



Flora of Arslanbey (İzmit/Turkey) and cultivated plants in Izmit city center

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Abstract

Research area includes the Town of Arslanbey that is situated within the borders of Kocaeli, Karatepe Mountain and the city centre of İzmit. In this study 918 specimens were collected. After the determination of the specimens 344 genera and 489 species and subspecies taxa were identified belonging to 101 families. 54 of these taxa is cultivar, 435 of them are in the natural plant. Most of the cultivated plants are introduced from outside our country. 11 of taxa are endemic to Turkey and their endemism rate is (2,55 %). Phytogeographical elements of the area are as follows; Euro-Siberian 102 (20,85 %), Irano-Turanian 11 (2,24 %), Meditarrenean 60 (12,26 %), and the others, wide spreaded and phytogeographical region unidentified are 317 (64,82 %). The 5 of the taxa identified belong to Pteridophyta and of 484 to Spermatophyta.

Key words: Flora, Arslanbey, Karatepe, İzmit

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Arslanbey (İzmit) florası ve İzmit şehir merkezindeki kültür bitkileri

Özet

Araştırma alanı, Kocaeli ili sınırları içinde yer alan Arslanbey Beldesi, Karatepe Dağı ve İzmit şehir merkezini içermektedir. Alandan toplanan 918 bitki örneğinin değerlendirilmesi sonucu 101 familyaya ait 344 cins ve 489 tür ve tür altı seviyede takson tespit edilmiştir. Bu taksonların 54 tanesi kültür olup diğer 435 takson doğaldır. 11 takson Türkiye için endemik olup endemizm oranı % 2,55'tir. Taksonların fitocoğrafik bölgelere dağılımı ise şöyledir: Avrupa-Sibirya 102 (% 20,85), İran-Turan 11 (% 2,24), Akdeniz 60 (% 12,26) ve geniş yayılışlılar ile fitocoğrafik bölgesine karar verilemeyenler ise 317 (% 64,82)'dir. Tespit edilen taksonların 5'i Pteridophyta, 484'ü ise Spermatophyta'ya aittir.

Anahtar kelimeler: Flora, Arslanbey, Karatepe, İzmit

1. Introduction

Our country is one of the richest and the most interesting countries in the world in terms of its plants, as in other fields. So the flora studies are important to reveal the wealth of our country. Research field is a transitional region between Mediterranean and Euro-Siberian phytogeographical regions. It is also located in the square of A2 according to the grid system adopted by Davis in Flora of Turkey (Davis,1965-85).

Arslanbey rural is located in the piedmonts of Mount of Samanlı which is about 150 m above sea level and in 17 km south east of İzmit district, Kocaeli. Arslanbey rural owns a topographic configuration flattening from south to north and is different from other settlements with natural thresholds (Figure 1). There are stream beds that separate the field from others and also flowing from the north to the south (Anonim, 2001).

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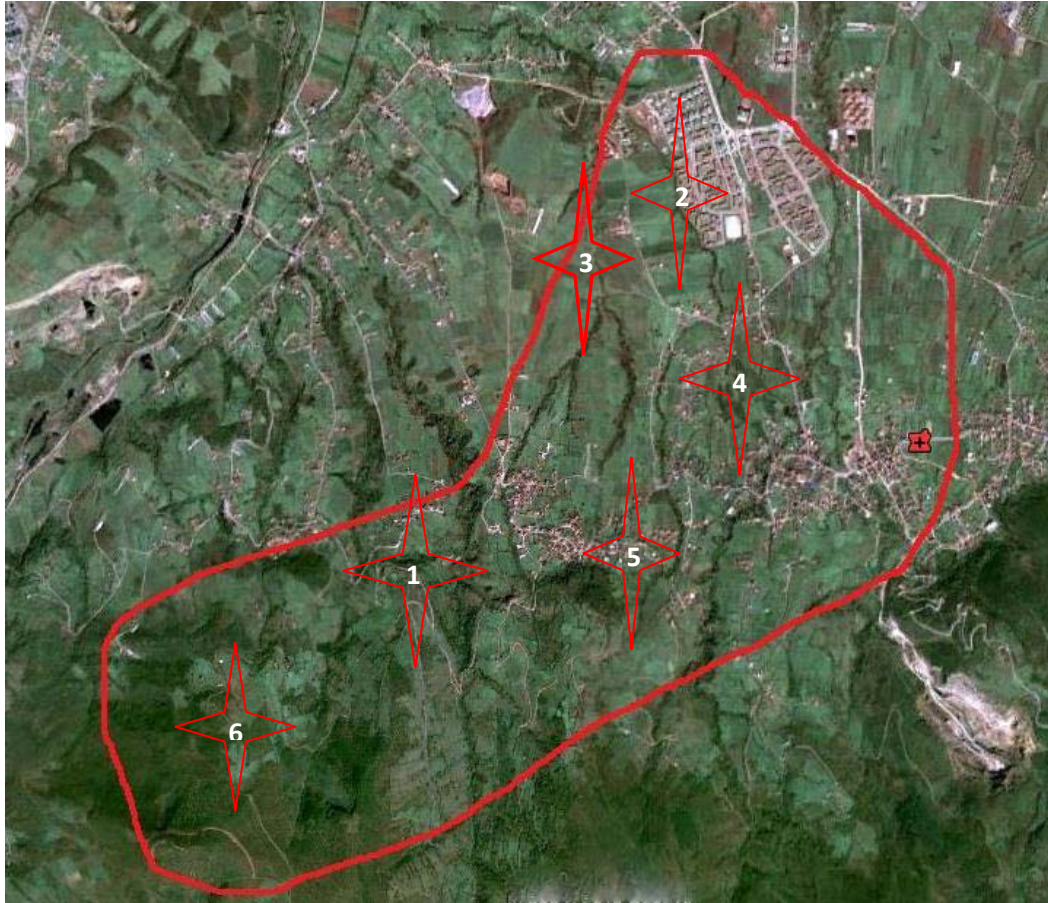


Figure 1. Satellite picture showing the borders of the study field (1-Arslanbey stream side, 2-Atakent, 3-Arslanbey-Atakent neighbourhood, 4-Way of Atakent-Arslanbey, 5-Way of Arslanbey-Karatepe, 6-Mountain way of Karatepe)

When we apply Emberger’s formulation for Kocaeli, the result is; Q (108,36) and m (3,3 °C). So the bioclimatic coating for Kocaeli station is determined as precipitated, mild Meditarrenean climate type (Akman, 1999). According to decreasing precipitation amount of Kocaeli observation station, the precipitation regime is as follows; W (273,9), A (228,1), S (169,9), S (140,5) (winter, autum, spring, summer).

According to this, precipitation regime of the research field is Central Mediterranean. Maximum precipitation is in December with 105,6 mm and in January with 93,9 mm and minimum precipitation is in July with 42,7 mm and in May with 44,7 mm according to Kocaeli observation station. And the average precipitation is 812,4 mm (Figure 2). Ombro-thermic diagram of research area was drawn using average temperatures and monthly average precipitation amounts.

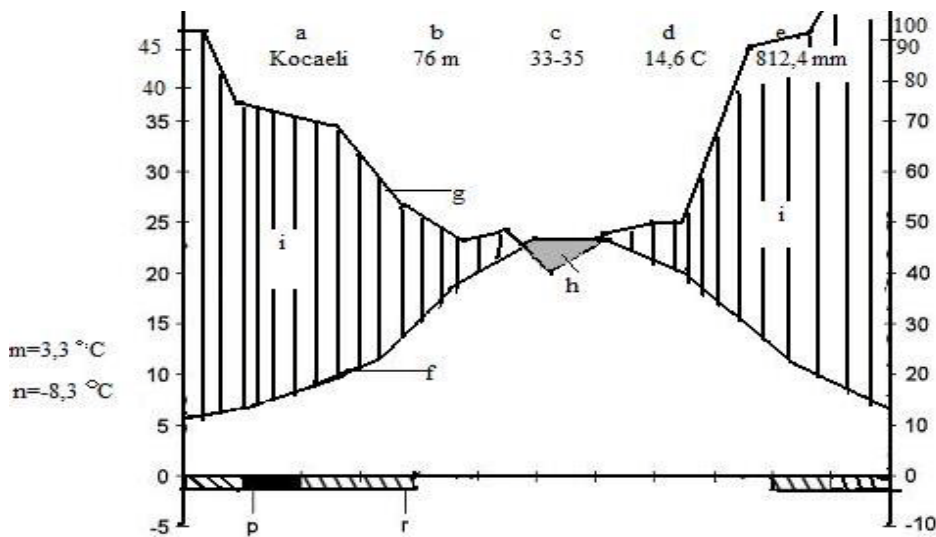


Figure 2. Kocaeli climate diagram

2. Materials and methods

A total amount of 918 plant specimens were collected between 2008 and 2011. The specimens collected were pressed and dried accordingly and prepared as herbarium material. The specimens were identified according to the Flora of Turkey and the East Aegean Islands (Davis, 1965-85), Suppl. 1, Vol. 10 (Davis et al., 1988), Vol. 11 (Güner et al., 2000), Flora Europaea Vol. 1-5 (Tutin et al., 1964-80), Flora Iranica (Rechinger, 1981), Flora Palaestina Vol. 1 (Zohary, 1966), Flora D'Italia Vol. 3 (Pignatti, 1982), were used as resource. Moreover in identification of cultivated plants, books named as Türkiye'nin Ağaçları ve Çalıkları (Mamikoğlu, 2010), Süs Bitkileri ve Yer Örtücüleri (Acartürk, 2001), Kültürpark'ın (İzmir) Ağaç ve Çalı Türleri (Gemici et al., 1992), Ankara'nın Egzotik Ağaç ve Çalıkları (Arslan and Çelem, 2001) were used and for controlling plant names authors Authors of Plant Names (Brummitt and Powell, 1999) was used. For learning morphological terms İngilizce-Türkçe Botanik Kılavuzu (Baytop, 1998) and Botanical Latin (Stearn, 1973) were used. These plants were identified that given to proper order the Flora of Turkey. The cultivated plants found in the area, particularly in the İzmit city center, are given in the floristic list with together. For the map of research field, Google Earth was used.

