



## Geophytes of East Anatolia (Turkey)

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### Abstract

Our country, in general, is rich in plant species such as bulbs, rhizomes, and tuberous which are economically very important and called as "geophyt". Amaryllidaceae, Asparagaceae, Colchicaceae, Iridaceae, Liliaceae and Orchidaceae are some of the most significant geophyt family in our country. The members of this family have a great economic potential many of which in medicinal and aromatic terms, apart from being used as an ornamental plant. Because of the reasons that they usually bloom in early spring or at the end fall, have a wide range of ecological tolerance, are grown easily and can bloom in a very short time after planted, they are of the ornamental plants which are sought in most of the world and widely used in landscaping. In scope of this study, plant flora of East Anatolia was prepared by presenting statistical up-to-date information of the genus and species belonging to this genus, subspecies and varieties which are belong to geophyt plant family (Amaryllidaceae, Araceae, Asparagaceaea, Colchicaceae, Iridaceae, Ixioliriaceae, Liliaceae, Orchidaceae and Xanthorrhoeaceae) present in the east of Turkey

*Keywords: Geophytes, East Anatolia, Turkey*

## Doğu Anadolu'nun (Türkiye) Geofit'leri

### Özet

Ülkemiz, genel olarak "geofit" olarak adlandırılan ve ekonomik açıdan çok önemli olan soğanlı, rizomlu, ve yumrulu bitki türleri açısından oldukça zengindir. Amaryllidaceae, Asparagaceae, Colchicaceae, Iridaceae, Liliaceae ve Orchidaceae ülkemizdeki başlıca önemli bazı geofit familyalarıdır. Bu familyaların mensupları süs bitkisi olarak kullanılmalarının dışında, birçoğu tıbbi ve aromatik açıdan büyük bir ekonomik potansiyele sahiptir. Genellikle erken ilkbaharda veya sonbahar sonunda çiçek açmaları, ekolojik toleranslarının geniş olması, kolay yetiştirilebilmeleri ve dikildikten çok kısa bir süre sonra çiçeklenmeleri gibi nedenlerden dolayı dünyanın birçok yerinde aranan ve yaygın olarak çevre düzenlemelerinde kullanılan süs bitkileridir. Bu çalışma kapsamında Türkiye'nin doğusunda bulunan geofit bitkilerinin (Amaryllidaceae, Araceae, Asparagaceae, Colchicaceae, Iridaceae, Ixioliriaceae, Liliaceae, Orchidaceae ve Xanthorrhoeaceae) familyalarına ait cins ve bu cinslere ait tür, alttür ve varyetelerin istatistiksel son güncel bilgilerini ortaya koyarak Doğu Anadolu'nun soğanlı bitki florası hazırlanmıştır.

*Anahtar kelimeler: Geofit, Doğu Anadolu, Türkiye*

## 1. INTRODUCTION

The term geophyt was first used by Danish botanist Christian Raunki. Geophytes are included magnoliophyta (angiosperms) group and have an important place in the world's flowering flora. Geophytes constitute about 6,5-7% of over 250,000 flowering plant species. Geophytes are in almost everywhere of world, but many of the origins are in the Mediterranean basin [1]. Almost all of them are plants with economic and medical importance [1, 2]. Geophyt plants species in Turkey are under the threat due to the reasons such as land clearing and overgrazing, industrialization, agricultural challenges, forest fires, road widening and new road opening activities of highways, unauthorized collectors and using some of them as export product [3, 4].

Amaryllidaceae family is represented by about 60 species and over 800 species throughout the world. Species belonging to the Amaryllidaceae family are spread in North America, Europe, Asia, Australia and tropical regions of Africa. The majority of family members choose tropical or subtropical climates, and also some of them grow in hot zones. Amaryllidaceae family has 6 species which spread in our country; *Allium*, *Galanthus*, *Sternbergia*, *Narcissus*, *Leucojum* and *Pancreatum* [5]. *Allium* genus is represented by 179 species in Turkey [5]. There are more than 800 species belonging to the genus *Allium* in the world [6]. Species within the genus *Allium* divide among themselves. *Allium* is a plant genus that includes well-known species such as onion, garlic, and leek. The species that include in species group, Clove or bulb of which is like garlic smell, generally indicates expansion area in the Northern Hemisphere region covering the eastern part of Europe and western Asia [7]. Some *Allium* species consumed locally in Turkey are called as körmən, kaya sarımsağı, yabani sarımsak, yabani soğan, it soğanı and çoban sarımsağı and are used for nutrient or therapeutic purposes [8].

Araceae family is represented by about 117 genera and over 8,000 species throughout the world. In our country, there are 9 genera and 42 species of them [5]. Genera that spread in our country are; *Arum*, *Arisarum*, *Biarum*, *Colocasia*, *Drancunculus*, *Eminium*, *Lemma*, *Spirodela* and *Zantedeschia* [5].

Asparagaceae family has 19 species which spread in our country; *Agave*, *Anthericum*, *Asparagus*, *Bellevalia*, *Convallaria*, *Danae*, *Drimia*, *Fessia*, *Hyacinthella*, *Hyacinthus*, *Muscari*, *Ornithogalum*, *Polianthes*, *Polygonatum*, *Prospero*, *Puschkinia*, *Ruscus*, *Scilla* and *Yucca* [5]. There are about 300 species of the genus *Asparagus* on the earth. And, in Turkey they are represented by 12 species 3 of which is endemic [5]. Some members of the *Asparagus* are important in terms of food, (*A. officinalis*), ornamental plants (*A. asparagoides*, *A. medeloides*, *A. plumosus*, *A. sandens*, *A. setaceus*, *A. sprenger*), and pharmacy [9]. As *Asparagus* species comprise steroidal saponins and sapogenol, they have important medical uses. Therefore, usually underground and sometimes the above-ground portion of the body are used for different purposes [10]. *Bellevalia* genus is represented by about 74 species on the earth, and in our country it is represented by 25 species 15 of which are endemic [11, 12, 13, 14, 5, 15, 16, 17, 18]. *Muscari* species are represented on Earth by about 40 species and in Turkey by 30 species 19 of which are endemic [5]. Most of the *Muscari* species are used as ornamentals. Some species of them (*M. comos*) consumed as food and have medical importance. Onions of some species are used internally as infusion, urinary increasing and expectorant, and externally as boil ripening. There are about 180 species of *Ornithogalum* genus on the earth. And in our country they are represented by 61 species 30 of which are endemic [5]. *Puschkinia* species are represented by four species on earth; and four of them are in our country [5]. *Scilla* genus is represented by about 80 species on earth, and in Turkey by a hybrid and 19 species 8 of which are endemic [5, 18].

Colchicaceae family is represented by 15 genus and 225 species throughout the world. *Colchicum* is the only genus of Colchicaceae family that spread in our country [5]. *Colchicum* genus is represented in Turkey by 47 species 21 of which are endemic [5]. The majority of *Colchicum* species is examined in terms of the amount of alkaloids in the seeds and tuber, and has been shown that there is in all of them. In addition, *Colchicum* species are

dangerous to humans and animals due to toxic alkaloids that they have. Poisoning in humans is seen by taking drugs with colchicine more than the medical amount [19, 4].

Iridaceae family is represented in more than 80 genera and about 1500 species worldwide. Iridaceae is cosmopolitan family and they are in North America, Europe, North Asia, Africa tropical regions and in Australia. Some species spread in frozen zones and Asia. Iridaceae family is represented by 5 genera in our country. They are *Crocus*, *Gladiolus*, *Gynandris*, *Iris* and *Romulea* [5]. Iridaceae family is grown as an ornamental plant in gardens and parks because of the beautiful flowers [5]. Tubers of *Crocus* species are eaten raw or cooked in the ashes in Turkey and also its meal is made. Some *Crocus* species are used as paint, medicine and perfume from of old [20]. *Crocus sativus* (saffron) has a long history of as a traditional treatment method and that it has anticarcinogenic, antimutagenic, immunomodulator and antioxidant-like properties was discovered by modern medicine [21]. *Crocus sativus* is used as a fabric dye and in perfumery especially in China and India [22]. *Crocus sativus* was an important crop plant during the Ottoman period and a large part of which product was exported. But gradually lost its importance and then has been cultivated in a very small area in Safranbolu [23, 24, 25]. Although there is no smell of *Gladiolus* flowers, they are popular and interesting plants because of their beautiful appearance, long endurance of cut flowers, easy production at low cost, easy protection against harmful ones, different colors, annual displacement ease, the length of the flowering season, rapid reproduction and easy production of new species popular because of the and related attractive are plants [26].

