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FLORA OF ÇALTEPE AND ÇELETEPE (BOLU)

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ABSTRACT. This study was carried out to reveal the vascular plant diversity of Çaltepe and Çeletepe. During 2015−2018, 2340 plant specimens were collected from the research area and 363 genera and 767 taxa belonging to 81 families were determined. Of all the collected taxa, 66 are endemic and endemism rate is %8.60. The IUCN threat categories of endemic and rare plants at global level are as follows: 1 taxon in "CR" category, as well as 4 taxa "EN", 4 taxa "VU", 9 taxa "NT", and 45 taxa "LC". Also, 3 rare taxa are found in the "VU" category, as well as 1 rare taxon in the "DD" category at regional level. 56 taxa are new records for the province of Bolu. The largest families in the study area are as follows: Asteraceae 97 taxa (%12.65), Fabaceae 62 taxa (%8.08), Lamiaceae 51 taxa (%6.65), Rosaceae 44 taxa (%5.74), Poaceae 37 taxa (%4.82), Brassicaceae 35 taxa (%4.56), Caryophyllaceae 32 taxa (%4.17), Apiaceae 28 taxa (%3.65), Boraginaceae 27 taxa (%3.52) and Orchidaceae 24 taxa (%3.13). The distribution of taxa into phytogeographic regions are as follows: 234 taxa (%30.50) Euro-Siberian, 64 taxa (%8.34) Mediterranean, 46 taxa (%5.99) Irano-Turanian, and 423 taxa (%55.15) multiregional and/or unknown. *Geranium* and *Silene* (12 taxa) are the most common genera in the research area. These genera are followed by *Salvia* (11 taxa), *Trifolium, Veronica* and *Campanula* (each with 10 taxa), *Ranunculus*, *Euphorbia* and *Vicia* (each with 8 taxa), and *Poa* (7 taxa).

1. INTRODUCTION

Turkey has a rich variety of flora and vegetation due to its different climate types (continental, ocean and Mediterranean climates), geomorphological diversity, rich water resources (sea, lake and stream), great altitude differences (sea level−5000 m), and a wide variety of habitat types. In addition to this, as a result of the phytogeographical classification conducted on land owned by the whole of Europe and Asia, Turkey is divided into three different phytogeographic regions [1]. Our country is one of the important plant centers of the world in terms of its location at

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the intersection point of Iran-Turan, Euro-Siberian and Mediterranean phytogeographic regions, its connection of the continents of Europe and Asia which have different climatic and edaphic conditions [2].

The first registered floristic study in our country was carried out between 1701 and 1702 by the French botanist Joseph Pitton de Tournefort in Northern Anatolia [3]. The work entitled "*Flora Orientalis*" which was published in six volumes by the Swiss botanist Pierre Edmund Boissier between 1867 and 1888 covers the region extending from Greece to Afghanistan and mostly contains plant species of the Anatolian and Middle Eastern countries. The current study which included 6000 plants from Anatolia is the first work written about the flora of Turkey [4]. Then, the "*Flora of Turkey and the East Aegean Islands*" was written in 10 volumes under the editor-in-chief of English botanist Peter Hadland Davis between 1965 and 1988. It includes the floristic record of approximately 9000 plants from our country, and has become the main book of the researchers dealing with plant taxonomy [5-6]. Afterwards, Güner *et al*. [7] wrote the eleventh volume by adding 400 new taxa to Turkey's flora. In the years following the completion of flora-writing, problems were encountered while diagnosing a large number of materials collected, as a result, attention was drawn to problems of some genera. However, taxonomic problems persist in some species of many genera, especially large genera. Because of the limited of time and materials in the process of writing the "*Flora of Turkey*", the deficiencies regarding many species and sections has been highlighted in the flora but no adequate solutions have been proposed. In addition, it was emphasized that detailed floristic studies are needed in many regions of Turkey, especially in Eastern Anatolia. With the publication of the book entitled "*Türkiye Bitkileri Listesi-Damarlı Bitkiler*", the number of taxa in Turkey has reached 11707 while the endemism rate was 31.82% [8]. However, the extraordinary richness and diversity of the flora of Turkey has not yet been fully revealed. On the other hand, there is a need to carry out regional floristic and revision studies to better understand the distribution boundaries of taxa and determine the variation limits of taxa, in the process of writing the new volumes of the "*Resimli Türkiye Florası*" [9-10]. The first number of the current study, which was initiated by Turkish botanists, was published in 2014 and the second number was published in 2018. In the following processes, it is planned to be written the other volumes of the book to cover all plants of Turkey.

The revisional studies solve some taxonomic problems; however, they cannot sufficiently reveal the geographic distribution and transitions of taxa. Also, the researchers usually do not have time to do it. The serious consideration of regional

records based on floristic studies will reveal the true distribution of taxa in that region and ensure that the wrong records are extracted.

The studies on Bolu's floristic diversity in chronological order are as follows; Gerede and Aktaş Forests, and Köroğlu Mountain by Akman and Ketenoğlu [11-12], Bolu and Semen Mountains by Akman and Yurdakulol [13-14], Yedigöller Natural Park by Ekim and İlarslan [15], campus flora of Abant İzzet Baysal University by Turgut [16], Gökçeler Mountain by Uluğ [17], Lake Abant by Türker and Güner [18], Lake Yeniçağa by Sümer [19], Lake Gölcük by İkinci and Güner [20], Karakiriş Mountain by Aksoy [21], Lake Sünnet by İkinci [22], Kartalkaya by Sungurlu [23], Kale-Bolu Hazelnut Nature Reserve Area by Arslan *et al*. [24], aquatic plants of Gölköy and Yumrukaya by Bayındır [25], petaloid monocotyledonous flora of Bolu by Demir and Eker [26], the effect of intense construction and population pressure on flora changes in Gölköy Campus by Doğan *et al*. [27], Lake Sülüklü by Kanoğlu *et al*. [28], Taşlıyayla and Kızık surrounding by Tunçkol and Akkemik [29], Flora of Argözü Valley (Kıbrıscık-Bolu) by Güneş Özkan *et al.* [30], flora and e-flora of Gölköy Campus by Eker *et al*. [31-32], aquatic plants of Bolu by İkinci and Bayındır [33], endemic and rare plants of Bolu by Eker *et al*. [4] were studied. The vegetational studies are as follows: Köroğlu Mountains by Akman and Ketenoğlu [34], Bolu and Semen Mountains by Akman *et al*. [35-36], Gerede-Aktaş forest by Ketenoğlu [37], Mudurnu surroundings by Akman and İlarslan [38] and Plant communities and stand structure characteristics of Bolu-Ayıkaya region by Çoban [39] were studied.

Çaltepe and Çeletepe regions, which are selected as a research area, are located in the northeast of the province of Bolu and found in A3 square according to Davis' grid system in the "*Flora of Turkey and East Aegean Islands*" (Figure 1). In the southwest-northeastern direction of Bolu province, Bolu Mountains are located. The highest point of the Bolu Mountains is Çeletepe (Çeledoruğu) in 1987 m. It is the second highest mountain after Köroğlu Hill (2499 m) in Köroğlu Mountains in Bolu Province. Çaltepe has a height of 1890 m. Çeletepe with N 40° 51.940' – E 031° 42.123' coordinates and Çaltepe with N 40° 53.570' – E 031° 46.526' coordinates are integrated with each other. There are Banaz Plateau and Yedi Erenler on Çeletepe, and Merkeşler Plateau on Çaltepe, and Kadıköy Plateau are located between these two peaks. On the south of both hills, the villages of Tetemeçele, Mesciçele, Yeşilçele Çobankaya and Bağışlar, in the southwest the villages of Gölcük, Yakabayat, Hamzabey and Musluklar, in the southeast the villages of Merkeşler and Avşar, in the west the village of Çukuröre, in North towards the Yedigöller mountain ranges Sarımustan, Kapankayası, Gurbettaşı are located. The region has

various habitat layers such as damaged forest, steppe, coniferous and mixed forests, subalpine and alpine regions in the height range of 1000–2000 m. It is predominantly under the influence of the Euro-Siberian floristic region from the north and, the Mediterranean floristic region from the south-west. Although the region is one of the rare regions with alpin layer in Bolu, there has not been any floristic work related to Çaltepe and Çeltepe until this study.

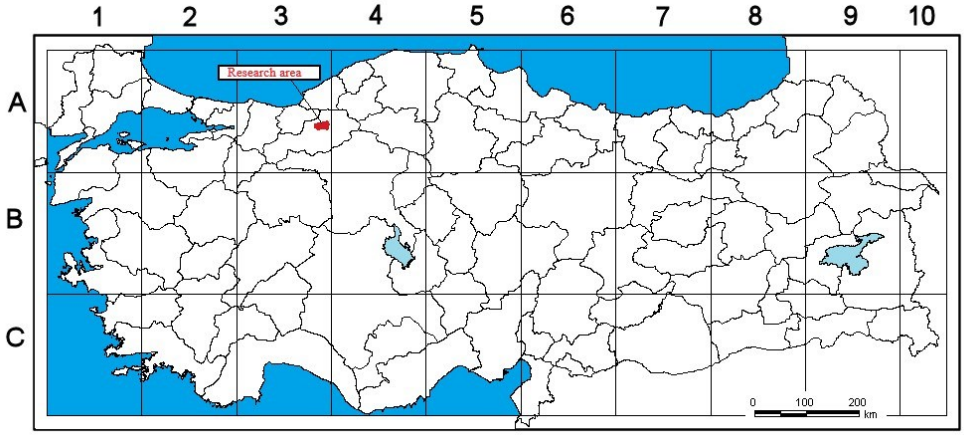

FIGURE 1. Map for Davis Grid System and the location of the research area in Turkey.

Considering temperature and precipitation data of Bolu, either semi-arid moist climate according to the De Martonne method or semi-arid Mediterranean climate according to Emberger drought index are observed (Akman, 2011). There is more rainfall in winter months and less rainfall in summer months in Bolu. Regarding the last 90 years rainfall data, annual mean temperature in Bolu city is 10.5 ºC. As the same data, mean maximum temperature is 27.9 ºC in August and mean minimum temperature is -3.6 ºC in January. Seasonal temperature avarages are 9.5 ºC in spring, 19.03 ºC in summer, 11.6 ºC in autumn and 1.7 ºC in winter. According to seasonal distribution of rainfalls, 160.8 mm in spring, 105.4 mm in summer, 115.5 mm in autumn, 164.1 mm in winter and annual mean rainfall is 546.8 mm. Depending on these data, the rainfall regime of Bolu city is classified as the 1st Lower Type of East Mediterranean rainfall regime [40] (Figure 2).

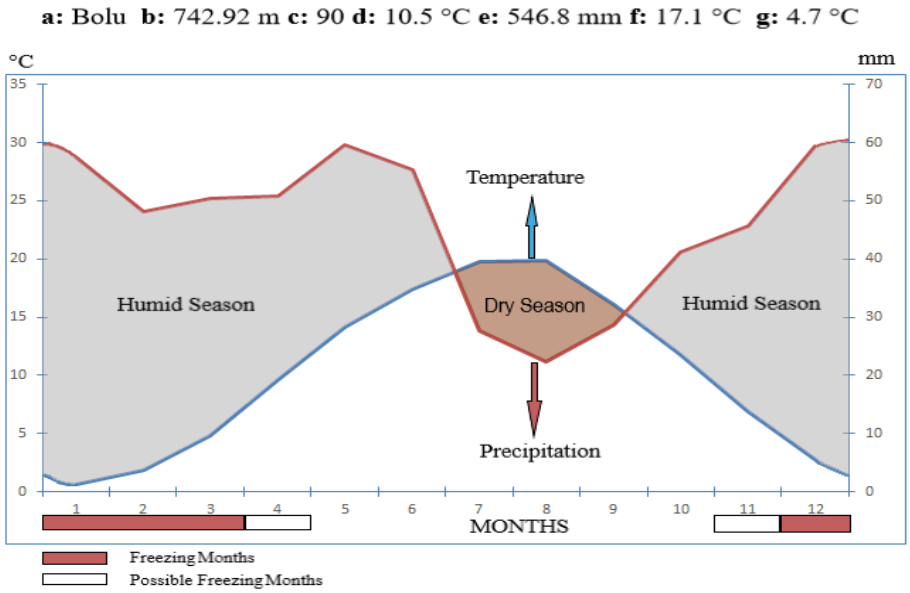

FIGURE 2. Climatic Diagram of Bolu (for the last 90 years). Explanations: a) Meteorological Station, b) Altitude of Meteorological Station, c) Data Collection Period (last ninety years), d) Mean Annual Temperature, e) Mean Annual Precipitation, f) Mean Maximum Temperature (ºC), g) Mean Minumum Temperature (ºC).

This study reveals the floristic diversity of Çaltepe and Çeletepe region in Bolu province. The species inventory lists of the research area were prepared, and observations were made regarding the distribution areas and population densities of endemic and rare species. Moreover, recommendations for the development of in situ conservation methods are presented.

The reasons for selecting Çaltepe and Çeletepe regions (Bolu) as the study area are as follows:

1. No studies have been conducted on the flora of Çaltepe and Çeletepe. In other words, this region is among the unknown or little-known regions of Turkey in terms of the floristic diversity.
2. The study area is an important region in terms of biodiversity due to the fact that it is under the influence of two different phytogeographic regions, and it has the second highest elevation after Köroğlu Hill in Bolu province.

The objectives of this study are formulated as follows in the order of priority:
1. To reveal the floristic inventory of the region.
2. To reveal the distribution areas and densities of endemic and rare species in the region by population observations.
3. To provide up-to-date regional reports about threat categories of endemic and rare species found in the IUCN Red Data List.
4. To determine the areas where biodiversity is high and to offer suggestions for in situ preservation.
5. To provide plant samples for the development of Bolu Abant İzzet Baysal University Herbarium (AIBU).

2. MATERIAL AND METHODS

In the research area, a total of 39 days of field studies were conducted from February 2015 to April 2018 and a total of 2340 flowering and fruiting plant specimens were collected from 19 main stations (Figure 3, Appendix 1) and substations. The photographs of taxa were taken in their natural environments, GPS coordinates, locality and habitat information were also noted. The collected samples were converted into herbarium material and the collector numbers were given, and then stored at the Bolu Abant İzzet Baysal University Herbarium (AIBU).

The specimens were diagnosed in the light of relevant literatures. Especially, for identification of the plants, 11 volumes of "*Flora of Turkey and East Aegean Islands* [5-7]" were used. To determine the correct and current scientific names of plant names "*Türkiye Bitkileri Listesi* [8]" were used as well as web sites "*World Checklist of Selected Plant Families* [41]", "*International Plant Name Index* [42]" and "*the Plant List* [43]". Author abbreviations were given according to IPNI [42].

Using "*International Union for Conservation of Nature* [44]" criteria, in determining of IUCN Red Data Book categories of endangered species of endemic and rare plants, the data in "*Türkiye Bitkileri Kırmızı Kitabı* [45]" were used. The abbreviations and meanings used in the identification of endangered species of plants are as follows: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Not Evaluated (NE), Data Deficient (DD). At the local level, population densities of endemic and rare taxa were categorized as "rare, low, medium-density, common" based on rough population observations.

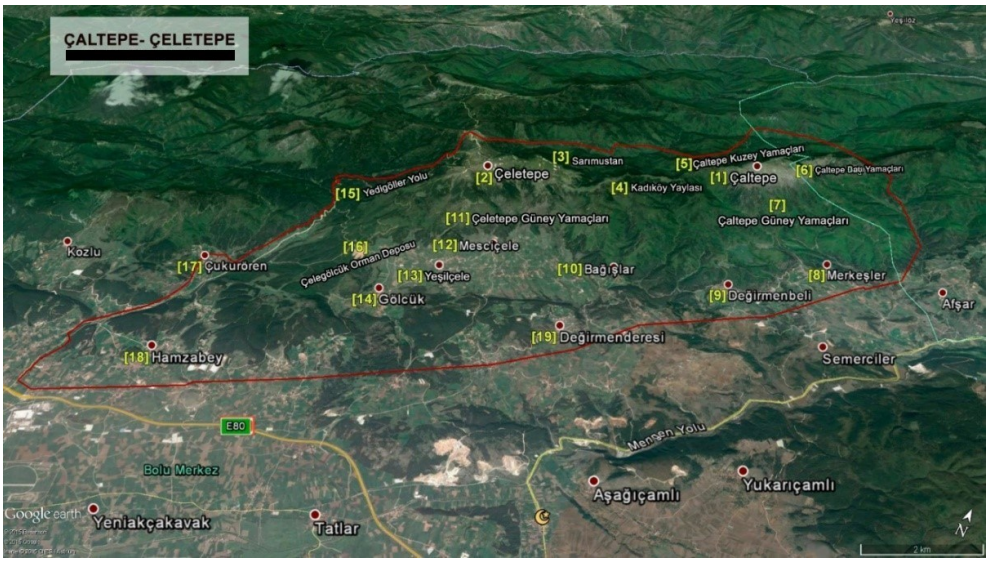

FIGURE 3. The main stations where fieldwork is carried out in the research area.