Meteorological data belonging to Kocaeli Province was obtained from Turkish State Meteorological Service (Anonim, 2009). Climate diagrams belonging to the research field was drawn according to Gaussen method. For climatic evaluation of research area the formulation of Emberger's which he developed for Mediterranean climate layers classification, and drought degrees was used. For the interpretation of the data about climate the book 'İklim ve Biyoiklim' (Akman, 1999) was used.

Plants collecting stations

- 1-Arslanbey stream side
- 2-Atakent
- 3-Arslanbey-Atakent neighbourhood
- 4-Way of Atakent-Arslanbey
- 5-Way of Arslanbey-Karatepe
- 6-Mountain way of Karatepe
- 7-Centre of İzmit, Yahya Kaptan
- 8-Centre of İzmit, the way between Yahya Kaptan-Halkevi

Symbols and Abbreviations List

a	Meteorology station
b	Height of meteorology station (m)
c	Temperature and precipitation observation
d	Average annual temperature
e	Average annual precipitation
f	Temperature curve
g	Precipitation curve
h	Drough season
i	Humid season
m	The lowest average temperature of the coldest season
n	Absolute minimum temperature
p	Absolute frost months
r	Probable frost months
Medit.	Mediterranean
el.	Element
Euro-Sib.	Euro-Siberian
Medit.	Mediterranean
E.	Eastern
W.	Western
Eux.	Euxine
DD	Data deficient
EN	Endangered
Ir.-Tur.	Irano-Turanian
LC	Least concern
OA	Oğuzhan Aslan
var.	Variety
End.	Endemic
Cult.	Culture

3. Results

PTERIDOPHYTA

EQUISETACEAE

Equisetum arvense L., 1, 150-200 m, 14.08.2010, OA 1896.

E. telmateia Ehrh., 1, 100-150 m, 14.08.2010, OA 1897.

HYPOLEPIDACEAE

Pteridium aquilinum (L.) Kuhn., 6, , 500-600 m, 14.08.2010, OA 1898.

ASPIDIACEAE

Polystichum setiferum (Forsk.) Woynar., 6, 500-600 m, 14.08.2010, OA 1899.

POLYPODIACEAE

Polypodium vulgare L. *subsp. vulgare* L., 6, 300-500 m, 14.08.2010, OA 1900.

SPERMATOPHYTA

GYMNOSPERMAE

PINACEAE

Abies nordmanniana (Stev.) Spach *subsp. nordmanniana*, 7, 15m., 14.09.2008, OA 1489. Eux. el..

A. nordmanniana (Stev.) Spach *subsp. bornmuelleriana* (Mattf.) Coode & Cullen, 6, 700-800 m, 14.08.2010, OA 1901. End. Eux. el..

Picea abies (L.) H. Karst, 7, 15 m, 14.09.2008, OA 1485. Cult. Non-Turkey (Foreign).

P. pungens Engelm., 2, 80 m, 14.08.2010, OA 1902. Cult. Non-Turkey (Foreign).

Cedrus atlantica (Endl.) Manetti, 7, 15 m, 14.09.2008, OA 1484. Cult. Non-Turkey (Foreign).

Pinus sylvestris L. *var. hamata* Steven, 7, 15 m, 14.09.2008, OA 1514. Euro-Sib. el..

Larix decidua Mill., 7, 15 m, 14.09.2008, OA 1488. Cult. Non-Turkey (Foreign).

TAXACEAE

Taxus baccata L., 6, 700-800 m, 14.08.2010, OA 1905.

CUPRESSACEAE

Cupressus sempervirens L., 7, 15 m, 14.09.2008, OA 1487. Cult. Medit. el. Turkey plant.

C. macrocarpa Hartw., 3, 80 m, 14.08.2010, OA 1906. Cult. Medit. el. Non-Turkey (Foreign).

C. arizonica Greene, 3, 90 m, 14.08.2010, OA 1907. Cult. Medit. el. Non-Turkey (Foreign).

Juniperus oxycedrus L. *subsp. oxycedrus*, 6, 600-700 m, 14.08.2010, OA 1908.

J. sabina L., 7, 15 m, 14.09.2008, OA 1486. Cult. Turkey plant.

Chamaecyparis lawsoniana (A. Murray) Parl., 3, 80 m, 14.08.2010, OA 1909. Cult. Non-Turkey (Foreign).

Cupressocyparis leylandii (A. B. Jacks & Dallim) Dallim, 7, 15 m, 01.10.2008 OA 1539. Cult. Non-Turkey (Foreign).

Thuja orientalis L., 7, 15 m, 14.09.2008 1495. Cult. Turkey plant.

EPHEDRACEAE

Ephedra major Host., 6, 500-600 m, 14.08.2010, OA 1910.

ANGIOSPERMAE

DICOTYLEDONAE

RANUNCULACEAE

Helleborus orientalis Lam., 5, 200-250 m, 20.03.2010, OA 1710. Eux. el..

Nigella arvensis L. var. *glauca* Boiss., 6, forest gap, 400-500 m, 19.06.2010, OA 1851.

N. sativa L., 3, forest gap, 90 m, 18.05.2008, OA 1272.

Consolida regalis Gray. subsp. *paniculata* (Host) Soo var. *paniculata*, 6, forest gap, 250-300 m, 19.06.2010, OA 1852.

Adonis aestivalis L. subsp. *aestivalis*, 6, 150-200 m, 19.06.2010, OA 1853.

Ranunculus brutius Ten., 6, forest gap, 300-400 m, 22.05.2010, OA 1788. Euro-Sib. el.

R. repens L., 3, 75 m, 01.05.2008, OA 1152.

R. muricatus L., 3, 78 m, 15.03.2008, OA 1047.

R. chius DC., 5, 200-250 m, 20.03.2010, OA 1711.

R. ficaria L. subsp. *ficariiformis* Rouy & Fouc., 3, 80 m, 13.03.2008, OA 1006.

Thalictrum flavum L., 6, 400-500 m, 19.06.2010, OA 1854.

BERBERIDACEAE

Berberis thunbergii DC., 7, 15 m, 01.10.2008 OA 1536. Cult. Non-Turkey (Foreign).

Epimedium pubigerum (DC.) Moren & Decaisne, 6, 200-250 m, 18.04.2010, OA 1745. Eux. el..

Nandina domestica Thunb., 3, 85 m, 12.09.2008, OA 1480. Cult. Non-Turkey (Foreign).

PAPAVERACEAE

Chelidonium majus L., 6, 250-300 m, 16.11.2008, OA 1591. Euro-Sib. el..

Papaver somniferum L. var. *somniferum*, 6, , 350-400 m, 22.05.2010, OA 1789.

P. hybridum L., 5, 160 m, 20.05.2009, OA 1646.

Fumaria officinalis L., 4, 90 m, 01.04.2008, OA 1085.

BRASSICACEAE (CRUCIFERAE)

Brassica nigra (L.) Koch., 4, 95 m, 03.04.2008, OA 1099.

Sinapis alba L., 5, 180 m, 17.05.2008 1219.

S. arvensis L., 6, 300-350 m, 18.04.2010, OA 1746.

Eruca sativa Mill., 4, 95 m, 01.04.2008 OA 1089.

Conringia orientalis (L.) Andrz., 6, forest gap, 250-300 m, 20.03.2010, OA 1713.

Lepidium campestre (L.) R. Br., 4, 85 m, 11.04.2008, OA 1114.

L. perfoliatum L., 6, 350-400 m, 22.05.2010, OA 1790.

Cardaria draba (L.) Desv. subsp. *draba*, 6, 250-300 m, 18.04.2010, OA 1747.

Capsella bursa-pastoris (L.) Medik., 3, 75 m, 19.06.2010, OA 1883.

Alyssum minutum Schlecht. ex DC., 6, 450-500 m, 18.04.2010, OA 1748.

A. strigosum Banks & Sol. subsp. *strigosum*, 4, 85 m, 15.04.2008, OA 1124.

Nasturtium officinale R. Br., 4, 80 m, 11.04.2008 OA 1117.

Barbarea vulgaris R. Br., 6, 250-300 m, 18.04.2010, OA 1749.

Cardamine hirsuta L., 4, 90 m, 08.03.09, OA 1613.

Matthiola tricuspidata (L.) R. Br., 4, 90 m, 11.04.2008, OA 1116. Medit. el..

Malcolmia africana (L.) R. Br., 6, 400-450 m, 18.04.2010, OA 1750.

Erysimum diffusum Ehrh., 3, 80 m, 20.04.2008 1086. Euro-Sib. el..

E. repandum L., 4 90 m, 01.04.2008, OA 1092.

Sisymbrium polyceratum L., 6, 500-550 m, 18.04.2010, OA 1751.

Camelina sativa (L.) Crantz, 5, 150 m, 17.05.2008, OA 1206.

C. microcarpa Andrz., 5, 180 m, 08.03.2009, OA 1622.

CAPPARACEAE

Capparis spinosa L. var. *spinosa*, 4, 80-150 m, 17.07.2010, OA 1885.

RESEDACEAE

Reseda luteola L., 6, 350-400 m, 19.06.2010, OA 1855.

CISTACEAE

Cistus salviifolius L., 6, 250-300 m, 20.03.2010, OA 1714.

Helianthemum nummularium (L.) Mill. subsp. *nummularium*, 6, 250-300 m, 20.05.2009, OA 1645.

H. canum (L.) Baumg. Group a, 6, 300-350 m, 20.05.2009, OA 1701.

H. salicifolium (L.) Mill., 6, 150-200 m, 18.04.2010, OA 1752.

VIOLACEAE

Viola sieheana Becker, 4, 90 m, 31.03.2008 1077.

