

## Contributions to the flora of East Anatolia

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### Abstract

This research covers contributions to the flora of East Anatolia. The field studies have been carried out to determine the flora of Uzundere (Kargapazarı dağları) and its surroundings. The 1002 plant specimens were collected from the research area during 1995-1996. With the taxonomic investigation of these materials, 302 genera, 649 species, 20 subspecies and 11 varieties ( 680 taxa), belonging to 80 families have been established. In this paper, a new taxon for the flora of Turkey (*Achillea cartilaginea* Ledeb. ex Reichenb.); 38 taxa that show variations from the characteristics, given in flora of Turkey; the list of taxa which is collected for the first time after the type specimen; and 23 taxa which are new for A8 and A9 grid squares, are given.

**Key Words:** Flora, Uzundere, *Achillea*, Turkey

### Doğu Anadolu florasına katkılar

### Özet

Bu araştırma Doğu Anadolu florasına katkıları içermektedir. 1995-1996 yılları arasında Uzundere (Kargapazarı Dağları) ve çevresinin florasını belirlemek amacıyla yapılan arazi araştırmaları sonucunda 1002 bitki örneği toplanmıştır. Bu bitkilerin taksonomik değerlendirilmesiyle 80 familyaya ait 302 cins, 649 tür, 20 alttür ve 11 varyete (680 takson) saptanmıştır. Bu makalede, Türkiye florası için yeni bir takson (*Achillea cartilaginea* Ledeb. ex Reichenb.); Türkiye florasındaki karakterlerden farklılık gösteren 38 takson ; tip örneklerinden sonra birinci kez toplanmış olan taksonların listesi ve A8, A9 kareleri için yeni olan 23 takson verilmiştir.

**Anahtar Kelimeler:** Flora, Uzundere, *Achillea*, Türkiye

### Introduction

Turkey has got a rich flora, with about 9000 vascular plant species (1), due to its geographical position. It takes place on the inter-section of Irano-Turanian, Euro-Siberian and Mediterranean phytogeographical regions. Since the research area takes place in the less known areas (2), the floristic research has been carried out (Fig. 1). The other floristic researches that have been carried out in Northeast Anatolia are The Flora of Munzur mountains (3), The flora of Aladağ (4), The flora of Tortum (5), The flora of Şengül and Bağırbaşa mountains (6), The flora of Çiçek mountain and its surroundings (7) and The flora of the region that falls between Akyaka, Arpaçay, Melik Köy and Değirmen Köprü villages, and U.S.S.R. frontier (8).