Ixioliriaceae family is available in our country with a worldwide genus. *Ixiolirion* genus is represented by 4 species in the World and by a single species in our country.

Liliaceae family is represented by 17 genera and about 850 species worldwide [27]. According to current classification, some types of families are collected under the Xanthorrhoeaceae, Amaryllidaceae and Asparagaceae families. Liliaceae family is represented by 5 genera in our country. These are *Erythronium*, *Fritillaria*, *Gagea*, *Lilium* and *Tulipa* [5]. Used both as ornamental plants and for medical purposes, *Fritillaria* species have a high economic importance for Turkey [28]. Because of showy flowers, *Fritillaria imperialis*, *F. persica* and *F. meleagris* species are the major species traded. The trade of *F. imperialis* and *F. persica* species has importance in Turkey and are exported on condition that to be cultural [29, 30]. Besides being an ornamental plant, the onions of some *Fritillaria* species such as primarily *F. cirrhosa* including *F. unibracteata*, *F. przewalski* and *F. delavan* are used as an important drug against coughing, high blood pressure and as expectorant in traditional Chinese medicine for thousands of years [28].

Ochidaceae family is represented worldwide by approximately 850 genera and about 20,000 species. Ochidaceae family is represented by 22 genera in our country. They are; *Anacamptis*, *Cephalanthera*, *Coeloglossum*, *Corallorhiza*, *Dactylorhiza*, *Epipactis*, *Epigonium*, *Gennia*, *Goodyera*, *Gymnadenia*, *Himantoglossum*, *Limodorum*, *Listera*, *Neotinea*, *Neottia*, *Ophrys*, *Orchis*, *Platanthera*, *Serapias*, *Spiranthes*, *Steveniella* and *Traunsteinera* [5]. In our country, ovoid nodular such as *Anacamptis*, *Ophrys*, *Himantoglossum*, *Serapias*, *Barlia* and different types of spiny nodular *Dactylorhiza* orchids are used to obtain sahlep. Although sahlep is obtained from nodular orchids, all genera of them are not suitable for this purpose. There is information about that sahlep is obtained from *Orchis* species mostly [31]. In recent years, sahlep, which is used as raw materials of food and medicine, is obtained from nodular of *Platanthera* orchids. Sahlep, which has been drug in Anatolia throughout centuries, was used as curative against malaria, arthritis, dysentery, cough, headache and wounds. Sahlep substance, which is used to make ice cream and sahlep, is obtained from nodular of sahlep plants [32].

Xanthorrhoeaceae family is represented by about 34 genera and over 3000 species worldwide. And there are 6 genera and 29 species which spread in our country [5]. The genera that spread in our country are; *Aloe*, *Asphodeline*, *Asphodelus*, *Eremurus*, *Hemerocallis* and *Kniphofia* [5].

## 2. MATERIAL and METHOD

The material of this study includes different field studies carried out in parts of Kars, Ağrı, Van, Hakkâri, Muş, Bitlis, Bingöl, Tunceli, Elazığ, Malatya, Erzincan and Erzurum (Figure 1), and in southern east of Sivas and

Kayseri, north edge of Kahramanmaraş and North parts of Diyarbakır and Adıyaman which are in A7, A8, A9, B6, B7, B8, B9, B10, C9 and C10 (Figure 2) squares according to grid system that is used in Turkey Flora between the years 1999-2014. According to data of floristic studies conducted in these provinces and their surroundings most of the existing plants have been collected and samples have been pressed in the field in accordance with the herbarium rules, onion samples have been taken, locality information and population observations have been carefully recorded, and macro and general photos of natural state of the plant that may reflect in the best way have been taken. The collected samples are kept in Mehmet Fırat’s collection to form herbarium in the future. And the information of collected species’ spreading has been in works titled ‘Flora of Turkey and the East Aegean Islands’, ‘Flora Orientalis’ and ‘Türkiye Bitkileri Listesi’. Samples are diagnosed according to [11, 12, 13]. New species published in the years 2013 and 2014 have been included [33, 34, 35, 36, 37].