V. kitabeliana Roem. & Schult., 5, 150-200 m, 20.03.2010, OA 1715.

V. tricolor L., 3, 80-100 m, 19.06.2010, OA 1856.

POLYGALACEAE

Polygala vulgaris L., 6, 450-500 m, 22.05.2010, OA 1791. Euro-Sib. el..

CARYOPHYLLACEAE

Stellaria media (L.) Vill subsp. *media*, 6, 200-250 m, 18.04.2010, OA 1753.

S. holostea L., 6, 150-200 m, 20.03.2010, OA 1716. Euro-Sib. el..

Cerastium banaticum (Roch.) Heuffel, 6, 550-600 m, 19.06.2010, OA 1857.

C. fontanum Baumg. subsp. *triviale* (Link) Jalas, 6, 300-350 m, 20.05.2009, OA 1693.

C. glomeratum Thuill., 6, 400-450 m, 18.04.2010, OA 1754

Holosteum umbellatum L. var. *glutinosum* (Bieb.) Gay., 4, 160 m, 01.04.2008, OA 1083.

H. umbellatum L. var. *umbellatum*, 6, 500-600 m, 22.05.2010, OA 1792.

Moenchia mantica (L.) Bartl. subsp. *mantica*, 3, 80 m, 20.04.2008, OA 1136.

Dianthus barbatus L., 3, 90 m, 20.06.2008, OA 1370.

D. caryophyllus L., 2, 80 m, 15.06.2008, OA 1335. Cult. Turkey plant.

D. plumarius Auct. ex Pers., 2, 70 m, 15.06.2008, OA 1339. Cult. Turkey plant.

Gypsophila golosa Huds., 3, 80 m, 20.03.2008, OA 1059.

Silene italica (L.) Pers., 6, 600-700 m, 20.05.2009, OA 1656.

S. vulgaris (Moench) Garcke var. *vulgaris*, 5, 150-200 m, 17.05.2008, OA 1198.

S. compacta Fischer, 5, 250 m, 16.11.2008, OA 1580.

S. armeria L., 3, 80-100 m, 29.06.2008, OA 1403. Euro-Sib. el..

S. alba (Mill.) Krause subsp. *eriocalycina* (Boiss.) Walters, 6, 500-600 m, 20.05.2009, OA 1642.

S. cretica L., 3, 70 m, 22.04.2008, OA 1145. Medit. el..

S. tenuiflora Guss., 6, 300-400 m, 20.05.2009, OA 1696.E. Medit. el..

S. dichotoma Ehrh. subsp. *sibthorpiana* (Reichb.) Rech., 6, 600-700 m, 20.05.2009, OA 1683.

S. gallica L., 6, 300-400 m, 20.05.2009, OA 1648.
Lychnis caronaria (L.) Desr., 3, 80 m, 19.06.2010, OA 1858.
 Euro-Sib. el.

POLYGONACEAE

Polygonum arenastrum Bor., 4, 90 m, 30.08.2008, OA 1466.
P. equisetiforme Sibth. & Sm., 4, 80-100 m, 17.07.2008, OA 1442.
Rumex acetosella L., 3, 80-100 m, 28.04.2008, OA 1151.
R. crispus L., 5, 160 m, 17.05.2008, OA 1203.
R. conglomeratus Murray, 6, 450-500 m, 22.05.2010, OA 1793.

CHENOPODIACEAE

Chenopodium album L. subsp. *album* var. *album*, 6, 200-250 m, 17.05.2008, OA 1212.

AMARANTHACEAE

Amaranthus deflexus L., 3, 80 m, 24.10.2008, OA 1559.

PHYTOLACCACEAE

Phytolacca americana L., 6, 350-400 m, 19.06.2010, OA 1859.

GUTTIFERAE

Hypericum calycinum L., 5, 180 m, 17.05.2008, OA 1225.
 Eux. el.
H. hyssopifolium Chaix subsp. *elongatum* (Ledeb.) Woron var. *elongatum*, 6, 600-650 m, 20.05.2009, OA 1661.
H. bithynicum Boiss., 6, 400-500 m, 22.05.2010, OA 1794.
 Eux. el.

MALVACEAE

Hibiscus rosa-sinensis L., 2 80 m, 28.08.2008, OA 1464.
Malva sylvestris L., 6, 250-300 m, 20.05.2009, OA 1651.
Alcea pallida Waldst. & Kit., 3, 80-100 m, 20.06.2008, OA 1368.
Althaea officinalis L., 3, 80 m, 17.07.2008, OA 1445.

TILIACEAE

Tilia argentea Desf. ex DC ,6, 600-700 m, 19.06.2010, OA 1860. Euro-Sib. el.

LINACEAE

Linum hirsutum L. subsp. *anatolicum* (Boiss.) Hayek var. *platyphyllum* Davis, 6, 200-250 m, 22.05.2010, OA 1795. End.
L. bienne Mill., 3, 90 m, 18.05.2008, OA 1257. Medit. el..
L. catharticum L., 6, 300-400 m, 19.06.2010, OA 1861. Euro-Sib. el.

GERANIACEAE

Geranium robertianum L., 4, 90-100 m, 08.03.2009, OA 1618.
G. dissectum L., 5, 180 m, 17.05.2008, OA 1228.
Erodium cicutarium (L.) L'Herit. subsp. *cutarium*, 6, 250-300 m, 20.03.2010, OA 1717.
Pelargonium endlicherianum Fenzl., 5, 200 m, 18.06.2008, OA 1365.

OXALIDACEAE

Oxalis acetosella L., 5, 750-800 m, 18.04.2010, OA 1755.

ACERACEAE

Acer trautvetteri Medw., 2, 80 m, 15.05.2008, OA 1175. Eux. el..
A. pseudoplatanus L., 8, 15 m, 14.09.2008, OA 1516. Cult. Euro-Sib. el.
A. campestre L. subsp. *campestre*, 3, 80 m, 17.05.2008, OA 1221. Euro-Sib. el.
A. negundo L., 7, 15 m, 01.10.2008, OA 1545. Cult. Turkey plant.

STAPHYLEACEAE

Staphylea pinnata L., 6, 250-300 m, 18.04.2010, OA 1756.

VITACEAE-(AMPELIDACEAE)

Vitis sylvestris Gmelin, 5 200 m, 16.11.2008, OA 1572.
Parthenocissus tricuspidata (Siebold & Zucc.) Planch, 8, 01.10.2008, OA 1519. Cult. Non-Turkey (Foreign).

RHAMNACEAE

Paliurus spina-christi Mill., 6, 400-450 m, 22.05.2010, OA 1796.

AQUIFOLIACEAE

Ilex colchica Poj., 7, 15 m, 14.09.2008, OA 1507. Eux. el..

ANACARDIACEAE

Cotinus coggyria Scop., 5, 200-250 m, 17.05.2008, OA 1205.

CELASTRACEAE

Euonymus verrucosus Scop., 3, 80 m, 29.06.2008, OA 1392.
E. japonicus, 3, 80 m, 19.06.2010, OA 1862. Cult. Non-Turkey (Foreign).

FABACEAE-(LEGUMINOSAE)

Caesalpinia gilliesii Wall. ex Hook., 3, 80 m, 17.07.2010, OA 1886. Cult. Turkey plant.

Gleditschia triacanthos L., 5, 160 m, 17.05.2008, OA 1241.

Cercis siliquastrum L. subsp. *siliquastrum*, 7, 15 m, 14.09.2008, OA 1502.

Acacia dealbata Link, 2, 80 m, 28.02.2009, OA 1640. Cult. Turkey plant.

Albizia julibrissin Durazz., 3, 80 m, 23.06.2008, OA 1380. Cult. Turkey plant. Eux. el..

Cytisus scoparius (L.) Link, 6, 400-500 m, 18.04.2010, OA 1757.

Genista tinctoria L., 3, 80 m, 31.05.2008, OA 1315. Euro-Sib. el..

G. lydia Boiss. var. *lydia* Griseb., 6, 600-700 m, 18.04.2010, OA 1758. Medit. el..

Robinia pseudoacacia L., 7, 15 m, 14.09.2008, OA 1501.

Astragalus ascioalyx Bunge, 6, 600-700 m, 20.05.2009, OA 1703. End. Ir.-Tur. el..

Psoralea bituminosa L., 3, 80 m, 07.12.2008, OA 1606. Medit. el..

Vicia cracca L. subsp. *cracca*, 3, 80 m, 22.04.2008, OA 1146. Euro-Sib. el..

V. tetrasperma (L.) Schreb., 6, 400-500 m, 18.04.2010, OA 1759.

V. hirsuta (L.) Gray., 6, 350-400 m, 22.05.2010, OA 1797.

V. sativa L. subsp. *sativa*, 5, 300 m, 17.05.2008, OA 1211.

Lathyrus annuus L., 6, 350-400 m, 14.08.2010, OA 1911. Medit. el..

L. hirsutus L., 6, 400-500 m, 22.05.2010, OA 1798.

Pisum sativum L. subsp. *sativum* var. *sativum*, 4, 90 m, 03.04.2008, OA 1096.

Ononis spinosa L. subsp. *leiosperma* (Boiss.) Sirj., 3, 80 m, 14.09.2008, OA 1497.

Trifolium repens L. var. *repens*, 3, 85 m, 15.03.2008, OA 1036.

T. speciosum Willd., 3, 80 m, 17.05.2008, OA 1222.

T. campestre Schreb., 3, 90 m, 26.05.2008, OA 1308.

T. dubium Sibth., 3, 80-100 m, 22.05.2010, OA 1799.

T. vesiculosum Savi var. *rumelicum* Gris., 5, 150-200 m, 17.05.2008, OA 1215.

T. pratense L. var. *pratense* Boiss. & Bal., 3, 90 m, 04.05.2008, OA 1162.

T. scabrum L., 3, 80 m, 05.09.08, OA 1474.

T. lappaceum L., 4, 100 m, 06.04.2008 1105. Medit. el..

T. echinatum Bieb., 3, 80 m, 15.03.2008, OA 1048. E. Medit. el..

T. pauciflorum d'Urv., 6, 400-450 m, 20.05.2009, OA 1667. E. Medit. el..

T. subterraneum L., 5, 200 m, 17.05.2008, OA 1185.

Melilotus officinalis (L.) Desr., 3, 80 m, 21.06.2008, OA 1375.

