

CONTRIBUTIONS TO THE FLORA OF NORTHEAST ANATOLIA

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ABSTRACT: This research covers contributions to the flora of Northeast Anatolia. Between 1981-1984, a total of 1726 plant specimens have been established from the research area. With the taxonomic investigations of these materials 250 genera, 594 species, 159 subspecies, and 77 varieties belonging to 60 families have been established. 830 taxa have been collected from the area totally. Four of these taxa are new for science, ten of them are new' for the flora of Turkey. In this paper, different characters belonging to 80 taxa from the flora of Turkey are given. **Key words:** Flora, Northeast Anatolia.

KUZEYDOĞU ANADOLU FLORASINA KATKILAR

Bu araştırma Kuzeydoğu Anadolu florasını içermektedir. Araştırma alanında 1981-1984 yılları arasında 1726 bitki örneği tesbit edilmiştir. Bu

örneklerin taksonomik değerlendirilmesiyle 60 familyaya ait 250 cins, 594 tür, 159 alttür ve 77 varyete saptanmıştır. Böylece alanda toplam 830 takson toplanmıştır. Bu taksonlardan 4 tanesi bilim dünyası için yeni, 10 tanesi ise Türkiye florası için yenidir. Bu makalede, Türkiye Florası'ndan farklı özellik taşıyan 80 takson verilmiştir.

Anahtar Kelimeler: Flora, Kuzeydoğu Anadolu.