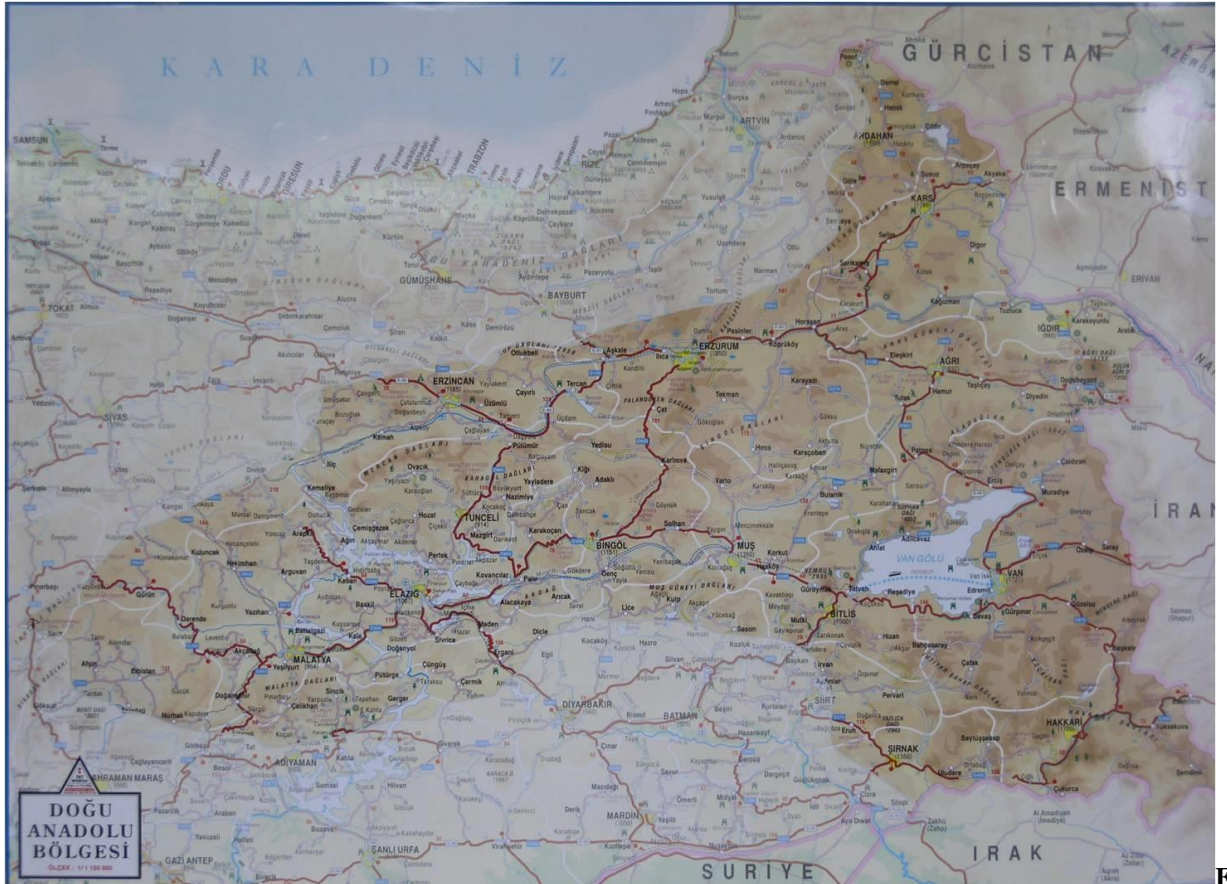


Figure 1. The map according to provinces of research field

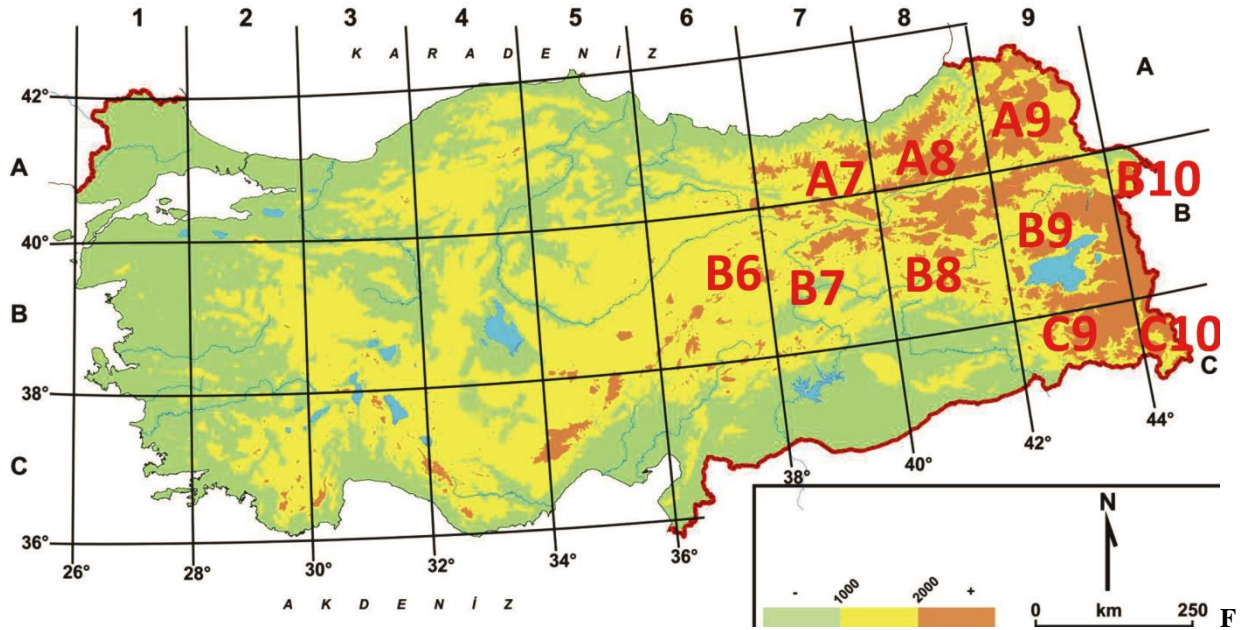


Figure 2. The map according to grid system of the research field

### 3. RESULTS

#### 3.1. Floristic list

##### AMARYLLIDACEAE

1. *Allium affine* Ledeb. **B8, B9, C10**; (Figure 3)
2. *A. akaka* S.G.Gmel. ex Schult. & Schult.f. **B8, B9, C10**; (Figure 3)
3. *A. ampeloprasum* L. **B9, C9**; (Figure 3)
4. *A. anacoleum* Hand.-Mazz **B8, B9, C9, C10**; (Figure 3)
5. *A. arlgirdense* Blakelock **C10**; (Figure 3)
6. *A. armenum* Boiss. & Kotschy **A8, B7, B8, B9 ENDEMIC**; (Figure 3)
7. *A. artvinense* Misch. **B8**
8. *A. asperiflorum* Misch. **B7 ENDEMIC**
9. *A. atroviolaceum* Boiss. **A9, B7, B8, B9, C9**; (Figure 3)
10. *A. aucheri* Boiss. **A9, B7, B9**; (Figure 3)
11. *A. balansae* Boiss. **A8, B7**
12. *A. baytopiorum* Kollmann & Özhatay **A9 ENDEMIC**
13. *A. callidictyon* C.A.Mey. ex Kunth **B7, B8, B9**
14. *A. calocephalum* Wendelbo **C9**; (Figure 3)
15. *A. cardiostemon* Fisch. & C.A.Mey. **A8, A9, B7, B8, B9, B10, C10**; (Figure 3)
16. *A. chrysantherum* Boiss. & Reut. **B7, B8, B9, C10**; (Figure 3)
17. *A. colchicifolium* Boiss. **B7**
18. *A. czelghauricum* Bordz. **A9 ENDEMIC**
19. *A. decipiens* Fisch. ex Schult. & Schult.f. subsp. *decipiens* **B7**
20. *A. denudatum* F.Delaroche **A9**
21. *A. dictyoprasum* C.A.Mey. ex Kunth **A9, B6, B7, B8, B9, B10, C9, C10**; (Figure 3)
22. *A. djimilense* Boiss. ex Regel **A9, B7**
23. *A. erzincanicum* N. Özhatay & Kandemir **B7 ENDEMIC**
24. *A. flavum* L. subsp. *tauricum* (Besser ex Rchb.) Stearn var. *tauricum*. **A9, B9, C9**; (Fig. 3)
25. *A. fuscoviolaceum* Fomin **A8, A9, B9, B10**; (Figure 3)
26. *A. giganteum* Regel **C9**

27. *A. glumaceum* Boiss. & Hausskn **A9 ENDEMIC**
28. *A. guttatum* Stev. subsp. *guttatum*. **B7, B9**; (Figure 3)
29. *A. guttatum* Stev. subsp. *sardoum* (Moris) Stearn **C9**
30. *A. hymenorrhizum* Ledeb. var. *hymenorrhizum*. **A9**
31. *A. kharputense* Freyn & Sint. **B6, B7, B8, B9, B10, C9, C10**; (Figure 3)
32. *A. koenigianum* Grossh. **A9 ENDEMIC**
33. *A. kossoricum* Fomin **A8, A9**
34. *A. kunthianum* Vved **B7**
35. *A. longicuspis* Regel **B9, C9**
36. *A. longisepalum* Bertol **C9**; (Figure 3)
37. *A. microspathum* Ekberg **B9, C9 ENDEMIC**; (Figure 3)
38. *A. nabelekii* Kamelin & Seisums **B8**
39. *A. nemrutdaghense* Kit Tan & Sorger **A7, B6 ENDEMIC**
40. *A. noeahirensis* Koyuncu & Kollmann **B7 ENDEMIC**
41. *A. noeanum* Reut. ex Regel **B7, C9, C10**; (Figure 4)
42. *A. oltense* Grossh. **A8, A9**
43. *A. oreophilum* C.A.Mey. **A9, B9**; (Figure 4)
44. *A. pallens* L. subsp. *pallens*. **B7, B9, C9**; (Figure 4)
45. *A. paniculatum* L. subsp. *paniculatum*. **B7, B9, A9**; (Figure 4)
46. *A. pseudoalbidum* N.Friesen & Özhatay **A9**
47. *A. pseudoampeloprasum* Misch. ex Grossh. **B8, B9**; (Figure 4)
48. *A. pseudoflavum* Vved **A9, B7, B9, B10**
49. *A. purpureoviride* Koyuncu & İ.Genç **B8, C9 ENDEMIC**
50. *A. pustulosum* Boiss. & Hausskn. **B6, B7**
51. *A. rhetoreanum* Nab. **C9, C10 ENDEMIC**; (Figure 4)
52. *A. roseum* L. subsp. *roseum*. **B7**
53. *A. rubellum* M. Bieb. **B9**
54. *A. rupestre* Steven **B8, B9**
55. *A. scabriscapum* Boiss. & Kotschy **B9, C10**; (Figure 4)
56. *A. schoenoprasum* L. **A9, B7, B8, B9, C9, C10**; (Figure 4)
57. *A. scorodoprasum* L. subsp. *jajlæ* (Vved.) Stearn **B8, B9**; (Figure 4)
58. *A. scorodoprasum* L. subsp. *waldsteinii* (G.Don) Stearn **A9, B8, B9**
59. *A. serpentinicum* İ. Genç & N. Özhatay **A8**
60. *A. shatakiense* Rech.f. **B8, B9, C9, C10**; (Figure 4)
61. *A. shirnakiense* L.Behçet & Rüstemoğlu **C9 ENDEMIC**; (Figure 4)
62. *A. sintenisii* Freyn **B7 ENDEMIC**
63. *A. sivasicum* Özhatay & Kollmann **B7, B8 ENDEMIC**
64. *A. sosnowskyanum* Misch. **A8, A9, B8**
65. *A. stamineum* Boiss. **B9**; (Figure 4)
66. *A. stearnianum* Koyuncu, Özhatay & Kollmann subsp. *vanense* Kollmann & Koyuncu **B9, C9 ENDEMIC**; (Figure 4)
67. *A. stipitatum* Regel **B9, C9, C10**; (Figure 4)
68. *A. szovitsii* Regel **B8, B9**; (Figure 4)
69. *A. tauricola* Boiss. **B8, B9, C9 ENDEMIC**; (Figure 4)
70. *A. tchihatschewii* Boiss. **B9, C9**; (Figure 4)
71. *A. trachycoleum* Wendelbo **C10**; (Figure 4)
72. *A. tripedale* Trautv **B8, B9, C9, C10**; (Figure 5)
73. *A. tuncelianum* (Kollmann) Özhatay, B.Mathew & Şiraneci **B7 ENDEMIC**
74. *A. vineale* L. **B6, B8, B9, C9**; (Figure 5)
75. *A. wendelboanum* Kollmann **B9 ENDEMIC**
76. *A. woronowii* Misch. ex Grossh. **A9**
77. *A. zebdanense* Boiss. & Noë **A9**; (Figure 5)
78. *Narcissus poeticus* L. subsp. *poeticus*. **B9**; (Figure 5)
79. *N. tazetta* L. subsp. *tazetta*. **C9, C10**; (Figure 5)
80. *Sternbergia clusiana* (Ker Gawl.) Ker Gawl. ex Spreng. **B6, B7, B9, C10**; (Figure 5)
81. *S. vernalis* (Mill.) Gorer & J.H.Harvey **B9, C9**; (Figure 5)