M. alba Desr., 3, 90 m, 26.05.2008, OA 1306.

Trigonella monspeliaca L., 4, 90 m, 06.06.2008, OA 1321. Medit. el..

T. procumbens (Besser) Reichb., 3, 80 m, 10.04.2008, OA 1111.
Medicago sativa L. subsp. *sativa*, 5, 180 m, 16.11.2008, OA 1575.
M. falcata L., 4, 100 m, 18.05.2008, OA 1274.
Dorycnium graecum (L.) Ser., 5, 200-250 m, 17.05.2008, OA 1199. Eux. el..
D. pentaphyllum Scop. subsp. *herbaceum* (Vill.) Rouy., 6, 300 m, 20.05.2009, OA 1643.
Lotus corniculatus L. var. *tenuifolius*, 4, 110 m, 18.05.2008, OA 1263.
Anthyllis vulneraria L. subsp. *praepropera* (Kerner) Bornm., 3, 90 m, 18.05.2008, OA 1256. Medit. el..
Hedysarum varium Willd., 6, 400-450 m, 19.06.2010, OA 1863. Ir.-Tur. el..
Onobrychis oxyodonta Boiss., 6, 600-700 m, 22.05.2010, OA 1800.
ROSACEAE
Spiraea vanhouttei (Briot) Zabel, 2, 85 m, 06.06.2008, OA 1322.
Laurocerasus officinalis Roemer, 5, 200 m, 16.11.2008, OA 1583.
Prunus spinosa L. subsp. *dasyphylla* (Schur) Domin, 4, 80-100 m, 20.03.2010, OA 1718. Euro-Sib. el.
P. × domestica L., 5, 150-200 m, 20.03.2010, OA 1719.
P. cerasifera Ehrh., 4, 100-150 m, 20.03.2010, OA 1720.
P. laurocerasus L., 4, 150-200 m, 20.03.2010, OA 1721.
P. persica (L.) Batsch., 4, 100-150 m, 20.03.2010, OA 1722.
Cerasus avium (L.) Moench, 4, 150-200 m, 20.03.2010, OA 1723.
C. vulgaris Mill., 4, 100-150 m, 20.03.2010, OA 1724.
Armeniaca vulgaris Lam., 5, 150-200 m, 20.03.2010, OA 1725.
Persica vulgaris Mill., 2, 80 m, 20.03.2010, OA 1726.
Rubus discolor Weihe & Nees, 5, 300 m, 16.11.2008, OA 1590.
R. canescens Dc. var. *canescens*, 6, 500-600 m, 22.05.2010, OA 1801. Euro-Sib. el.
Potentilla astracanicum Jacq., 6, 450 m, 20.05.2009, OA 1679. Euro-Sib. el.
Fragaria vesca L., 6, 200-800 m, 16.11.2008, OA 1566
Geum urbanum L., 6, 500-600 m, 22.05.2010., OA 1802. Euro-Sib. el.
Agrimonia eupatoria L., 2, 90 m, 26.06.2008, OA 1386.
Sanguisorba minor Scop. subsp. *minor*, 4, 100 m, 18.05.2008, OA 1255.
Rosa sempervirens L., 2, 80 m, 22.05.2010, OA 1803. Medit. el.
R. gallica L., 2, 90 m, 22.05.2010, OA 1804.
R. damascena Mill., 2, 80 m, 22.05.2010, OA 1805. Cult. Turkey plant.
R. moschata J. Herrm., 2, 85 m, 22.05.2010, OA 1806. Cult. Turkey plant.
R. banksiana Ait., 2, 80 m, 22.05.2010, OA 1807. Cult. Turkey plant.
R. wichuraiana Crepin, 2, 85 m, 22.05.2010, OA 1808. Cult. Turkey plant.
R. canina L., 6, 400-500 m, 16.11.2008, OA 1600.
Mespilus germanica L., 6, 350-400 m, 16.11.2008, OA 1584. Eux. el..
Photinia × fraseri Dress, 2, 80 m, 22.05.2010, OA 1809. Cult. Non-Turkey (Foreign).
Cotoneaster horizontalis Decne., 3, 90 m, 22.05.2010, OA 1810.
C. salicifolius Franch., 3, 80 m, 22.05.2010, OA 1811. Cult. Non-Turkey (Foreign).
C. franchetii Boiss., 3, 90 m, 22.05.2010, OA 1812.

Pyracantha coccinea Roem., 2, 85 m, 22.04.2008, OA 1148.
Crataegus monogyna Jacq. subsp. *monogyna*, 7, 15 m, 14.09.2008, OA 1513.
Sorbus terminalis (L.) Crantz var. *terminalis*, 6, 450-550 m, 22.05.2010, OA 1813.
Eriobotrya japonica (Thunb.) Lindl., 6, 300-400 m, 19.06.2010, OA 1864.
Cydonia oblonga Mill., 4, 90 m, 11.04.2008, OA 1119.
Malus sylvestris Mill. subsp. *orientalis* (A. Uglitzkich) Browicz var. *orientalis*, 6, 200-250 m, 20.03.2010, OA 1727.
Pyrus communis L. subsp. *communis*, 6, 200-250 m, 18.04.2010, OA 1760.
PUNICACEAE
Punica granatum L., 4, 100-150 m, 19.06.2010, OA 1884.
MYRTACEAE
Myrtus communis L. subsp. *communis*, 7, 15 m, 01.10.2008, OA 1535.
Eucalyptus camaldulensis Dehnh., 7, 15 m, 14.09.2008, OA 1515. Cult. Turkey plant.
Callistemon linearis Dc., 8, 15 m, 01.10.2008, OA 1540. Cult. Non-Turkey (Foreign).
LYTHRACEAE
Lythrum salicaria L., 4, 100 m, 21.06.2008, OA 1377. Euro-Sib. el.
Lagerstroemia indica L., 7, 15 m, 14.09.2008, OA 1510. Cult. Non-Turkey (Foreign).
ONAGRACEAE
Oenothera biennis L., 3, 80 m, 26.05.2008, OA 1305.
Epilobium angustifolium L., 6, 450-600 m, 19.06.2010, OA 1865.
E. parviflorum Schreber, 3, 90 m, 29.06.2008, OA 1393.
E. lanceolatum Seb. & Mauri, 4, 120 m, 20.06.2008, OA 1367.
HALORAGIDACEAE
Myriophyllum spicatum L., 6, 550-600 m, 22.05.2010, OA 1814.
DATISCEAE
Datisca cannabina L., 6, 450-600 m, 19.06.2010, OA 1866.
CRASSULACEAE
Sedum sediforme (Jacq.) Pau, 6, 400-450 m, 20.05.2009, OA 1676. Medit. el..
SAXIFRAGACEAE
Saxifraga rotundifolia L., 6, 400-500 m, 18.04.2010, OA 1761. Euro-Sib. el.
HYDRANGEACEAE
Philadelphus coronarius L., 6, 300-350 m, 17.05.2008, OA 1200.
Hydrangea macrophylla Thunb. Dc, 2, 85 m, 05.06.2008, OA 1319. Cult. Non-Turkey (Foreign).
Deutzia scabra Thunb., 5, 160 m, 17.05.2008, OA 1240. Cult. Non-Turkey (Foreign).
APIACEAE (UMBELLIFERAE)
Anthriscus nemorosa (Bieb.) Sprengel, 6, 500 m, 20.05.2009, OA 1654.
A. caucalis Bieb., 6, 400-500 m, 22.05.2010, OA 1815.
Scandix pecten-veneris L., 6, 250-300 m, 20.03.2010, OA 1729.
Sium sisarum L. var. *lancifolium*, 6, 300-350 m, 19.06.2010, OA 1867.
Oenanthe pimpinelloides L., 6, 250-300 m, 17.05.2008. OA 1186.
Foeniculum vulgare Mill., 6, 500-600 m, 22.05.2010, OA 1816.
Bupleurum flavum Forssk., 6, 400-500 m, 19.06.2010, OA 1868. E. Medit. el.
Ligusticum alatum (Bieb.) Sprengel, 6, 250-300 m, 17.05.2008, OA 1214.

Angelica sylvestris L. var. *sylvestris*, 6, 250-300 m, 17.07.2010, OA 1887. Euro-Sib. el.

Opopanax hispidus (Friv.) Gris., 6, 350-450 m, 22.05.2010, OA 1817.

Heraclium sphondylium L. subsp. *ternatum* (Velen.) Brummitt, 6, 300-400 m, 22.05.2010, OA 1818. Euro-Sib. el.

Laser trilobum (L.) Borkh., 6, 300-350 m, 22.05.2010, OA 1819.

Torilis arvensis (Huds.) Link subsp. *arvensis*, 6, 500-600 m, 19.06.2010, OA 1869.

Astrodaucus orientalis (L.) Drude, 6, 550-600 m, 22.05.2010, OA 1820. Ir.-Tur. el..

Turgenia latifolia (L.) Hoffm., 6, 700-800 m, 18.04.2010, OA 1762.

Daucus carota L., 4, 130 m, 12.09.2008, OA 1481.

D. guttatus Sm., 3, 90 m, 26.08.2008, OA 1461.

Artemisia squamata L., 3, 80 m, 13.05.2008, OA 1169.

ARALIACEAE

Hedera helix L., 6, 300-350 m, 16.11.2008, OA 1593 A.

