.

Echium italicum L.

12.07.1996 / Türe and Böcük / CT-401.

Heliotropium europaeum L.

18.06.1998 / Türe and Böcük / CT-564.

Lappula barbata (Bieb.) Gürke

Ir.-Tur. Element / 18.05.1998 / Türe and Böcük / CT-489.

L. patula (Lehm) Aschers ex Gürke

10.06.1998 / Türe and Böcük / CT-534.

Lithospermum officinale L.

Euro.-Sib. Element / 06.07.1998 / Türe and Böcük / CT-583.

Moltkia coerulea (Willd.) Lehm

Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-462.

Myosotis sicula Guss.

05.08.1998 / Türe and Böcük / CT-596.

BRASSICACEAE

Aethionema arabicum (L.) Andr. ex DC.

18.05.1998 / Türe and Böcük / CT-472.

Alyssum desertorum Stapf. var. **desertorum**

25.05.1998 / Türe and Böcük / CT-496.

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

18.05.1998 / Türe and Böcük / CT-473.

A. sibiricum Willd.

10.06.1998 / Türe and Böcük / CT-516.

Brassica elongata Ehrh

10.06.1998 / Türe and Böcük / CT-514.

Camelina hispida Boiss. var. **grandiflora** (Boiss.) Hedge

End. / 25.05.1998 / Türe and Böcük / CT-497.

C. rumelica Vel.

18.05.1998 / Türe and Böcük / CT-474.

Capsella bursa-pastoris (L.) Medik.

12.05.1999 / Türe and Böcük / CT-602.

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

16.04.1998 / Türe and Böcük / CT-431.

Crambe tataria Sebeök var. **tataria**

25.05.1998 / Türe and Böcük / CT-495

C. orientalis L. var. **orientalis**

Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-451.

Descurainia sophia (L.) Webb ex Prantl

10.06.1998 / Türe and Böcük / CT-518.

Erysimum pusillum Bory & Chaub.

Medit. Element / 10.06.1998 / Türe and Böcük / CT-517.

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

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-545.

Lepidium perfoliatum L.

10.06.1998 / Türe and Böcük / CT-515.

Sisymbrium officinale (L.) Scop.

12.07.1996 / Türe and Böcük / CT-400.

S. altissimum L.

04.06.1997 / Türe and Böcük / CT-417.

Thlaspi perfoliatum L.

12.05.1998 / Türe and Böcük / CT-452.

BUDDLEJACEAE

***Buddleia davidii** Franch.

BUXACEAE

***Buxus sempervirens** L.

Euro.-Sib. Element.

***B. microphylla** Sieb. and Zucc.

CAPRIFOLIACEAE

***Lonicera nitida** Wills.

***L. periclymenum** L.

***Sambucus nigra** L.

Euro.-Sib. Element.

***S. nigra** L. var. **aurea** Sweek.

***Symphoricarpos albus** Blake.

***Viburnum lantana** L.

Euro.-Sib. Element.

***V. opulus** L.

Euro.-Sib. Element.

***Weigela coraensis** Thunb.

CARYOPHYLLACEAE

Cerastium perfoliatum L.

04.06.1997 / Türe and Böcük / CT-419.

****C. tomentosum** L.

Dianthus zonatus Fenzl. var. **zonatus**

18.05.1998 / Türe and Böcük / CT-476.

Minuartia micrantha Schischk.

18.05.1998 / Türe and Böcük / CT-475.

Silene alba (Miller) Krause subsp. **ericalyicina** (Boiss.) Walters.

18.06.1998 / Türe and Böcük / CT-546.

S. conica L.

25.05.1998 / Türe and Böcük / CT-499.

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

16.04.1998 / Türe and Böcük / CT-432.

CELASTRACEAE***Euonymus alata** L.***E. fortunei** (Turcz.) Hand.-Mazz.***E. japonicus** Thunb.**CHENOPODIACEAE*****Atriplex halimus** L.**Chenopodium album** L. subsp. **album** var. **album**

25.05.1998 / Türe and Böcük / CT-500.

C. murale L.

10.06.1998 / Türe and Böcük / CT-522.