## ARACEAE

82. *Arum elongatum* Steven **B8, B9, B10, C9**; (Figure 5)
83. *A. rupicola* Boiss. var. *rupicola*. **B7, B8 ENDEMIC**
84. *A. rupicola* Boiss. var. *virescens* (Stapf) P.C.Boyce **B7**
85. *Biarum bovei* Blume **B8**; (Figure 5)
86. *B. carduchorum* (Schott) Engl **B7, B8, C9**; (Figure 5)
87. *Eminium intortum* (Banks & Sol.) Kuntze **B8**
88. *E. rauwolfii* (Blume) Schott var. *rauwolfii*. **A8, B7, C9**; (Figure 5)

## ASPARAGACEAE

89. *Asparagus officinalis* L. subsp. *officinalis*. **B10**
90. *A. palaestinus* Baker **B10**
91. *A. persicus* Baker **B7, B8, B9, C9, C10**; (Figure 5)
92. *A. verticillatus* L. **C9**
93. *Bellevalia anatolica* B.Mathew & Özhatay **B7 ENDEMIC**
94. *B. crassa* Wendelbo **B7 ENDEMIC**
95. *B. chrisii* Yıldırım & B. Şahin **B7 ENDEMIC**
96. *B. fominii* Woronow **B7, B8, B9**; (Figure 5)
97. *B. forniculata* (Fomin) Delaunay **A8, A9, B7, B8**
98. *B. glauca* (Lindl.) Kunth **B7**
99. *B. hakkariensis* Fırat **C10 ENDEMIC**; (Figure 5)
100. *B. kurdica* Fırat **C9 ENDEMIC**; (Figure 5)
101. *B. kurdistanica* Feinbrun **C9, C10**; (Figure 5)
102. *B. leucantha* K.Perss. **B8 ENDEMIC**
103. *B. longistyla* (Miscz.) Grossh **B9**
104. *B. malatyaensis* Uzunh. & H.Duman **B6 ENDEMIC**
105. *B. olivieri* (Baker) Wendelbo **C9**
106. *B. paradoxa* (Fisch. & C.A.Mey.) Boiss. **A9**
107. *B. rixii* Wendelbo **B9 ENDEMIC**; (Figure 5)
108. *B. siirtensis* Fırat **C9 ENDEMIC**; (Figure 5)
109. *B. speciosa* Woronow ex Grossh. **A9, B6, B7, B8, B9**; (Figure 6)
110. *Convallaria majalis* L. **A9, B8**
111. *Hyacinthella acutiloba* K.Perss. & Wendelbo **B7 ENDEMIC**
112. *H. siirtensis* B.Mathew **B9 ENDEMIC**; (Figure 6)
113. *Hyacinthus orientalis* L. subsp. *chionophilus* Wendelbo **B7 ENDEMIC**
114. *Muscari armeniacum* Leichtlin ex Baker **A7, A8, A9, B6, B7, B8, B9, B10, C9, C10**; (Figure 6)
115. *M. aucheri* (Boiss.) Baker **B7 ENDEMIC**
116. *M. azureum* Fenzl **B7 ENDEMIC**
117. *M. caucasicum* (Griseb.) Baker **A9, B8, B9, B10, C10**; (Figure 6)
118. *M. coeleste* Fomin **A9, B7, B8, B10 ENDEMIC**; (Figure 6)
119. *M. comosum* (L.) Mill. **B8, B9, C9**
120. *M. longipes* Boiss. **B7, B8**
121. *M. massayanum* C.Grunert **B7 ENDEMIC**
122. *M. neglectum* Guss. ex Ten. **B9, B10**; (Figure 6)
123. *M. tenuiflorum* Tausch **A9, B8, B10, C9, C10**; (Figure 6)
124. *Ornithogalum arcuatum* Steven **B7, B9, B10, C9, C10**; (Figure 6)
125. *O. luschanii* Stapf. **B8 ENDEMIC**
126. *O. malatyanum* Mutlu **B7 ENDEMIC**
127. *O. montana* Cirillo **A9, B8, B9, C10 ENDEMIC**; (Figure 6)
128. *O. munzurensense* Speta **B7 ENDEMIC**
129. *O. narbonense* L. **A9, B6, B7, B8, B9, B10, C10**; (Figure 6)
130. *O. navaschirii* Agapova **B8**
131. *O. oligophyllum* E.D.Clarke **A9, B8, B9, B10, C10**; (Figure 6)
132. *O. orthophyllum* Ten. subsp. *kochii* (Parl.) Maire & Weiller **A9, C10**
133. *O. persicum* Hausskn. ex Bornm. **B7, C10**; (Figure 6)
134. *O. pyrenaicum* L. **A7, B7**; (Figure 6)
135. *O. sphaerocarpum* A.Kern. **B8**; (Figure 6)
136. *O. transcaucasicum* Miscz. ex Grossh. **B8**

137. *O. umbellatum* L. **C9**
138. *O. wiedemannii* Boiss. var. *wiedemannii*. **B9**
139. *Polygonatum sibiricum* Redoute **B7**
140. *Prospero seisumsana* (Rukšans&Zetterl.) Yıldırım **B9 ENDEMIC**; (Figure 6)
141. *Puschkinia bilgineri* Yıldırım **B9, C10 ENDEMIC**; (Figure 6)
142. *P. kurdica* Rukšāns **B9, C10 ENDEMIC**; (Figure 6)
143. *P. peshmenii* Rix & B.Mathe **B9, C10 ENDEMIC**; (Figure 6)
144. *P. scilloides* Adams **A8, A9, B7, B8, B9, B10, C9, C10**; (Figure 7)
145. *Scilla leepii* Speta **B7, B9 ENDEMIC**; (Figure 7)
146. *S. persica* Hausskn **C9, C10**; (Figure 7)
147. *S. siberica* Haw. subsp. *armena* (Grossh.) Mordak **A9, B8, B9, B10, C9**; (Figure 7)