The complete floristic list was set out according to the the systematic order in "*Angiosperm Phylogeny Group III* [46]". Enumaretion of the taxa are given in the following order:

- Names of division, class, order and family in accordance with the taxonomic hierarchy
- Valid genus name, author(s)
- Valid species name, author(s); if it is present infraspecific category
- Colection information for specimen examined: location, altitude, habitat, GPS (Global Position System) coordinate, collection date, collector(s) number, identifier(s) and identification date
- If there is, endemism and rarity
- If known, phytogeographic region
- If it is a new record for Bolu, it is specified

In this study, climatic data of Bolu province were received from "Bolu Meterology Station" [47].

3. RESULTS

In the research area, 39 days of fieldwork was conducted between 2015–2018, and 2340 plant samples were collected from 19 different main locations and sublocations (Figure 3, Appendix 1). As a result of the diagnosis of these samples, 767 taxa (745 species) were identified (Appendix 2), of which 66 were endemic and 4 rare, belonging to 81 families and 363 genera. 15 of the taxa belong to the division Pteridophyta and the remaining 752 taxa belong to the division Spermatophyta. Five of the spermatophytic taxa belong to Gymnospermae and 747 belong to Angiospermae. Of the 747 taxa belonging to Angiospermae, 109 belong to Monocotylodonae and 638 belong to Dicotylodonae (Figure 4). 56 taxa are the new records for the province of Bolu (Appendix 2).

In the research area, characteristic vegetation types of Black Sea climate are seen. That is, forest, distorted forest, steppe, subalpine, alpine, rock, river and moist creek vegetation types are seen. Generally, below 1000 m, settlements, culture areas, degraded forests and steppe vegetation are observed. In these altitudes, the forest formation is characterized by the large-leaved *Quercus* spp., *Crataegus* spp., *Prunus* spp., *Corylus* spp., *Salix* spp. and coniferous *Abies nordmanniana* subsp. *equi-trojani* and *Pinus* spp. In the vicinity of the upper Kadıköy Plateau (1000–1500 m high) close to the north facing, the dominant species is Kazdağı fir (*Abies nordmanniana* subsp. *equi-trojani*). Also, beech (*Fagus orientalis*), hornbeam (*Carpinus betulus*), European bladdernut (*Staphylea pinnata*) and wych elm (*Ulmus glabra*) are intermingled in some places. On the south side, the black pine (*Pinus nigra* subsp. *pallasiana*) and yellow pine (*Pinus sylvestris* var. *hamata*) are dominant, but occasionally beech and hornbeam appear. In the southeastern region, up to 1200 m, mainly the oak species (*Quercus petraea* subsp. *iberica*, *Quercus pubescens* subsp. *pubescens, Quercus infectoria* subsp. *infectoria, Quercus macranthera* subsp. *syspirensis*) are included in the forest composition. This composition is accompanied by the cade juniper (*Juniperus oxycedrus* subsp. *oxycedrus* var. *oxycedrus*) in the southern and southeastern parts under 1200 m. At the 1700 m elevations where the subalpine zone is observed, dwarf juniper (*Juniperus communis* var. *saxatilis*) is dominant; geophytes, some alpine plants and moist plains dominate the alpine parts of both integrated mountain masses (Çeletepe and Çaltepe). At the creek edges, there are some trees such as poplar (*Populus nigra* subsp. *nigra, Populus tremula* subsp. *tremula*), willow (*Salix alba* subsp. *alba, Salix caprea*), nut (*Corylus avellana* var. *avellana*), common alder (*Alnus glutinosa* subsp. *glutinosa*) and some hygrophilous plant species such as horsetails (*Equisetum* spp.)

and saxifrages (*Saxifraga* spp.). *Salix caprea, Populus nigra* subsp. *nigra*, *Rosa canina, Colutea cilicica, Rubus* spp. are common tree and shrub species of dry creek bed in summer. On the other hand, common herbaceous species are *Chenopodium album, Mentha longifolia, Xanthium strumarium* subsp. *strumarium, Trifolium campestre* subsp. *campestre* var. *campestre, Lamium purpureum* var. *purpureum, Euphorbia pannonica*.

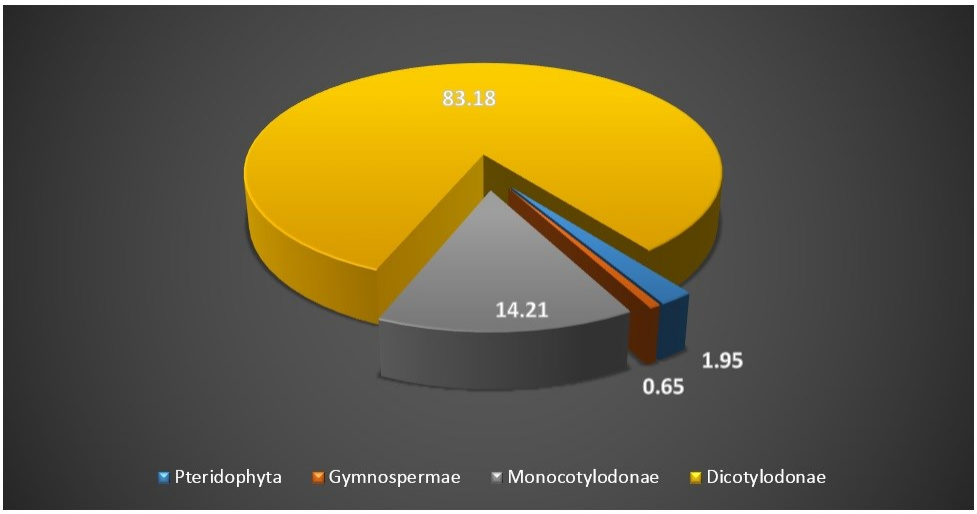

FIGURE 4. Spectrum of the distribution of species according to major taxa.

The distribution of taxa according to phytogeographical regions is as follows: 234 taxa (30.50%) Euro-Siberian, 64 taxa (8.34%) Mediterranean, 46 taxa (5.99%) Irano-Turanian and 423 taxa (55.15%) are the multizone and/or their phytogeographical regions are unknown (Figure 5). Of all the collected taxa, 66 are endemic and endemism rate is %8.60. The IUCN threat categories of endemic and rare plants are as follows: 1 taxon in “CR” category at global level, as well as 4 taxa “EN”, 4 taxa “VU”, 9 taxa “NT”, and 45 taxa “LC” (Table 1). Also there are 3 rare taxa which are found in the “VU” category and 1 rare taxon which is found in the “DD” category at regional level (Table 1).

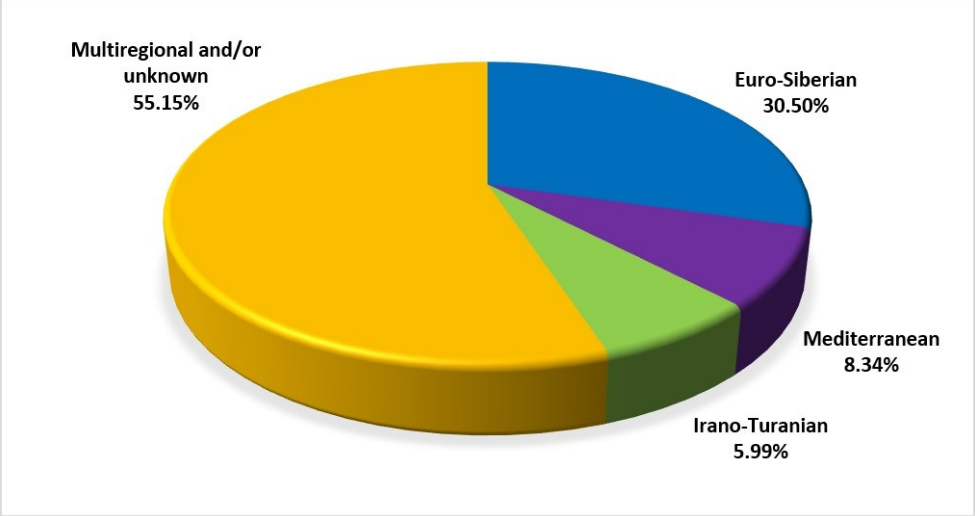

FIGURE 5. Distribution of species in research area according to phytogeographic regions.

Considering the population density of endemic and rare taxa detected in the research area, it can be said that especially *Asperula pestalozzae*, *Astragalus amoenus*, *Astragalus panduratus, Asyneuma rigidum* subsp. *sibtharpianum*, *Aubrieta olympica, Campanula grandis* subsp. *grandis, Cyanus pichleri* subsp. *extrarosularis, Delphinium fissum* subsp. *anatolicum, Hieracium paphlagonicum, Iris kerneriana, Lamium purpureum* var. *aznavourii*, *Lathyrus czeczottianus*, *Lathyrus tukhtensis, Melampyrum arvense* var. *elatius, Minuartia erythrosepala* var. *cappadocica*, *Papaver pilosum* subsp. *pilosum*, *Poa asiaeminoris*, *Salvia tobeyi, Silene olympica* var. *olympica, Trifolium aureum* subsp. *barbulatum, Turanecio hypochionaeus, Vicia freyniana, Hordeum murinum* subsp. *leporinum, Iris pumila* subsp. *attica* and *Lilium martagon* are rare taxa at regional level (Table 1).

TABLE 1. Endemic and rare plants, their IUCN Red Data Book categories and population frequency identified in the research area.

No	Endemic plants name	IUCN	Population frequency
1	*Abies nordmanniana* subsp. *equi-trojani*	NT (endemic)	Common
2	*Allium huber-morathii*	LC (endemic)	Medium
3	*Allium olympicum*	LC (endemic)	Low
4	*Arum hygrophilum* subsp. *euxinum*	LC (endemic)	Medium
5	*Asperula pestalozzae*	LC (endemic)	Rare
6	*Astragalus amoenus*	LC (endemic)	Rare
7	*Astragalus condensatus*	LC (endemic)	Low
8	*Astragalus mesogitanus*	LC (endemic)	Common
9	*Astragalus panduratus*	EN (endemic)	Rare
10	*Astrantia maxima* subsp. *haradjianii*	NT (endemic)	Common
11	*Asyneuma rigidum* subsp. *sibtharpianum*	LC (endemic)	Rare
12	*Aubrieta olympica*	EN (endemic)	Rare
13	*Campanula grandis* subsp. *grandis*	LC (endemic)	Rare
14	*Campanula lyrata* subsp. *lyrata*	LC (endemic)	Common
15	*Centaurea consanguinea*	LC (endemic)	Low
16	*Cirsium sintenisii*	NE (endemic)	Low
17	*Corydalis caucasica* subsp. *abantensis*	EN (endemic)	Medium
18	*Corydalis wendelboi* subsp. *congesta*	EN (endemic)	Common
19	*Crataegus tanacetifolia*	LC (endemic)	Medium
20	*Crataegus x bornmuelleri*	NE (endemic)	Low
21	*Crocus ancyrensis*	NT (endemic)	Common
22	*Cyanus pichleri* subsp. *extrarosularis*	LC (endemic)	Rare
23	*Dactylorhiza nieschalkiorum*	VU (endemic)	Medium
24	*Delphinium fissum* subsp. *anatolicum*	LC (endemic)	Rare
25	*Dianthus balansae*	LC (endemic)	Medium
26	*Dianthus carmelitarum*	LC (endemic)	Common
27	*Dianthus leucophaeus*	LC (endemic)	Low
28	*Digitalis lamarckii*	LC (endemic)	Common
29	*Eryngium bithynicum*	LC (endemic)	Common
30	*Euphorbia amygdaloides* var. *robbiae*	NT (endemic)	Medium
31	*Helichrysum arenarium* subsp. *aucheri*	LC (endemic)	Medium
32	*Hieracium paphlagonicum*	LC (endemic)	Rare
33	*Iris kerneriana*	LC (endemic)	Rare
34	*Jurinea alpigena*	LC (endemic)	Low
35	*Jurinea pontica*	LC (endemic)	Low
36	*Lamium purpureum* var. *aznavourii*	CR (endemic)	Rare
37	*Lathyrus czeczottianus*	LC (endemic)	Rare
38	*Lathyrus tukhtensis*	LC (endemic)	Rare
39	*Lathyrus undulatus*	VU (endemic)	Medium
40	*Linaria genistifolia* subsp. *confertiflora*	LC (endemic)	Low

41	*Linum hirsutum* subsp. *anatolicum* var. *anatolicum*	LC (endemic)	Common
42	*Lonicera orientalis*	LC (endemic)	Medium
43	*Melampyrum arvense* var. *elatius*	NT (endemic)	Rare
44	*Minuartia erythrosepala* var. *cappadocica*	LC (endemic)	Rare
45	*Muscari aucheri*	LC (endemic)	Low
46	*Noccaea iberidea*	NE (endemic)	Low
47	*Onosma bornmuelleri*	LC (endemic)	Common
48	*Onosma bracteosa*	LC (endemic)	Low
49	*Ornithogalum alpigenum*	NT (endemic)	Low
50	*Papaver pilosum* subsp. *pilosum*	LC (endemic)	Rare
51	*Paracaryum paphlagonicum*	NT (endemic)	Low
52	*Phlomis russeliana*	LC (endemic)	Common
53	*Poa asiaeminoris*	NT (endemic)	Rare
54	*Ptilostemon afer* subsp. *eburneus*	LC (endemic)	Low
55	*Quercus macranthera* subsp. *syspirensis*	LC (endemic)	Low
56	*Salvia tobeyi*	VU (endemic)	Rare
57	*Sempervivum gillianiae*	LC (endemic)	Medium
58	*Silene olympica* var. *olympica*	LC (endemic)	Rare
59	*Trifolium aureum* subsp. *barbulatum*	LC (endemic)	Rare
60	*Trifolium elongatum*	LC (endemic)	Common
61	*Tripleurospermum rosellum* var. *album*	VU (endemic)	Medium
62	*Turanecio hypochionaeus*	LC (endemic)	Rare
63	*Verbascum abieticola*	LC (endemic)	Low
64	*Verbascum bithynicum*	NT (endemic)	Common
65	*Verbascum caudatum*	LC (endemic)	Low
66	*Vicia freyniana*	LC (endemic)	Rare
67	*Hordeum murinum* subsp. *leporinum*	DD (rare)	Rare
68	*Iris pumila* subsp. *attica*	VU (rare)	Rare
69	*Koeleria pyramidata*	VU (rare)	Low
70	*Lilium martagon*	VU (rare)	Rare

The largest families in the study area are as follows: Asteraceae (97 taxa/%12.65), Fabaceae (62 taxa/%8.08), Lamiaceae (51 taxa/%6.65), Rosaceae (44 taxa/%5.74), Poaceae (37 taxa/%4.82), Brassicaceae (35 taxa/%4.56), Caryophyllaceae (32 taxa/%4.17), Apiaceae (28 taxa/%3.65), Boraginaceae (27 taxa/%3.52), Orchidaceae (24 taxa/%3.13). The number of plants of the 10 most common families constitutes 56.97% of the total number of plants (Figure 6).

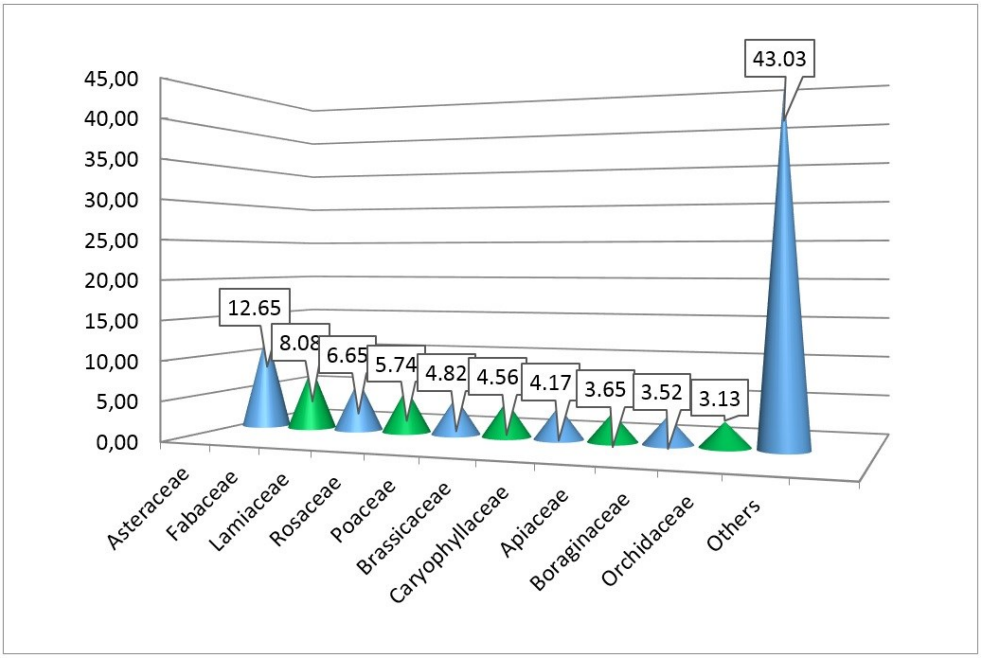

FIGURE 6. The largest families in the study area.