H. colchica (C.Koch) C.Koch, 6 400 m, 1593 B. Eux. el..

CORNACEAE

Cornus mas L., 6, 350-450 m, 18.04.2010 1763. Euro-Sib. el.

CAPRIFOLIACEAE

Sambucus ebulus L., 6, 400 m, 16.11.2008, OA 1582. Euro-Sib. el.

S. nigra L., 6, 400-500 m, 18.04.2010, OA 1764. Euro-Sib. el.

Viburnum tinus L., 6, 400-450 m, 18.04.2010, OA 1765. Medit. el..

Lonicera etrusca Santi var. *etrusca*, 6, 300-350 m, 22.05.2010, OA 1821. Medit. el..

L. japonica Thunb., 2 80 m, 26.08.2008, OA 1459. Cult. Non-Turkey (Foreign).

Abelia chinensis R. Br., 8, 15 m, 01.10.2008, OA 1550. Cult. Non-Turkey (Foreign).

A. grandiflora (André) Rehd., 2, 80-90 m, 18.05.2008, OA 1266. Cult. Non-Turkey (Foreign).

Weigela floribunda C. A. Mey., 2, 80 m, 18.05.2008, OA 1265. Cult. Non-Turkey (Foreign).

RUBIACEAE

Asperula lilaciflora Boiss. subsp. *phrygia* (Bornm.) Schönb.-Tem., 6, 300-400 m, 19.06.2010, OA 1870. End.

A. arvensis L., 6, 500-600 m, 20.05.2009, OA 1688. Medit. el..

Galium rotundifolium L., 6, 450-500 m, 16.11.2008, OA 1568. Avr-Sib. el.

VALERIANACEAE

Valeriana officinalis L. 3, 90 m, 05.09.2008, OA 1476.

DIPSACACEAE

Dipsacus laciniatus L., 6, 300-350 m, 16.11.2008, OA 1596.

Cephalaria syriaca (L.) Schrader, 6, 400-450 m, 20.05.2009, OA 1686.

Scabiosa columbaria L. subsp. *ochroleuca* (L.) Celak var. *ochroleuca* (L.) Coulter, 6, 300 m, 17.05.2008, OA 1235.

ASTERACEAE (COMPOSITAE)

Bidens tripartita L., 6, 450-500 m, 17.07.2010, OA 1888.

Xanthium spinosum L., 6, 250-300 m, 14.08.2010, OA 1912.

Pallenis spinosa (L.) Cass., 5, 150-200 m, 18.04.2010, OA 1766. Medit. el..

Inula britannica L., 6, 350-400 m, 17.07.2010, OA 1894. Euro-Sib. el.

Pulicaria odora (L.) Reichb., 6, 250-300 m, 16.11.2008, OA 1574. Medit. el..

Aster tripolium L., 4, 90-110 m, 16.08.2008, OA 1455. Euro-Sib. el.

A. laevis L., 2, 80 m, 14.08.2010, OA 1913.

Conyza canadensis (L.) Cronquist, 3, 80 m, 14.09.2008, OA 1498.

Bellis perennis L., 4, 90 m, 13.03.2008, OA 1025. Euro-Sib. el.

Senecio aquaticus Hill subsp. *erraticus* (Bertol.) Matthews, 6, 350-400 m, 20.05.2009, OA 1658. Euro-Sib. el.

S. pseudo-orientalis Schischkin, 6, 22.05.2010, OA 1822. Ir.-Tur. el.

S. vulgaris L., 3, 80 m, 01.04.2008, OA 1090.

S. vernalis Waldst. & Kit., 4, 90-110 m, 08.03.09, OA 1622.

Tussilago farfara L., 3, 80 m, 15.03.2008, OA 1046. Euro-Sib. el.

Calendula arvensis L., 2, 80-90 m, 14.07.2008, OA 1421. Cult. Turkey plant.

Ageratum houstonianum Mill., 8, 01.10.2008, OA 1524. Cult. Non-Turkey (Foreign).

Eupatorium cannabinum L., 3, 90 m, 01.10.2008, OA 1529. Euro-Sib. el.

Anthemis cretica L. subsp. *pontica* (Willd.) Grierson, 6, 400-450 m, 18.04.2010, OA 1767.

A. cotula L., 5, 150-170 m, 17.05.2008, OA 1195.

Achillea coarctata Poir., 6, 450-500 m, 20.06.2008, OA 1369.

Chrysanthemum segetum L., 4, 100 m, 15.06.2008, OA 1338. Medit. el..

Tanacetum parthenium (L.) Schultz Bip., 6, 500-600 m, 22.05.2010, OA 1823.

Tripleurospermum tenuifolium (Kit.) Freyn, 5, 800-900 m, 20.05.2009, OA 1700. Euro-Sib. el..

Artemisia santonicum L., 3, 90 m, 16.06.2008, OA 1348. Euro-Sib. el..

Onopordum anatolicum (Boiss.) Eig., 5, 150-200 m, 29.06.2008, OA 1396 B. End. Ir.-Tur. el..

Cirsium vulgare (Savi) Ten., 2, 80-100 m, 01.05.2008, OA 1153.

C. hypoleucum DC., 3, 75 m, 12.09.2008, OA 1479. Eux. el..

C. arvense (L.) Scop. subsp. *arvense*, 3, 80-100 m, 26.05.2008, OA 1301.

Picnomon acarna (L.) Cass., 3, 90 m, 29.06.2008, OA 1396 A. Medit. el..

Carduus nutans L. subsp. *nutans sensu lato*, 6, 350-400 m, 14.08.2010, OA 1914.

Jurinea pontica Hausskn. & Freyn ex Hausskn., 6, 250-300 m, 19.06.2010, OA 1871. End. Ir.-Tur. el..

Centaurea solstitialis L. subsp. *solstitialis*, 3, 90 m, 20.06.2008, OA 1372.

Xeranthemum annuum L., 4, 100 m, 29.06.2008, OA 1404.

Cichorium intybus L., 5, 150-200 m, 14.07.2008, OA 1420.

Scorzonera sublanata Lipschitz, 5, 200 m, 18.05.2008, OA 1262. E. Medit. el..

Tragopogon longirostris Bisch. ex Sch. Bip. var. *longirostris*, 6, 250-300 m, 18.04.2010, OA 1768.

T. dubius Scop., 6, 400-450 m, 10.07.2008, OA 1414.

T. pratensis L. subsp. *pratensis*, 3, 80 m, 22.05.2010, OA 1824. Euro-Sib. el.

Sonchus asper (L.) Hill subsp. *glaucescens* (Jordan) Ball, 6, 400 m, 20.05.2009, OA 1673.

Hieracium bithynicum (Zahn) Sell & West, 5, 200 m, 17.05.2008, OA 1196. End. Eux. el..

Pilosella piloselloides (Vill.) Sojak subsp. *piloselloides*, 6, 800-900 m, 20.05.2009, OA 1689.

Lapsana communis L. subsp. *intermedia* (Bieb.) Hayek, 6, 400-450 m, 22.05.2010, OA 1825.

Taraxacum scaturiginosum G. Hagl, 6, 350-400 m, 28.02.2009, OA 1634.

T. officinale Weber, 3, 80-100 m, 02.03.2008, OA 1628.

Crepis alpestris (Jacq.) Tausch, 3, 80 m, 20.05.2008, OA 1285. Euro-Sib. el.

C. setosa Hall. F., 6, 300-350 m, 22.05.2010, OA 1826. Euro-Sib. el.

Zinnia elegans Jacq., 2, 90 m, 30.07.2008, OA 1450. Cult. Non-Turkey (Foreign).

CAMPANULACEAE

Campanula latifolia L., 2, 80 m, 27.05.2008, OA 1309. Euro-Sib. El.

C. persicifolia L., 3, 80-90 m, 16.05.2008, OA 1178. Euro-Sib. el.

ERICACEAE

Rhododendron ponticum L., 6, 450-500 m, 20.05.2009, OA 1659. Eux. el..

Erica arborea L., 6, 400-450 m, 16.11.2008, OA 1599.

Arbutus unedo L., 4, 80-150 m, 14.08.2010, OA 1915.

Vaccinium arctostaphylos L., 6, 500-600 m, 14.09.2008, OA 1506. Eux. el..

PRIMULACEAE

Primula vulgaris Huds. subsp. *sibthorpii* (Hoffmanns.) W. W. Sm. & Forrest, 6, 400-450 m, 20.03.2010, OA 1730. Eux. el..

Androsace maxima L., 6, 350-400 m, 18.04.2010, OA 1769.

Anagallis arvensis L. var. *arvensis*, 6, 500-600 m, 17.05.2008, OA 1229.

EBENACEAE

Diospyros lotus L., 4, 80-100 m, 22.05.2010, OA 1827.

STYRACACEAE

Styrax officinalis L., 6, 300-350 m, 18.04.2010, OA 1770.

OLEACEAE

Jasminum fruticans L., 4, 80-100 m, 29.06.2008, OA 1407. Medit. el..

Fraxinus excelsior L. subsp. *excelsior*, 7, 15 m, 14.09.2008, OA 1494. Euro-Sib. el.

F. angustifolia Vahl. subsp. *angustifolia*, 7, 01. 10.2008, OA 1527.

Ligustrum vulgare L., 6, 250-300 m, 17.05.2008, OA 1208. Euro-Sib. el.

L. japonicum Thunb., 2, 80 m, 29.06.2008, OA 1408. Cult. Non-Turkey (Foreign).

Olea europaea L. var. *europaea*, 5, 200 m, 18.06.2008, OA 1360. Cult. Medit. el..

O. europaea L. var. *sylvestris* (Miller) Lehr., 6, 300-350 m, 16.11.2008, OA 1595. Medit. el..

Phillyrea latifolia L., 6, 600-700 m, 22.05.2010, OA 1828. Medit. el..

APOCYNACEAE

Nerium oleander L., 2, 80 m, 18.04.2010, OA 1771. Cult. Medit. el..