#### COLCHICACEAE

148. *Colchicum hirsutum* Stef. **B8**
149. *C. kotschy* Boiss. **B8, B9, C9, C10**; (Figure 7)
150. *C. kurdicum* (Bornm.) Stef. **B9, C9, C10**; (Figure 7)
151. *C. lagotum* K.Perss. **B8**
152. *C. munzurense* K.Perss. **B7 ENDEMIC**
153. *C. raddeanum* (Regel) K.Perss. **B7**
154. *C. serpentinum* Woronow ex Misch. **A9**
155. *C. soboliferum* (Fisch & C.A.Mey.) Stef. **B7, B9, C10**; (Figure 7)
156. *C. szovitsii* Fisch. & C.A.Mey. subsp *szovitsii*. **A9, B7, B8, B9, B10, C9, C10**; (Figure 7)
157. *C. trigynum* (Steven ex Adam) Stearn **B7, B8, B9, B10, C10**; (Figure 7)
158. *C. triphyllum* Kunze **B7**

#### IRIDACEAE

159. *Crocus ancyrensis* (Herb.) Maw **B6, B7 ENDEMIC**
160. *C. biflorus* Mill. subsp. *pseudonubigena* B.Mathew **B8, B9, C9 ENDEMIC**; (Figure 7)
161. *C. biflorus* Mill. subsp. *tauri* (Maw) B.Mathew **A7, A8, A9, B6, B7, B8, B9, C10**; (Figure 7)
162. *C. cancellatus* Herb. subsp. *damascenus* (Herb.) B.Mathew **B6, B7, B9, C10**; (Figure 7)
163. *C. karduchorum* Kotschy ex Maw **B9 ENDEMIC**; (Figure 7)
164. *C. kotschyanus* K.Koch subsp. *cappadocicus* B.Mathew **B7, B8 ENDEMIC**
165. *C. kotschyanus* K.Koch subsp. *hakkariensis* B.Mathew **C10 ENDEMIC**; (Figure 7)
166. *C. kotschyanus* K.Koch subsp. *kotschyanus*. **B6, B9**; (Figure 7)
167. *C. kotschyanus* K.Koch subsp. *suworowianus* (K.Koch) B.Mathew **A7, A8, A9, B7**
168. *C. leichtlinii* (Dewar) Bowles **B7 ENDEMIC**
169. *C. pallasii* Goldb. subsp. *pallasii*. **B6, B7**
170. *C. pallasii* Goldb. subsp. *turcicus* B.Mathew **B7**
171. *Gladiolus antakiensis* A.P.Ham. **C9**; (Figure 7)
172. *G. atrovioleaceus* Boiss. **B9, B10, C9**; (Figure 7)
173. *G. attilae* Kit Tan, B.Mathew & A.Baytop **B8 ENDEMIC**; (Figure 7)
174. *G. kotschyanus* Boiss. **A8, A9, B7, B9, C9, C10**; (Figure 7)
175. *Gynandriris sisyrinchium* (L.) Parl. **C9**; (Figure 7)
176. *Iris aphylla* L. **B8**; (Figure 8)
177. *I. atropatana* Grossh. **B8**
178. *I. aucheri* (Baker) Sealy **B7, B8, B9, C9, C10**; (Figure 8)
179. *I. barnumiae* Foster & Baker **B9, B10, C9, C10**; (Figure 8)
180. *I. caucasica* Hoffm. subsp. *caucasica*. **A9, B9**
181. *I. caucasica* Hoffm. subsp. *turcica* B.Mathew **A7, A8, A9, B6, B7, B8, B9, B10, C10**; (Figure 8)
182. *I. danfordiae* (Baker) Boiss. **A7, A8, B6, B7, B8**
183. *I. elegantissima* Sosn. **A8, B8, B9, B10**; (Figure 8)
184. *I. galatica* Siehe **A7, A8, B6, B7 ENDEMIC**
185. *I. × germanica*. L **A7**
186. *I. kerneriana* Asch. & Sint. ex Baker **B7 ENDEMIC**
187. *I. lycotis* Woron. **C10**; (Figure 8)
188. *I. paradoxa* Steven f. *choschab* (Hoog) B.Mathew & Wendelbo **B9, C10**; (Figure 8)
189. *I. persica* L. **B7, B8, B9, B10, C9, C10**; (Figure 8)
190. *I. peshmeniana* Güner & T.Hall **B7 ENDEMIC**
191. *I. pseudocauucasica* Grossh. **B8, B9, C9**; (Figure 8)



192. *I. reticulata* M.Bieb. var. *kurdica* Rukšans **B9, C9 ENDEMIC**; (Figure 8)  
193. *I. reticulata* M.Bieb. var. *reticulata*. **A9, B7, B8, B9, C9, C10**; (Figure 8)  
194. *I. sari* Schott ex Baker **A8, B6, B7, B8, B9 ENDEMIC**; (Figure 8)  
195. *I. spuria* L. subsp. *musulmanica* (Fomin) Takht. **A9, B8, B9, B10, C9, C10**; (Figure 8)  
196. *I. stenophylla* Hausskn. ex Baker subsp. *stenophylla*. **B6**  
197. *I. taochia* Woronow ex Grossh. **A8, A9, B8 ENDEMIC**; (Figure 8)  
198. *I. urmiensis* Hoog **B9, C9**; (Figure 8)  
199. *I. zagrica* B.Mathew & Zarrei **C10**; (Figure 8)

#### **IXIOLIRIACEAE**

200. *Ixiolirion tataricum* (Pall.) Schult. & Schult.f. var. *tataricum*. **B6, B7, B8, B9, C9, C10**; (Figure 8)