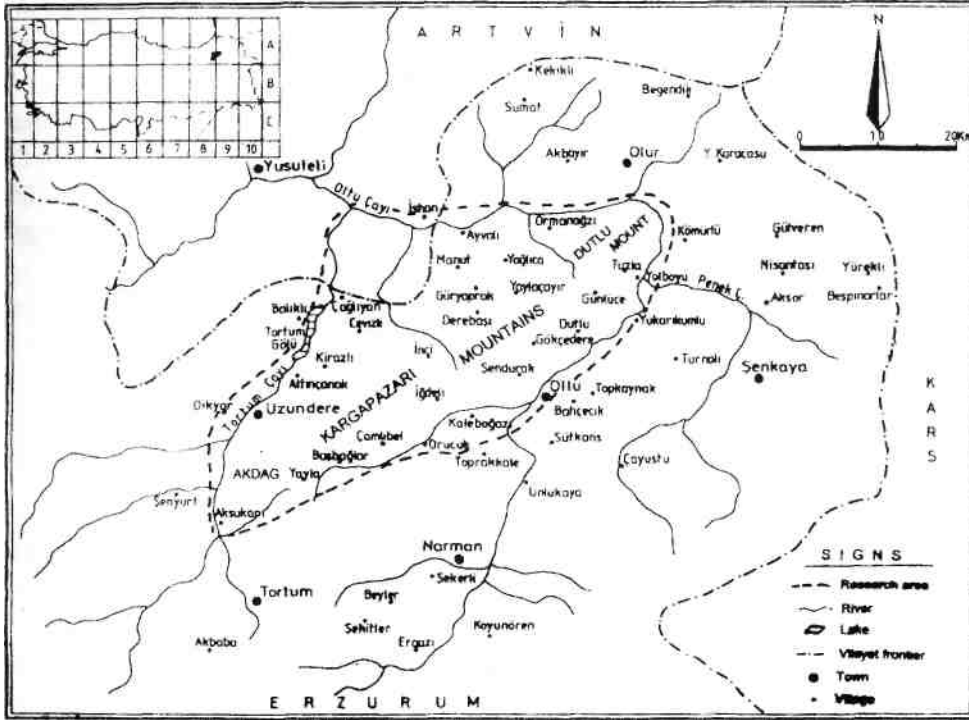


Fig. 1. Map of the research area

### Materials and Method

1002 plant samples were collected from the study area in 1995 and 1996. Using herbarium techniques, the samples were pressed and dried. The samples were identified by using the Flora of Turkey and The East Aegean Island and stored in The Herbarium of Yüzüncü Yıl University (VANF). During the identification, plant samples that show variation from the characteristics, given in Flora of Turkey, were noted. The format, used in variation list, is as follows: The name of the taxon, its locality, altitude, collection date and collectors number are given first, and then the morphological variations are listed. The characters which are given in Flora of Turkey is also given in paranthesis. If a character is not given in Flora of Turkey, it is shown as (—). *Achillea cartilaginea* Ledeb ex Reichenb, was collected on 27.7.1997, during our floristic study in the provinces of Ardahan. It was checked from related references (9,10). The taxon was kept in the Herbarium of Yüzüncü Yıl University (VANF). The lists of the taxa which are collected for the first and second time after the type specimens are given after the explanation of the diagnostic characters of *Achillea cartilaginea* Ledeb. ex Reichenb.. Then the list of new records for A8 and A9 grid squares are given (11-31). Abd. is used as the abbreviated form of the collector's name.

### Results

#### I. The Variation List

##### PAPAVERACEAE

*Glaucium grandiflorum* Boiss. & Huet var. *grandiflorum*

A9 Erzurum: Oltu, from Oltu to Günlüce village, stream bed, 1300-1500 m, 06.5.1996, Abd. 1965.

Calyx smaller 2.2-2.5 cm, (3 - 5 cm).

##### BRASSICACEAE (CRUCIFERAE)

*Thlaspi perfoliatum* L.

A8 Erzurum: Oltu, around Başbağlar village, 1800-2000 m, 05.5.1996, Abd. 1962.

Siliculae smaller; 3-4 χ 3-3.5 mm (5-7 χ 4-5).

*Arabis nova* Vill.

A8 Erzurum: Dikyar village, Avuşgen district, 1600-2000 m, 23.5.1995, Abd. 1180.

Plant taller 40-45 cm, (8 - 30 cm).

*Barbarea minor* C. Koch var. *eriopoda* Busch

A8 Erzurum: Uzundere, Azorth high plateau, Gözeler place, forest area, 2100-2400 m, 18.6.1995, Abd. 1268.

Petals up to 2.5 mm broad (petals not more than 1 mm broad).

*Erysimum leptophyllum* (Bieb.) Andr.

A8 Erzurum:, Oltu, from Oltu to Orcuk village, around arable field, 1300-1500 m,

18.5.1995, Abd. 1019.

Some leaves trifid ( leaves linear).

**POLYGALACEAE**

*Polygala anatolica* Boiss. & Heldr. A9 Erzurum: Olur, around Ormanağzı village, 1100-1400 m, 22.5.1995, Abd. 1550.

Inner sepals larger; **11-12**  $\times$  6-7 mm ( 7-10  $\times$  3-5 mm).