C. polyspermum L.

06.07.1998 / Türe and Böcük / CT-573.

CISTACEAE**Helianthemum canum** (L.) Baumg.

04.06.1997 / Türe and Böcük / CT-418.

CONVOLVULACEAE**Convolvulus arvensis** L.

12.05.1998 / Türe and Böcük / CT-461.

C. galaticus Rostan ex Choisy

End. / Ir.-Tur. Element / 10.06.1998 / Türe and Böcük / CT-532.

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

18.06.1998 / Türe and Böcük / CT-563.

C. lineatus L.

18.06.1998 / Türe and Böcük / CT-562.

CORNACEAE***Cornus alba** L.***C. sanguinea** L.**CORYLACEAE*****Coryllus avellana** L.**CRASSULACEAE****Sedum acre** L.

18.05.1998 / Türe and Böcük / CT-485.

CUCURBITACEAE**Ecbalium elaterium** (L.) A.Rich.

Medit. Element / 12.05.1998 / Türe and Böcük / CT-454.

CUPRESSACEAE***Biota orientalis** Endl.***Chamaecyparis lavsoniana** (A. Murr.) Parl.***C. pisifera** Endl.***Cupressocyparis leylandii** (Jackson et Dallimore) Dallimore***Cupressus arizonica** Greene***Juniperus chinensis** L.***J. communis** L. subsp. **nana** Syme.***J. excelsa** Bieb.***J. foetidissima** Willd.***J. oxycerus** L. subsp. **oxycedrus*****J. virginiana** L.***Thuja occidentalis** L.***Thujopsis dolabrata** (L. F.) Sieb. et Zucc.**CUSCUTACEAE****Cuscuta campestris** Yuncker

10.06.1998 / Türe and Böcük / CT-533.

DIPSACACEAE**Scabiosa argentea** L.

06.07.1998 / Türe and Böcük / CT-580.

S. persica Boiss.

Ir.-Tur. Element / 10.06.1998 / Türe and Böcük / CT-526.

EBENACEAE***Diospyros kaki** L.**ELAEAGNACEAE*****Elaeagnus angustifolia** L.***Hippophae rhamnoides** L.**EUPHORBIACEAE****Euphorbia macroclada** Boiss.

Ir.-Tur. Element / 04.06.1997 / Türe and Böcük / CT-426.

E. stricta L.

Euro.-Sib. Element / 18.06.1998 / Türe and Böcük / CT-568.

E. virgata Waldst. & Kit.

16.04.1998 / Türe and Böcük / CT-446.

FABACEAE (LEGUMINOSAE)***Albizzia julibrissin** Durazz.

Euro.-Sib. Element.

Alhagi pseudalhagi (Bieb.) Desv.

Ir.-Tur. Element / 05.08.1998 / Türe and Böcük / CT-593.

***Amorpha fruticosa** L.**Astragalus strictispinis** Boiss.

End. / 04.06.1997 / CT-420.

A. vulneraria DC.

End. / 05.08.1998 / Türe and Böcük / CT-591.

Cercis siliquastrum** L.Colutea cilicica** L.**Coronilla varia** L. subsp. **varia**

16.04.1998 / Türe and Böcük / CT-437.

Dorycnium graceum (L.) Ser.

Euro.-Sib. Element / 22.05.1997 / Türe and Böcük / CT-407.

Gleditschia triacanthos** L.Laburnum anagyroides** Med.**Lathyrus laxiflorus** (Desf.) O. Kuntze subsp. **laxiflorus**

12.05.1998 / Türe and Böcük / CT-453.

Lotononis genistoides (Fenzl.) Benth.

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-549.

Lotus corniculatus L. var. **corniculatus**

22.05.1997 / Türe and Böcük / CT-408.

Medicago lupulina L.

04.06.1997 / Türe and Böcük / CT-421.

M. rigidula (L.) All. var. **rigidula**

05.08.1998 / Türe and Böcük / CT-592.

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

25.05.1998 / Türe and Böcük / CT-501.

Melilotus alba Desr.

10.06.1998 / Türe and Böcük / CT-524.