#### **LILIACEAE**

201. *Fritillaria alburyana* Rix **B7, B8, B9 ENDEMIC**  
202. *F. assyriaca* Baker subsp. *assyriaca*. **B8, B9**; (Figure 8)  
203. *F. aurea* Schott **B6 ENDEMIC**  
204. *F. baskilensis* Behcet **B7 ENDEMIC**  
205. *F. caucasica* Adam **A9, B8, B9, B10**; (Figure 9)  
206. *F. crassifolia* Boiss. & A. Huet subsp. *crassifolia*. **A7, B8 ENDEMIC**  
207. *F. crassifolia* Boiss. & A. Huet subsp. *hakkarensis* Rix **C10**; (Figure 9)  
208. *F. crassifolia* Boiss. & A. Huet subsp. *kurdica* (Boiss. & Noë) Rix **B8, B9, B10, C9, C10**; (Figure 9)  
209. *F. imperialis* L. **A9, B6, B7, B8, B9, C9, C10**; (Figure 9)  
210. *F. latifolia* Willd. **A7, A9, B7**  
211. *F. michailovskyi* Fomin **A9, B8 ENDEMIC**  
212. *F. minima* Rix **B9 ENDEMIC**; (Figure 9)  
213. *F. minuta* Boiss. & Noë **B8, B9, C9, C10**; (Figure 9)  
214. *F. persica* L. **C9**; (Figure 9)  
215. *F. pinardii* Boiss. **A7, B7, B8, B9, C9, C10**; (Figure 9)  
216. *F. straussii* Bornm. **C10**; (Figure 9)  
217. *F. uva-vulpis* Rix **B9**  
218. *G. bohémica* (Zauschn.) Schult. & Schult.f. **A7**  
219. *G. bulbifera* (Pall.) Salisb. **A7, A9, B7, B8, B9, B10**; (Figure 9)  
220. *G. chanae* Grossh. **A7, A9**  
221. *G. chlorantha* (M.Bieb.) Schult. & Schult.f. **B7**  
222. *G. chomutovae* (Pascher) Pascher **B8, B9**  
223. *G. confusa* A.Terracc. **B9, B10, C9, C10**  
224. *G. gageoides* (Zucc.) Vved. **B9, C10**  
225. *G. glacialis* K.Koch **A7, A9, B7, B8, B9**; (Figure 9)  
226. *G. granatellii* (Parl.) Parl. **A7, B7**  
227. *G. helenae* Grossh. **B9**  
228. *G. luteoides* Stapf **A9, B7, B8, B9, B10, C9, C10**; (Figure 9)  
229. *G. peduncularis* (C.Presl) Pascher **B8**  
230. *G. reticulata* (Pall.) Schult. & Schult.f. **A9**; (Figure 9)  
231. *G. taurica* Steven **A9, B7, B9, C9**  
232. *G. tenera* Pascher **B9**  
233. *G. uliginosa* Siehe & Pascher **B9, C9**; (Figure 9)  
234. *G. vanensis* Tekşen & Karaman **B9 ENDEMIC**  
235. *G. villosa* (M.Bieb.) Sweet var. *hermonis* Dafni & Heyn **A7, B9**  
236. *G. villosa* (M.Bieb.) Sweet var. *villosa*. **A7, B7, B8, B9, C10**  
237. *Lilium kesselringianum* Misch. **A9, B8**  
238. *L. monadelphum* M.Bieb. var. *szovitsianum* (Fisch. & Avé-Lall.) Elwes **A9**  
239. *Tulipa aleppensis* Boiss. ex Regel **B7**  
240. *T. armena* Boiss. var. *armena*. **A7, A8, B8, B9, C9, C10**; (Figure 9)  
241. *T. biflora* Pall. **B9**; (Figure 9)  
242. *T. humilis* Herb. **B9, C9, C10**; (Figure 9)  
243. *T. julia* K.Koch **A9, B9, C9, C10**; (Figure 9)  
244. *T. koyuncui* Eker & Babac **B9, C9 ENDEMIC**; (Figure 10)  
245. *T. sintenisii* Baker **B7, B8, B9, C9, C10 ENDEMIC**; (Figure 10)  
246. *T. sylvestris* L. var. *sylvestris*. **B9**; (Figure 10)

247. *T. systola* Stapf **C9**; (Figure 10)

#### ORCHIDACEAE

248. *Anacamptis pyramidalis* (L.) Rich. **A9, B6, B7, B8, C9**; (Figure 10)  
249. *Cephalanthera damasonium* (Mill.) Druce **A7, A9, B6, B7, B8**  
250. *C. kotschyana* Renz & Taubenheim **B7, B8, B9, C10 ENDEMIC**; (Figure 10)  
251. *C. kurdica* Bornm. ex Kraenzl. **A8, A9, B8, C9**; (Figure 10)  
252. *C. longifolia* (L.) Fritsch **A7, A8, A9, B7, B8, B9, C9**  
253. *C. rubra* (L.) Rich. **A7, A8, A9, B6, B7**  
254. *C. x taubenheimii* H.Baumann **B6 ENDEMIC**  
255. *Coeloglossum viride* (L.) Hartman **A7, A8, A9, B9**  
256. *Corallorhiza trifida* Châtel. **A7, A8, A9**  
257. *Dactylorhiza euxina* (Nevski) H.Baumann & Künkele subsp. *armeniaca* (Hedrén) Kreutz **A8, A9**  
258. *D. euxina* (Nevski) H.Baumann & Künkele subsp. *euxina*. var. *euxina*. **A8, A9, B8, B9**  
259. *D. euxina* (Nevski) H.Baumann & Künkele subsp. *euxina*. var. *markowitschii* (Soó) Renz & Taubenheim

#### **A7, A8, A9**

260. *D. iberica* (M.Bieb. ex Willd.) Soó **A7, A8, B6, B7, B8, B9, C9, C10**  
261. *D. incarnata* (L.) Soó subsp. *cruenta* (O.F.Müll.) P.D.Sell **B6**  
262. *D. x kopdagiana* H.Baumann **B8 ENDEMIC**  
263. *D. x nevskii* H.Baumann & Künkele **B8**  
264. *D. osmanica* (Klinge) P.F.Hunt & Summerh. var. *anatolica* (Nelson) Renz & Taubenheim **B6, B7**

#### ENDEMIC

265. *D. osmanica* (Klinge) P.F.Hunt & Summerh. var. *osmanica*. **A8, B6, B7, B8 ENDEMIC**  
266. *D. romana* (Seb.) Soó subsp. *georgica* (Klinge) Soó ex Renz & Taubenheim **A8, A8, A8, B6, B8, B9, B10**; (Figure 10)  
267. *D. umbrosa* (Karelin & Kirilow) Nevski var. *chuhensis* (Renz & Taubenheim) Kreutz **B9, C9**; (Figure 10)  
268. *D. umbrosa* (Karelin & Kirilow) Nevski var. *umbrosa*. **A8, A9, B8, B9, B10, C9, C10**  
269. *D. urvilleana* (Steudel) Baumann & Künkele subsp. *urvilleana*. **A7, A8, A9, B7, B8**  
270. *Epipactis helleborine* (L.) Crantz subsp. *helleborine*. **A7, A8, A9, B6, B7, B8, B9, C9, C10**  
271. *E. palustris* (L.) Crantz **B7, B8, C9, C10**  
272. *E. persica* (Soó) Hausskn. ex Nannf. **C10**  
273. *E. veratrifolia* Boiss. & Hohen. **A8, B9, C9**  
274. *Goodyera repens* (L.) R.Br. **A7, A8, A9**  
275. *Gymnadenia conopsea* (L.) R.Br. **A7, A8, A9, B6, B9, C10**  
276. *Himantoglossum affine* (Boiss.) Schltr. **B7, B8, C9**; (Figure 10)  
277. *H. comperianum* (Steven) P.Delforge **B8, B9, C9**  
278. *Limodorum abortivum* (L.) Sw. var. *abortivum*. **A7, A8, A9, B8, B9, C9**; (Figure 10)  
279. *Ophrys aramaeorum* P.Delforge **B8, C9 ENDEMIC**  
280. *O. bornmuelleri* M.Schulze subsp. *bornmuelleri*. **B8, B9, C9**  
281. *O. bornmuelleri* M.Schulze subsp. *carduchorum* Renz & Taubenheim **B8 ENDEMIC**  
282. *O. cilicica* Schltr. **B8, B9 ENDEMIC**  
283. *O. oestrifera* M.Bieb. subsp. *akcakarae* Kreutz **B7**  
284. *O. oestrifera* M.Bieb. subsp. *bremifera* (Steven) K.Richt. **B7**  
285. *O. oestrifera* M.Bieb. subsp. *oestrifera*. **A7, A9, B6, B7, B8, C9**; (Figure 10)  
286. *O. phrygia* H.Fleischm. & Bornm. **B7, B8, C9**  
287. *O. reinholdii* Spruner ex Fleischm. subsp. *straussii* (H.Fleischm.) E.Nelson **B7, B8, B9, C10**; (Figure 10)  
288. *O. schulzei* Bornm. & Fleischm. **C8, C9**  
289. *O. transhyrcana* Czerniak. subsp. *mouterdeana* (B.Baumann & H.Baumann) Kreutz **B7**  
290. *O. umbilicata* Desf. subsp. *khuzestanica* Renz & Taubenheim **C9**  
291. *Orchis anatolica* Boiss. **B8, C9**; (Figure 10)  
292. *O. collina* Banks & Sol. ex Russell **C9**; (Figure 10)  
293. *O. coriophora* L. subsp. *coriophora*. **A7, A8, A9, B6, B7, B8, B9, C9, C10**  
294. *O. laxiflora* Lam. subsp. *laxiflora*. **B7**  
295. *O. mascula* (L.) L. subsp. *longicalcarata* Akhalk. **B7, B8, B9**  
296. *O. mascula* (L.) L. subsp. *pinetorum* (Boiss. & Kotschy) G.Camus **A7, B6, B7, B8, B9, C9, C10**  
297. *O. pallens* L. **A7, A8**