**CARYOPHYLLACEAE**

*Minuartia erythrocephala* (Boiss.) Hand.- Mazz. var. *erythrocephala* A8 Erzurum: Uzundere, around Yayla village, woodland, 2000-2200 m, 12.7.1995, Abd. 1610. Pedicels glandular hairy (--), In some samples inflorescens have more than 10 flowers 5-20 (2-10 ).

*Cerastium chlorifolium* Fisch. & Mey. A8 Erzurum: Uzundere, Yayla village, around woodland, 2000-2200 m, 19.5.1995,

Abd. 1159.

Plant longer; 45-50 cm (20-35 cm).

*Dianthus calocephalus* Boiss. A9 Erzurum: Oltu, around Dutlu village, stream bed, 1400-1600 m, 13.7.1995, Abd.

1671. Some samples have longer bracteoles: more than 1/2 of calyx length (less than 1/2

calyx length).

*Saponaria prostrata* Willd. subsp. *calvertii* (Boiss.) Hedge A8 Erzurum: Oltu, around Başbağlar village, roadside, 1900-2000 m, 19.5.1995, Abd.

1071.

In early stage calyx glandular hairy (—).

**GERANIACEAE**

*Geranium, ibericum* Cav. subsp. *ibericum* A9 Erzurum: Oltu, from Gökçedere village to Gtiryaparak village, forest area, 1700-

1900 m, 23.6.1995, Abd. 1478.

Longest bract longer than 7 mm: 7.5-9 mm ( 4-7 mm), diameter of basal leaves broader; up to 13.5 cm (4-9 cm).

**FABACEAE (LEGUMINOSAE)**

*Chesneya elegans* Fomin A8 Erzurum: Oltu, around İnanmış village, roadside, 1600-1800 m, 19.5.1995, Abd. 1100.

Leaflets smaller; 7-9  $\times$  5-8 mm (12-20  $\times$  7-10 mm). *Astragalus canescens* DC. A8

Erzurum: Uzundere, Uzundere forest, by the old Yayla road, 1600-1800 m, 13.7.1995,

Abd. 1743. Legume 10x5 mm, beak 3 mm curved (—).

*A. aduncus* Willd. A8 Erzurum: Oltu, from Oltu to Orcuk village, around arable field, 1300-1500 m,

18.5.1995, Abd. 1006.

Leaflets 4 - 10 paired (4 - 7 paired).

*A. onobrychioides* Bieb. A8 Erzurum: Uzundere, from Aksukapi village to Yayla village, 1800-2000 m,

09.7.1995, Abd. 1518.

Plant shorter; 15-20 cm (20-30 cm).

*A. cylindraceus* DC. A8 Erzurum: Oltu, Azort high plateau, Gözeler place, around woodland, 2000-2300 m,

18.6.1995.

Abd. 1263.

Peduncles shorter; 7-9 cm (10-20 cm).

*A. czorochensis* Charadze A8 Erzurum: Uzundere, Uzundere forest, Aros place, 1600-1800 m, 24.6.1995, Abd.

1500.

Leaflet pairs more than 8; 10-12 pairs (5-8 paired).

#### ROSACEAE

*Rosa pimpinellifolia*, L. A9 Erzurum: Oltu, from Günlüce village to Ormanağzı village, woodland, 1800-2000

m, 22.6.1995, Abd. 1844.

Leaflets greater; up to 3  $\times$  1.5 cm (0.5-2  $\times$  0.4-1.2 cm).

#### LYTHRACEAE

*Lythrum salicaria* L. A8 Erzurum: Uzundere, from Cevizli village to Çağlayan village, roadside, 1000-1300

m, 14.7.1995, Abd. 1786.

Leaves hairy ( — ).

#### CRASSULACEAE

*Sedum lelephium* L. subsp. *maximum* (L.) Krocke A9 Erzurum: Oltu, from Gökçedere village to Derebaşı village, Kale place, forest area,

1900-2200 m, 12.8.1995, Abd. 1878.

Inflorescences have more than 50 flowers; 50-100 (c.50 flower).