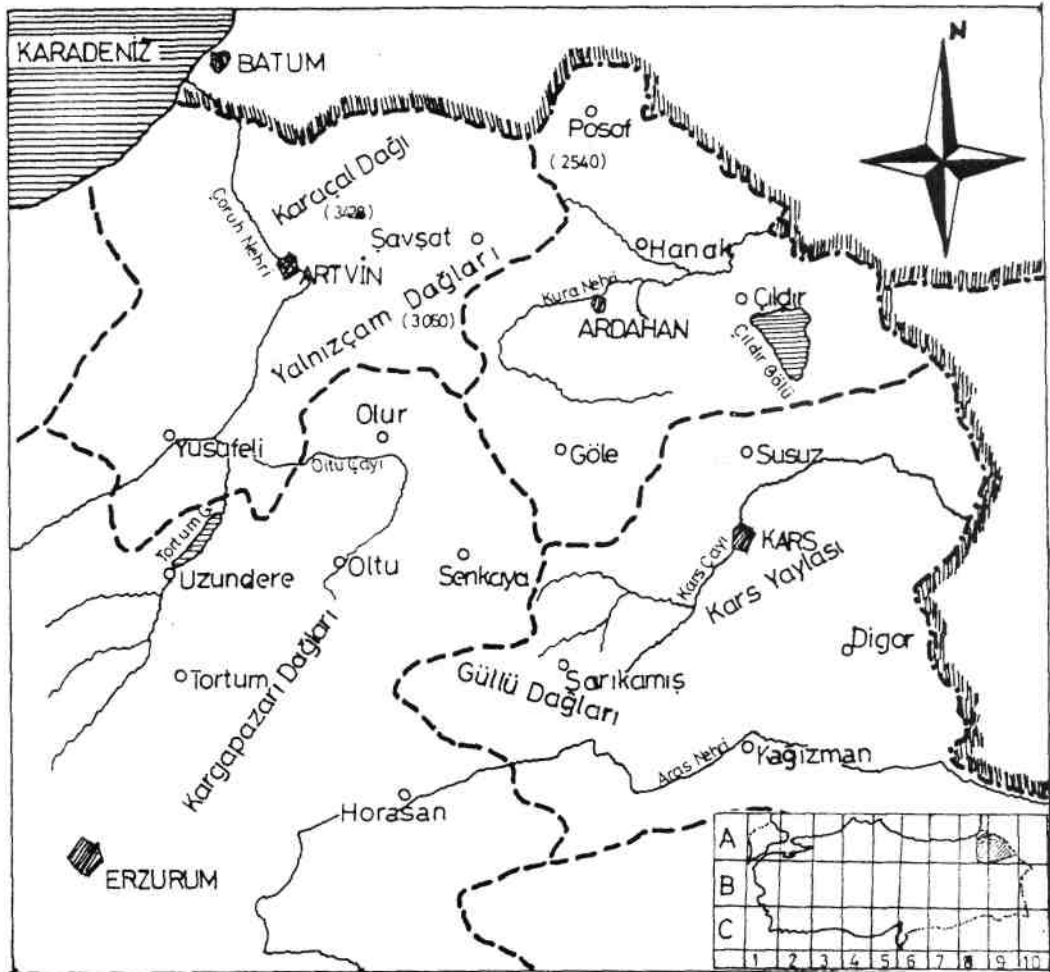
INTRODUCTION

Turkey has got a rich flora with 8792 plant species (1). The location of Turkey on the world, being located on the cross section of phytogeographical regions of Euro-Siberian, Irano-Turanian and Mediterranean, topographical structure, climatic effects of human beings, being the centre of many genera and high level of endemism are the main sources of this floristic richness(1). Davis studies the floristic areas of Turkey in four categories: unknown areas, little known areas, more or less known areas, well known areas (2). In order to determine the subject *of* a Ph.D. thesis, plant materials of Northeast Anatolia have been collected. Floristic works on Northeast Anatolia are as follows: The Flora of Kaçkar Mountain (3). The Flora of Rize and Vegetation (4), The Flora of Aladağ (5), The Flora of Munzur Mountains.(6), The Flora of Akyaka-Arpaçay (7), and The Flora of Mount Çiçek and its surroundings (8).

MATERIAL AND METHOD

A total of 1726 plant samples were collected from the study area between July and August in 1981-1984. The samples were pressed and dried by using the herbarium techniques. All of the samples were identified by using The Flora of Turkey (1), The Flora U.S.S.R.(9), Flora Europaea (10), and The Herbarium Department of Botany, Hacettepe University (HUB), and stored in it. In this paper, variations of 80 taxa were determined. Collector's number follows the name of taxon. Order of the families is given according to the Flora of Turkey. However, the genera, species, subspecies and varieties are ordered according to the alphabetical order. The numbers of the specimens are given under the localities with the beginning and ending numbers. In addition to that, the numbers of the related reference are given in parenthesis.

Abbreviations: Dk: Demirkuş, HUB: Herbarium Department of Botany, Hacettepe University.



MAP 1 NORTHEAST ANATOLIA

1:1.500.000

-  The National Frontier
-  Borders of Province
-  River
-  Administrative Province
-  County Seat

**LOCALITIES WHERE PLANT MATERIALS SAMPLED AND
SPECIMEN NUMBERS (1001-1727), (Map 1).**

A9 Kars: Göle, Karlıyazı Village, Meadow, Sürügüden Stream, High plateau of Karlıyazı Village, 1800-2300 m., 7.7-10.1981.

1001-1103

A9 Kars: Ardahan, between Bülbülan and Kutul high plateau, c.2300m., 7.13.1981

1104-1127

A9 Kars: Ardahan, from Yaylacık, Alagöz, Büyüksütlüce-Morofka Villages to plateau of Karlıyazı, (Kartal Tepe), 1800-2500 m., 7.15.1981.

1128-1167

A9 Kars: Ardahan, Hoçvan, Mount Kısır, 2000-2550 m., 7.17.1981.

1168-1204

A8 Erzurum: Tortum, from Bar Hill (Tuzla Village) to Bar Stream, from Taşbaşı Village to Tortum Stream. 1600-2000m., 8.9.1981.

1205-1248

A8 Erzurum: Tortum, Azort (Uzundere) high plateau, forest area, 1000-1900 m., 8.9-10.1981 .

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1249-1306

A9 Kars: Göle, between Balçesme Meadows and Şeref high plateau,
2000-2400 m., 8.15.1981

1307-1326 A9 Kars: Göle, Karlıyazı

Village, near Kura River, 2000 m., 8.20.1981.

1327-1336 A8 Erzurum: Oltu, The Forest

of Eskidutlu Village, 2200m., 7.19.1982.

1337-1450 A9 Erzurum:

Şenkaya, Bey Stream, 800-1600m, 7.23.1982.

1451-1496

A8 Erzurum: Oltu, Azort, around Lake Tortum, 900-1000 m.,
7.26.1982.