298. *O. palustris* Jacq. subsp. *robusta* (T.Stephenson) Kreutz **A7, A8, A9, B6, B7, B8, B9, B10, C9, C10**; (Figure 10)  
 299. *O. punctulata* Steven ex Lindley **A7, A8, B7, B8, C9**  
 300. *O. purpurea* Huds. subsp. *caucasica* (Regel) B.Baumann **A7, A8, B7**  
 301. *O. simia* Lam. **A7, B8, C9**; (Figure 10)  
 302. *O. spitzelii* Sauter ex W.D.J.Koch. **B8, C9, C10**  
 303. *O. x timbalii* Velen. **B7, C9**  
 304. *O. tridentata* Scop. **A7, A8, B8, B9, C9, C10**; (Figure 10)  
 305. *Plantanthera chlorantha* (Cruster) Rechb. **A7, A8, B6, B8, C9**  
 306. *Serapias orientalis* (Greuter) H.Baumann & Künkele subsp. *levantina* (H.Baumann & Künkele) Kreutz **B8**  
 307. *Traunsteinera sphaerica* (M.Bieb.) Schltr. **A8, A9**

**XANTHORRHOEACEAE**

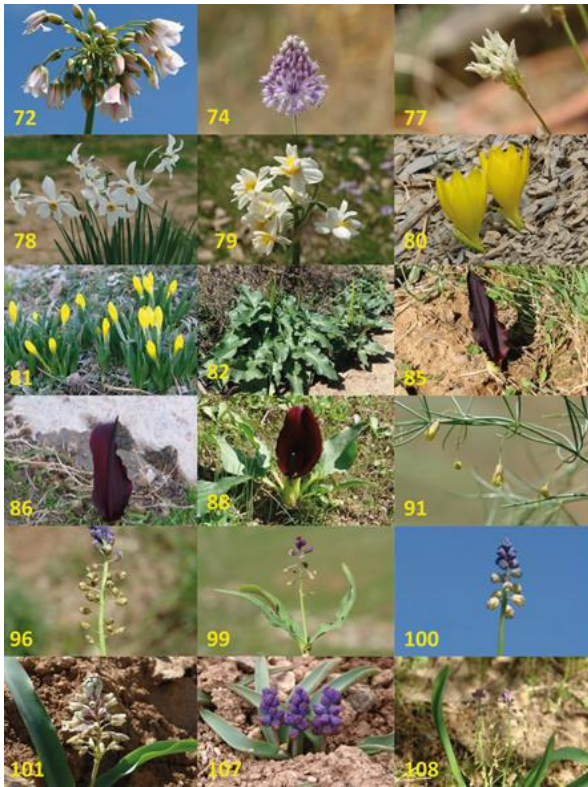
308. *Asphodeline damascena* (Boiss.) Baker subsp. *damascena*. **B7, B8**  
 309. *A. prolifera* (M.Bieb.) Kunth **A9**  
 310. *A. tenuior* (Fisch. ex M.Bieb.) Ledeb. var. *puberulenta* Tuzlaci **B7**  
 311. *A. tenuior* (Fisch. ex M.Bieb.) Ledeb. var. *tenuiflora*. **A8, A9, B6, B7**  
 312. *Eremurus cappadocicus* J.Gay ex Baker **B8**  
 313. *E. spectabilis* M.Bieb. **A8, A9, B8, B9, B10, C9, C10**



**Figure 3.** Geophytes between 1-37 according to the floristic list



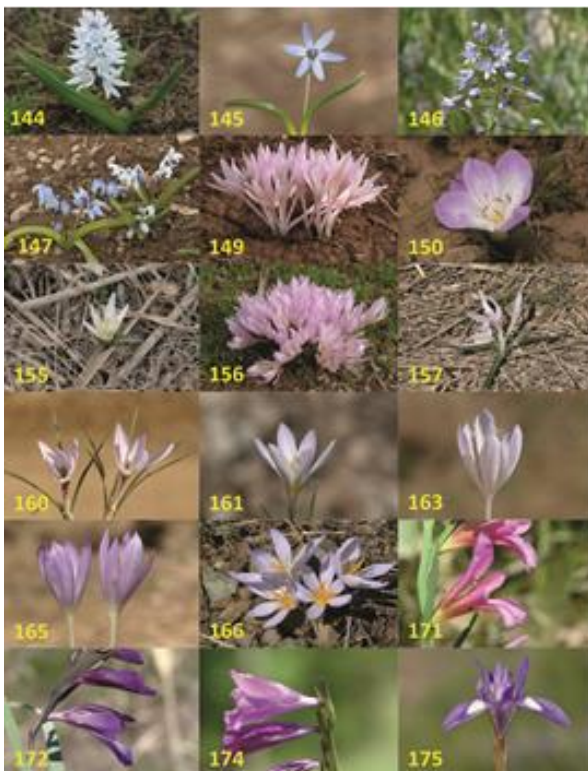
**Figure 4.** Geophytes between 41-71 according to the floristic list



**Figure 5.** Geophytes between 72-108 according to the floristic list



**Figure 6.** Geophytes between 109-143 according to the floristic list



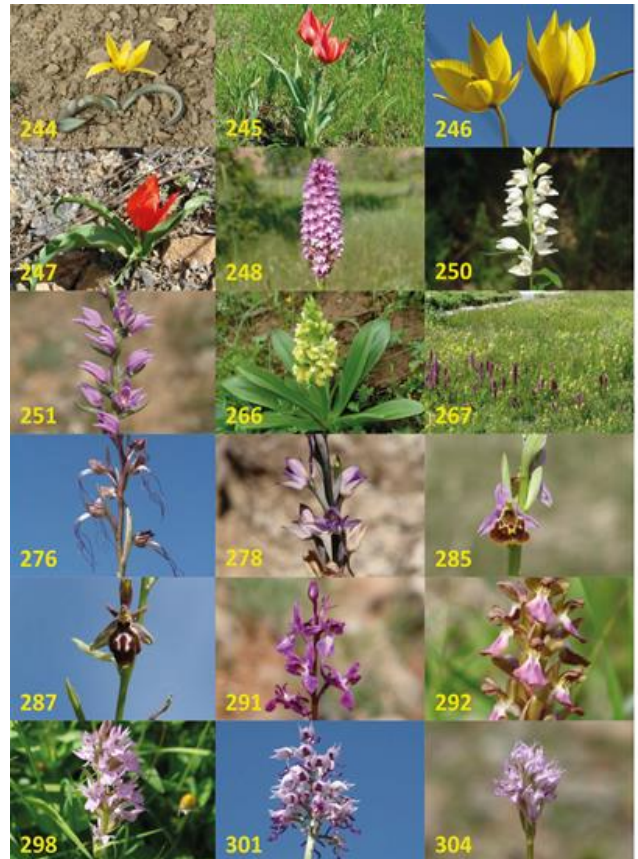
**Figure 7.** Geophytes between 144-175 according to the floristic list



**Figure 8.** Geophytes between 176-202 according to the floristic list



**Figure 9.** Geophytes between 205-243 according to the floristic list



**Figure 10.** Geophytes between 244-304 according to the floristic list

#### 4. DISCUSSIONS and CONCLUSION

The total number of vascular plants in the flora of Turkey is like this; 167 family, 1320 genus and 11707 taxa. And the main geophyt family in our country is Amaryllidaceae, Araceae, Asparagaceae, Colchicaceae, Iridaceae, Ixioliriaceae, Liliaceae, Orchidaceae and Xanthorrhoeacea. There are all of these families in our work area. Diagnosis of the samples collected in the field and literature study results show the distribution of all members of this family in our area.