Vinca herbacea Waldst. & Kit., 4, 80-100 m, 03.04.2008, OA 1093.

V. major L. subsp. *major*, 4, 80-150 m, 03.04.2008, OA 1100 A. Medit. el..

V. minor L., 4, 100 m, 03.04.2008, OA 1100 B.

ASCLEPIADACEAE

Vincetoxicum canescens (Willd.) Decne. subsp. *canescens*, 4, 100-150 m, 30.08.2008, OA 1465.

GENTIANACEAE

Centaurium erythraea Rafn. subsp. *turcicum* (Velen.) Melderis, 6, 200-300 m, 22.05.2010, OA 1829.

Gentianella caucasea (Loddiges ex Sims) Holub, 6, 500-600 m, 17.07.2010, OA 1889. Eux. el..

CONVOLVULACEAE

Convolvulus arvensis L., 5, 150-200 m, 17.05.2008, OA 1226.

Calystegia sepium (L.) R. Br. subsp. *sepium*, 5, 150-200 m, 09.07.2008, OA 1411.

Ipomea purpurea (L.) Roth., 4, 80-150 m, 22.05.2010, OA 1830.

BORAGINACEAE

Lappula squarrosa (Retz.) Dumort., 6, 380-400 m, 17.05.2008, OA 1227.

Myosotis arvensis (L.) Hill subsp. *arvensis*, 6, 300-350 m, 17.05.2008 1209. Euro-Sib. el..

Echium italicum L., 3, 90 m, 22.05.2010, OA 1831. Medit. el..

E. vulgare L., 5, 22.05.2010, OA 1832. Euro-Sib. el..

E. plantagineum L., 6, 200-250 m, 17.05.2008, OA 1233. Medit. el..

Onosma bracteosum Hausskn. & Bornm., 6, 450-600 m, 22.05.2010, OA 1833. End. Ir-Tur. el..

Cerintho minor L. subsp. *auriculata* (Ten.) Domac, 6, 300-400 m, 22.05.2010, OA 1834.

Trachystemon orientalis (L.) G. Don, 6, 400-500 m, 20.05.2009, OA 1691. Eux. el..

Anchusa officinalis L., 6, 200-250 m, 17.05.2008, OA 1187. Euro-Sib. el.

A. undulata L. subsp. *hybrida* (Ten.) Coutinho, 6, 300 m, 16.11.2008, OA 1601. Medit. el..

Alkanna tinctoria (L.) Tausch. subsp. *anatolica* Hub.-Mor., 3, 90-110 m, 18.05.2008, OA 1270. E. Medit. el..

SOLANACEAE

Solanum dulcamara L., 6, 400-500 m, 22.05.2010, OA 1835. Euro-Sib. el.

Physalis alkekengi L., 6, 450-500 m, 22.05.2010, OA 1836.

SCROPHULARIACEAE

Verbascum orientale (L.) All., 6, 250-300 m, 20.05.2009, OA 1672. E. Medit. el..

Scrophularia canina L. subsp. *bicolor* (Sm.) Greuter, 6, 250-300 m, 16.11.2008, OA 1586. E. Medit. el..

Antirrhinum majus L. subsp. *majus*, 3, 80 m, 17.05.2008, OA 1242. W. Medit. el..

Digitalis ferruginea L. subsp. *ferruginea*, 2, 80 m, 18.05.2008, OA 1268 A. Euro-Sib. el.

D. purpurea L., 2, 80 m, 18.05.2008, OA 1268 B. Cult. Non-Turkey (Foreign).

Veronica anagalloides Guss. subsp. *heureka* M. A. Fischer, 6, 600-700 m, 17.05.2008, OA 1234. Ir-Tur. el..

V. chamaedrys L., 6, 600-650 m, 18.04.2010, OA 1772. Euro-Sib. el.

Parentucellia latifolia (L.) Caruel subsp. *latifolia*, 3, 80 m, 18.05.2008, OA 1282. Medit. el..

Bellardia trixago (L.) All., 5, 200-250 m, 20.03.2010, OA 1731.

Paulownia tomentosa (Thunb.) Steud., 8, 15 m, 17.07.2010, OA 1893. Cult. Non-Turkey (Foreign).

VERBENACEAE

Verbena officinalis L., 3, 90 m, 21.06.2008, OA 1378.

Clerodendrum bungei Steud., 2, 80 m, 09.07.2008, OA 1412. Cult. Non-Turkey (Foreign).

LAMIACEAE (LABIATAE)

Ajuga orientalis L., 6, 400-500 m, 18.04.2010, OA 1773.

Teucrium chamaedrys L. subsp. *chamaedrys*, 6, 450-500 m, 19.06.2010, OA 1872. Euro-Sib. el.

Rosmarinus officinalis L., 2, 80 m, 15.03.2008, OA 1049. Medit. el..

Scutellaria hastifolia L., 3, 80 m, 18.05.2008, OA 1253. Euro-Sib. el.

Lamium maculatum L. var. *maculatum*, 6, 450-500 m, 28.02.2009, OA 1637. Euro-Sib. el.

Ballota nigra L. subsp. *anatolica* P. H. Davis, 4, 100-150 m, 01.04.2008, OA 1091. End. Ir-Tur. el..

Sideritis montana L. subsp. *remota* (D'Urv.) P.W. Ball. ex Heywood, 6, 350-400 m, 22.05.2010, OA 1837. Medit. el..

Stachys germanica L. subsp. *bithynica* (Boiss.) R. Bhattacharjee, 6, 600-700 m, 18.05.2008, OA 1281. Euro-Sib. el.

S. recta L. subsp. *subcrenata* (Vis.) Briq., 2, 80 m, 26.06.2008, OA 1387. E. Medit. el..

S. iberica Bieb. subsp. *iberica* var. *densipilosa* R. Bhattacharjee, 6, 600 m, 17.07.2010, OA 1895. End. Ir-Tur. el..

S. annua L. subsp. *cilicia* (Boiss.) R. Bhattacharjee, 3, 80 m, 18.05.2008, OA 1280. End. E. Medit. el..

Nepeta italica L. subsp. *italica*, 6, 250-300 m, 16.11.2008, OA 1585.

Prunella vulgaris L., 6, 300-350 m, 22.05.2010, OA 1838. Euro-Sib. el.

Origanum vulgare L. subsp. *vulgare*, 6, 200-250 m, 17.07.2008, OA 1430. Euro-Sib. el.

Calamintha nepeta (L.) Savi subsp. *glandulosa* (Req.) P. W. Ball., 4, 100-150 m, 19.06.2010, OA 1873.

Thymus longicaulis C. Presl subsp. *longicaulis* var. *longicaulis*, 3, 90 m, 18.04.2010, OA 1774.

Mentha pulegium L., 3, 90 m, 26.08.2008, OA 1460.

M. × piperita L., 3, 80 m, 29.06.2008, OA 1405.

M. suaveolens Ehrh., 6, 300-350 m, 21.06.2008, OA 1374. Medit. el..

M. longifolia (L.) Huds. subsp. *typhoides* (Briq.) Harley var. *typhoides* (L.) Huds., 6, 500-600 m, 29.06.2008, OA 1399.

M. spicata L. subsp. *tomentosa* (Briq.) Harley, 3, 90 m, 14.07.2008, OA 1422.

Salvia tomentosa Mill., 6, 650-700 m, 18.04.2010, OA 1775. Medit. el..

S. sclarea L., 4, 80-100 m, 22.05.2008, OA 1288.

S. virgata Jacq., 5, 150-200 m, 20.04.2008, OA 1139. Ir.-Tur. el..

BUDDLEJACEAE

Buddleja davidii Franch., 2, 80 m, 30.07.2008, OA 1451. Cult. Non-Turkey (Foreign).

PLANTAGINACEAE

Plantago major L. subsp. *major*, 6, 600-700 m, 19.06.2010, OA 1874.

P. lanceolata L., 6, 250-300 m, 17.05.2008, OA 1213.

THYMELAEACEAE

Daphne pontica L., 6, 250-300 m, 20.03.2010, OA 1732. Eux. el..

ELAEAGNACEAE

Elaeagnus angustifolia L. var. *orientalis* L., 3, 90 m, 18.05.2008, OA 1275.

LAURACEAE

Laurus nobilis L., 3, 80 m, 03.04.2008, OA 1094. Medit. el..

SANTALACEAE

Osyris alba L., 6, 300-350 m, 17.05.2008, OA 1191. Medit. el..

LORANTHACEAE

Viscum album L. subsp. *album*, 6, 300-350 m, 20.03.2010, OA 1733.

ARISTOLOCHIACEAE

Asarum europaeum L., 6, 450-500 m, 20.03.2010, OA 1734. Euro-Sib. el.

Aristolochia clematitis L., 6, 400-500 m, 18.04.2010, OA 1776. Euro-Sib. el.

A. bottae Jaub. & Spach, 6, 550-600 m, 20.03.2010, OA 1735. Ir.-Tur. el..

EUPHORBIACEAE

Euphorbia helioscopia L., 6, 250-300 m, 17.05.2008, OA 1204.

E. falcata L. subsp. *falcata* var. *falcata*, 6, 400-500 m, 18.04.2010, OA 1777.

URTICACEAE

Urtica dioica L., 6, 500-600 m, 16.11.2008, OA 1588. Euro-Sib. el.

CANNABACEAE

Humulus lupulus L., 4, 100-150 m., 30.08.2008, OA 1469. Euro-Sib. el.

MORACEAE

Morus alba L., 5, 150-200 m, 22.05.2010, OA 1839.

M. nigra L., 5, 150-200 m, 22.05.2010, OA 1840.

Ficus carica L. subsp. *carica* (All.)

Schinz. & Thell., 6, 250-300 m, 16.11.2008, OA 1594.

ULMACEAE

Ulmus glabra Huds., 7, 15 m, 14.09.2008, OA 1500. Euro-Sib. el.