The largest genera in the study area are as follows: the most common two genera are *Geranium* and *Silene* (each 12 taxa). The following genera are *Salvia* (11 taxa), *Trifolium*, *Veronica* and *Campanula* (each with 10 taxa), *Ranunculus*, *Euphorbia* and *Vicia* (each with 8 taxa), and *Poa* (7 taxa) (Figure 7).

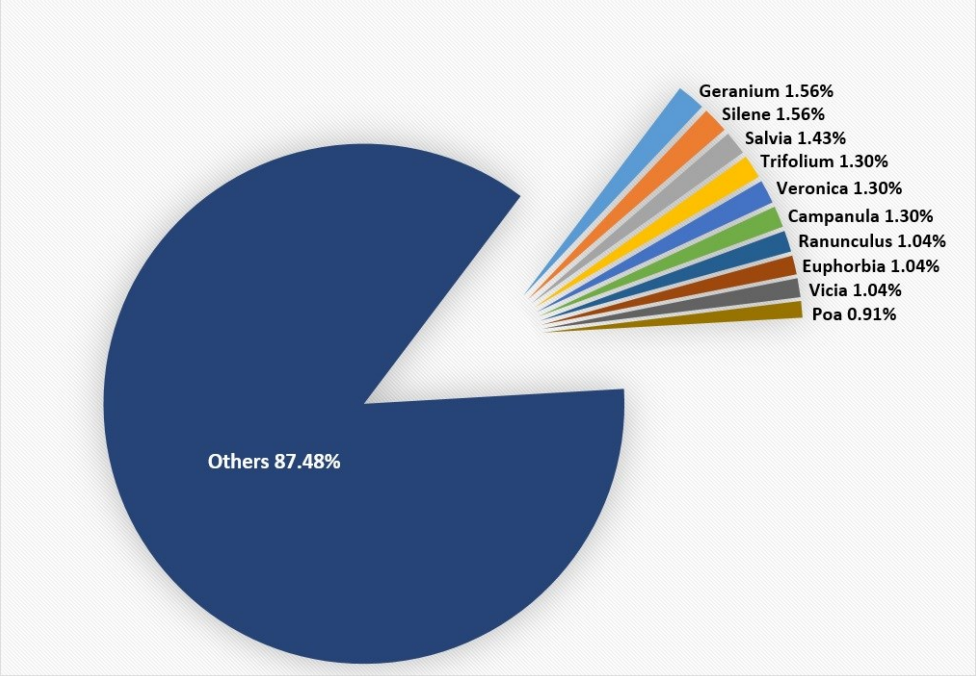

FIGURE 7. The largest 10 genera in the research area.

4. DISCUSSION

The research area is the place where the highest plant diversity is detected with 767 taxa which are compared with the previous floristic studies conducted in Bolu province. The number of taxa detected in the previous 13 floristic studies is between 174 and 660 (Table 2). The ratio of endemic plants identified in the current research area to the total number of taxa is 8.60%. In previous studies in Bolu, this rate is between 3.5−13.79%. It is observed that the four studies with a relatively higher rate of endemism [21-22, 29-30] were conducted in the southern parts of Bolu and the interactions of Iran-Turan and Mediterranean phytogeographic regions are more dominant in these areas. The range of endemism in these four studies is between 10.8% and 13.79%. In two studies in the north of Bolu which are closest to the current research area, the rate of endemism is 5.8−6.7%. In general, the endemism rate in province of Bolu is below the average of Turkey because Bolu is located in

the Euro-Siberian phytogeographic region having the least endemic taxa within the three phytogeographic regions of Turkey. However, with a rate of 8.60% endemism, the study area has a higher average of endemism compared to the average of endemism revealed in other studies carried out in the north of Bolu (Table 2).

TABLE 2. Comparison of floristic studies:

Abbreviations of studies: Studies: 1. Results of this study; 2. Güneş Özkan *et al.* (2016); 3. Akman & Ketenoğlu (1979b); 4. Akman & Yurdakulol (1981b); 5. Aksoy (2009); 6. Arslan *et al.* (2013); 7. Ekim & İlarslan (1982); 8. İkinci & Güner (2007); 9. İkinci (2011); 10. Kanoğlu *et al.* (2016); 11. Sungurlu (2011); 12. Tunçkol & Akkemik (2016); 13. Turker & Güner (2003); 14. Sümer (2002).

Compared Studies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Total Taxa	**767**	**554**	**315**	**286**	**511**	**240**	**245**	**453**	**324**	**406**	**174**	**573**	**660**	**345**
Endemic species (%)	%8.60	%11.73	%5	%4.1	%13.5	%5.8	%6.7	%3.5	%10.8	%9.36	%9.7	%13.79	%7.7	%3.5
Euro-Sib. (%)	%30.50	%19.68	%12.6	%19.5	%13.4	%37.5	%27.2	%30.8	%16.4	%19.46	%22.1	%22.5	%23.7	%24.7
Medit. (%)	%8.34	%14.08	%7.6	%7.6	%7.78	%5	%5.5	%5.2	%13.3	%5.91	%4.5	%9.07	%5.7	%3.2
Ir.-Tur. (%)	%5.99	%11.37	%7.6	%3.8	%26.1	%2.5	%2.3	%1.5	%10.2	%4.93	%4.5	%9.94	%4.8	%4.6
Multi-regional or phytogeographic region unknown (%)	%55.15	%54.87	%67.2	%65	%52.7	%55	%55.5	%58.4	%60.1	%69.7	%68.9	%58.46	%67.8	%65.5

According to phytogeographical regions, the Euro-Siberian elements are dominant with a ratio of 30.50% in the research area. In 12 of the 13 floristic studies previously conducted in Bolu province, the Euro-Siberian elements are in the first place and the ratio in all studies is found to be between 12.6−37.5%. In only one study [21], Irano-Turanian elements are in the first place. Similarly, with the exception of two of the remaining 13 studies [19, 29], in 11 studies, the Mediterranean elements are in the second place or have the same ratio with the Irano-Turanian elements. Although Bolu province is mainly under the influence of the Euro-Siberian phytogeographic region, it can be said that, as it moves from north to south, the Irano-Turanian phytogeographic region in the Seben and Kıbrıscık districts and the Mediterranean phytogeographic region in the Göynük district have a greater effect. Since the study area is in the north, the Euro-Siberian elements are denser and this result is in line with the range (27.2−37.5%) of the two studies [15, 24] conducted in the north of Bolu (Table 2).

The first three families with the most taxa in the research area are as follow respectively: Asteraceae (12.65%), Fabaceae (8.08%) and Lamiaceae (6.65%). The ordering of these three large families are compatible with the order in the "*Flora of Turkey* [5-7]". Considering the floristic studies conducted in Bolu, the result of this research is similar to the family ranking in the two studies, the same ranking is 14.1%, 11.8%, 7.5% in Aksoy [21] and 11.4%, 8.33%, 6.14% in Kanoğlu *et al.* [28]. In six of the remaining 11 floristic studies [18-19, 22-24, 29], Asteraceae ranked first in the 8.3−14.3% range while in other four studies [12, 14-15, 20], Fabaceae ranked first in the 8.48−11.1% range. In one study [30], Poaceae was the leading with a rate of 9.93%. On the other hand, Asteraceae, Fabaceae and Lamiaceae, which are ranking among the top three in the *Flora of Turkey*, were included in the first six ranking in all studies carried out in Bolu, and at least two of these three families were located in the first three. Poaceae or Rosaceae were sometimes included in the first three rankings. In addition to the three common families mentioned above, Brassicaceae was among the top ten families in all studies. The other families in the top 10 are mainly Caryophyllaceae, Boraginaceae, Apiaceae, Ranunculaceae and Plantaginaceae *s.l.*, and less frequently Asparagaceae, Campanulaceae, Cyperaceae, Ericaceae, Orchidaceae and Rubiaceae. In the present study, the ratio of the families in the top 10 in the total plant composition is 56.97%, which overlaps with the range (50.49−58.48%) of the other studies (Table 3).

TABLE 3. Comparison of our research with other surveys according to the 10 largest families.

Abbreviations of studies: 1. Result of this study; 2. Güneş Özkan *et al.* (2016); 3. Akman & Ketenoğlu (1979b); 4. Akman & Yurdakulol (1981b); 5. Aksoy (2009); 6. Arslan *et al.* (2013); 7. Ekim & İlarslan (1982); 8. İkinci & Güner (2007); 9. İkinci (2011); 10. Kanoğlu *et al*. (2016); 11. Sungurlu (2011); 12. Tunçkol & Akkemik (2016); 13. Turker & Güner (2003); 14. Sümer (2002).
Abbreviations of families: Api.: Apiaceae; Asp.: Asparagaceae; Ast.: Asteraceae; Bra.: Brassicaceae; Bor.: Boraginaceae; Cam.: Campanulaceae; Car.: Caryophyllaceae; Cyp.: Cyperaceae; Eri.: Ericaceae; Fab.: Fabaceae; Lam.: Lamiaceae; Orc.: Orchidaceae; Pla.: Plantaginaceae *s.l.*; Poa.: Poaceae; Ran.: Ranunculaceae; Ros.: Rosaceae; Rub.: Rubiaceae; Cyp.: Cyperaceae.

Compared Studies		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Total Numbers of Taxa		**767**	**554**	**315**	**286**	**511**	**240**	**245**	**453**	**324**	**406**	**174**	**573**	**660**	**345**
The largest 10 families and percentages	**1**	Ast. %12.65	Poa. %9.93	Fab. %8.48	Fab. %9.9	Ast. %14.1	Ast. %8.3	Fab. %11.1	Fab. %9.6	Ast. %9.9	Ast. %11.4	Ast. %9.2	Ast. %11.52	Ast. %10.4	Ast. %14.3
	2	Fab. %8.08	Ast. %9.21	Ast. %9.21	Ast. %7.5	Fab. %11.8	Ros. %7.9	Ast. %10.7	Ast. %9.3	Lam. %9.9	Fab. %8.33	Fab. %8.0	Lam. %7.11	Poa. %8.2	Poa. %9.6
	3	Lam. %6.65	Fab. %8.48	Pla. %6.0	Ros. %7.3	Lam. %7.5	Fab. %6.7	Ros. %5.5	Poa. %8.7	Fab. %9.3	Lam. %6.14	Poa. %8.0	Poa. %7.11	Fab. %7.1	Fab. %7.3
	4	Ros. %5.74	Ros. %5.96	Poa. %5.3	Lam. %6.6	Poa. %6.8	Lam. %6.3	Lam. %5.5	Lam. %5.3	Bor. %5.6	Bra. %5.70	Ros. %8.0	Bra. %6.77	Lam. %6.7	Lam. %5.8
	5	Poa. %4.82	Bra. %5.23	Lam. %5.0	Poa. %6.2	Ros. %5.2	Poa. %5.4	Poa. %4.7	Ros. %5.3	Ros. %4.0	Ros. %4.84	Lam. %6.3	Fab. %6.44	Ros. %5.3	Bra. %5
	6	Bra % 4.56	Lam. %4.87	Car. %5.0	Bra. %5.9	Bra. %3.9	Car. %4.2	Api. %4.7	Bra. %4.0	Bra. %4.0	Bor. %4.39	Car. %5.2	Ros. %5.08	Bra. %4.7	Ran. %4.7
	7	Car. %4.17	Car. %4.87	Bra. %4.7	Car. %4.8	Bor. %3.1	Bra. %3.8	Car. %4.3	Api. %3.8	Api. %3.7	Poa. %3.51	Pla. %3.0	Api. %3.72	Car. %3.4	Api. %4.4
	8	Api. %3.65	Lil. %3.61	Bor. %4.4	Ran. %3.6	Api. %3.0	Pla. %3.3	Bra. %2.6	Car. %3.8	Car. %2.8	Car. %3.70	Bra. %3.0	Bor. %3.38	Ran. %3.2	Cyp. %3.5
	9	Bor. %3.52	Bor. %3.43	Api. %3.1	Pla. %3.5	Pla. %1.95	Api. %3.3	Rub. %2.1	Bor. %3.2	Ran. %2.8	Api. %2.19	Rub. %3.0	Car. %3.38	Pla. %3.1	Ros. %2.9
	10	Orc. %3.13	Rub. %2.89	Ran. %2.8	Rub. %3.1	Cam. %1.56	Bor. %2.9	Eri. %2.1	Orc. %2.8	Pla. %2.4	Asp. %2.19	Asp. %3.0	Pla. %2.44	Api. %3.0	Car. %2.6
	Others	%43.03	%41.52	%46.01	%41.60	%41.09	%47.9	%46.7	%44.2	%45.60	%47.61	%43.3	%43.05	%44.9	%39.9

Geranium (12 taxa), *Silene* (12 taxa) and *Salvia* (11 taxa) are the first three genera that contain the most taxa in the research area. When we look at the floristic studies conducted in Bolu, *Geranium* (7 taxa) is ranked second in Kanoğlu *et al.* [28]. *Silene* with 6 taxa is ranked second in Arslan *et al.* [24] while similarly, in Ekim and İlarslan [15] it is ranked third with four taxa. However, as illustrated in Table 4, in five of the 13 studies [12, 14, 18, 24, 30] *Veronica* is ranked first with the range of 6−15 taxa. In two each studies [15, 23 and 20, 22] *Trifolium* and *Vicia* are the leading genera with the ranges of 4−9 and 7−9 taxa, respectively. In four separate studies [19, 21, 28-29], *Astragalus* (14 taxa), *Salvia* (12 taxa), *Ranunculus* (9 taxa) and *Centaurea* (7 taxa) are the most common genera. Other genera ranked in the first three apart from those mentioned above are *Allium*, *Ranunculus*, *Hypericum*, *Campanula*, *Lathyrus, Carex* and *Galium*. In this study, although the weight of the

first three ranks of genera differed significantly from the first three ranks of genera in the previous studies, it is seen that the similarity of the genera composition increased in the first 10 ranks. The ratio of the genera in the top 10 in the total plant composition is 12.48% and and overlaps with the intervals in other studies (12.47−21.91%).

TABLE 4. Comparison of our research with other surveys according to the 10 largest genera.

Abbreviations of studies: 1. Results of this study; 2. Güneş Özkan *et al.* (2016); 3. Akman & Ketenoğlu (1979b); 4. Akman & Yurdakulol (1981b); 5. Aksoy (2009); 6. Arslan *et al.* (2013); 7. Ekim & İlarslan (1982); 8. İkinci & Güner (2007); 9. İkinci (2011); 10. Kanoğlu *et al.* (2016); 11. Sungurlu (2011); 12. Tunçkol & Akkemik (2016); 13. Turker & Güner (2003); 14. Sümer (2002); O.= Others genera.