M. officinalis (L.) Desr.

16.04.1998 / Türe and Böcük / CT-436.

Onobrychis oxydonta Boiss.

10.06.1998 / Türe and Böcük / CT-525.

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

18.05.1998 / Türe and Böcük / CT-483.

Robinia pseudoacacia** L.Sophora japonica** L.**Trifolium repens** L. var. **repens**

16.04.1998 / Türe and Böcük / CT-434.

T. pratense L. var. **pratense**

16.04.1998 / Türe and Böcük / CT-435.

Trigonella spruneriana Boiss. var. **spruneriana**

Ir.-Tur. Element / 06.07.1998 / Türe and Böcük / CT-577.

Vicia cracca L. subsp. **stenophylla** Vel.

18.05.1998 / Türe and Böcük / CT-482.

V. peregrina L.

12.05.1999 / Türe and Böcük / CT-604.

Wisteria sinensis** (Sims.) DC.**FAGACEAE**Carpinus betulus** L.

Euro.-Sib. Element.

Fagus sylvatica** L.Quercus ithaburensis** Decne subsp. **macrolepis** (Kotschy) Hedge & Yalt.

E. Medit. Element.

***Q. robur** L. subsp. **robur**

Euro.-Sib. Element.

GERANIACEAE**Erodium acaule** (L.) Becherer & Thell

Medit. Element / 18.05.1998 / Türe and Böcük / CT-480.

E. cicutarium (L.) I'Heçrit. subsp. **cutarium**

05.08.1998 / Türe and Böcük / CT-590.

Geranium purpureum Vill.

18.06.1998 / Türe and Böcük / CT-548.

G. tuberosum L. subsp. **tuberosum**

06.07.1998 / Türe and Böcük / CT-574.

****Pelargonium hybridum** (L.) I' Heçrit.****P. peltatum** (L.) L'Herit**GLOBULARIACEAE****Globularia orientalis** L.

Ir.-Tur. Element / 10.06.1998 / Türe and Böcük / CT-538.

G. trichosantha Fisch. & Mey.

18.05.1998 / Türe and Böcük / CT-490.

HIPPOCASTANACEAE***Aesculus hippocastanum** L.**IRIDACEAE****Gladiolus atrovioleaceus** Boiss.

Ir.-Tur. Element / 25.05.1998 / Türe and Böcük / CT-511.

JUGLANDACEAE***Juglans regia** L.**LAMIACEAE (LABIATAE)****Ajuga** = Böcük / CT-413.

Nepeta nuda L. subsp. **albiflora** (Boiss.) Gams
06.07.1998 / Türe and Böcük / CT-586.

Salvia aethiopsis L.
12.05.1998 / Türe and Böcük / CT-465.

S. cryptantha Montbret & Aucher ex Benth
End. / Ir.-Tur. Element / 18.05.1998 / Türe and Böcük / CT-491.

S. frigida Boiss.
Ir.-Tur. element / 12.05.1999 / Türe and Böcük / CT-607.

****S. officinalis** L.
S. virgata Jacq.
10.06.1998 / Türe and Böcük / CT-539.

Scutellaria orientalis L. subsp. **pinastifida** Edmonson
25.05.1998 / Türe and Böcük / CT-509.

Sideritis montana L. subsp. **montana**
Medit. Element / 22.05.1997 / Türe and Böcük / CT-412.

Stachys annua (L.) L. subsp. **annua** var. **lycaonica** Bhattacharjee
Ir.-Tur. Element / 16.04.1998 / Türe and Böcük / CT-445.

S. byzantina C.Koch
Euro.-Sib. Element / 18.06.1998 / Türe and Böcük / CT-567.

Teucrium chamaedrys L. subsp. **chamaedrys**
Euro.-Sib. Element / 25.05.1998 / Türe and Böcük / CT-508.

T. polium L.
16.04.1998 / Türe and Böcük / CT-443.

****Thymus citriodorus** (Pers.) Schreber
T. leucostomus Hausskn. & Velen. var. **argillaceus** Jalas
05.08.1998 / Türe and Böcük / CT-598.