*S. tenellum* Bieb. A8 Erzurum: Uzundere, from Yayla village to Uzundere, forest area, 1800-2000 m,

18.6.1995, Abd. 1280.

Sepals shorter; 1.5 - 2.5 mm (c. 3 mm), some samples have larger petals; 2-2.5  $\times$  sepals (1-1.5  $\times$  sepals).

#### SAXIFRAGACEAE

*Saxifraga adscendens* L. subsp. *adscendens* A9 Erzurum: Oltu, Dutlu high plateau, forest area, rock surface, 1900-2100 m,

13.7.1995, Abd. 1716.

Plant taller; 15-19 cm (2.5-10 cm).

#### **DIPSACACEAE**

*Knautia involuclrata* Somm & Lev. A8 Erzurum: Oltu, from Orcuk village to İnci Village, roadside, 1600-1800 m,

12.8.1995, Abd. 1871.

Stem not pubescent above (stem setose and pubescent above).

*Scabiosa argentea* L. A8 Erzurum: Uzundere, Between Başbağlar and Yayla villages, roadside, 1900-2000

m, 19.6.1995, Abd. 1323.

Involuclral bracts more than 8 (6-8).

#### **ASTERACEAE (COMPOSITAE)**

*Tanacetum mucroniferum* Hub.-Mor. A8 Erzurum: Uzundere, from Aksukapi village to Yayla village, 1700-2000 m,

09.7.1995, Abd. 1529.

Primary leaf segments 10-20 pairs (10-16 pairs); some primary segments up to 12 mm (2-8 mm).

*T. oliense* (Sosn.) Grierson A9 Erzurum: Oltu, from Günlüce village to Ormanağzı village, forest area, 1900-2100

m, 10.7.1995, Abd. 1577.

Leaf segments 5-8 pairs (3-5 paired).

*T. chiliophyllum* (Fisch. & Mey.) Schultz Bip. var. *chiliophyllum* A9 Erzurum: Oltu, from Dutlu village to Dutlu Mount, woodland, 1800-2000 m,

13.7.1995, Abd. 1686.

Plant taller; 45 cm (25-35 cm).

*Circium pseudopersonata* Boiss.&Ball. subsp. *kusnezowianum* (Somm. & Lev.) Petrak A9 Erzurum: Oltu, from Dutlu village to Dutlu mount, Ancient Dutlu, 1800-2000 m,

13.7.1995, Abd. 1697.

Leaves narrower; 4-5 cm (6-16 cm), marginal spines longer; 3mm [(0.5-1 (-)mm)j].

*Carduus lanuginosus* Willd. A8 Erzurum: Uzundere, from Aksukapi village to Yayla village, 1700-2000 m,

09.7.1995, Abd. 1547.

Stem longer; 65-70 cm (20-50 cm).

*Uechlitzia arrnena* Freyn & Sint. A9 Erzurum: Oltu, from Günlüce village to Ormanağzı village, forest area, 1900-2100

m, 11.8.1995, Abd. 1835.

Ligules whitish (ligules carmine).

**CAMPANULACEAE**

*Campanula trachelium* L. subsp. *athoa* (Boiss. & Heldr.) Hayek A9 Erzurum: Oltu, from Dutlu village to Dutlu mount, Ancient Dutlu, 1700-2000 m, 13.7.1995, Abd. 1661.

Calyx lobes linear (calyx lobes triangular).

*C. sibirica* L. subsp. *hohenackeri* (Fisch & Mey.) Damboldt A9 Erzurum: Oltu, around Tuzla village, roky slopes, 1200-1400 m, 22.5.1995, Abd. 1165.

Leaves usually entire, sometimes crenulate (crenate), calyx appendages lanceolate (ovate, obtuse) and shorter than ovary (as long as ovary).

*C. alliarifolia* Willd. A9 Erzurum: Oltu, from Günlüce village to Ormanağzı village, roadside, 1900-2100 m, 10.7.1995, Abd. 1578.

Corolla longer, 25-35 mm (20 mm).