1497-1524

A8 Artvin: Yusufeli Öğden from Kapreşat quarter to Ziyaret Hill,
Pinus forest area, 1800-2400m., 7.27.1982.

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1525- 1580

A8 Artvin: Sarıbudak high plateau (Melo), Kireçkuyuları quarter, the south slope, **Pinus** woodland, 1800-2000m., 7.28.1982.

1581-1601

A9 Artvin: Ardanuç, from Lahşet Meadows to 40 km Kutul, Mount Kurdevan, 1900-2100m., 7.29.1982.

1602- 1664

A9 Artvin: Ardanuç, Hamurlu high plateau, Uzunçayırlar quarter, around woodland, 1900-2200m, 7.30.1982.

1665- 1686

A9 Artvin: Karçal Stream, **Pinus-Picea** woodland; 1800-2400m., 7.31.1982.

1687-1695

A8 Artvin: Şavşat, between Veliköy-Pırnallı Villages; 1650-1850m., 8.1.1982.

1696-1763

A9 Kars: Ardahan, Hanak forest-Gölebert woodland, and nursery field, 1800-2100m., 8.2-4.1982.

1764-1860

A9 Kars: ıldır between Dirsekkaya Village and Kurtkale, 1600-2100m., 8.6.1982.

1861-1872

A9 Kars: Gle, Karlıyazi Village, Meadows, Tilkiburun quarter, 8.1-2.1982.

1873-1880

A9 Kars: Gle, between Kaymak Tepe and Kprl Village, 2100-2450m., 8.11.1892.

1881-1891

A9 Kars: Gle, Baleşme Village, Meadows, 2100-2400m., 8.12.1982.

1892-2007

A8 Erzurum: To turn, Taşbaşı Village, Mountain slope, 1600-2000m., 7.24.1984.

2008-2103

A8 Erzurum: Th ; south slope of Lake Tortum, between Demirlirampa quarter and limestone slope, 950-1600m., 7.27.1984.

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2104-2110

A8 Erzurum: Oltu, Tortum, between Azort Village and Azort high plateau, around Azort Stream , 1000-2500m 7.28.1984.

2111-2194

A8 Erzurum: Oltu, between Güllüce Village and Ormanağzı Village, 2000m., 7.30.1984.

2195-2245

A9 Erzurum: Olur, from Yangın kulesi to Olur, along the passage, 1700-2500 m., 7. 31. 1984.

2246-2300

A9 Erzurum: Olur, Kekikli Village, Şirişinönü fields, 1750-2300m., 8.1.1984.

2301-2350

A9 Erzurum: Şenkaya, the road of Pertivan high plateau, around Pertvan Meadow, 1750-2300 m., 8.3.1984.

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2351-2400

A8 Artvin: Yusufeli, Demirkent high plateau, 1500-2300 m., 8.4.1984.

2401- 2420

A8 Artvin: Yusufeli, Öğdem, from Kapreşet quarter to Ziyaret Mountain, 1800-2500 m., 8.5.1984.

2421-2445

A9 Artvin: Ardanuç, from Lahşet Meadows to Mount Kurdeven, top frontier of forest c.2500m., 8.8.1984.

2446-2518

A9 Kars: Ardahan, Kızodamal Stream, between Kutul high plateau and Bülbülan, 1800-2300m., 8.8-10.1984.

2519-2563

A9 Artvin: Ardanuç, Peynirli Village, Çukurçayırlar quarter, 2300m., 8.11.1984.

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2564-2604

A8/9 Artvin: Mount Karçal (Kaçkal), Ortaköy Road, Pırnal high plateau, Cehennem Stream, the high plateau of Berta quarter, 1600-3100m., 8.12.1984.

2605-2652

A8/9 Artvin: The beginning of Ortaköy road, Karçal Stream, Artvin side, around woodland road, 1600-2000m., 8.15.1984.

2653-2690

A9 Kars: Göle, Balçesme Village, Meadows, 2200m., 8.16.1984.

2691-2724

A9 Kars: Ardahan, Mount Yalnızçam, Katmerlikaya quarter, c.2300m., 8.19.1984.

2725- 2727

RESULTS**BRASSICACEAE**

Draba bruniifolia Stev. subsp. **olympica** (Sibth. ex DC.) Coode et Cullen
Dk. 1154, Plant longer than 10 cm, and inflorescence, more than 8 flowers.