U. laevis Pall., 4, 80-150 m, 20.03.2010, 1736. Euro-Sib. el.

Zelkova carpinifolia (Pallas) C. Koch., 8, 5 m, 01.10.2008, OA 1523. Eux. el..

Celtis australis L., 6, 400-450 m, 20.03.2010, OA 1737. Medit. el..

JUGLANDACEAE

Juglans regia L., 6, 300-350 m, 16.11.2008, OA 1579.

Pterocarya fraxinifolia (Poiret.) Spach., 6, 250-300 m, 19.06.2010, OA 1875. Eux. el..

PLATANACEAE

Platanus orientalis L., 8, 15 m, 01.10.2008, OA 1547.

P. occidentalis L., 8, 15 m, 01.10.2008, OA 1552. Cult. Non-Turkey (Foreign).

FAGACEAE

Fagus orientalis Lipsky, 6, 300-500 m, 22.05.2010, OA 1841. Euro-Sib. el.

Castanea sativa Mill., 6, 500-600 m, 16.11.2008, OA 1587. Euro-Sib. el.

Quercus frainetto Ten., 4, 80-100 m, 22.05.2010, OA 1842. Euro-Sib. el.

Q. petraea (Mattuschka) Liebl. subsp. *iberica* (Steven ex Bieb.) Krassiln., 6, 500-600 m, 16.11.2008, OA 1576 B.

Q. cerris L. var. *austriaca* Willd. Loudon, 6, 150-200 m, 16.11.2008, OA 1576 A. Euro-Sib. el.

CORYLACEAE

Carpinus betulus L., 6, 250-300 m, 17.07.2010, OA 1890. Euro-Sib. el.

Ostrya carpinifolia Scop., 6, 200-250 m, 17.05.2008, OA 1244. Medit. el..

Corylus avellana L. var. *avellana*, 6, 200-300 m, 20.03.2010, OA 1738. Euro-Sib. el.

BETULACEAE

Alnus glutinosa (L.) Gaertner subsp. *glutinosa*, 6, 200-250 m, 18.04.2010, OA 1778. Euro-Sib. el.

SALICACEAE

Salix alba L., 6, 150-250 m, 18.04.2010, OA 1779. Euro-Sib. el.

S. babylonica L., 8, 15 m, 14.09.2008, OA 1493.

S. caprea L., 6, 250-450 m, 18.04.2010, OA 1780. Euro-Sib. el.

Populus alba L., 6, 400-450 m, 20.03.2010, OA 1739. Euro-Sib. el.

P. nigra L. subsp. *nigra*, 8, 15 m, 01.10.2008, OA 1546.

MONOCOTYLEDONES

ALISMACEAE

Alisma lanceolatum With., 3, 90 m, 29.06.2008, OA 1391.

CANNACEAE

Canna indica L., 2, 80 m, 17.07.2008, OA 1437. Cult. Turkey plant.

ARECACEAE (PALMAE)

Phoenix canariensis Hort. ex Chabaud, 8, 10 m, 18.04.2010, OA 1781. Cult. Turkey plant.

Chamaerops humilis L., 8, 15 m, 20.03.2010, OA 1740. Cult. W. Medit. el..

Washingtonia filifera (J. Linden ex Andre) H. Wendl, 8, 5-10 m, 14.08.2010, OA 1916. Cult. Turkey plant.

ARACEAE

Spathiphyllum wallisi, 2, 90 m, 24.06.2008, OA 1383. Cult. Non-Turkey (Foreign).

LILIACEAE

Smilax excelsa, L., 6, 450-600 m, 22.05.2010, OA 1843. Medit. el..

S. aspera L., 6, 350-400 m, 18.04.2010, OA 1782.

Ruscus aculeatus L., var. *aculeatus*, 6, 200-250 m, 20.03.2010, OA 1741.

R. hypoglossum L., 6, 400-450 m, 20.03.2010, OA 1742. Euro-Sib. el.

Asparagus aphyllus L., subsp. *orientalis* (Baker) P. H. Davis 3, 90 m, 15.06.2008, OA 1336. Medit. el..

Ornithogalum sphaerocarpon Kerner, 6, 500-600 m, 18.04.2010, OA 1783.

Muscari tenuiflorum Tausch., 4, 90-110 m, 08.03.2009, OA 1626.

M. neglectum Guss., 3, 80 m, 01.04.2008, OA 1088.

Tulipa schrenkii Regel, 7, 15 m, 10.04.2008, OA 1112. Cult. Non-Turkey (Foreign).

Gagea chrysantha (Jan) Schultes & Schultes fil., 3, 90 m, 13.03.2008, OA 1011. Medit. el..

Yucca gloriosa L., 8, 15 m, 19.10.2008, OA 1557. Cult. Turkey plant.

AMARYLLIDACEAE

Agave americana L., 3, 80 m, 14.08.2010, OA 1917.

Leucojum aestivum L., 5, 150-200 m, 20.03.2010, OA 1743. Euro-Sib. el.

Clivia miniata Regel, 2, 80 m, 11.06.2008, OA 1324. Cult. Non-Turkey (Foreign).

IRIDACEAE

Iris pseudacorus L., 6, 150-200 m, 17.05.2008, OA 1189.

I. suaveolens Boiss. & Reuter, 2, 90 m, 18.05.2008, OA 1245. E. Medit. el..

ORCHIDACEAE

Cephalanthera longifolia (L.) Fritsch, 6, 700-750 m, 18.04.2010, OA 1784. Euro-Sib. el.

Orchis papilionacea L. var. *papilionacea*, 6, 300-350 m, 20.03.2010, OA 1744.

TYPHACEAE

Typha latifolia L., 5, 150-200 m, 19.06.2010, OA 1876.

CYPERACEAE

Carex pendula Huds., 6, 150-250 m, 22.05.2010, OA 1844. Euro-Sib. el.

POACEAE-(GRAMINEAE)

Brachypodium sylvaticum (Huds.) P.Beauv., 3, 90-110 m, 02.06.2008, OA 1317. Euro-Sib. el.

Elymus elongatus Host. Runemark subsp. *turcicus* (Macguire) Melderis, 6, 300-400 m, 19.06.2010, OA 1877.

E. repens (L.) Gould subsp. *repens*, 6, 450-600 m, 19.06.2010, OA 1878.

Aegilops geniculata Roth., 5, 150-200 m, 18.04.2010, OA 1785. Medit. el..

Hordeum marinum Huds. var. *marinum*, 4, 80-100 m, 22.05.2010, OA 1845.

H. bulbosum L., 6, 400-500 m, 22.05.2010, OA 1846.

Bromus arvensis L., 6, 350-450 m, 19.06.2010, 1879.

B. japonicus Thunb. subsp. *japonicus*, 6, 250-300 m, 20.05.2009, OA 1666.

B. tectorum L. subsp. *tectorum*, 6, 300-350 m, 20.05.2009, OA 1670.

B. sterilis L., 6, 300-350 m, 20.05.2009, OA 1697.

B. inermis Leysser, 6, 500-600 m, 19.06.2010, OA 1880.

Avena barbata Pott. ex Link subsp. *barbata*, 6, 500-550 m, 20.05.2009, OA 1650. Medit. el..

A. sativa L., 6, 250 m, 17.05.2008, OA 1216.

Koeleria nitidula Velen., 6, 400-500 m, 22.05.2010, OA 1847.

Holcus lanatus L., 4, 100-150 m, 09.07.2008, OA 1410. Euro-Sib. el.

Ammophila arenaria (L.) Link subsp. *arundinacea* H. Lindb. Fil., 6, 400-500 m, 19.06.2010, OA 1881. Medit. el..

Apera intermedia Hack., 6, 400-450 m, 20.05.2009, OA 1669. Ir.-Tur. el..

Agrostis stolonifera L., 6, 400-500 m, 10.06.2010, OA 1882. Euro-Sib. el.

Alopecurus myosuroides Huds. var. *myosuroides*, 5, 100-150 m, 08.03.2009, OA 1614. Euro-Sib. el.

A. rendlei Eig, 4, 80-100 m, 08.03.2008, OA 1615. Medit. el..

Phleum alpinum L., 6, 500-550 m, 22.05.2010, OA 1849. Euro-Sib. el.

P. subulatum (Savi) Asch. & Graebn. subsp. *subulatum*, 6, 450-500 m, 22.05.2010, OA 1848.

Festuca valesiaca Schleicher ex Gaudin, 6, 450-500 m, 18.07.2010, OA 1786.

Lolium perenne L., 6, 450-500 m, 18.07.2010, OA 1787. Euro-Sib. el.

Vulpia ciliata Dumort. subsp. *ciliata*, 6, 400-450 m, 20.05.2009, OA 1687.

Catapodium rigidum (L.) C. E. Hubbard ex Dony subsp. *rigidum* var. *rigidum*, 6, 450-500 m, 20.05.2009, OA 1662.

Poa annua L., 6, 250-300 m, 17.05.2008, OA 1202.

P. bulbosa L., 6, 500-550 m, 20.05.2009, OA 1652.

Dactylis glomerata L. subsp. *glomerata*, 6, 650-700 m, 20.05.2009, OA 1681. Euro-Sib. el.

Briza maxima L., 6, 350-400 m, 20.05.2009, OA 1649.

Stipa bromoides (L.) Dörfler, 6, 400-500 m, 22.05.2010, OA 1850. Medit. el..

Cortaderia selloana (Schultes & Schultes fil.) Aschers. & Graebn., 8, 15 m, 01.10.2008, OA 1520.

Setaria glauca (L.) P. Beauv., 6, 400-450 m, 17.07.2010, OA 1891.

Saccharum strictum Host. Sprengel, 6, 250-300 m, 17.07.2010, OA 1892.

BIGNONIACEAE

Campsis radicans Seem, 3, 90 m, 15.06.2008, OA 1344. Cult. Non-Turkey (Foreign).

NYCTAGINACEAE

Mirabilis jalapa L., 2, 80 m, 14.08.2010, 1918. Cult. Non-Turkey (Foreign).