Compared Studies		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total Numbers of Taxa		767	554	315	286	511	240	245	453	324	406	174	573	660	345
The largest 10 genera, their numbers of taxa number and percentages	1	*Geranium* 12 (%1.56)	*Veronica* 10 (%1.81)	*Veronica* 12 (%3.81)	*Veronica* 7 (%2.45)	*Salvia* 12 (%2.35)	*Veronica* 6 (%2.50)	*Trifolium* 9 (%3.67)	*Vicia* 9 (%1.98)	*Vicia* 7 (%2.16)	*Centaurea* 7 (%1.72)	*Trifolium* 4 (%2.30)	*Astragalus* 14 (%2.44)	*Veronica* 15 (%2.27)	*Ranunculus* 9 (%2.6)
	2	*Silene* 12 (%1.56)	*Allium* 9 (%1.62)	*Trifolium* 9 (%2.86)	*Galium* 6 (%2.10)	*Astragalus* 10 (%1.96)	*Silene* 6 (%2.50)	*Campanula* 5 (%2.04)	*Trifolium* 8 (%1.76)	*Astragalus* 7 (%2.16)	*Geranium* 7 (%1.72)	*Allium* 4 (%2.30)	*Trifolium* 12 (%2.09)	*Ranunculus* 12 (%1.82)	*Veronica* 7 (%2.00)
	3	*Salvia* 11 (%1.43)	*Trifolium* 9 (%1.62)	*Lathyrus* 7 (%2.22)	*Ranunculus* 6 (%2.10)	*Centaurea* 8 (%1.57)	*Trifolium* 5 (%2.08)	*Silene* 4 (%1.63)	*Veronica* 7 (%1.54)	*Salvia* 6 (%1.85)	*Hypericum* 7 (%1.72)	*Hypericum* 3 (%1.72)	*Ranunculus* 10 (%1.75)	*Trifolium* 10 (%1.52)	*Carex* 7 (%2.00)
	4	*Trifolium* 10 (%1.30)	*Galium* 9 (%1.62)	*Sedum* 7 (%2.22)	*Poa* 6 (%2.10)	*Geranium* 8 (%1.57)	*Galium* 4 (%1.67)	*Lathyrus* 4 (%1.63)	*Poa* 6 (%1.32)	*Centaurea* 5 (%1.54)	*Ornithogalum* 6 (%1.48)	*Geranium* 3 (%1.72)	*Centaurea* 9 (%1.57)	*Carex* 10 (%1.52)	*Juncus* 6 (%1.80)
	5	*Veronica* 10 (%1.30)	*Ranunculus* 8 (%1.44)	*Myosotis* 6 (%1.90)	*Silene* 5 (%1.75)	*Euphorbia* 7 (%1.37)	*Allium* 4 (%1.67)	*Sedum* 3 (%1.22)	*Bromus* 6 (%1.32)	*Viola* 5 (%1.54)	*Salvia* 6 (%1.48)	*Epilobium* 3 (%1.72)	*Silene* 9 (%1.57)	*Galium* 8 (%1.21)	*Medicago* 5 (%1.50)
	6	*Campanula* 10 (%1.30)	*Lathyrus* 7 (%1.26)	*Campanula* 6 (%1.90)	*Cardamine* 5 (%1.75)	*Trifolium* 6 (%1.17)	*Lamium* 4 (%1.67)	*Geranium* 3 (%1.22)	*Carex* 5 (%1.10)	*Myosotis* 4 (%1.23)	*Trifolium* 6 (%1.48)	*Sedum* 3 (%1.72)	*Allium* 8 (%1.40)	*Allium* 8 (%1.21)	*Trifolium* 5 (%1.50)
	7	*Ranunculus* 8 (%1.04)	*Astragalus* 6 (%1.08)	*Ranunculus* 6 (%1.90)	*Carex* 5 (%1.75)	*Ornithogalum* 6 (%1.17)	*Campanula* 4 (%1.67)	*Epilobium* 3 (%1.22)	*Dianthus* 5 (%1.10)	*Carex* 4 (%1.23)	*Astragalus* 5 (%1.23)	*Galium* 3 (%1.72)	*Hypericum* 8 (%1.40)	*Poa* 7 (%1.06)	*Euphorbia* 5 (%1.50)
	8	*Euphorbia* 8 (%1.04)	*Sedum* 6 (%1.08)	*Astragalus* 6 (%1.90)	*Euphorbia* 5 (%1.75)	*Lathyrus* 5 (%0.98)	*Geranium* 4 (%1.67)	*Festuca* 3 (%1.22)	*Geranium* 5 (%1.10)	*Valerianella* 4 (%1.23)	*Campanula* 5 (%1.23)	*Myosotis* 3 (%1.72)	*Salvia* 8 (%1.40)	*Astragalus* 7 (%1.06)	*Vicia* 4 (%1.20)
	9	*Vicia* 8 (%1.04)	*Gagea* 6 (%1.08)	*Silene* 5 (%1.59)	*Crocus* 5 (%1.75)	*Galium* 5 (%0.98)	*Ranunculus* 4 (%1.67)	*Rubus* 3 (%1.22)	*Galium* 5 (%1.10)	*Dianthus* 3 (%0.93)	*Crataegus* 5 (%1.23)	*Euphorbia* 3 (%1.72)	*Quercus* 7 (%1.22)	*Salvia* 7 (%1.06)	*Lathyrus* 4 (%1.20)
	10	*Poa* 7 (0.91)	*Alyssum* 6 (%1.08)	*Galium* 5 (%1.59)	*Trifolium* 5 (%1.75)	*Carduus* 5 (%0.98)	*Cirsium* 3 (%1.25)	*Asperula* 3 (%1.22)	*Viola* 5 (%1.10)	*Silene* 3 (%0.93)	*Lathyrus* 5 (%1.23)	*Quercus* 3 (%1.72)	*Lathyrus* 7 (%1.22)	*Centaurea* 7 (%1.06)	*Centaurea* 4 (%1.20)
	O.	87.48	86.282	78.095	80.769	85.910	81.667	83.673	86.534	85.185	85.468	81.609	83.944	86.21	83.50

5. CONCLUSION

In the light of the information and comparisons given above, it would be fair to suggest that the research area is an important plant biodiversity center in Bolu. In more detail, the area reaching the summit of Çaltepe from the upper parts of Merkeşler Village, and the Gurbettaşı locality on the way of Sarımustan and Yedigöller has the highest variety of plants and these regions hosts many endemic and rare plants. Precautions should be taken to protect the *in-situ* (in place) of these

two regions. It will be crucial to consult with experts in order to prevent the destruction of nature in the case of activities such as construction and road building in the region.

Regional flora studies are very important for the determination of biological diversity of our country, the discovery of new species, and detection and protection of endangered species. In recent years, studies related to the conservation and rational use of plant genetic resources have been increasing in the world. First of all, the way of protection depends on the identification of the existing one. This study is hoped to contribute not only to the identification and preservation of our biological richness, but also to the establishment of information resources for the relevant institutions and organizations. The scientific data obtained in the present study will be beneficial for other disciplines, such as agriculture, biotechnology, biochemistry, pharmacy, medicine, food engineering, landscape sciences and pharmaceutical botany. Furthermore, it will provide a data for the development of economically important interdisciplinary projects. The data obtained from the floristic studies is of great importance in terms of pharmacy, particularly in terms of determining the potential of medicinal plants in the field of pharmaceutical botany, determination of plant gene resources related to agriculture and pasture breeding, recognition of important plants for beekeeping, and detection of natural forest areas.

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APPENDICES

APPENDIX 1. Locations belonging to collected specimens.
(Abbreviations - Loc. no: Locality number)

Loc.no	Locality
1	Çaltepe summit and its environs
1.1	Merkeşler Upland
2	Çeletepe summit and its environs
2.1	Banaz Upland
3	Sarımustan and its environs
3.1	Gurbettaşı
4	Kadıköy Plateau and its environs
5	Northern slopes of Çaltepe
6	Eastern slopes of Çaltepe
7	Southern slopes of Çaltepe
8	Southern slopes of Çeletepe
9	Çele Gölcük forest warehouse
10	Çele Gölcük Village
10.1	Yakabayat Village
11	Değirmenderesi Village
11.1	Taşcılar Village
11.2	Banaz Village
12	Çukurören Village
13	Mesciçele Village
13.1	Tetemeçele Village
14	Değirmenbeli Village
15	Yedigöller road
16	Bağışlar Village
16.1	Semerciler Village
17	Merkeşler Village
17.1	Hayranlar Village
17.2	Afşar Village
18	Hamzabey Village
18.1	Bahceköy Village
19	Yeşilçele Village

APPENDIX 2. Enumeration of taxa.

(Abbreviations - Loc. no: Locality no; Col. no: Collecter no; Ph.R.: Phytogeographic region); EuSib: Euro-Siberian element; IrTu: Iran-Turan element; Med: Mediterranean element; * New record for Bolu Province.

No	Taxon name	Loc. no	Col. no	Ph.R.
	PTEROPHYTA			
	EQUISETOPSIDA			
	EQUISETALES			
	EQUISETACEAE			
1	***Equisetum arvense*** L.	15	143	
2	***Equisetum palustre*** L.	3;12;13.1;15	1631;513;820;1877	
3	***Equisetum hyemale*** L.	6;7;16	1430;322;993	
	POLYPODIOPSIDA			
	POLYPODIALES			
	ASPLENIACEAE			
4	***Asplenium adiantum-nigrum*** L.	4	1540	
5	***Asplenium ceterach*** L.	11.1	1663	
6	***Asplenium scolopendrium*** L	5	2273	
7	***Asplenium septentrionale*** (L.) Hoffm.	3	2155	
8	***Asplenium trichomanes*** L.	3	594;1235;1538	
	ATHYRIACEAE			
9	***Athyrium filix-femina*** (L.) Roth	3	2176	
	POLYPODIACEAE			
10	***Polypodium vulgare*** L. var. ***vulgare***	3;5;8	1353;2168;2272	
	PTERIDOPSIDA			
	ATHYRIALES			
	CYSTOPTERIDACEAE			
11	***Cystopteris fragilis*** (L.) Bernh.	6	1022	
	DENNSTAEDTIALES			
	DENNSTAEDTIACEAE			
12	***Pteridium aquilinum*** (L.) Kuhn	6;7;17	226;920;979	
	DRYOPTERIDALES			
	DRYOPTERIDACEAE			
13	***Dryopteris filix-mas*** (L.) Schott	1.1;3;7;15	1435;393;330;595	
14	***Polystichum aculeatum*** (L.) Roth ex Mert.	13.1	1514	
15	***Polystichum setiferum*** (Forssk.) Moore ex Woyn.	17	1244	
	GYMNOSPERMAE			
	PINOPSIDA			
	PINALES			
	CUPRESSACEAE			
16	***Juniperus communis*** L. var. ***saxatilis*** Pall.	1;1.1;8	648;73;175;388	

17	***Juniperus oxycedrus*** L. subsp. ***oxycedrus*** var. ***oxycedrus***	13;15;19	1334;756;53;267	
	PINACEAE			
18	***Abies nordmanniana*** (Steven) Spach subsp. ***equi-trojani*** (Asch. & Sint. ex Boiss.) Coode & Cullen	1;3;5;13.1	6;189;387;1874	EuSib
19	***Pinus nigra*** J.F.Arnold subsp. ***pallasiana*** (Lamb.) Holmboe	13.1	7;698;765;1028	EuSib
20	***Pinus sylvestris*** L. var. ***hamata*** Steven	7;9;13.1	5;100;432	EuSib
	ANGIOSPERMAE			
	EUDICOTYLEDONEAE			
	APIALES			
	APIACEAE			
21	***Angelica sylvestris*** L. var. ***sylvestris***	4;15	1290;1448	EuSib
22	***Anthriscus nemorosa*** (M.Bieb.) Spreng.	1;1.1;2.1	399;203;348;1848	
23	**** Anthriscus sylvestris*** (L.) Hoffm.	13.1	1124	
24	***Astrantia maxima*** Pall. subsp. ***haradjianii*** (Grintz) Rech.f.	1;1.1;4;6;17	1132;1239;2036	
25	***Bupleurum falcatum*** L. subsp. ***cernuum*** (Ten.) Arcang.	1;4	1127;2240	
26	***Bupleurum rotundifolium*** L.	15;18.1	1793;1937	
27	***Caucalis platycarpos*** L.	6;17	314;937	Med
28	**** Chaerophyllum aureum*** L.	3	1871	
29	**** Cnidium silaifolium*** (Jacq.) Simonk. subsp. ***orientale*** (Boiss.) Tutin	1.1;6	1015	
30	***Conium maculatum*** L.	18.1	1950	
31	***Daucus carota*** L.	17	944	
32	***Echinophora tenuifolia*** L. subsp. ***sibthorpiana*** (Guss.) Tutin	15	1315	IrTu
33	***Eryngium bithynicum*** Boiss.	11.2	1046	IrTu
34	***Eryngium campestre*** L. var. ***virens*** (Link) Weins	17.1	2066	
35	***Eryngium giganteum*** M.Bieb.	4;15	1204;1280	EuSib
36	***Gasparrinia peucedanoides*** Thell.	1;15	1195;1259	EuSib
37	***Heracleum platytaenium*** Boiss.	3;17	313;280;1869	EuSib
38	***Laser trilobum*** (L.) Borkh.	17	310	
39	***Laserpitium hispidum*** M.Bieb.	10.1;17	903;1381	EuSib
40	***Oenanthe fistulosa*** L.	1.1	2296	
41	***Orlaya grandiflora*** (L.) Hoffm.	17	305	
42	***Malabaila secacul*** (Mill.) Boiss. subsp. ***secacul***	11.2	2223	
43	**** Prangos ferulacea*** (L.) Lindl.	1.1;4;17	278;2131;2314	
44	***Sanicula europaea*** L.	1.1;2.1;15;17	246;377;596	EuSib
45	***Scandix iberica*** M.Bieb.	11.2;17	1551;1604	
46	***Seseli tortuosum*** L.	13.1	2336	

47	***Smyrnium perfoliatum*** L.	13.1;17	311;152;425	
48	***Torilis leptophylla*** (L.) Rchb.f.	17	936	
	ARALIACEAE			
49	***Hedera helix*** L.	7	1569	
	ASTERALES			
	ASTERACEAE			
50	***Achillea grandifolia*** Friv.	5	2282	
51	***Achillea millefolium*** L. subsp. ***millefolium*** var. ***millefolium***	1;1.1;17	1227;2125;2244	EuSib
52	***Achillea nobilis*** L. subsp. ***neilreichii*** (A.Kern.) Velen.	2;15	1221;2257;2258	EuSib
53	***Achillea setacea*** Waldst. & Kit.	15;17	663;1063;1779	EuSib
54	***Anthemis cotula*** L.	17;18.1	935;889;1951	
55	***Anthemis cretica*** L. subsp. ***anatolica*** (Boiss.) Grierson	11.2	2225	
56	***Anthemis cretica*** L. subsp. ***pontica*** (Willd.) Grierson	2;7;15	1453;362;324;651	
57	***Anthemis pseudocotula*** Boiss.	1.1;3;11	1010;846;2154	
58	***Arctium minus*** (Hill) Bernh.	16;17.2	1427;885;958	EuSib
59	***Bellis perennis*** L.	9;13;17;19	140;48;74;242	EuSib
60	***Carduus acanthoides*** L. subsp. ***acanthoides***	18.1	1927;1882	EuSib
61	***Carduus adpressus*** C.A.Mey.	1.1;17	1238;2115;2191	EuSib
62	***Carduus nutans*** L. subsp. ***nutans***	3;15	573;696	
63	***Carduus pycnocephalus*** L. subsp. ***albidus*** (M.Bieb.) Kazmi	18.1	1932	
64	***Carlina vulgaris*** L.	2.1;15	1155;2307	
65	***Carthamus lanatus*** L.	15	568	
66	***Centaurea consanguinea*** DC.	15;16;17.2	1411;2058;1304	IrTu
67	***Centaurea iberica*** Trevir. ex Spreng.	10.1;15;17	1366	
68	**** Centaurea kotschyi*** (Boiss. & Heldr.) Hayek var. ***persica*** (Boiss.) Wagenitz	1;7	2299	
69	***Centaurea phrygia*** L. subsp. ***stenolepis*** (A.Kern.) Gugler	10.1	1391;1386	EuSib
70	***Centaurea solstitialis*** L. subsp. ***solstitialis***	16;18.1	1409;1946	
71	***Chondrilla juncea*** L.	15;17.2	2079;1327	
72	***Cichorium intybus*** L.	11;18.1	1933;836;852;853	
73	***Cirsium arvense*** (L.) Scop.	15;17.2	1145;967	
74	***Cirsium hypoleucum*** DC.	12;15;17	768;249;462;882	EuSib
75	***Cirsium ligulare*** Boiss.	3;10.1;17.1	1154;1378;2075	EuSib
76	**** Cirsium sintenisii*** Freyn	1;2;6	2130;2096;2310	
77	***Cirsium vulgare*** (Savi) Ten.	10.1;15;17.1	1335;1376;2073	
78	***Conyza canadensis*** (L.) Cronquist	13.1;15	1316;2195	