**BORAGINACEAE**

*Myosolis laxa* Lehm. subsp. *caespitosa* (C.F.Schultz) Ilyl ex Nordh. A8 Erzurum: Oltu, from Oltu to Orcuk village, around arable fields, 1300-1400m, 18.5.1995, Abd. 1002.

Lower side of leaves distinctly hairy (glabrescent below).

*Onosma bornmuelleri* Hausskn. A9 Erzurum: Oltu, Dutlu high plateau, forest area, 1900-2100 m, 13.7.1995, Abd. 1726.

Stem longer 35-40 cm (12-30 cm).

*Symphytum armeniacum* Bucknall A8 Erzurum: Uzundere, Uzundere forest, 1600-1900 m, 12.7.1995, Abd. 1643.

Calyx longer 6 mm (5 mm), corolla up to 9 mm (13-15 mm).

*Nonea. intermedia*, Ledeb. A8 Erzurum: Uzundere, Azort high plateau, Gözeler place, around woodland, 2100-

2300 m, 19.6.1995, Abd. 1266.

Corolla longer; up to 15 mm (c.12 mm).

**OROBANCHACEAE**

*Orobanche purpurea* Jacq. A9 Erzurum: Oltu, around Bahçecik Village, 1300-1400 m, 23.6.1995, Abd. 1466.

Some samples shorter; 9-10 cm (15-60 cm).

**II. New species for the Flora of Turkey**

*Achillea cartilaginea* Ledeb. ex. Reichenb. (Table 1, Figure 2) Fl. Germ. Excurs. 849 (1832)(32). A new species for the Flora of Turkey. The taxon doubtfully recorded in the flora of Turkey (9). Differs from *Achillea biserrata* Bieb. by hairy and glandular-punctate leaflets on both sides. Ligules 2-4 mm, phyllaries often glabrose.

Flowering time : May - September (9,10). Habitat: Damp grassland, river banks and scrubs.

A9, Ardahan: Göle, Karlryazı village, Ahmet meadows, Kura river bank, 1850 m,  
27.7.1997, N. Demirkuş 4551.

Geographical Distribution: Center and North U.S.S.R. (Russia).

Table 1. Comparison of diagnostic characters of *A. cartilaginea*. and *A. biserrata* Bieb.

Characters	<i>A. cartilaginea</i>	<i>A. biserrata</i>
Leaves	densely puberulent and glandular punctate on both sides	glabrous above, adpressed - pilose below.
Ligules	2-3.7 mm	4-8 mm
Phyllaries	pubescent	often subglabrous

### III. List of the taxa which are collected for the first time after the type specimen

1. *Cerastium lazicum* Boiss.

A8 Erzurum: Oltu, around İnci village, meadows, 1650 m, 20.5.1995, Abd. 1114.

2. *Acer divergent* Pax var. *trilobum* Yalt.

A9 Erzurum: Olur, Ormanağzı village, 1700 m, 22.G.1995, Abd. 1445.

### IV. List of the new records for A8 and A9 grid squares

#### BRASSICACEAE

*Lepidium salimim*, L. subsp. *sativum* A8 Erzurum: Uzundere, between Cevizli and Çağlayan villages, 1000-1400 m,  
14.7.1995, Abd. 1782.

*Thlaspi oxyceras* (Boiss.) Hedge A9 Erzurum: Oltu, From Günlüce village to Ormanağzı village, roadside, 2000-2200 m, 06.5.1996, Abd. 1971.

*Mallhiola longipetala* (Vent.) DC. subsp. *bicornis* (Sibth. & Smith) P.W. Ball A8 Erzurum: Oltu, around the road of İnci village, 1600-1800 m, 20.6.1995, Abd. 1268

*Erysimum leucanthemum* (Steph.) Fedtsch. A8 Erzurum: Uzundere, around Cevizli village, 1200-1500 m, 14.7.1995, Abd. 1792.

*E. eginense* Bornm. A8 Erzurum: Oltu, Kesik köprü place, 1400-1600 m, Abd. 1125.