Ziziphora capitata L.
Ir.-Tur. Element / 05.03.1998 / Türe and Böcük / CT-599.

LILIACEAE
Allium atroviolaceum Boiss.
06.07.1998 / Türe and Böcük / CT-588.

Asphodeline lutea (L.) Reichb
Medit. Element / 18.05.1998 / Türe and Böcük / CT-492.

Muscari neglectum Guss
25.05.1998 / Türe and Böcük / CT-510.

Ornithogalum comosum L.
04.06.1997 / Türe and Böcük / CT-427.

O. pyrenaicum L.
12.05.1999 / Türe and Böcük / CT-608.

***Yucca filamentosa** L.

LOBELIACEAE
****Lobeia erinus** L.

HAMAMELIDACEAE
***Liquidambar orientalis** Mill.

MALVACEAE
Alcea pallida Waldst. & Kit.
18.05.1998 / Türe and Böcük / CT-479.

***Hibiscus syriacus** L.
Malva neglecta Wallr.
16.04.1998 / Türe and Böcük / CT-433.

MORACEAE
***Maclura pomifera** (Raf.) Schneid.
***Morus alba** L.

OLEACEAE
***Forsythia x intermedia** Zab.
***Fraxinus angustifolia** L.
***F. excelsior** L.
***F. ornus** L.
***Jasminum officinale** L.
***Ligustrum japonicum** Thunb.
***L. ovalifolium** Hassk.
***L. vulgare** L.
Euro.-Sib. Element.
***Syringa vulgaris** L.

ORABANCHACEAE
Orbanche elatior Sutton
16.04.1998 / Türe and Böcük / CT-442.

PAPAVERACEAE
Glaucium leiocarpum Boiss.
22.05.1997 / Türe and Böcük / CT-405.
Hypecoum imberbe Sibth. & Sm.
16.04.1998 / Türe and Böcük / CT-430.
Papaver rhoeas L.
22.05.1997 / Türe and Böcük / CT-406.

PINACEAE
***Abies nordmanniana** (Stev.) Spach. subsp. **bornmuelleriana** (Mattf.) Coode et Cullen

***Cedrus atlantica** (Endl.) Carr.

***C. libani** A. Rich.

Medit. Element.

***Picea abies** (L.) Karst.

***P. glauca** (Moench.) Voss.

***P. omorika** Purkyne.

***P. orientalis** (L.) Link.

***P. pungens** Engelm.

***Pinus brutia** Ten.

E. Medit. Element.

***P. griffithii** Mc. Clelland.

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

***P. nigra** Arn. subsp. **pallasiana** (Lamb.) Holmboe.
var. **pyramidata** (Acatay) Yaltrık.

***P. nigra** Arn. subsp. **pallasiana** (Lamb.) Holmboe.
var. **seneriana** (Saatci) Yaltrık.

***P. strobus** L.

***P. sylvestris** L. subsp. **hamata** (Steven) Fomin.

Euro.-Sib. Element.

PLANTAGINACEAE

Plantago lanceolata L.

06.07.1998 / Türe and Böcük / CT-587.

PLATANACEAE

***Platanus orientalis** L.

PLUMBAGINACEAE

Acantholimon ulicinum (Willd. ex Schultes) Boiss.
subsp. **lycanoicum** (Boiss. & Heldr.) Bokhari &
Edmonson

05.08.1998 / Türe and Böcük / CT-600.

POACEAE

Aegilops biuncialis Vis.

10.06.1998 / Türe and Böcük / CT-540.

A. cylindrica Host

Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-468.

A. geniculata Roth

Medit Element / 22.05.1997 / Türe and Böcük / CT-414.

A. triuncialis L subsp. **triuncialis**

12.05.1998 / Türe and Böcük / CT-469.

Alopecurus myosuroides Hudson var. **myosuroides**

Euro.-Sib. Element / 10.06.1998 / Türe and Böcük / CT-541.

Avena barbata Pott ex Link subsp. **barbata**

Medit. Element / 22.05.1997 / Türe and Böcük / CT-415.

Bromus scoparius L.

18.05.1998 / Türe and Böcük / CT-493.