79	***Cota tinctoria*** (L.) J.Gay var. ***pallida*** (DC.) U.Özbek & Vural	1.1;17;15	1240;1165;1255	
80	***Cota tinctoria*** (L.) J.Gay var. ***discoidea*** (All.) Özbek & Vural	2.1;12;15	1959;473	
81	***Crepis foetida*** L. subsp. ***foetida***	15	716	
82	**** Crepis reuteriana*** Boiss. & Heldr. subsp. ***reuteriana***	11.1;17	1552;1673;1326	Med
83	***Crepis sancta*** (L.) Bornm.	17;17.2	1557;2013;2077	
84	***Crupina crupinastrum*** (Moris) Vis.	14;17	2003	
85	***Cyanus depressus*** (M.Bieb.) Soják	17	1682	
86	***Cyanus pichleri*** (Boiss.) Holub subsp. ***extrarosularis*** (Hayek & Siehe) Wagenitz & Greuter	2.1	2179	
87	***Cyanus pichleri*** (Boiss.) Holub subsp. ***pichleri***	1;2.1;6;13.1	343;2122;418	
88	***Cyanus thirkei*** (Sch.Bip.) Holub	12	1814	Med
89	***Cyanus triumfettii*** (All.) Dostál ex Á.Löve & D.Löve subsp. ***triumfettii***	6;3.1;17	1246;2221;1190	
90	***Doronicum orientale*** Hoffm.	1.1;9;15	75;117;196;395	
91	***Echinops microcephalus*** Sm.	17.1;17.2	2065	Med
92	***Echinops sphaerocephalus*** L. subsp. ***sphaerocephalus***	12	1343;2135	EuSib
93	**** Echinops spinosissimus*** Turra subsp. ***bithynicus*** (Boiss.) Greuter	11.1;14	1300;2228	IrTu
94	***Filago arvensis*** L.	15	1139	
95	***Erigeron acris*** L. subsp. ***acris***	17	1242	EuSib
96	**** Erigeron acris*** subsp. ***pycnotrichus*** (Vierh.) Grierson	1.1;2.1	1215;2311	EuSib
97	***Eupatorium cannabinum*** L.	6;16	2085;1428	EuSib
98	***Helichrysum arenarium*** (L.) Moench subsp. ***aucheri*** (Boiss.) P.H.Davis & Kupicha	13	1078	IrTu
99	***Helichrysum plicatum*** DC. subsp. ***plicatum***	1.1;3.1;2;15	1189;2180;2110	
100	***Helminthotheca echioides*** (L.) Holub	1.1	2320	
101	***Hieracium oblongum*** Jord.	3;12;15;17	1811;223;470;527	EuSib
102	***Hieracium paphlagonicum*** Freyn & Sint.	1.1	2290	EuSib
103	***Hieracium vagum*** Jord.	3;3.1	2150;2166;2207	EuSib
104	***Inula britannica*** L.	6	2088	EuSib
105	***Inula oculus-christi*** L.	10.1	1374	EuSib
106	***Inula salicina*** L.	14	2235	EuSib
107	***Jurinea alpigena*** K.Koch	1;3.1;7;15	2129;1260;1261	EuSib
108	***Jurinea pontica*** Hausskn. & Freyn ex Hausskn.	10.1;11;15	850;1303;1380	IrTu
109	***Lactuca muralis*** (L.) Gaertn.	11;17.2	2078;841	EuSib

110	***Lactuca saligna*** L.	9;15	1473	
111	***Lactuca serriola*** L.	15	1301	EuSib
112	***Lactuca viminea*** (L.) J.Presl & C.Presl	13.1	1106	
113	***Lapsana communis*** L. subsp. ***intermedia*** (M.Bieb.) Hayek var. intermedia	1;6;12;17.2	1924;504;2052	EuSib
114	***Lapsana communis*** L. subsp. ***pisidica*** (Boiss. & Heldr.) Rech.f.	11.2;17.2	946;1056	
115	***Leontodon crispus*** Vill. subsp. ***asper*** (Waldst. & Kit.) Röhl. var. ***asper***	9;15;17	1795;779;1710	
116	***Leontodon hispidus*** L. subsp. ***hispidus***	1.1;11.2;12	1810;1059;2204	EuSib
117	***Pilosella hoppeana*** (Schult.) F.W.Schultz & Sch.Bip. subsp. ***testimonialis*** (Nägeli ex Nägeli & Peter)	13.1;17.2	806;962;1171	EuSib
118	***Pilosella piloselloides*** (Vill.) Soják subsp. ***magyarica*** (Peter) S.Bräut. & Greuter	11.2	1963	
119	***Onopordum tauricum*** Willd.	11;11.1;18.1	837;1921;1928	EuSib
120	***Petasites hybridus*** (L.) G.Gaertn.; B.Mey. & Scherb.	4;10.1;15	14;81;454;1545	EuSib
121	***Ptilostemon afer*** (Jacq.) Greuter subsp. ***eburneus*** Greuter	16	798	
122	***Scolymus hispanicus*** L. subsp. ***hispanicus***	17.2	2064	Med
123	***Scorzonera cana*** (C.A.Mey.) Griseb. var. ***jacquiniana*** (W.Koch) D.F.Chamb.	15;17	268;1628	
124	**** Senecio othannae*** M.Bieb.	3	2287	EuSib
125	***Senecio vernalis*** Waldst. & Kit.	13;14;19	1583;32	
126	***Senecio vulgaris*** L.	9	137	
127	**** Senecio viscosus*** L.	3.1	1156	
128	***Sonchus asper*** (L.) Hill subsp. ***glaucescens*** (Jord.) Ball ex Ball	18.1	1942	
129	***Sonchus oleraceus*** (L.) L.	6;11;12	842;1252;1947	
130	***Tanacetum corymbosum*** (L.) Sch.Bip. subsp. ***cinereum*** (Griseb.) Grierson	3;15	1205	EuSib
131	***Tanacetum parthenium*** (L.) Sch.Bip.	6;12;13.1	488;1110;2048	
132	***Tanacetum poteriifolium*** Grierson	12	1809	EuSib
133	***Taraxacum buttleri*** Soest	9;13;19	30;112;29	
134	***Taraxacum macrolepium*** Schischk.	9;15	142;748	
135	***Telekia speciosa*** (Schreb.) Baumg.	5	2263;2269	EuSib
136	***Tephroseris integrifolia*** (L.) Holub subsp. ***aucheri*** (DC.) B.Nord.	1;2.1;4;5	174;402;618	EuSib
137	***Tragopogon coloratus*** C.A. Mey.	3.1;11.1	541;287;1909	IrTu
138	***Tragopogon dubius*** Scop.	11.1;15;17.2	1775;1665;670	

139	***Tragopogon porrifolius*** L. subsp. ***longirostris*** (Sch.Bip.) Greuter	11.1;13.1;17	1909;1667;234	
140	***Tripleurospermum oreades*** (Boiss.) Rech.f. var. ***oreades***	1;4;9	1749;111;170	
141	***Tripleurospermum rosellum*** (Boiss. & Orph.) Hayek var. ***album*** E. Hossain	3;3.1;15	1635;1638;552	
142	***Tripleurospermum tenuifolium*** (Kit.) Freyn ex Freyn	15;17	2010;664	EuSib
143	***Turanecio hypochionaeus*** (Boiss.) Hamzaoglu	1;17	1136;1237	
144	***Tussilago farfara*** L.	4	1546	EuSib
145	***Xanthium strumarium*** L. subsp. ***strumarium***	11	2323	
146	***Xeranthemum annum*** L.	11;17.2	2056;1990;838	
	BRASSICALES			
	BRASSICACEAE			
147	***Alliaria petiolata*** (M.Bieb.) Cavara & Grande	1;9	82;202	
148	***Alyssum armenum*** Boiss.	3.1;9;17	144;180;288	
149	***Alyssum minutum*** Schltdl. ex DC.	14	1581	
150	***Alyssum murale*** Waldst. & Kit. subsp. ***murale*** var. ***murale***	13.1;17	281;436	
151	***Alyssum obtusifolium*** Steven ex DC.	16;17.2	956;1410	
152	***Alyssum sibiricum*** Willd.	1	624	
153	***Arabis alpina*** L. subsp. ***alpina***	1.1;2;2.1	370;1853;1867	
154	***Arabis hirsuta*** (L.) Scop.	9;15	516;553;1868	
155	***Arabis nova*** L.	3.1	555	
156	***Arabis sagittata*** (Bertol.) DC.	1;1.1;2;15	93;171;355;1256	
157	***Arabidopsis thaliana*** (L.) Heynh.	2.1	1838	
158	**** Aubrieta olympica*** Boiss.	3.1	2210	
159	***Capsella bursa-pastoris*** (L.) Medik.	9;13;19	129;31;133	
160	***Cardamine bulbifera*** (L.) Crantz	3;13	312;556	EuSib
161	***Cardamine hirsuta*** L.	9;13;19	46;76;83;116	
162	***Cardamine lazica*** Boiss. & Balansa ex Boiss.	3;2.1	558;1839	EuSib
163	***Conringia orientalis*** (L.) Dumort.	2	353	
164	***Draba heterocoma*** Fenzl	7	2302	
165	***Draba muralis*** L.	4	604	
166	***Draba verna*** L.	9;17;19	1564;45;49;130	
167	**** Eruca vesicaria*** (L.) Cav.	13.1	1620	
168	**** Erysimum uncinatifolium*** Boiss. & A.Huet	1;13.1	168;414;435	EuSib
169	***Lepidium draba*** L.	11	1599	
170	***Microthlaspi perfoliatum*** (L.) F.K.Mey.	2;9	125;364	

171	***Myagrum perfoliatum*** L.	15	747	
172	***Nasturtium officinale*** R.Br.	15	1803	
173	***Noccaea iberidea*** (Boiss.) Al-Shehbaz & Menke	2	1852	
174	***Noccaea ochroleuca*** (Boiss. & Heldr.) F.K.Mey.	9;1.1	104;191	
175	***Rapistrum rugosum*** (L.) All.	15	675	
176	***Rorippa amphibia*** (L.) Besser	15	659	
177	***Rorippa sylvestris*** (L.) Besser subsp. ***sylvestris***	15;18.1	743;1949	
178	***Sisymbrium loeselii*** L.	15	1773;1325	
179	***Sisymbrium officinale*** (L.) Scop.	13	1062	
180	***Turritis glabra*** L.	2.1;9;15	567;791	
181	***Turritis laxa*** (Sm.) Hayek	5;9;15	138;532;2270	
	RESEDACEAE			
182	***Reseda lutea*** L. var. ***lutea***	12;15;18	1323;1360;1813	
	BORAGINALES			
	BORAGINACEAE			
183	***Anchusa azurea*** Mill. var. ***azurea***	15	1786	
184	***Anchusa hybrida*** Ten.	13;15	714;1065	Med
185	***Anchusa leptophylla*** Roem. & Schult. subsp. ***leptophylla***	17	1677	
186	***Buglossoides arvensis*** (L.) I.M.Johnst. subsp. ***sibthorpiana*** (Griseb.) R.Fern.	14	1582	
187	***Buglossoides purpurocaerulea*** (L.) I.M.Johnst.	17	257	EuSib
188	***Cerinthe minor*** L. subsp. ***auriculata*** (Ten.) Domac	1;4;15;13.1	687;199;434;622a	
189	***Cynoglossum creticum*** Mill.	15	733;1767	
190	***Cynoglossum montanum*** L.	13.1;17	165;289;1064	EuSib
191	***Echium italicum*** L.	13.1;15;17	1185;803;1297	Med
192	***Echium vulgare*** L. subsp. ***vulgare***	13.1;17	291;456;1108	EuSib
193	***Heliotropium europaeum*** L.	10.1	1364	IrTu
194	***Myosotis arvensis*** (L.) Hill subsp. ***arvensis***	1;6;9	634;783;1253	EuSib
195	***Myosotis alpestris*** F.W.Schmidt subsp. ***alpestris***	1;2;9	77;376;357	
196	***Myosotis heteropoda*** Trautv.	3	2149	IrTu
197	***Myosotis lithospermifolia*** (Willd.) Hornem.	3.1;15	547;551	EuSib
198	***Myosotis ramosissima*** Rochel	13;19	43	
199	***Myosotis rivularis*** (Vestergr.) A.P. Khokhr.	15	466	
200	***Myosotis sylvatica*** Hoffm. subsp. ***cyanea*** (Hayek) Vestergr.	13.1;17	166;214	EuSib
201	**** Onosma aucherana*** DC.	4;13.1;17	1484;210;2220	Med

202	**** Onosma bourgaei*** Boiss.	16;17	293;800	IrTu
203	***Onosma bornmuelleri*** Hausskn. & Bornm.	2.1;13.1	419;823;1861	IrTu
204	**** Onosma bracteosa*** Hausskn. & Bornm.	4	338	IrTu
205	***Onosma heterophylla*** Griseb.	3.1	1757	EuSib
206	***Onosma taurica*** Willd. var. ***taurica***	11.1	1892	
207	***Paracaryum paphlagonicum*** (Bornm.) R.R.Mill	11.1;17;17.1	1699;1893;2071	IrTu
208	**** Phacelia tanacetifolia*** Benth.	17	1674	
209	***Trachystemon orientalis*** (L.) D.Don	4;917	22;85;286;197	EuSib
	CAMPANULACEAE			
210	***Asyneuma amplexicaule*** (Willd.) Hand.-Mazz. subsp. ***amplexicaule*** var. ***amplexicaule***	17	1243	
211	***Asyneuma limonifolium*** (L.) Janch. subsp. ***limonifolium***	1;11.1;17	1762;2229;2230	
212	***Asyneuma rigidum*** (Willd.) Grossh. subsp. ***sibtharpianum*** (Schult.) Damboldt	1;2	1220;2116	
213	***Asyneuma rigidum*** (Willd.) Grossh. subsp. ***rigidum***	1;15;13.1	673;2126;2251	IrTu
214	**** Asyneuma virgatum*** (Labill.) Bornm. subsp. ***virgatum*** (Labill.) Bornm.	1	1126	
215	***Campanula cymbalaria*** Sm.	1.1	2319	
216	***Campanula glomerata*** L. subsp. ***hispida*** (Witasek) Hayek	17;6;11.2	1974;2102;1216	
217	***Campanula grandis*** Fisch. & C.A.Mey. subsp. ***grandis***	3	2286	
218	***Campanula latifolia*** L. subsp. ***latifolia***	1;1.1	1265;2236	
219	***Campanula lyrata*** Lam. subsp. ***lyrata***	1.1;12;13.1	2027;303;325;253	
220	***Campanula olympica*** Boiss.	15	1441;581	EuSib
221	***Campanula persicifolia*** L. subsp. ***persicifolia***	17.2;15;17	972;910;2008	EuSib
222	***Campanula rapunculoides*** L.	2.1;17;17.2	878;980;1432;1983	EuSib
223	***Campanula rapunculus*** L. subsp. ***lambertiana*** (A.DC.) Rech.f.	4	2103	
224	***Legousia pentagonia*** (L.) Thell.	15;17	718;1716	Med
	CARYOPHYLLALES			
	AMARANTHACEAE			
225	***Chenopodium album*** L.	11	2324	
226	***Chenopodium foliosum*** Asch.	1.1;15	750;1254	
227	***Beta trigyna*** Waldst. & Kit.	4;15	571;612	
	CARYOPHYLLACEAE			
228	***Agrostemma githago*** L.	17	1715	

229	***Cerastium brachypetalum*** Desp. ex Pers. subsp. ***roeseri*** (Boiss. & Heldr.) Nyman	14	1574	
230	***Cerastium glomeratum*** Thuill.	14	1584	
231	***Dianthus balansae*** Boiss.	1;2;1.1;17	1231;1130;2243;2309	
232	***Dianthus carmelitarum*** Reut. ex Boiss.	15	1178;540	EuSib
233	***Dianthus carthusianorum*** L.	3.1;15;16	1466;1403;2067;2159	
234	***Dianthus calocephalus*** Boiss.	11;11.2	1980;851	
235	***Dianthus leucophaeus*** Sm.	2.1	1864	
236	***Minuartia erythrosepala*** Hand.-Mazz. var. ***cappadocica*** (Boiss.) McNeill	1	647	IrTu
237	***Minuartia hirsuta*** (M.Bieb.) Hand.-Mazz. subsp. ***falcata*** (Griseb.) Mattf.	13;19	41;1859	
238	**** Minuartia juressi*** (Willd.) Lacaita subsp. ***asiatica***	2	2260	Med
239	***Myosoton aquaticum*** (L.) Moench	12	2138	
240	***Moenchia mantica*** (L.) Bartl.	4;17	237;616	
241	***Petrorhagia prolifera*** (L.) P.W.Ball & Heywood	17	862	
242	***Saponaria glutinosa*** M.Bieb.	12;17.2	955;1342;2029	
243	***Scleranthus annuus*** L. subsp***. annuus***	2	345	
244	***Scleranthus perennis*** L. subsp. ***dichotomus*** (Schur) Nyman	2.1;2	1346;795	
245	**** Scleranthus perennis*** L. subsp. ***marginatus*** (Guss.) Nyman	2;15;17	115;259;562;2211	
246	**** Silene armeria*** L.	17	301	EuSib
247	***Silene argentea*** Ledeb.	11;11.1	857;858;1913	IrTu
248	***Silene compacta*** Fisch.	1;15;17	2024;579;829;1293	
249	***Silene coronaria*** (Desr.) Clairv. ex Rchb.	5	2279	EuSib
250	***Silene dichotoma*** Ehrh. subsp. ***dichotoma***	1;16	365;801	
251	***Silene gallica*** L.	17	869	
252	***Silene italica*** (L.) Pers. subsp. ***italica***	1.1;17;3.1	1029;282;366;1272	Med
253	***Silene latifolia*** Poir. subsp. ***alba*** (Mill.) Greuter & Burdet	18	1336	
254	***Silene noctiflora*** L.	15	1451	
255	***Silene olympica*** Boiss. var. ***olympica***	1;1.1	632;2246	IrTu
256	**** Silene otites*** (L.) Wibel	17.2	2060	
257	***Silene vulgaris*** (Moench) Garcke var. ***vulgaris***	2;15;17	787;514;1718;1941	
258	***Stellaria media*** (L.) Vill.	13;15;19	38;118;126	
259	***Vaccaria hispanica*** (Mill.) Rauschert	17	1712	
	POLYGONACEAE			
260	***Rumex acetosella*** L.	2;15	1345;507;1187;1277	
261	***Rumex crispus*** L.	15;17;18.1	1948;274;523;886	