Amaryllidaceae family has 6 species which spread in our country, and they are *Allium*, *Galanthus*, *Sternbergia*, *Narcissus*, *Leucojum* and *Pancreatium*. In the field of our study there spread 3 genera which are *Allium*, *Sternbergia* and *Narcissus*. There are 198 taxa of *Allium* genus in our country 65 (37%) of which are endemic and 77 taxa of it in our field of study of 21 (26%) of which are endemic. In our country there are 10 taxa and in our field of study there are 2 taxa of *Narcissus*. There is not endemic species in our country. 1 (20%) of 5 taxa of *Sternbergia* genus in our country is endemic and there are 2 taxa in our field of study.

Araceae family has 9 genera in our country, and they are *Arum*, *Arisarum*, *Biarum*, *Colocasia*, *Drancunculus*, *Eminium*, *Lemma*, *Spirodela* and *Zantedeschia*. And there are 3 genus in our field of study; *Arum*, *Biarum*, *Eminium*. There are 17 taxa of *Arum* genus in our country 3 (18%) of which are endemic and 3 taxa of it in our field of study 1(33%) of which is endemic. There are 10 taxa of *Biarum* genus in our country 2 (20%) of which are endemic and 2 taxa of *Biarum* genus in our field of study. There are 6 taxa *Eminium* genus in our country 1 (17%) of which is endemic and 2 taxa of *Eminium* genus in our field of study

Asparagaceae family has 19 genera in our country, and they are *Agave*, *Anthericum*, *Asparagus*, *Bellevalia*, *Convallaria*, *Danae*, *Drimia*, *Fessia*, *Hyacinthella*, *Hyacinthus*, *Muscari*, *Ornithogalum*, *Polianthes*, *Polygonatum*, *Prospero*, *Puschkinia*, *Ruscus*, *Scilla* and *Yucca*. And in our field of study there are 10 genus; *Asparagus*, *Bellevalia*, *Convallaria*, *Hyacinthella*, *Hyacinthus*, *Muscari*, *Ornithogalum*, *Polygonatum*, *Prospero*, *Puschkinia* and *Scilla*. There are 14 taxa of *Asparagus* genus in our country 3 (21%) of which are endemic and 3 taxa of *Asparagus* genus in our field of study. There are 33 taxa of *Bellevalia* genus in our country 11 (33%) of which are endemic and 15 taxa of it in our field of study 7 (47%) of which are endemic. There is 1 species of *Convallaria* in our country and field of study. There are 12 taxa of *Hyacinthella* genus in our country 10 (83%) of which are endemic and 2 taxa of it in our field of study 2 (100%) of which are endemic. There are 3 taxa of *Hyacinthus* genus in our country 1 (33%) of which is endemic, and 1 (%100) endemic taxa of *Asparagus* genus in our field of study. There are 30 taxa of *Muscari* genera in our country 19 (63%) of which are endemic, and 10 taxa of *Muscari* genera in the field of our study 4 (40%) of which are endemic.

There are 63 taxa of *Ornithogalum* genus in our country 32 (51%) of which are endemic, and 16 taxa of *Ornithogalum* genera in our field of study 4 (25%) of which are endemic. There is 1 of the 6 taxa of *Polygonatum* genus of our country in our field of study. There are 2 taxa of *Prospero* genus in our country 1 (50%) of which is endemic, and there is only one (100%) of them in our field of study that is endemic. There are 4 taxa of *Puschkinia* in our country and our field of study 3 (75%) of which are endemic. There 20 taxa of *Scilla* in our country 8 of which are endemic and 3 taxa in our field of study 1 (33%) of which is endemic.

The only genus of Colchicaceae family in our country is *Colchicum*, and there are 4 taxa of it in our country 22 (45%) of which are endemic and 11 taxa in our field of study 1 (9%) which is endemic.

Iridaceae family has 5 genus in our country and field of study; *Crocus*, *Gladiolus*, *Gynandris*, *Iris* and *Romulea* there are 79 taxa of *Crocus* genus in our country 53 (67%) of which are endemic and 12 taxa of it 6 of which (50%) are endemic. There are 11 taxa of *Gladiolus* genus in our country 5 (45%) of which are endemic and 4 taxa in our field of study 1 (25%) of which is endemic. There is only one species of *Gynandris* genus in our country and field of study. There are 57 taxa of *Iris* genus in our country 24(42%) of which are endemic and 24 taxa of it in our field of study 6(25%) of which are endemic.

Ixioliriaceae family is represented by only one species in our country and field of study.

Liliaceae family is represented by 5 genera in our country; *Erythronium*, *Fritillaria*, *Gagea*, *Lilium* and *Tulipa*, and by 4 genera in our field of study. There are 38 taxa of *Fritillaria* genus in our country 16(42%) of which are endemic and 17 taxa of it in our field of study 3(17%) of which are endemic. There are 31 taxa of *Gagea* genus in our country 4(13%) of which are endemic and 19 taxa of it in our field of study 1(5%) of which is endemic. *Lilium* genus is represented by 8 taxa in our country 2(25%) of which are endemic and 2 taxa in our field of study. There are 19 taxa of *Tulipa* genus in our country 3(15%) of which are endemic and 9 taxa of it in our field of study 2(22%) of which are endemic.

Ochidaceae family is represented by 22 genera in our country; *Anacamptis*, *Cephalanthera*, *Coeloglossum*, *Corallorhiza*, *Dactylorhiza*, *Epipactis*, *Epigonium*, *Gennia*, *Goodyera*, *Gymnadenia*, *Himantoglossum*, *Limodorum*, *Listera*, *Neotinea*, *Neottia*, *Ophrys*, *Orchis*, *Platanthera*, *Serapias*, *Spiranthes*, *Steniella* and *Traunsteinera*, and by 15 genera in our field of study. *Anacamptis* genus is represented by only one species in our country and field of study. There are 9 taxa of *Cephalanthera* genus in our country 3(33%) of which are endemic and 6 taxa of it in our field of study 2(33%) of which are endemic. *Coeloglossum* genus is represented by only one species in our country and field of study. *Corallorhiza* genus is represented by only one species in our country and field of study. There are 33 taxa of *Dactylorhiza* genus in our country 14(42%) of which are endemic and 13 taxa of it in our field of study 3(23%) of which are endemic. *Epipactis* genus is represented by 14 taxa in our country 2(14%) of which are endemic and by 4 taxa in our field of study. *Goodyera* genus is represented by only one species in our country and field of study. *Gymnadenia* genus is represented by only one species in our country and field of study. *Himantoglossum* genus is represented by 4 taxa in our country 1(25%) of which are endemic and by 2 taxa in our field of study. *Limodorum* genus is represented by 2 taxa in our country, and by 1 taxon in our field

of study. There are 88 taxa of *Ophrys* genus in our country 36(41%) of which are endemic and 12 taxa of it in our field of study 3(25%) of which are endemic. *Orchis* genus is represented by 50 taxa in our country and by 14 taxa in our field of study. *Platanthera* genus is represented by 4 taxa in our country and by 1 taxon in our field of study. *Serapias* genus is represented by 7 taxa in our country and by 1 taxon in our field of study. *Traunsteinera* genus is represented by 2 taxa in our country and by 1 taxon in our field of study.

Xanthorrhoeaceae family is represented by 6 genera in our country; *Aloe*, *Asphodeline*, *Asphodelus*, *Eremurus*, *Hemerocallis* and *Kniphofia*, and by 2 genera in our field of study. There are 23 taxa of *Asphodeline* genus in our country 11(47%) of which are endemic and 4 taxa in our country 1(25%) of which are endemic. *Eremurus* genus is represented by 2 taxa in our country and field of study.

The Geophyt are 9 families, 74 genera and 967 taxa in flora of Turkey 353(36%) of which are endemic and 44 genera and 313 taxa of 9 families in our field of study 83(27%) of which are endemic. Why the rate of endemism in East Anatolia is lower is due to having a very long border neighborhood with 4 countries. Geographical borders are not of consideration as they are drawn politically. However, as plants are endemic they should be evaluated according to geographic boundaries rather than to countries. According to this evaluation criterion the rate of onion plants' endemism in our field of study is much higher.

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