Erysimum leucanthemum (Steph.) Fedtsch.

Dk. 1451 a, 1486, 1386, petals short(6-8 mm), some leaves with an
indumentum of 4 fid hairs.

Fibigia clypeata(L) Medik.

Dk. 2294 , siliculae large (21-30x13-18 mm).

Hesperis matronalis L. subsp. **adzharica** (Tzvelev) Cullen

Dk. 1873, stems, with glandular hairs.

Dk. 2564, petals white,

Thlaspi orbiculatum Stev.

Dk. 2576, fruits large (13-15 X 14-16 mm).

POLYGALACEAE

Polygala supina Schreb.

Dk. 2473, capsules asymmetric and winged, inner sepals pale colored.

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MALVACEAE**Alcea guestii** Zoh.

Dk. 1663 b, mericarps surface rough (not smooth).

Lavatera thuringiaca L.

Dk. 1808, the middle segment of median stem leaves longer than laterals.

CARYOPHYLLACEAE**Dianthus liboschitzianus** Ser

Dk. 2695, flowers white, petal limbs 10 mm, calyx 19x4 mm, bracts 3/4 calyx length.

Silene montbretiana Boiss. Dk. 1460, leaves glabrous.**GERANACEAE****Geranium divaricatum** Ehrh.

Dk. 1029, sepal awns short (1 mm), petals short (5 mm), sepals short (4 mm or less).

Geranium ibericum Cav. subsp. **ibericum** Dk. 1478, bractslonger than 7mm (8-10 mm). **Geranium ibericum** Cav. supsp.**jubatum** (Hand-Mazz.) Davis Dk. 1630, bracts longer than 5mm(5-7 mm). **Geranium platypetalum** Fisch. et Mey. Dk. 2214,

2245, petal tips truncate or round.

Dk. 1555, glandular hairs pale colored.

Dk. 2395, 2649, all bracts longer than 10 mm(1 1-12 mm).

Dk. 2249, lower bracts up to 15 mm (longer).

FABACEAE (LEGUMINOSAE)

***Astragalus acmophyllus* Bunge**

Dk. 1534, bracteoles absent.

***Astragalus aduncus* Willd.**

Dk. 2384, leaflets more (9 paired).

***Astragalus albifolius* Freyn et Sint.**

Dk. 1209, 2066, standard longer than 16 mm(17-20 mm).

***Astragalus frickii* Bunge**

Dk. 2611, leaves longer than 12 cm(15-25 mm), all peduncles shorter than 1.5cm.

***Astragalus hymenocystis* Fisch. Et Mey.**

Dk. 1393, leaflets 3-4 pairs, leaves short (1-2 cm).

***Astragalus onobrychis* L.**

Dk. 1888, legume small(6-8 X 2.5 mm) and standard short(15-17 mm).

***Astragalus viridissimus* Freyn et Sint.**

Dk. 2612 leaf indumentum different (both side of leaf long hairy).

***Astragalus woronowii* Bornm.**

Dk. 2418, leaflets more (6 paired).

Lathyrus cyaneus (Stev.) Koch **var. cyaneus**

Dk. 1887, stipules longer than 9 mm, styles wider than 0.75mm.

Lathyrus pratensis L.

Dk. 1883, stipules equally sagittate.

ROSACEAE**Alchemilla ciminensis** B. Pawl

Dk. 2346, flowers small (3-4mm).

APIACEAE**Bupleurum cappadocicum** Boiss.

Dk. 1895, rays unequal.

Cnidium silaifolium (Jacq.) Simonkai subsp. **orientale** (Boiss.)

Tutin

Dk. 2318, 2320, leaves large (20-45 cm).

Turgenia latifolia (L.) Hoifm.

Dk. 1487, spines long (4.5 mm).

CAPRIFOLIACEAE**Lonicera caucasica** Pallas subsp. **caucasica**

Dk. 2708, bracts short (2-3 mm).

VALERIANACEAE

Valeriana saxicola C. A. Meyer Dk.

2603, plant large and stem leafy.

ONAGRACEAE

Epilobium algidum Bieb.