262	***Rumex nepalensis*** Spreng.	4	1501	
263	***Rumex obtusifolius*** L. subsp. ***subalpinus*** (Schur) Celak	15	505	
264	**** Rumex pulcher*** L. subsp. ***pulcher***	17;13	1037;1073	
265	***Rumex tuberosus*** L. subsp. ***tuberosus***	1	1263	
	TAMARICACEAE			
266	***Tamarix parviflora*** DC.	11.1	2233	Med
	CELASTRALES			
	CELASTRACEAE			
267	***Euonymus europaeus*** L.	15;17.1	764;2053	EuSib
268	***Euonymus latifolius*** (L.) Mill. subsp. ***latifolius***	16	1419	EuSib
	CORNALES			
	CORNACEAE			
269	***Cornus mas*** L.	15;16	1418;700	EuSib
270	***Cornus sanguinea*** L. subsp. ***australis*** (C.A.Mey.) Jáv.	17.2	2055	EuSib
	CROSSOSOMATALES			
	STAPHYLEACEAE			
271	***Staphylea pinnata*** L.	3	2339	EuSib
	CUCURBITALES			
	DATISCACEAE			
272	***Datisca cannabina*** L.	6;15;17	489;884;1138;2084	
	DIOSCOREALES			
	DIOSCOREACEAE			
273	***Dioscorea communis*** (L.) Caddick & Wilkin	7;3;13.1	319;1397;2175;2330	
	DIPSACALES			
	ADOXACEAE			
274	***Sambucus ebulus*** L.	4;17.2	1500;947	EuSib
275	***Sambucus nigra*** L.	4;10.1;13.1	159;620;828;1390	EuSib
276	***Viburnum lantana*** L.	1;4;17	185;621;1229;2092	EuSib
	CAPRIFOLIACEAE			
277	***Centranthus longiflorus*** Steven subsp. ***longiflorus***	11	1992	IrTu
278	***Cephalaria gigantea*** (Ledeb.) Bobrov	1.1;2	1014;2152	EuSib
279	***Dipsacus laciniatus*** L.	4;17.1	1291;2076	
280	***Knautia involucrata*** Sommier & Levier	2;2.1;1.1	1276;1605;2120;2187	EuSib
281	***Lonicera orientalis*** Lam.	1.1;15;17	389;298;463;2104;2317	Med
282	***Morina persica*** L. var. ***persica***	11	1993	IrTu
283	***Scabiosa argentea*** L.	2.1	1047	
284	***Scabiosa atropurpurea*** L.	4;2.1;15	622b;866;1302;1929	
285	***Scabiosa columbaria*** L. subsp. ***ochroleuca*** (L.) Celák var. ***ochroleuca***	2;6	2097;2259	
286	***Scabiosa micrantha*** Desf.	11.1	1919	

287	***Scabiosa rotata*** M.Bieb.	11	1999	IrTu
288	***Valeriana alliariifolia*** Vahl.	6;15;17.2	2022;524;987;1872	
289	***Valerianella locusta*** (L.) Laterr.	17	1566	EuSib
290	***Valerianella turgida*** (Steven) Betcke	4	617	
	ERICALES			
	ERICACEAE			
291	***Erica arborea*** L.	6;17.2	2090;969	
292	***Monotropa hypopitys*** L.	15	525;1211	
293	***Orthilia secunda*** (L.) House	6	1000	
294	***Rhododendron ponticum*** L.	6;15	578;2051;996;1201	EuSib
	PRIMULACEAE			
295	***Anagallis arvensis*** L. var. ***arvensis***	11	848	
296	***Anagallis arvensis*** L. var. ***caerulea*** (L.) Gouan	17.1	2074	
297	***Anagallis foemina*** Mill.	15;18	1321;1361	Med
298	***Cyclamen coum*** Mill. subsp. ***coum***	13.1;17;19	1;57;284;229	
299	***Lysimachia punctata*** L.	6	2019	
300	**** Lysimachia verticiliaris*** Spreng.	6;15	2087;1206	EuSib
301	***Lysimachia vulgaris*** L.	6	974	
302	***Primula acaulis*** (L.) L. subsp. ***acaulis***	6;1.1;2.1	3;56;63;70;195	EuSib
	FABALES			
	FABACEAE			
303	***Argyrolobium biebersteinii*** P.W.Ball	2.1;15;17	520;1499;1984;2025	EuSib
304	***Anthyllis vulneraria*** L. subsp. ***boisseri*** (Sagorski) Bornm.	1;1.1;17	2005;655;1020	
305	***Astragalus amoenus*** Fenzl	2.1	1860	IrTu
306	***Astragalus angustifolius*** Lam. subsp. ***pungens*** (Willd.) Hayek	1	623	
307	***Astragalus condensatus*** Ledeb.	16	1400	IrTu
308	***Astragalus glycyphylloides*** DC.	1;2.1;17	1348;241;1289;1212;890	EuSib
309	***Astragalus mesogitanus*** Boiss.	11;11.1;17	2001;211;854;1657	IrTu
310	**** Astragalus panduratus*** Bunge	17	943	IrTu
311	***Astragalus ponticus*** Pall.	11;17.2	1996;1922	
312	***Bituminaria bituminosa*** (L.) C.H.Stirt	2.1;15;17	1957;682;933;2059	Med
313	***Colutea cilicica*** Boiss. & Balansa	11.1;17;17.2	1897;2002;881;950	
314	***Coronilla scorpioides*** (L.) W.D.J.Koch	15	686	
315	***Cytisus austriacus*** L. subsp. ***pygmaeus*** (Willd.) Briq.	1;2;15	178;360;539;1857	EuSib
316	***Cytisus hirsutus*** L.	6;15;17	2025;120;1151;1772	
317	***Dorycnium graecum*** (L.) Ser.	6;15;17	247;471;1144;2021	EuSib
318	***Dorycnium pentaphyllum*** Scop. subsp. ***anatolicum*** (Boiss.) Gams	15;17.2	680;953;1307	
319	***Dorycnium pentaphyllum*** Scop. subsp. ***herbaceum*** (Vill.) Rouy	11.2;15;17	1784;1960;922	
320	***Dorycnium rectum*** (L.) Ser.	6	996	Med

321	***Galega officinalis*** L.	4;15	1141;1122	EuSib
322	***Genista januensis*** Viv. subsp. ***lydia*** (Boiss.) Kit Tan &ZieI.	15;17	251;1181;472;1309	Med
323	***Genista tinctoria*** L.	17;17.2	963;905	EuSib
324	***Lathyrus aureus*** (Steven) D.Brandza	1;6;17	2047;139;220;465	EuSib
325	***Lathyrus czeczottianus*** Bässler	1	200;422	EuSib
326	**** Lathyrus corniculatus*** L. var. ***corniculatus***	12	2139	
327	***Lathyrus laxiflorus*** (Desf.) Kuntze subsp. ***laxiflorus***	15;17	121;225;464	
328	***Lathyrus nissolia*** L.	17	255	
329	***Lathyrus tukhtensis*** Czeczott	1.1	1019	EuSib
330	***Lathyrus undulatus*** Boiss.	4;13.1;17	816;1111;1292	EuSib
331	**** Lens ervoides*** (Brign.) Grande	15	482	Med
332	***Lotus corniculatus*** L. var. ***alpinus*** Ser.	10.1;13	1079;1373	
333	***Lotus corniculatus*** L. var. ***corniculatus***	1;15	417;665;1785	
334	***Medicago minima*** (L.) Bartal. var. ***minima***	11.1;17	870;1701;1899	
335	***Medicago orbicularis*** (L.) Bartal.	11.1;18.1	1900;1944	
336	**** Medicago rigidula*** (L.) All. var. ***rigidula***	13	1076	
337	***Medicago sativa*** L. subsp. ***sativa***	1;17	2294;860;2295	
338	***Medicago x varia*** Martyn	11.1;11.2;13	1956;1070;1888	
339	***Melilotus albus*** Medik.	17	932	
340	***Melilotus officinalis*** (L.) Pall.	1;15;18.1	653;695;1938	
341	***Melilotus spicatus*** (Sm.) Breistr.	17.2	1923	
342	***Onobrychis oxyodonta*** Boiss.	1;2;10.1	1093;644;1383;2313	
343	***Ononis spinosa*** L. subsp. ***leiosperma*** (Boiss.) Sirj.	13	1074	
344	***Scorpiurus subvillosus*** L. var. ***subvillosus***	11.1	1904	
345	***Securigera varia*** (L.) Lassen	13.1;15;17	296;909;804;2158	Med
346	***Trifolium arvense*** L. var. ***arvense***	4;17	1043;871;1268	
347	***Trifolium aureum*** Pollich subsp. ***barbulatum*** Freyn & Sint. ex Freyn	3	2171	EuSib
348	***Trifolium campestre*** Schreb. subsp. ***campestre*** var. ***campestre***	15	589;475;671;1140	
349	***Trifolium dubium*** Sibth.	17	2015	
350	***Trifolium elongatum*** Willd.	1;15;17	254;561;775;826;1207	
351	***Trifolium hybridum*** L. subsp. ***anatolicum*** (Boiss.) Hossain	15	1143;500	
352	***Trifolium patens*** Schreb.	15;17	145;272	
353	***Trifolium pratense*** L. var. ***pratense***	4;15;17	235;209;1798;2308	
354	***Trifolium repens*** L. var. ***repens***	15;17	258;705	
355	***Trifolium resupinatum*** L. var. ***resupinatum***	15	729	

356	***Vicia abbreviata*** Spreng.	1;13.1	201;437	EuSib
357	***Vicia cassubica*** L.	15	487	EuSib
358	***Vicia cracca*** L. subsp. ***cracca***	17	1714	EuSib
359	***Vicia freyniana*** Bornm.	1;15	449;534	EuSib
360	**** Vicia lathyroides*** L.	13;19	47	
361	***Vicia pannonica*** Crantz var. ***pannonica***	15;17.2	1805;2329	
362	**** Vicia sepium*** L.	6	2038	EuSib
363	**** Vicia villosa*** Roth subsp. ***villosa***	6;18.1	1934;2046	
	POLYGALACEAE			
364	***Polygala anatolica*** Boiss. & Heldr.	1;16;17	1241;1404;271;1671	
365	**** Polygala major*** Jacq.	11.1	1670	EuSib
366	**** Polygala pruinosa*** Boiss. subsp. ***pruinosa*** Boiss.	17	266;894	
	FAGALES			
	BETULACEAE			
367	***Alnus glutinosa*** (L.) Gaertn. subsp. ***glutinosa***	12	1344	EuSib
368	***Carpinus betulus*** L.	15;16;17	1420;1209;2099	EuSib
369	***Corylus avellana*** L. var. ***avellana***	8;1.1;13.1	1031;164;317;318	EuSib
370	***Corylus colurna*** L.	17.2	1036	EuSib
	FAGACEAE			
371	***Fagus orientalis*** Lipsky	6;15;17	2082;222;770;1431	EuSib
372	***Quercus infectoria*** G.Oliver subsp. ***infectoria***	16	1407	EuSib
373	***Quercus macranthera*** Fisch. & C.A.Mey. ex Hohen. subsp. ***syspirensis*** (K.Koch) Menitsky	14;17;17.2	224;960;2327	
374	***Quercus petraea*** (Matt.) Liebl. subsp. ***iberica*** (Steven ex M.Bieb.) Krassiln.	4;13;17	906;2326;2333	
375	***Quercus pubescens*** Willd. subsp. ***pubescens***	11;14;16	1401;2321;2322;2325	
	GENTIANALES			
	APOCYNACEAE			
376	***Vinca minor*** L.	13.1	2237	
377	***Vinca major*** L. subsp. ***major***	12	1629	Med
378	***Vincetoxicum fuscatum*** subsp. ***fuscatum*** (Hornem.) Endl.	15	1305	IrTu
	GENTIANACEAE			
379	***Blackstonia perfoliata*** (L.) Huds. subsp. ***perfoliata***	5	2264	
380	***Centaurium erythraea*** Rafn subsp. ***erythraea***	17.2	977	EuSib
381	***Centaurium erythraea*** Rafn subsp. ***rumelicum*** (Velen.) Melderis	13	1082	Med
382	***Gentiana asclepiadea*** L.	1;15	1439;1234;2113	EuSib
383	***Gentiana cruciata*** L.	6	1248	EuSib

	GERANIACEAE			
384	***Erodium cicutarium*** (L.) L'Hér. subsp. ***cicutarium***	4;15;18.1	1945;509;607;1071	
385	***Erodium acaule*** (L.) Bech. & Thell.	13;15;19	135;34	Med
386	***Geranium asphodeloides*** Burm.f. subsp. ***asphodeloides***	1.1;13.1;17	162;238;517;2203	Med
387	***Geranium bohemicum*** L.	7;15	331;479	
388	***Geranium columbinum*** L.	11.2	1975	
389	***Geranium dissectum*** L.	17	275	
390	***Geranium tuberosum*** L.	1;1.1	193;1753	IrTu
391	***Geranium purpureum*** Vill.	1.1;15;17.2	392;588;320;1033	
392	**** Geranium pusillum*** Burm J.	11.2	1607	
393	***Geranium pyrenaicum*** Burm.f.	4;13.1;17	153;335;508;2153	
394	***Geranium robertianum*** L.	1.1;13.1;17	157;216;421;2190	
395	**** Geranium rotundifolium*** L.	4	606	
396	***Geranium macrostylum*** Boiss.	1;1.1;2.1	176;386;1842	Med
397	***Geranium molle*** L.	14;17	276;1576	
	RUBIACEAE			
398	***Asperula involucrata*** Wahlenb.	12;15;17	217;460;1822	EuSib
399	***Asperula pestalozzae*** Boiss.	17	868	EuSib
400	***Asperula taurina*** L.	1;1.1	374;448	
401	***Cruciata laevipes*** Opiz	13.1	163	EuSib
402	***Cruciata taurica*** (Pall. ex Willd.) Ehrend.	1;2;15	91;359;638	IrTu
403	***Galium aparine*** L.	4;15;17	315;493;598	
404	***Galium odoratum*** (L.) Scop.	1.1;4;15	378;466;550	EuSib
405	***Galium palustre*** L.	12;15	1807;1168	EuSib
406	***Galium paschale*** Forssk.	6;16;17	883;915;1424;2030	Med
407	***Galium rotundifolium*** L.	2.1	1837	EuSib
408	***Galium tricornutum*** Dandy	14	1591	IrTu
409	***Galium verum*** L. subsp. ***verum***	2;4;17	611;861;984;1194	EuSib
	LAMIALES			
	LAMIACEAE			
410	***Ajuga reptans*** L.	12;13.1;17	263;153;154;1630	EuSib
411	***Ajuga chamaepitys*** (L.) Schreb. subsp. ***chia*** (Schreb.) Arcang.	15	1319;694	Med
412	***Ajuga orientalis*** L.	1.1;15	89;398	
413	***Ballota nigra*** L. subsp. ***anatolica*** P.H.Davis	11	849	IrTu
414	***Clinopodium grandiflorum*** (L.) Kuntze	6;3;1	1004;1511;2101;2148	EuSib
415	***Clinopodium graveolens*** (M.Bieb.) Kuntze subsp. ***graveolens***	17	1706	
416	***Clinopodium vulgare*** L. subsp. ***arundanum*** (Boiss.) Nyman	9;15;17	727;781;911	
417	***Clinopodium vulgare*** L. subsp. ***vulgare***	11.1;12	1917;2136	