B. tectorum L.

12.05.1998 / Türe and Böcük / CT-470.

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

22.05.1997 / Türe and Böcük / CT-416.

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

12.05.1999 / Türe and Böcük / CT-609.

****Festuca glauca** Will.

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

16.04.1998 / Türe and Böcük / CT-450.

Koeleria cristata (L.) Pers.

04.06.1997 / Türe and Böcük / CT-428.

Lolium perenne L.

Euro.-Sib. Element / 10.06.1998 / Türe and Böcük / CT-542.

Poa bulbosa L.

10.06.1998 / Türe and Böcük / CT-543.

P. pratensis L.

04.06.1997 / Türe and Böcük / CT-429.

Stipa lessingiana Trin & Rupr.

18.06.1998 / Türe and Böcük / CT-570.

POLYGALACEAE

Polygala pruinosa Boiss. subsp. **pruinosa**

06.07.1998 / Türe and Böcük / CT-572.

POLYGONACEAE

Polygonum arenastrum Bor.

10.06.1998 / Türe and Böcük / CT-520.

***P. baldschuanicum** Regel.

P. pulchellum Lois.

10.06.1998 / Türe and Böcük / CT-521.

Rumex crispus L.

18.06.1998 / Türe and Böcük / CT-547.

R. pulcher L.

18.05.1998 / Türe and Böcük / CT-477.

PORTULACACEAE

****Portulaca grandiflora** Hooker

PUNICACEAE***Punica granatum** L.**RANUNCULACEAE****Adonis flammae** Jacq.

25.05.1998 / Türe and Böcük / CT-494.

***Clematis montana** (L.) Link.**Consolida orientalis** (Gay) Schröd.

10.06.1998 / Türe and Böcük / CT-544.

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

10.06.1998 / Türe and Böcük / CT-513.

Helleborus orientalis Lam.

06.07.1998 / Türe and Böcük / CT-585.

Nigella arvensis L. var. **involuta** Boiss.

18.05.1998 / Türe and Böcük / CT-471.

Ranunculus arvensis L.

06.07.1998 / Türe and Böcük / CT-571.

R. constantinopolitanus (DC.) d'Urv.

12.05.1999 / Türe and Böcük / CT-601.

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

25.05.1998 / Türe and Böcük / CT-498.

R. luteola L.

10.06.1998 / Türe and Böcük / CT-519.

ROSACEAE***Amygdalus communis** L. var. **amara** (DC.) Focke.***A. communis** L. var. **dulcis** (DC.) Koehne.***Cerasus mahaleb** (L.) Miller var. **mahaleb*****Chaenomeles speciosa** (Sweet) Nakai.***Cotoneaster franchetii** Boiss.***C. horizontalis** Decne.***Crataegus oxydonta** L.***Malus x purpurea** Rehd.***Kerria japonica** DC.**Potentilla recta** L.

18.05.1998 / Türe and Böcük / CT-484.

P. reptans L.

16.04.1998 / Türe and Böcük / CT-438.

Prunus cerasifera** Ehrh.Pyracantha coccinea** Roemer.***Ribes aureum** Pursh.***Rosa foetida** J. Herrmann.

Ir.-Tur. Element.

***Rubus idaeus** L.**Sanguisorba minor** Scop. subsp. **muricata** (Spach) Briq.

25.05.1998 / Türe and Böcük / CT-502.

Sorbaria sorbifolia** A. Br.Spirea x vanhouttei** Zbl.**RUBIACEAE****Cruciata taurica** (Palls ex Willd.) Ehrend.

Ir.-Tur. Element / 16.04.1998 / Türe and Böcük / CT-449.

Galium odoratum (L.) Scop.

Euro.-Sib. Element / 12.05.1998 / Türe and Böcük / CT-466.

G. spurium L. subsp. **spurium**

Euro.-Sib. Element / 12.07.1996 / Türe and Böcük / CT-404.

G. subuliferum Somm. & Lev.

12.05.1998 / Türe and Böcük / CT-467.

G. tricornutum Dandy

Medit. Element / 16.04.1998 / Türe and Böcük / CT-448.