Dk. 2671, leaves long (5-6 cm).

Epilobium angustifolium L.

Dk. 1247, leaves and stems wrinkled hairy.

Epilobium minutiflorum Hausskn.

Dk. 2612 leaves hairy and seeds papillose.

Epilobium montanum L.

Dk. 1578 b, flowers dark violet and dark pink colored.

Epilobium parviflorum Schreber

Dk. 2616, petals long (11 mm).

ASTERACEAE (COMPOSITAE)

Achillea wilhelmsii C. Koch

Dk. 1909, involucre short (1.5-3 mm).

Aster amellus L. subsp. **ibericus** (Stev.) Avetisian

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Dk. 1856, involucre glandulous.

Carlina biebersteinii Bernh. ex Hornem.

Dk. 2142, inner phyllaries are like outer ones.

Centaurea cheiranthifolia Willd. subsp **cheiranthifolia**

Dk. 2146, flowers yellow.

Centaurea polypodiifolia (Boiss.) Wagenitz var. *polypodiifolia*

Dk. 2244, involucre small (10-16x6-8 mm).

Centaurea pulcherrima Willd. var. **pulcherrima**

Dk. 2633, flowers white..

Centaurea thirkei Schultz Bip.

Dk. 2590, pappus 3.5 mm, achenes 7 mm, capitulum small.

Cicerbita rasemosa (Willd.) Bauverd.

Dk. 2606, plant long and glandular hairy.

Circium aggregatum Ledeb.

Dk. 2586, phyllaries 3-4 seriate and reflexed, capitula small.

Cousinia brachyptera DC.

Dk. 2061, flowers long (15-17 mm).

Echinops pungens Trautv. var. *pungens*

Dk. 1519, capitulum short (c.2 mm) and corolla tube small (6-8 mm).

Hieracium microtum Boiss.

Dk.1314 a, all sizes small and plant thin.

Hieracium onosmaceum (Zahn) Juxip

Dk. 2291, cauline leaves more than 6 (c.10 mm) and plant long (30-40 cm).

Hieracium tamderense Hub-Mor.

Dk. 2252, stem leaves less (3-6).

Inula salicina L.

Dk. 1369, involucre small (1-1.5 cm broad), and phyllaries 6 rows.

Leontodon hispidus L. var. **glabratus** (W. Koch) Bisch.

Dk. 1711 b, phyllaries hispid hairy.

Leontodon hispidus L. var. **hispidus**

Dk. 2601, hairs usually 3 forked.

Onopordum tauricum Willd.

Dk. 2028, involucre small(2.5-3 \times 1.75-4 cm) and phyllaries loose.

Pilosella verruculata (link.) Sojak

Dk. 1457, peduncles glandular hairy.

Tanacetum argenteum (Lam.) Willd. subsp. **canum** (C. Koch) Grierson

var. **canum**

Dk. 2438, involucre small (3-5 mm broad) and hermaphrodite flowers less(15-20).

Tanacetum eginense (Hausskn. ex Bornm.) Grierson

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Dk. 1347 b, all leaf sizes small; leaves up to 10 cm, leaf segment small (4-10x2-6 mm).

Tripleurospermum oreades (Boiss.) Rech. fil. var. *oreades*

Dk. 1633, capitula small; 0.75-1.5 cm broad (excluding ligules).

CAMPANULACEAE

Asyneuma amplexicaule (Willd.) Hand.-Mazz. subsp. **amplexicaule** var. **amplexicaule**

Dk. 2129, 2391, leaves with narrow base, pedicels small or absent.

Campanula glomerata L. subsp. **hispida** (Witasek) Hayek Dk.

2260, plant not erect, lower leaves as long as stem.

POLEMONIACEAE

Polemonium caeruleum L.

Dk. 2705, capsule large (6-7 mm), seeds narrow winged.

BORAGINACEAE

Anchusa undulata L. subsp. **hybrida** (Ten) Coutinho Dk.

2006, leaves entire (not undulate). **Echium russicum** J. F.

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Dk. 2089, corolla violet, red coloured and long (15 mm), calyx long (9.5mm).

Nonea karsensis M. Popov

Dk. 2253 a, stem unbranched, nuts not erect.