418	**** Galeopsis bifida*** Boenn.	3	2172	EuSib
419	**** Glechoma hederacea*** L.	13.1	155;1621	EuSib
420	***Lamium album*** L. subsp. ***crinitum*** (Montbret & Aucher ex Benth.) Mennema	2;4	204;349	EuSib
421	***Lamium garganicum*** L. subsp. ***garganicum***	4;15	1542;1636	EuSib
422	***Lamium garganicum*** L. subsp. ***striatum*** (Sm.) Hayek var. ***striatum***	1	423	Med
423	***Lamium maculatum*** (L.) L.	1.1;15	369;554	
424	***Lamium purpureum*** L. var. ***purpureum***	1.1;2;13.1	1529;28;66;194	EuSib
425	***Lamium purpureum*** L. var. ***aznavourii*** Gand. ex Aznav.	17	299	EuSib
426	***Leonurus quinquelobatus*** Gilib.	1	1234;2109	EuSib
427	***Mentha longifolia*** (L.) L. subsp. ***longifolia***	15	735	
428	***Mentha longifolia*** (L.) L. subsp. ***typhoides*** (Briq.) Harley	15	1331	
429	***Nepeta italica*** L.	11.1	1916	Med
430	***Origanum vulgare L***. subsp. ***vulgare***	1.1;15;17.2	949;1016;2062	EuSib
431	***Prunella vulgaris*** L.	1;15;17	583;656;896	EuSib
432	***Prunella laciniata*** (L.) L.	13;15	1777;690;1080	EuSib
433	***Phlomis pungens*** Willd. var. ***pungens***	18.1	1931	
434	***Phlomis russeliana*** (Sims) Lag. ex Benth.	2.1;17	891;2007;300;1841	EuSib
435	***Salvia aethiopis*** L.	1;11.1;17	1902;2218;645	
436	***Salvia forskahlei*** L.	15;17.2	590;966;1161	EuSib
437	***Salvia glutinosa*** L.	5;17	2098;2277	EuSib
438	***Salvia sclarea*** L.	11;11.1;17	1903;2000;925;1032	
439	**** Salvia tobeyi*** Hedge	1	1752	EuSib
440	***Salvia tomentosa*** Mill.	2;11.2;17.2	952;1095;1954;2063	Med
441	**** Salvia verbenaca*** L.	10.1	1379	Med
442	***Salvia verticillata*** L. subsp. ***amasiaca*** (Freyn & Bornm.) Bornm.	11.1;15	667;1787;1901;1907	IrTu
443	***Salvia verticillata*** L. subsp. ***verticillata***	15;17	2011;587	EuSib
444	***Salvia virgata*** Jacq.	11;17.1	847;2061	IrTu
445	***Salvia viridis*** L.	17	1705	Med
446	***Scutellaria albida*** L. subsp. ***albida***	11.1	1911;2234	Med
447	***Scutellaria albida*** L. subsp. ***velenovskyi*** (Rech.f.) Greuter & Burdet	6	2026	Med
448	***Sideritis montana*** L. subsp. ***montana***	15	1328	Med
449	***Sideritis taurica*** Steph. ex Willd.	1;4;7	1264;2128;2239;2289	EuSib
450	***Stachys annua*** sl.	15;17;17.2	279;951;1688;2028	
451	***Stachys byzantina*** K.Koch	1;15	1770;443	EuSib
452	***Stachys iberica*** M.Bieb. subsp. ***iberica*** var. ***iberica***	2;15	2253;1173	IrTu

453	***Stachys sylvatica*** L.	6;5	2037;2278	EuSib
454	***Stachys thirkei*** K.Koch	11.1;15	703;1884;510;569	
455	***Teucrium chamaedrys*** L. subsp. ***chamaedrys***	1.1;11.1;11.2	1894;1027;1966;2189	
456	***Teucrium polium*** L. subsp. ***polium***	11.2;15;17	681;1955;864	
457	***Thymus longicaulis*** C.Presl subsp. ***chaubardii*** (Rchb.f.) Jalas	11.1;15	1180;1656	Med
458	***Thymus longicaulis*** C.Presl subsp. ***longicaulis***	2.1;17	1355;265	EuSib
459	***Thymus praecox*** Opiz subsp. ***jankae*** (Celak) Jalas	11.1;15	1883;543;570	EuSib
460	***Ziziphora capitata*** L.	11.1	1912	
	OLEACEAE			
461	***Ligustrum vulgare*** L.	17.1;15	713;1761;2057	EuSib
	RUTACEAE			
462	***Ruta thesioides*** Fisch. ex DC.	11.1;17.3	2224;1918	
	OROBANCHACEAE			
463	***Euphrasia pectinata*** Ten.	2;1.1;15	1090;1806;2193	EuSib
464	***Lathraea squamaria*** L.	1	149	EuSib
465	***Macrosyringion glutinosum*** (M.Bieb) Rothm.	1;2;15	1196;1257;2177	
466	***Melampyrum arvense*** L. var. ***arvense***	1.1;6	1018	EuSib
467	**** Melampyrum arvense*** L. var. ***elatius***	5;17	907;1273	EuSib
468	***Orobanche elatior*** Sutton	1.1	1017	
469	***Orobanche purpurea*** Jacq.	2.1	1350	
470	**** Orobanche gracilis*** Sm.	1;2;15	566;825;1103	
471	***Orobanche minor*** Sm.	15;17	273;661;691	
472	***Orobanche nana*** (Reutq.) Beck	17	1678	
473	***Parentucellia latifolia*** Caruel subsp. ***latifolia***	13;17;19	42;248	Med
474	***Pedicularis condensata*** M.Bieb.	1;15	444;536	EuSib
475	***Pedicularis comosa*** L. var. ***sibthorpii*** (Boiss.) Boiss.	1;2;15	1445;1135;1851	
476	***Rhinanthus angustifolius*** C.C.Gmel. subsp. ***grandiflorus*** (Wallr.) D.A.Webb)	2.1;4	1962;608	
477	***Rhynchocorys elephas*** (L.) Griseb. subsp. ***elephas***	1;3;7	316;2020;1875;2106	EuSib
	SCROPHULARIACEAE			
478	***Scrophularia canina*** L. subsp. ***bicolor*** (Sm.) Greuter	2;12;17	1713;1849;2068	Med
479	***Scrophularia scopolii*** Hoppe ex Pers. var. ***adenocalyx*** Sommier & Levier	4;15;17	240;334;492;2039	EuSib
480	***Scrophularia umbrosa*** Dumort.	3	2173	EuSib
481	***Verbascum abieticola*** Bornm.	1;4	438;1734	EuSib
482	***Verbascum bithynicum*** Boiss.	11.2;15;17	734;918;1964;2266	EuSib

483	***Verbascum caudatum*** Post	2	1866	IrTu
484	**** Verbascum cheiranthifolium*** Boiss. var. ***cheiranthifolium***	11.2;15	1885;2140	
485	***Verbascum gnaphalodes*** M.Bieb.	4;15	474;1735	EuSib
486	***Verbascum phlomoides*** L.	2;15;18.1	712;1864;1930	EuSib
	VERBENACEAE			
487	***Verbena officinalis*** L. var. ***officinalis***	17	895	
	MALPIGHIALES			
	EUPHORBIACEAE			
488	***Euphorbia aleppica*** L.	15	1320	
489	***Euphorbia amygdaloides*** L. var. ***amygdaloides***	4	1742	EuSib
490	***Euphorbia amygdaloides*** L. var. ***robbiae*** (Turrill) Stace	4;15;17	79;1639;21;232	EuSib
491	***Euphorbia falcata*** L. subsp. ***falcata*** var. ***falcata***	15	1322	
492	***Euphorbia glareosa*** Pall. ex M.Bieb.	10.1	1369	
493	***Euphorbia helioscopia*** L. subsp. ***helioscopia***	11,1;5	1598;746	
494	***Euphorbia pannonica*** Host	4,6,15	131;603;679;2040	EuSib
495	***Euphorbia seguieriana*** Neck. subsp. ***niciciana*** (Borbás ex Novák) Rech.f.	17	1039;2004	
496	***Euphorbia seguieriana*** Neck. subsp. ***seguieriana***	2;15;17	236;1091;476;1768	EuSib
497	***Euphorbia stricta*** L.	13;17;17.2	150;230;1034;1341	EuSib
498	***Mercurialis annua*** L.	17.3	1613	
499	***Mercurialis perennis*** L.	1	148	EuSib
	HYPERICACEAE			
500	***Hypericum bithynicum*** Boiss.	15	726;1192	EuSib
501	***Hypericum montbretii*** Spach	15;17	295;458;1152	
502	***Hypericum origanifolium*** Willd. var. ***origanifolium***	12;15	1700;1812	
503	***Hypericum perforatum*** L. subsp. ***perforatum***	2;10.1;15	1356;531;1377	
504	***Hypericum tetrapterum*** Fr. var. ***tetrapterum***	6;17	875;2089	
	LINACEAE			
505	***Linum bienne*** Mill.	1;11.2;17	867;1982;269;629;1075	
506	***Linum hirsutum*** L. subsp. ***anatolicum*** (Boiss.) Hayek var***. anatolicum***	11;11.2;15	844;1050;1914;1769	IrTu
507	***Linum tenuifolium*** L.	11.1;15	1766;685;1908	
508	***Linum trigynum*** L.	17	873	Med
	SALICACEAE			
509	***Populus nigra*** L. subsp. ***nigra***	8,15	329;741	EuSib
510	***Populus tremula*** L. subsp. ***tremula***	15	769	
511	***Salix alba*** L. subsp. ***alba***	15	1627;736	EuSib

512	***Salix caprea*** L.	1	433	EuSib
	VIOLACEAE			
513	***Viola arvensis*** Murray	4	605	
514	***Viola canina*** L.	13;19	58	
515	***Viola gracilis*** Sibth. et Sm.	2;13.1;15	1516;1162;88;351;354	
516	***Viola odorata*** L.	1;15;16.1	1553;86;186	
517	***Viola parvula*** Tineo	2	1648	
518	***Viola sieheana*** W.Becker	1.1;13;19	50;384;537	
519	***Viola suavis*** M.Bieb.	4;17	1560;20	
	MALVALES			
	CISTACEAE			
520	***Cistus creticus*** L.	9;10.1;17	778;1384;1828;1898	Med
521	***Cistus laurifolius*** L.	15	777	Med
522	***Fumana procumbens*** (Dunal) Gren. & Godr.	11.1	1886	
523	***Helianthemum nummularium*** (L.) Mill. subsp. ***nummularium***	1;15;17	264;658;693;1060	
524	**** Helianthemum ovatum*** Dun.	1.1	2202	
	MALVACEAE			
525	***Alcea apterocarpa*** Boiss.	5	2283	IrTu
526	***Alcea pallida*** (Willd.) Waldst. & Kit.	11.1;17	1906;923	
527	***Althaea hirsuta*** L.	15	1797	
528	***Malva neglecta*** Wallr.	17	2209	
529	***Malva sylvestris*** L.	17	2006;928	
530	***Tilia rubra*** DC. subsp. ***caucasica*** (Rupr.) V. Engl.	13	2338	EuSib
	PLANTAGINACEAE			
531	***Digitalis ferruginea*** L. subsp. ***ferruginea***	13;17;17.2	924;1083;1269;2284	EuSib
532	***Digitalis lamarckii*** Ivan.	2;11;11.1	1094;855;1895;1910	IrTu
533	***Kickxia elatine*** (L.) Dumort. subsp. ***crinita*** (Mabille) Greuter	15	1329a	Med
534	***Kickxia spuria*** (L.) Dumort. subsp. ***integrifolia*** (Brot.) R.Fern.	15	1329b	
535	***Linaria genistifolia*** (L.) Mill. Cf. subsp. ***confertiflora*** (Boiss.) P.H.Davis	1;2	1274;2256;2162	EuSib
536	***Globularia trichosantha*** Fisch. & C.A.Mey. subsp. ***trichosantha***	1	635;188	Med
537	***Plantago lanceolata*** L.	13;15	529;668;740;1069	IrTu
538	***Plantago major*** L. subsp. ***intermedia*** (Gilib.) Lange	17	1498	
539	***Plantago major*** L. subsp. ***major***	1;15;17	450;250;528	
540	***Veronica anagallis-aquatica*** L.	2;4;15	481;333;486;1878	
541	***Veronica bozakmanii*** M.A.Fisch.	14;15	559;1585	IrTu
542	***Veronica chamaedrys*** L.	1.1;15;17	51;218;381;557	EuSib

543	***Veronica gentianoides*** sl.	1;2	187;346;361;1855	EuSib
544	***Veronica hederifolia*** L.	11;15	127;1580	
545	***Veronica jacquinii*** Baumg.	11.1;15	1655;1184	EuSib
546	***Veronica officinalis*** L.	6;15	124;2050	EuSib
547	**** Veronica orientalis*** Mill. subsp. ***orientalis***	1;2;15	545;643;827;1854	
548	***Veronica persica*** Poir.	15	134;742	
549	***Veronica serpyllifolia*** L.	4	1743	
	THYMELAEACEAE			
550	***Daphne pontica*** L. subsp. ***pontica***	1.1;4;17	245;385;1744	EuSib
551	***Daphne oleoides*** Schreb. subsp. ***oleoides***	1.1	2245	
	MYRTALES			
	LYTHRACEAE			
552	***Lythrum salicaria*** L.	11.1	2231	EuSib
	ONAGRACEAE			
553	***Circaea lutetiana*** L.	2	2268	
554	***Epilobium angustifolium*** L.	11.2;13.1	1965;809	EuSib
555	***Epilobium hirsutum*** L.	11.2;15	1054;1436	
556	***Epilobium lanceolatum*** Seb. & Mauri	4;11.2;15	1952;459;1123	EuSib
557	***Epilobium montanum*** L.	15;17;17.2	549;;876;1142;1925	EuSib
558	***Epilobium parviflorum*** Schreb.	6;17.2	976;2086	
559	**** Oenothera biennis*** L.	13.1	1395	
	PIPERALES			
	ARISTOLOCHIACEAE			
560	***Aristolochia pallida*** Willd.	1;17;17.3	283;2226;442	EuSib
	RANUNCULALES			
	PAPAVERACEAE			
561	***Chelidonium majus*** L.	13.1;17.3	158;1612	EuSib
562	***Corydalis caucasica*** DC. subsp. ***abantensis*** Lidén	4;13.1;15	109;146;16;12;23	
563	***Corydalis caucasica*** DC. subsp. ***caucasica***	4	15;17;18	EuSib
564	***Corydalis wendelboi*** Lidén subsp. ***congesta*** Lidén & Zetterl.	2;13.1;15	13;10;62;71;108	
565	***Fumaria asepala*** Boiss.	11	1594	IrTu
566	***Fumaria officinalis*** L. subsp. ***officinalis***	1	657;1593	IrTu
567	***Glaucium grandiflorum*** Boiss. & A.Huet subsp. ***refractum*** (Nábělek) Mory	11	2227;1804	IrTu
568	***Papaver lacerum*** Popov	11.1;15	1668	
569	***Papaver pilosum*** Sibth. & Sm. subsp. ***pilosum***	2.1	2252	
570	***Papaver rhoeas*** L.	7;15;17.2	328;1104;1324;2229	

	RANUNCULACEAE			
571	***Adonis flammea*** Jacq.	11	1596	
572	***Clematis vitalba*** L.	2	2157	
573	***Clematis viticella*** L.	11.1	1915	
574	***Consolida regalis*** Gray subsp. ***regalis***	18	1359	
575	***Consolida orientalis*** (J.Gay) Schrödinger	15;18.1	1790;749;1943	
576	***Delphinium fissum*** Waldst. & Kit. subsp. ***anatolicum*** Chowdhuri & P.H.Davis	1;1.1	1234;2112;2292	
577	***Ficaria verna*** Huds. subsp. ***ficariiformis*** (Rouy & Foucaud) B.Walln.	2.1;17	65;1571	
578	***Helleborus orientalis*** Lam.	13.1;17	2;59;260	EuSib
579	***Nigella arvensis*** L. subsp. ***glauca*** (Boiss.) N.Terracc.	15	1318	
580	***Ranunculus arvensis*** L.	1;1.1	371;426	
581	***Ranunculus brutius*** Ten.	1.1;15	367;548;1759	EuSib
582	***Ranunculus constantinopolitanus*** (DC.) d'Urv**.**	15;17	141;239	
583	***Ranunculus dissectus*** M.Bieb. subsp. ***sibthorpii*** Davis	1.1;15;2	33;347;363;2205	
584	***Ranunculus gracilis*** E.D.Clarke	15	132	
585	***Ranunculus marginatus*** d'Urv.	15	480;518	
586	***Ranunculus neapolitanus*** Ten.	13	1086;1880	
587	***Ranunculus repens*** L.	15	744	
	ROSALES			
	MORACEAE			
588	***Ficus carica*** L. subsp. ***carica***	11.1	2232	Med
	ROSACEAE			
589	***Agrimonia eupatoria*** L. subsp. ***eupatoria***	17	2072;887	
590	***Agrimonia repens*** L.	10.1;17.2	945;2016;1392	
591	***Alchemilla erythropoda*** Juz.	13.1;15	818;1200	EuSib
592	***Alchemilla mollis*** (Buser) Rothm.	1;1.1	167;375	
593	***Alchemilla porrectidens*** Juz.	2;4	356;615	EuSib
594	***Alchemilla pseudocartalinica*** Juz.	1;1.1	427;382	
595	***Cotoneaster integerrimus*** Medik.	15	753;1193;1333	
596	***Cotoneaster nummularius*** Fisch. & C.A.Mey.	2;11.2	1052;2262	
597	***Crataegus microphylla*** K.Koch subsp. ***microphylla***	15;17	223;763	EuSib
598	***Crataegus monogyna*** Jacq. var. ***monogyna***	4;17	1733;899	
599	***Crataegus orientalis*** Pall. ex M.Bieb. subsp. ***orientalis***	15	1771	