Bougainvillea glabra Choisy, 2, 90 m, 19.05.2008, OA 1283. Cult. Non-Turkey (Foreign).

4. Discussion

In the consequence of the evolution of the plant samples collected during floristic studies 101 family, 344 genera, 489 species and subspecies taxa were determined. 5 of 489 taxa are included in Pteridophyta and 484 taxa in Spermatophyta. While Gymnospermae is represented with 17 taxa, 467 taxa belong to Angiospermae. In research area 11 endemic taxa were identified and their endemism rate is 2,55 %. The most important reason for his low rate in the area is Euro-Siberian phytogeographic region has less endemic plant species than the other phytogeographic region in our country.

The number of the species whose phylogeographic region known is 172 out of 489 taxa identified in research field. 102 of the species whose phylogeographical region is known Euro-Siberian (20,85 %), 6 of them Mediterranean (12,26 %) and 11 of them is Irano-Turanian (2,24 %). 22 taxa identified as Euxine element are included in Euro-Siberian phylogeographical region. The number of the taxa, within the total amount of 489 taxa, whose phylogeographical region unknown is 317 (64,82 %)

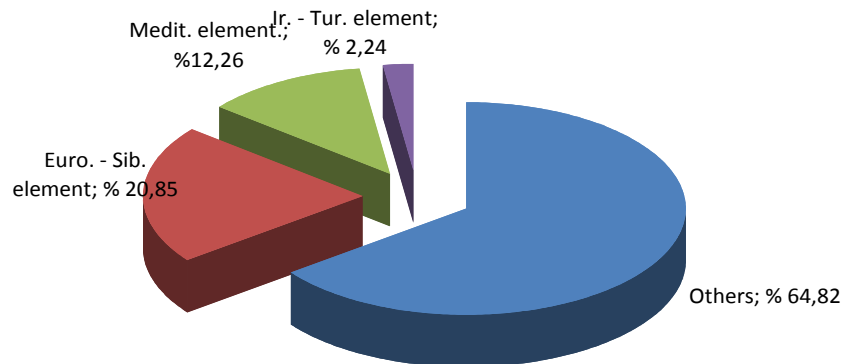


Figure 3. Spectrum of phylogeographical region elements

The families including the largest genera in research field are Compositae (36), Gramineae (24), Leguminosae (23), Rosaceae (23), Umbelliferae (16), Cruciferae (16), Labiatae (15), Caryophyllaceae (8), Boraginaceae (8), Liliaceae (8) (Table 1). The families including the largest genera are ordered as Gramineae , Compositae and Umbelliferae

Table 1. 10 families including the highest number of genus and their rates (%)

Family	Number of Genus	Rates of Genus to Total Number of Genus(%)
Compositae	36	10,46
Gramineae	24	6,97
Leguminosae	23	6,68
Rosaceae	23	6,68
Umbelliferae	16	4,65
Cruciferae	16	4,65
Labiatae	15	4,36
Caryophyllaceae	8	2,32
Boraginaceae	8	2,32
Liliaceae	8	2,32

Table 2. Families and their rates (%) including the highest number of species and subspecies

Family	Number of Species	Rates of Species to Total Number of the Species (%)
Compositae	47	9,61
Leguminosae	42	8,58
Rosaceae	37	7,56
Gramineae	34	6,95
Labiatae	24	4,90
Caryophyllaceae	22	4,49
Cruciferae	21	4,29
Umbelliferae	18	3,68
Ranunculaceae	11	2,24
Boraginaceae	11	2,24
Liliaceae	11	2,24
Others	211	43,14

The highest number of species and subspecies in research field includes the families as follows; Compositae (47), Leguminosae (42), Rosaceae (37), Gramineae (34), Labiatae (24), Caryophyllaceae (22), Cruciferae (21), Umbelliferae (18), Ranunculaceae (11), Boraginaceae (11), Liliaceae (11). Other 211 taxa left belong to other families. In the Table 2. 11 families including the highest number of species and subspecies and their rates to total number of species and subspecies are given.

Trifolium is the genus including the highest number of species in research are with a number of 11 species. Silene (9), Rosa (7), Ranunculus, Prunus, Mentha and Bromus with a number of (5) species, Acer, Vicia, Senecio and Stachys genera with (4) species follow Trifolium (Table 3).

First 10 families including the highest number of genera according to Flora of Turkey are Gramineae, Compositae, Umbelliferae, Cruciferae, Leguminosae, Labiatae, Caryophyllaceae, Boraginaceae, Liliaceae and Rosaceae. Compositae, Gramineae and Leguminosae families come in first three row in research area. The comparison of the families rich in number of species with studies around and the other flora studies carried out near the research

area ‘ Flora of Beşkayalar Valley (Akaydın et al., 2006)’, Flora of Kayışdağı (İstanbul/Turkey) and floristic comparison with neighboring floras (Akaydın et al., 2011) is given in Table 4.

Table 3. Genera including the highest number of taxa in species and subspecies level and their rates

Genus	Number of Species	Rates of Species %
Trifolium	11	2,24
Silene	9	1,84
Rosa	7	1,43
Ranunculus	5	1,02
Prunus	5	1,02
Mentha	5	1,02
Bromus	5	1,02
Acer	4	0,81
Vicia	4	0,81
Senecio	4	0,81
Stachys	4	0,81

Table 4. Comparison of families in research area rich in terms of genus amount with other studies around

Family	Number of the Genus	Rates of Genus (%)	Number of the Genus	Rates of Genus (%)	Number of the Genus	Rates of Genus (%)
Compositae	36	10,46	27	13,98	36	13,74
Gramineae	24	6,97	10	5,18	31	11,83
Leguminosae	23	6,68	8	4,14	19	7,25
Rosaceae	23	6,68	10	5,18	11	4,19
Umbelliferae	16	4,65	7	3,62	10	3,81
Cruciferae	16	4,65	4	2,07	17	6,48
Labiatae	15	4,36	8	4,14	14	5,34
Caryophyllaceae	8	2,32	10	5,18	11	4,19
Boraginaceae	8	2,32	5	2,59	6	2,29
Liliaceae	8	2,32	6	3,10	10	3,81

Research areas

1. O.Aslan – Flora of Arslanbey (İzmit) and cultivated plants in Izmit city center
2. G.Akaydın, G.Çalışkan , E. B. Yılmaz–Flora of Ballıkayalar Valley (Akaydın et al.,2006)
3. G. Akaydın, B. Özüdoğru, H. Kırmızıbekmez, E. Yeşilada-The Flora of Kayışdağı and floristic comparison with neighboring floras (Akaydın et al., 2011)

Table 5. Comparison of families in research area rich in terms of species amounts with other studies in neighbourhood

Family	1		2		3	
	Number of the Species	Rates of Species (%)	Number of the Species	Rates of Species (%)	Number of the species	Rates of Species (%)
Compositae	47	9,61	41	13,7	65	13,65
Leguminosae	42	8,58	14	4,7	63	13,23
Rosaceae	37	7,56	13	4,4	14	2,94
Gramineae	34	6,95	12	4	46	9,66
Labiatae	24	4,90	12	4	23	4,83
Caryophyllaceae	22	4,49	16	5,4	20	4,20
Cruciferae	21	4,29	8	2,73	22	4,62
Umbelliferae	18	3,68	7	2,38	13	2,73
Ranunculaceae	11	2,24	7	2,38	11	2,31
Boraginaceae	11	2,24	7	2,38	10	2,10
Liliaceae	11	2,24	7	2,38	18	3,78

According to Flora of Turkey families rich in terms of genus amount are Compositae, Leguminosae, Labiatae, Cruciferae, Caryophyllaceae, Scrophulariaceae, Umbelliferae, Liliaceae and Boraginaceae. Compositae, Leguminosae and Rosaceae families came in first three rows in research area (Table 5). The comparison of the families rich in genus amount with studies around and other flora studies carried out by Galip Akaydın, Gözde Çalışkan and Emine Burcu Yılmaz ‘ Flora of Beşkayalar Valley (Gölcük-Kocaeli) (Akaydın et al., 2006)’, The Flora of Kayışdağı (İstanbul/Turkey) and floristic comparison with neighboring floras (Akaydın et al., 2011)’ is given in Table 5.

Endangered categories of the endemic plants collected from the research area was arranged again considering Türkiye Bitkileri Kırmızı Kitabı (Ekim et al., 2000) and 2001 IUCN categories. Endemic taxa discovered in consequence of our research and shown in the table above and their endangered categories are as follows;

<i>Abies nordmanniana</i> (Stev.) Spach subsp. <i>bornmuelleriana</i>	LC
<i>Linum hirsutum</i> L. subsp. <i>anatolicum</i> (Boiss.) Hayek var. <i>platyphyllum</i> Davis.....	EN
<i>Astragalus ascioalax</i> Bunge.....	LC
<i>Asperula lilaciflora</i> Boiss. subsp. <i>phrygia</i> (Bornm.) Schönb.-Tem.....	LC
<i>Onopordum anatolicum</i> (Boiss.) Eig.....	LC
<i>Jurinea pontica</i> Hausskn. & Freyn ex Hausskn.....	LC
<i>Hieracium bithynicum</i> (Zahn) Sell & West.....	DD
<i>Onosma bracteosum</i> Hausskn. & Bornm.....	LC
<i>Ballota nigra</i> L. subsp. <i>anatolica</i> P. H. Davis.....	LC
<i>Stachys iberica</i> Bieb. subsp. <i>iberica</i> Bieb. var. <i>densipilosa</i> R. Bhattacharjee.....	LC
<i>Stachys annua</i> L. subsp. <i>cilicia</i> (Boiss.) R. Bhattacharjee.....	LC

Due to the fact that there are stone quarry, uncontrolled grazing in research area and attempts to make up settlement and to open field, natural environment spoils and this gives extreme harm to the ecosystem of the area.

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