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

Dk. 2699, corolla short (18-21), the tips of anthers exerted from corollas (not included).

SCROPHULARIACEAE

Linaria genistifolia (L.) Miller subsp. **linifolia** (Boiss.) Davis

Dk. 2075, leaves narrow; 1-2 mm (not 2-4 mm).

Scrophularia cinerascens Boiss.

Dk. 1089, corolla yellow (not greenish-pink), staminode claret red.

Scrophularia cryptophyla Boiss. et Heldr.

Dk. 2010, leaves acute - acuminate and dentate, the border of calyx is membranous.

OROBANCHACEAE

Orobanche ramosa L.

Dk. 2113, spike not lax (dense).

Orobanche elatior Sutton

Dk. 1424, plant small (up to 6 cm).

Orobanche minor Sm.

Dk. 1538 b, 2342, calyx, shorter, plant short up to 10 cm, corolla glandular hairy.

Orobanche mutelli F. Schultz

Dk. 2068, calyx tooth shorter than calyx tube (not equalling calyx tube).

LAMIACAEA (LABIATAE)**Lamium amplexicaule** L

Dk. 2399, some plant sizes large; stem up to 100 cm, calyx c.9.5 mm (not 2-8.5 mm).

Mentha spicata L. subsp. **spicata**

Dk. 1531, leaf sizes are different; 30-40x10-16(not 35-37 x 12 mm).

Salvia candidissima Vahl subsp. **candidissima**

Dk. 2084, all sizes of flowers small.

Scutellaria albida L. subsp. **colchica** (Rech. fil.) Edmondson

Dk. 1689, leaves wide; 20-30 x 20-23 mm (not 20-30 x 15-20 mm).

Scutellaria pontica C. Koch

Dk. 2633, inflorescence lax, like spike, flower number less (2-6).

Stachys macrantha (C. Koch) Stearn

Dk. 1570, plant with sessile glandular hairy.

Stachys officinalis (L.) Trevisan subsp. **officilanis**

Dk. 1862, upper part of calyx stellate hairy, lower part of calyx glabrous or hirsute hairy.

RUBIACEAE

Asperula suavis Fisch. et Mey.

Dk. 1558, leaves long(up to 20 mm) and anthers long up to 1 mm.

LILIACEAE

Allium schoenoprasum L.

Dk. 2283, leaf narrow, (0.5-2.2mm), pedicel short (1.5-7mm.), spathe entire and acuminate, pedicels small (1.5-7mm).

DISCUSSION

The conclusions of this research is based on the taxonomic investigations of 1726 plant samples which were collected during a period of four years. As a result of the identification of the plant samples, 60 families, 250 genera and 594 species were established. In addition to them, 159 subspecies and 77 varieties were identified. The total number of identified taxa is 830.

At the end of this research; three *of* these taxa; a **Vicia** specimen in **Fabaceae** (is to be prepared for publishing) **Geranium platypetalum** Fisch. et Mey. var. **albipetalum** S. Erik et N. Demirkuş (11) in **Geraniaceae**, and

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Morina persica L. var. **decussatifolia** S. Erik et N. Demirkuş (11) in **Morinaceae**, **Chaerophyllum** specimen in **Apiaceae** (is to be prepared for publishing) are found to be new for science. Also, **Aconitum anthora** L. (12), **Delphinium crispulum** Rupr.(13) in **Ranunculaceae**, **Papaver monanthum** Trautv.(14) in **Papavraceae**, **Serratula radiata** (Waldst, et Kit) Bieb. subsp. **radiata** (11) **Ligularia sibirica** (L.) Cass.(17), **Scorzonera woronowii** Krasch. (17), **Scorzonera latifolia** (Fisch. et Mey.) DC. var. **angustifolia** Prilipko (18) in **Asteraceae**, **Campanula trachelium** L. subsp. **trachelium** in **Campanulaceae** (17), **Hyssopus officinalis** L. subsp. **officinalis** in **Lamiaceae** (21) **Allium hymenorrhizum** Ledeb. in **Liliaceae** (19-21) are new records for Turkey. Moreover, 131 taxa which are new for the squares A8 and A9 were recorded (15,16). New different characters which are not included in the Flora of Turkey were added to 10 of them. In this paper, variable characters of 80 taxa are given.

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