600	***Crataegus tanacetifolia*** (Poir.) Pers.	12;15;17	2134;697;865	
601	***Crataegus x bornmuelleri*** Zabel ex K.I.Chr. & Ziel.	3;3.1;15	1164;1456;2161	
602	***Filipendula vulgaris*** Moench	1	2304	EuSib
603	***Fragaria vesca*** L.	13.1;15;17	122;261;898;1270	EuSib
604	***Geum urbanum*** L.	1;4;13.1	156;420;1844;2105	EuSib
605	***Malus sylvestris*** (L.) Mill. subsp. ***orientalis*** (Uglitzk.) Browicz var. ***orientalis***	2	1101	
606	***Mespilus germanica*** L.	15	731	EuSib
607	***Potentilla argentea*** L.	17	270;304	
608	***Potentilla astracanica*** Jacq. subsp. ***astracanica***	11.1	1662	EuSib
609	***Potentilla calabra*** Ten.	11.1	805	Med
610	***Potentilla crantzii (***Crantz) Beck ex Fritsch	17	874	EuSib
611	***Potentilla micrantha*** Ramond ex DC.	11.1;15	4;107;60	
612	***Potentilla recta*** L.	15;17	577;1796;2023	
613	***Potentilla reptans*** L.	1;6;10	428;1387;2033	
614	***Prunus avium*** (L.) L.	1.1;17;17.2	40;897;994;1061	EuSib
615	***Prunus divaricata*** Ledeb. var. ***divaricata***	9;15;17.2	797;959;2141	
616	***Prunus laurocerasus*** L.	1	2331	
617	***Prunus spinosa*** L.	16.1;12	1550;2133	EuSib
618	***Pyracantha coccinea*** M.Roem.	15	1512;724;755	EuSib
619	***Pyrus elaeagnifolia*** Pall. subsp. ***elaeagnifolia***	9;15	796;1467	
620	***Rosa canina*** L.	2;7;15	327;1472;2160	
621	***Rosa horrida*** Fisch.	1.1	2316	
622	***Rubus caesius*** L.	17.2	961	
623	***Rubus canescens*** DC. var. ***canescens***	6;15;17.2	986;754;2034	EuSib
624	***Rubus hirtus*** Waldst. & Kit.	15	576	EuSib
625	***Rubus idaeus*** L. subsp. ***idaeus***	2.1;3;15	1354;1186;2267	EuSib
626	***Rubus ulmifolius*** Schott.	11.1;13.1;17	863;1399;1920	
627	***Sanguisorba minor*** Scop. subsp. ***balearica*** (Bourg. ex Nyman) Muñoz Garm. & C.Navarro	15	692;1183	
628	***Sorbus aucuparia*** L.	1.1;2.1;4	396;1352;2216	EuSib
629	***Sorbus domestica*** L.	14	1299	EuSib
630	***Sorbus kusnetzovii*** Zinserl.	2	2332	
631	***Sorbus torminalis*** (L.) Crantz var. ***torminalis***	17	297	
632	***Sorbus umbellata*** (Desf.) Fritsch	1.1;6;15	1021;766;2121	
	ULMACEAE			
633	***Ulmus glabra*** Huds.	3	2340	EuSib

	URTICACEAE			
634	***Urtica dioica*** L. subsp. ***dioica***	2.1;4;15	119;1845;453	EuSib
	SANTALALES			
	SANTALACEAE			
635	***Thesium arvense*** Horv.	13;14;19	44;1592	EuSib
636	***Viscum album*** L. subsp. ***album***	3;10	1513;2174	
	SAPINDALES			
	ANACARDIACEAE			
637	***Rhus coriaria*** L.	17.2	1035	
	SAPINDACEAE			
638	***Acer campestre*** L. subsp. ***campestre***	16	1421	EuSib
639	***Acer heldreichii*** Orph. ex Boiss. subsp. ***trautvetteri*** (Medw.) A.E.Murray	1.1;15	758;2206	EuSib
640	***Acer platanoides*** L.	5	2285	EuSib
	SAXIFRAGALES			
	CRASSULACEAE			
641	**** Phedimus stoloniferus*** (S.G.Gmel.) 't Hart	3;5	2170;2275	EuSib
642	***Sedum acre*** L. subsp. ***acre***	11	856	
643	***Sedum album*** L.	1.1;11;15	1470;2117;845	
644	***Sedum pallidum*** M.Bieb.	5;11;11.2	2274;840;2094	EuSib
645	***Sedum urvillei*** DC.	11.1	1891	
646	**** Sempervivum gillianiae*** Muirhead	1;1.1;2	652;2124;2318	EuSib
	GROSSULARIACEAE			
647	**** Ribes uva-crispa*** L.	17	1684	
	SAXIFRAGACEAE			
648	***Saxifraga cymbalaria*** L.	3;9;15	586;784;1876	
649	***Saxifraga exarata*** Vill.	17	1236	
650	***Saxifraga rotundifolia*** L. subsp. ***rotundifolia***	15	535;1637	EuSib
	SOLANALES			
	CONVOLVULACEAE			
651	***Calystegia silvatica*** (Kit.) Griseb.	15;17.2	2031;572;771;954	
652	***Convolvulus arvensis*** L.	15;17;18	506;1698;1935;1936	
653	***Convolvulus cantabrica*** L.	13.1;14	1340;1765;2070;306	Med
654	***Cuscuta europaea*** L.	17.2	957	
	SOLANACEAE			
655	***Atropa belladonna*** L.	4;6;15	478;1266;2080	EuSib
656	***Datura stramonium*** L.	13.1	2194	
657	***Hyoscyamus niger*** L.	2.1;17	1214;1676	
658	***Solanum dulcamara*** L.	13.1;17	1396;1685	EuSib
	MONOCOTYLEDONEAE			
	ALISMATALES			
	ARACEAE			

659	***Arum hygrophilum*** Boiss. subsp. ***euxinum*** (R.R.Mill) Alpınar	11.2	1603	EuSib
660	***Lemna minor*** L.	1	2305	
	ASPARAGALES			
	AMARYLLIDACEAE			
661	***Allium guttatum*** Steven subsp. ***guttatum***	1;2;13.1	2301;1226;2248	
662	***Allium guttatum*** Steven subsp. ***sardoum*** (Moris) Stearn	15	1160;1182	Med
663	***Allium huber-morathii*** Kollmann; Özhatay & Koyuncu	6;15;17	1228;1191;2093	IrTu
664	***Allium jubatum*** J.F.Macbr.	15;17	717;1721	EuSib
665	***Allium olympicum*** Boiss.	15	1158	EuSib
666	***Allium rotundum*** L.	1;3.1;6	2123;1159;1230	
667	***Allium stamineum*** Boiss.	6;1;1.1;13.1	1006;2288;1030	Med
668	***Galanthus plicatus*** M.Bieb. subsp. ***plicatus***	1	147	
	ASPARAGACEAE			
669	***Muscari aucheri*** (Boiss.) Baker	11.2	2334	
670	***Muscari armeniacum*** Leichtlin ex Baker	15;4;1	90;19;26;27;179;231	
671	***Ornithogalum alpigenum*** Stapf	12	1808	Med
672	***Ornithogalum fimbriatum*** Willd.	1	182;1750	Med
673	***Ornithogalum narbonense*** L.	15	672	Med
674	***Ornithogalum oligophyllum*** E.D.Clarke	4;15;17	219;106;87;340	
675	***Ornithogalum sphaerocarpum*** A.Kern.	6	2041;2042	
676	***Ornithogalum sigmoideum*** Freyn & Sint.	1;13;19	52;637	EuSib
677	***Polygonatum orientale*** Desf.	1.1;17	397;285;1044	EuSib
678	***Prospero autumnale*** (L.) Speta	12;13;15	1434;1483;1480;2144	Med
679	***Ruscus hypoglossum*** L.	3	2335	EuSib
680	***Scilla bifolia*** L.	4;13.1;15	11;94;24;61;183	Med
	IRIDACEAE			
681	***Crocus ancyrensis*** (Herb.) Maw	2;2.1;13.1	8;68;72;97	IrTu
682	***Crocus olivieri*** J.Gay subsp. ***olivieri***	15	98	
683	***Crocus speciosus*** M.Bieb. subsp. ***speciosus***	13.1;15;17	114;1486;1495;1507	
684	***Gladiolus italicus*** Mill.	17	1717	
685	***Iris kerneriana*** Asch. & Sint. ex Baker	13.1	2213	EuSib
686	***Iris sintenisii*** Janka	6;15;17	302;721;2091	EuSib
687	***Iris pumila*** L. subsp. ***attica*** (Boiss. & Heldr.) K.Richt.	11.2	1611	EuSib
	LILIALES			
	COLCHICACEAE			

688	***Colchicum boissieri*** Orph.	13.1	2200	IrTu
689	***Colchicum speciosum*** Steven	13.1;15	1465;1487;2045;2111	EuSib
690	***Colchicum umbrosum*** Steven	15	1478	EuSib
	LILIACEAE			
691	***Gagea dubia*** Terracc.	13.1;15	9;113;101	
692	**** Gagea fragifera*** (Vill.) E.Bayer & G.López	4;15;2.1	25;96;64	
693	**** Gagea glacialis*** K.Koch	15	95	IrTu
694	***Gagea villosa*** (M.Bieb.) Sweet var. ***villosa***	2.1	67	Med
695	***Fritillaria pontica*** Wahlenb.	1;4;6	198;337;431;2044	EuSib
696	***Lilium martagon*** L.	5;15	2265;2276;2306	
	XANTHORRHOEACEAE			
697	***Asphodeline lutea*** (L.) Rchb.	6;17.2	989	Med
	ORCHIDALES			
	ORCHIDACEAE			
698	***Anacamptis coriophora*** (L.) R.M.Bateman	15	776	
699	***Anacamptis pyramidalis*** (L.) Rich.	11.2;15;17	704;833;1764	
700	***Cephalanthera damasonium*** (Mill.) Druce	1:17	309;654;1313	EuSib
701	***Cephalanthera epipactoides*** Fisch. & C.A.Mey.	11.3	1683	Med
702	***Cephalanthera rubra*** (L.) Rich.	1;13.1;15;17	511;683;1729;2018	
703	***Dactylorhiza nieschalkiorum*** H.Baumann & Künkele	13.1	817;813	
704	***Dactylorhiza romana*** (Sebast.) Soó subsp. ***romana***	1	822	
705	***Epipactis persica*** (Soó) Hausskn. ex Nannf.	4;15	1213;1284;1150	
706	***Epipactis helleborine*** (L.) Crantz subsp. ***helleborine***	4;5;13.1	1109;2280;1116;1285	
707	***Epipactis turcica*** Kreutz	1.1;13.1	1023;1024;1115	
708	***Epipogium aphyllum*** Sw.	4;15;17	1287;1202;2237	EuSib
709	***Himantoglossum caprinum*** (M.Bieb.) Spreng.	4;15;18	1338;1055;1728	EuSib
710	***Limodorum abortivum*** (L.) Sw. var. ***abortivum***	4;11.2;17	1267;1961;1727;1829	
711	***Neotinea tridentata*** (Scop.) R.M.Bateman; Pridgeon & M.W.Chase	11.1	1672	Med
712	***Neottia nidus-avis*** (L.) Rich.	1;3;9;13.1;15	430;468;1286;1502	EuSib
713	***Ophrys apifera*** Huds.	4;11.2;15	832;834;1337;1763	
714	***Ophrys oestrifera*** M.Bieb. subsp. ***oestrifera***	6;17	2017;1726	

715	***Ophrys transhyrcana*** Czerniak. ***subsp. paphlagonica*** Kreutz	15	1799	
716	***Orchis mascula*** (L.) L. subsp. ***pinetorum*** (Boiss. & Kotschy) E.G.Camus	7;9;17	128;262;522;1153	Med
717	***Orchis pallens*** L.	1.1;15	78;190;372;1131	EuSib
718	***Orchis purpurea*** Huds. subsp. ***purpurea***	17.2	970	EuSib
719	***Orchis simia*** Lam.	12;17	308;1823	Med
720	***Platanthera chlorantha*** (Custer) Rchb.	9;13.1;17	642;773;1117;1493	
721	***Spiranthes spiralis*** (L.) Chevall.	4;15	1433;1481;1488;2145	Med
	POALES			
	CYPERACEAE			
722	**** Carex caryophyllea*** Latourr.	16.1	1556	EuSib
723	***Carex flacca*** Schreb. subsp. ***erythrostachys*** (Hoppe) Holub	1.1;17	228;412	Med
724	***Carex pendula*** Huds.	3;6;17	321;2261;591;1873	EuSib
	JUNCACEAE			
725	***Juncus effusus*** L. subsp. ***effusus***	6;15	580;1879	
726	***Juncus inflexus*** L. subsp. ***inflexus***	16;17;17.2	277;1429;785;1926	
727	***Luzula campestris*** (L.) DC.	1;1.1	636;410	EuSib
728	***Luzula forsteri*** (Sm.) DC. subsp. ***caspica*** Novikov	17	1562	EuSib
729	***Luzula multiflora*** (Ehrh.) Lej. subsp. ***multiflora***	1.1;9	84;411	
	POACEAE			
730	***Aegilops geniculata*** Roth	15	702	Med
731	***Agrostis stolonifera*** L.	9;12;15	491;496;789	EuSib
732	***Aira elegantissima*** Schur subsp. ***elegantissima***	2	1223	Med
733	***Anthoxanthum odoratum*** L. subsp. ***alpinum*** (A.Löve & D.Löve) B.M.G.Jones & Melderis	1;4;15	92;177;208;341	EuSib
734	***Avena barbata*** Pott ex Link subsp. ***barbata***	1;4	172;206;336	Med
735	***Avena sterilis*** L. subsp. ***sterilis***	1.1;15;18.1	669;403;1939	
736	***Bothriochloa ischaemum*** (L.) Keng	1.1	413	
737	***Brachypodium sylvaticum*** (Huds.) P.Beauv.	12	498	EuSib
738	***Briza media*** L.	1.1;15;17	1174;904;2188;2297	
739	***Bromus hordeaceus*** L. subsp. ***hordeaceus***	13	1068	
740	***Bromus japonicus*** Thunb. subsp. ***japonicus***	1.1;6;17	934;2315	
741	***Bromus tectorum*** L.	12	497	
742	***Calamagrostis epigejos*** (L.) Roth	6;17.2	982;2081	EuSib

743	**** Chrysopogon gryllus*** (L.) Trin.	11.1	1887	
744	***Cynosurus cristatus*** L.	13	1081	EuSib
745	***Cynosurus echinatus*** L.	4,15;17	674;601;1066	Med
746	***Dactylis glomerata*** L. subsp***. glomerata***	1;4;17	415;326;447	EuSib
747	***Elymus hispidus*** (Opiz) Melderis subsp. ***barbulatus*** (Schur) Melderis	13	1067	
748	***Elymus repens*** (L.) Gould	15	678b	
749	***Festuca drymeja*** Mert. & W.D.J.Koch	15	494	EuSib
750	**** Helictotrichon versicolor*** (Vill.) Schult. & Schult.f.	2.1	1843;1856;609	EuSib
751	***Hordeum bulbosum*** L.	7;9;17;11.2	794;416;917;1057	
752	***Hordeum murinum*** L. subsp. ***leporinum*** (Link) Arcang.	18.1	1935;1940	IrTu
753	***Holcus lanatus*** L.	13.1	1105	EuSib
754	***Koeleria pyramidata*** (Lam.) P.Beauv.	17	938	EuSib
755	***Lolium perenne*** L.	15	1308;678a	EuSib
756	***Melica ciliata*** L. subsp. ***ciliata***	3;3.1;7	2151;2291	
757	**** Phleum aIpinum*** L.	1.1	406	EuSib
758	***Poa angustifolia*** L.	15	499	
759	***Poa annua*** L.	1;1.1;13.1	408;1617	
760	***Poa asiaeminoris*** H.Scholz & Byfield	1	446	
761	***Poa bulbosa*** L.	1.1;13;19	404;207;600;602	
762	***Poa pratensis*** L.	1	173	
763	**** Poa sterilis*** M.Bieb.	7;15	323;495;405	
764	***Poa trivialis*** L.	1.1;17	409;227	
765	***Sesleria alba*** Sm.	17	2219	
766	***Trisetum flavescens*** (L.) P.Beauv.	17	221	EuSib
	TYPHACEAE			
767	***Typha latifolia*** L.	3	1449	

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