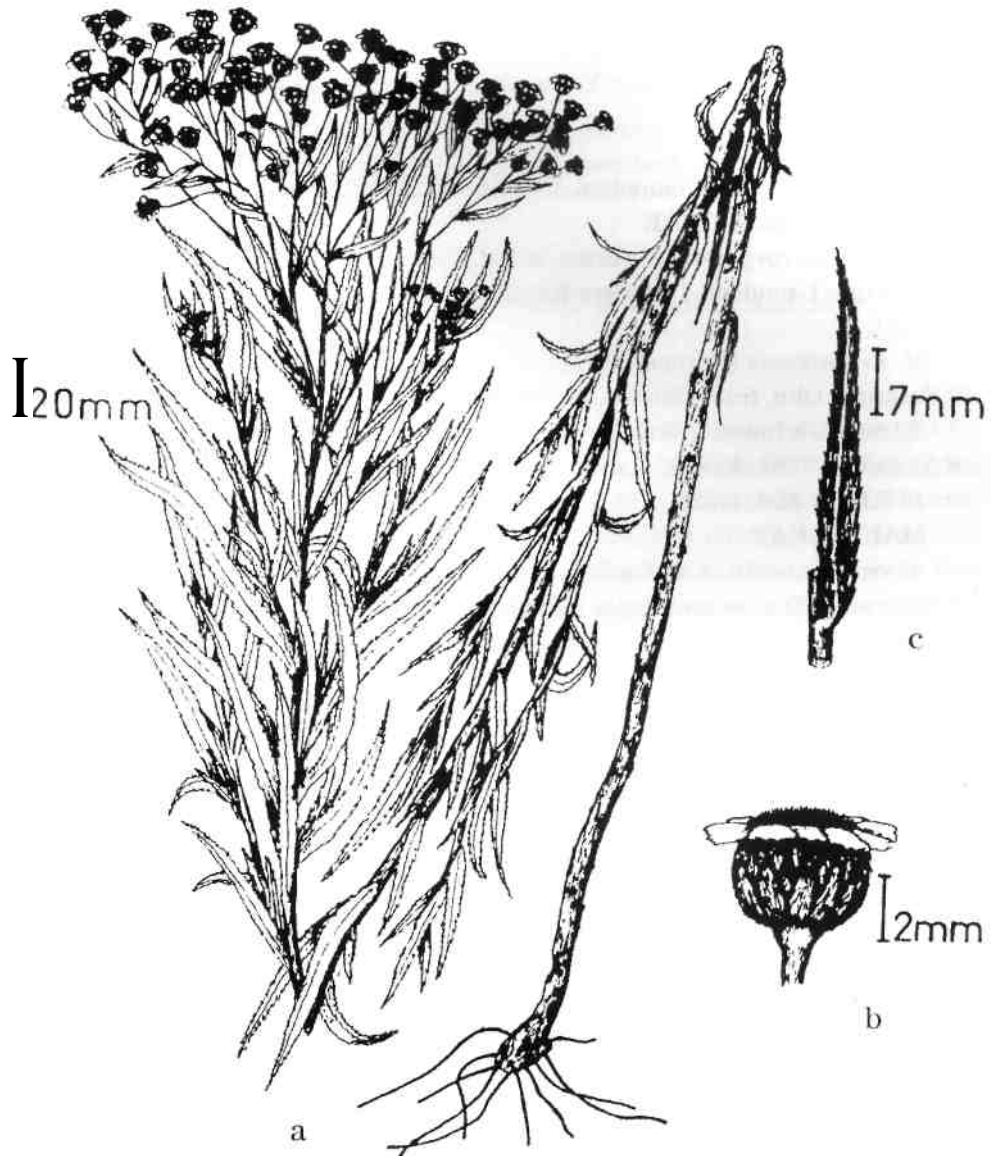


Fig. 2. *Achillea cartilaginea* Ledeb. ex Reichenb.