G. verum L. subsp. **verum**

Euro.-Sib. Element / 16.04.1998 / Türe and Böcük / CT-447.

Rubia tinctorum L.

Ir.-Tur. Element / 18.06.1998 / Türe and Böcük / CT-569.

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

06.07.1998 / Türe and Böcük / CT-576.

SALICACEAE***Populus alba** L.

Euro.-Sib. Element.

P. x canadensis** Moench.P. x canescens** (Aiton) Sm.***P. simonii** Carr.***P. tremula** L.

Ir.-Tur. Element.

P. usbekistanica** Kom. subsp. **usbekistanica**Salix alba** L.

Euro.-Sib. Element.

***S. babylonica** L.

***S. caprea** L.

Euro.-Sib. Element.

***S. elaeagnos** Scop.

Euro.-Sib. Element.

S. matsudana** var. **tortuosa** Rehd.**SAPINDACEAE**Koelreuteria paniculata** Laxm.**SAXIFRAGACEAE*****Philadelphus coronarius** L.**SCROPHULARIACEAE******Antirrhinum majus** L. subsp. **majus****Linaria corifolia** Desf.

End. / Ir.-Tur. Element / 12.05.1998 / Türe and Böcük / CT-463.

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

Euro.-Sib. Element / 12.07.1996 / CT-403.

Verbascum cheiranthifolium Boiss. var. **asperulum** (Boiss.) Murb.

End. / 04.06.1997 / Türe and Böcük / CT-424.

Veronica hederifolia L.

18.06.1998 / Türe and Böcük / CT-565.

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

16.04.1998 / Türe and Böcük / CT-441.

SIMAROUBACEAE***Ailanthus altissima** (Mill.) Swingle**SOLANACEAE****Datura stramonium** L.

12.07.1996 / Türe and Böcük / CT-402.

Hyoscyamus niger L.

10.06.1998 / Türe and Böcük / CT-537.

TAMARICACEAE***Tamarix gallica** L.**TAXACEAE*****Taxus baccata** L.**TILIACEAE*****Tilia rubra** DC.

Eux. Element.

T. tomentosa** Moench.**ULMACEAE**Ulmus glabra** Huds.***U. minor** Miller.***U. pumila** L.**VIOLACEAE****Viola kitaibeliana** Roem. & Schult.

05.08.1998 / Türe and Böcük / CT-589.

****V. tricolor** L.**VITACEAE*****Parthenocissus quinquefolia** Graben.**ZYGOPHYLLACEAE****Tribulus terrestris** L.

06.07.1998 / Türe and Böcük / CT-575.

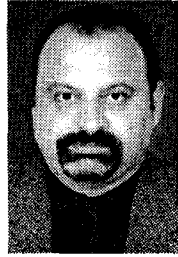
Peganum harmala L.

18.05.1998 / Türe and Böcük / CT-481.

REFERENCES

- Altunayar, G. (1987). *Bitki Bilimi Terimleri Sözlüğü*. Devlet Su İşleri, Ankara.
- Coşkunçelebi, K. and Beyazoğlu, O. (1996). Karadeniz Teknik Üniversitesi Kampüsü'nün Doğal Çiçekli Bitkileri, S.Ü. Fen-Edebiyat Fak., *Fen Dergisi*, 13, 127-139.
- Davis, P.H., (1965-1985). *Flora of Turkey and the East Aegean Islands . Vol. I-IX*, Univ. Press., Edinburgh.
- Davis, P.H., (1975). *Turkey, Present States of Floristic Knowledge*. Dep. of Botany of Royal Botanic Garden. Edinburgh Univ., England.
- Davis, P. H., Mill, R. R. and Tan, K. (1988). *Flora of Turkey and the East Aegean Islands. Vol. X*, University Press., Edinburgh.
- Ekim, T. and Akman, Y., (1991). Eskişehir İli Sündiken Dağları'ndaki Orman Vegetasyonunun Bitki Sosyolojisi Bakımından Araştırılması, *Doğa Türk Bot. Derg.*, 15 (1), 28-40.
- Ekim, T. (1978). *Orta Anadolu (Eskişehir) Türkmen Dağı'nın Floristik Çalışması*, TBAG-258 nolu proje, Ankara.
- Erdir, M. (1999). *Musaözü Gölet Çevresi (Eskişehir) Florasının Araştırılması*, Yüksek Lisans Çalışması, Anadolu Üniv. Fen Bilimleri Enstitüsü, Eskişehir.
- Erik, S., Akaydın, G. and Göktepe, A. (1998). *Başkent'in Doğal Bitkileri*, Ankara Çevre Koruma Vakfı Başkanlığı, Ankara.
- Heywood, V. H. and Tutin, G.T. (1963-1980). *Flora Europea, Vol. I-V*, Cambridge.
- İlarslan, R. (1994). Deveci Dağları'nın (Yozgat-Tokat) Florasına Katkı. *Tr. J. Botany*, 18, 337-366.

- Meteoroloji Genel Müdürlüğü (1999) Eskişehir Bölge Müdürlüğü, Eskişehir.
- Ocak, A. and Türe, C. (2000). The Flora of the Osman-gazi University Campus, *Ot Sistematik Botanik Dergisi* (in press).
- Polunin, O. (1972). *The Concise Flowers of Europea*. Oxford Univ. Press., New York-Toronto.
- Seçmen, Ö., Gemici, Y., Leblebici, E., Görk, G. and Bekat, L. (1995). *Tohumlu Bitkiler Sistematigi*, Ege Üniv. Fen Fak. Kitaplar Serisi, No:116, Bornova-İzmir.
- Stearn, W.T. (1967). *Botanical Latin*, Edinburgh, England.
- Tarımcılar, G. (1992). *Uludağ Üniversitesi Kampüsü Alanı Florası*. Yüksek Lisans Tezi, Uludağ Üniversitesi Fen Bilimleri Enstitüsü, Bursa.
- Tokur, S. (1992). *Bitki Tayin Esasları Ders Notları*, Os-mangazi Üniv. Fen-Ed. Fak., Eskişehir.
- Türe, C., (1993) Eskişehir İl Merkezindeki Liken Tür-lerinin Hava Kirliliğine Bağlı Olarak Dağılımı, *Doğa Tr. J. Botany*, 17, 249-253.
- Türe, C., Ocak, A., and Mısırdalı, H. (1996). Balıkdamı'nın (Gökada) Florası, *Anadolu Üniv. Fen Fak. Derg.*, 2, 55-69.
- Türe, C., Bingöl, N.A. and Ocak, A. (1999). Gramineae of Eskişehir City Center and Its Vicinity. *1st International Symposium on Protection of Natural Environment and Ehrami Karaçam*, Kütahya.
- Ünal, O. (1996). *Akdeniz Üniversitesi Kampüsü'nün Bitki Sosyolojisi ve Ekolojisi Yönünden Bir Botanik Bahçesi Kurulması Amacına Yönelik Olarak İncelenmesi ve Haritalanması*. Yüksek Lisans Tezi, Akdeniz Üniversitesi Fen Bilimleri Enstitüsü, Antalya.
- Yücel, E. (1993). Eskişehir'de Yetişen Ağaç ve Çalılar-ın Kentsel Ekoloji Açısından Değerlendirilmesi, *Anadolu Üniv., Fen Edebiyat Dergisi*, 4, (4), 93-118.
- Yücel, E., Yalıtık, F. and Öztürk, M. (1995). *Süs Bitkileri (Ağaçlar ve Çalılar)*, Anadolu Üniv. Yay. No: 833, Eskişehir.
- Zohary, M. (1973). *Geobotanical Foundations of Middle East. Vol. I.-II.*, Gustav Fischer-Stuttgart.



Cengiz Türe, was born in 1965 in Eskişehir. 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, doctor's degree 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 a education staff.



Harun Böcük, was born in Eskişehir. He completed his first and high education in Eskişehir. He graduated from Anadolu University, the faculty of Sciences in 1999. In the same year, he won the exam of master degree in botany branch, the faculty of Science, Anadolu University. He is still a master student in the faculty of Science, Anadolu University.