- a) Habitus
- b) Capitulum
- c) Leaf

**VIOLACEAE**

*Viola occulta* Lehm. A8 Erzurum: Uzundere, around Yayla village, nursery area, 2000-2300 m, 05.5.1996, Abd. 1963.

*V. modesla* Fenzl A9 Erzurum: Oltu, Dutlu mountain, forest area, 2000-2200 m, 06.5.1996, Abd. 1977.

**CARYOPHYLLACEAE**

*Minuartia corymbulosa* (Boiss. & Bal.) Ne Neil var *corymbulosa*. A8 Erzurum: Uzundere, Uzundere forest, forest area, 2000-2300 m, 18.6.1995, Abd. 1281.

*M. urumiensis* (Bornm.) Bornm. A9 Erzurum: Oltu, from Oltu to Olur, roadside, 1200-1300 m, 18.6.1996, Abd. 1991.

*Silene laxa* Boiss. & Kotschy A8 Erzurum: Uzundere, Uzundere forest, around old Yayla road, 1600-2000 m, 13.7.1995, Abd. 1752.

**MALVACEAE**

*Alcea striata* (DC.) Alef. subsp. *striata* A9 Erzurum: Oltu, around Tuzla village, stream bed, 1100-1300 m, 21.6.1995, Abd. 1424.

**GERANIACEAE**

*Geranium maerostylum* Boiss. A8 Erzurum: Oltu, around arable field, 1300-1400 m, 18.5.1995, Abd. 1021.

**ASTERACEAE**

*Aster tripolium* L. A8 Erzurum: Uzundere, from Aksukapi to Yayla village, 1600-2000 m, 09.7.1995, Abd. 1532.

*Circium libanoticum* DC. subsp. *lycaonicurn* (Boiss. & Ieldr.) Davis & Parris A9 Erzurum: Oltu, Ormanağzı village, 1000-1300 m, 22.5.1995, Abd. 1173.

*Jurinea ponlica* Hausskn. & Freyn ex Hausskn. A9 Erzurum: Oltu, around Yolboyu village, 1100-1300 m, 21.6.1995, Abd. 1412.

*Tragopogon fibrosus* Freyn & Sint. ex Freyn A8 Erzurum: Uzundere, around Yayla village, 2000-2300 m, 19.6.1995, Abd. 1332.

**SOLANACEAE**

*Solanum nigrum* L. subsp. *nigrum* A8 Erzurum: Oltu, around the road of İnci village, 1600-1800 m, 12.5.1995, Abd. 1868.

**LAMIACEAE**

*Ajuga chamaepilys* (L.) Schreber subsp. *cunealifolia* (Staph.) P.H.Davis A8 Erzurum: Oltu, around arable fields, 1300-1400 m, 18.5.1995, Abd. 1031.

*Thymus canoviridis* Jalas A8 Erzurum: Oltu, around the road of İnci village, 1600-1800 m, 20.6.1995, Abd. 1390.

*T. migricus* Klokov et Shost. A8 Erzurum: Oltu, around the road of İnci village, 1600-1800 m, 20.6.1995, Abd. 1391.

#### PLUMBAGINACEAE

*Acantholimon armenum* Boiss. & Huet var. *balan.se* Boiss. & Iluet A9 Erzurum: Oltu, around Yolboyu village, stream bed, 1100-1300 m, 21.6.1995, Abd. 1418.

#### LILIACEAE

*Bellevalia gracilis* Feinbrun A8 Erzurum: Oltu, around arable fields, 1300-1400 m, 18.5.1995, Abd. 1009.

#### Conclusion

The conclusion of this research is based on the taxonomic investigation of 1002 plant samples. As a result of the identification of plant samples, 680 taxa belonging to 80 families have been established and all the samples are kept in the Herbarium of Yüzüncü Yıl University (VANF). One of them (*Achillea cartilaginea* Ledeb. ex Reichenb.) is new for the flora of Turkey. Two of them were collected for the first time after the type specimens. Moreover, variable characters of 38 taxa, and 23 taxa which are new for A8 and A9 grid squares are given.

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