

Endemic plants of Lake Van Basin

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Van Gölü Havzası endemik bitkileri

Abstract: This study was carried out on endemic plants collected from the Lake Van basin between 1994 and 2002. As a result, 98 endemic taxa, 23 of which grow only in the Lake Van basin, were determined. Including the endemic taxa reported before from the region, a list of 259 endemic taxa belonging to 34 families and 117 genera were compiled. Twenty-three of 259 taxa listed, are unique to the Lake Van Basin. There are 249 endemic taxa in the VANF Herbarium. The authors collected 98 of them. The other 151 endemic taxa were determined by other researchers. Ten endemic taxa were recorded from the literature. In addition to the features in the Flora of Turkey, new features and variations of nine endemic taxa identified. Total 612 images and 200 pictures belonging to 98 endemic taxa scanned and transferred to computer. All images were uploaded to the web page, Virtual Herbarium of the Lake Van Basin, which is also a part of VANF Herbarium.

Key words: Endemic plants, taxonomy, IUCN, Turkey

Özet: Bu çalışma 1994-2002 yılları arasında Van Gölü havzasından toplanan endemik bitkiler üzerinde gerçekleştirilmiştir. Sonuçta, yirmi üç tanesi sadece Van Gölü havzasında yetişen, 98 endemik takson belirlenmiştir. Bölgeden daha önceden rapor edilen taksonların da dahil edilmesiyle, 34 familya ve 117 cins içinde yer alan 259 endemik taksondan oluşan bir liste oluşturulmuştur. Listelenen 259 taksondan 23 tanesi sadece Van Gölü Havzasına özgüdür. VANF Herbariyumu'nda 249 endemik takson vardır. Bunlardan 98 tanesi yazarlar tarafından toplanmıştır. Kalan 151 endemik takson ise diğer araştırmacılar tarafından belirlenmiştir. On endemik takson da literatürden kaydedilmiştir. Türkiye Florasındaki özelliklere ek olarak, dokuz endemik taksonun yeni özellikleri ve varyasyonları belirlenmiştir. Doksan sekiz endemik taksona ait 612 görüntü ve 200 resim camlı tarayıcıdan taranarak bilgisayar ortamına aktarılmıştır. Bütün görüntüler VANF Herbariyumu'nun bir parçası da olan web sayfasına, Van Gölü Havzası'nın Sanal Herbariyumu'na, yüklenmiştir.

Anahtar kelimeler: Endemik bitkiler, taksonomi, IUCN, Türkiye

1. Introduction

Floristic studies indicate that Turkey has a very rich species diversity. This is because the country is located in the transition area of three, Irano-Turanien, Mediterranean and Euro-Siberian, phytogeographical regions (Bulut and Yılmaz, 2010). About 12.000 seed plant taxa have been identified in Turkey while this number is about 13.000 in whole of Europe (Erik ve Tarıkahya, 2004; Ekim, 2005). Turkey is also among the most important countries in terms of endemic plant species (Davis et al., 1988; Ekim, 2005; Özhatay et al., 2009). More than 3000 endemic plant taxa, most of which are threatened, have so far been determined within the boundaries of Turkey (Atalay, 1997; Ekim et al., 2000) and the localities of almost 2900 endemic taxa have been mapped (Şenkul and Kaya, 2017).

The Lake Van is situated on the high plateaus of Eastern Anatolia, between 38°18' - 39°00'N latitudes and 42°17'-43°39'E longitudes. The lake surface stands at 1648 m above sea level, with a surface area of 3574 km² (Degens et al., 1984). The drainage basin of Lake Van covers an area of about 20.000 km² (Çiftçi et al., 2008) within the boundaries of Bitlis and Van provinces and falls in B9 according to P.H. Davis' grid square system. The basin is surrounded by high volcanic mountains. The long term annual precipitation is 387.2 mm and annual average temperature is 9.4 °C (mgm, 2018). In general the basin is characterized by steppe vegetation, and forest and shrubby areas are generally dominated by *Quercus* sp.

The study aims to present a complete list of endemic plant taxa growing in Van Lake basin.

2. Materials and Method

Endemic plant samples, which were collected by the authors from the field, existing in Yüzüncü Yıl University Herbarium (VANF) herbarium or those, obtained from the literature make the material of this study.

Endemic plant samples were collected from Lake Van basin (Fig 1) between the years 1994 and 2002. During field studies, colour slides were taken and required ecological data were recorded. Then the plant samples were transferred to the herbarium and prepared as herbarium materials. Identification was performed with the help of Flora of Turkey and the East Aegean Islands (Davis, 1965-1982). Later on, the existing plant samples in VANF herbarium were traced and endemic taxa a belonging to Van Lake basin were listed together with the necessary information about the taxa. Meanwhile the related literature (Behçet, 2001; Doğan and Akaydin, 2004; Özgökçe et al., 2005; Sutorý, 2005; Akan et al., 2008; Karabacak and Behçet, 2009; Dirmenci et al., 2010; Eker and Babaç, 2010; Yıldırım et al., 2011; Yıldız et al., 2011; İlçim et al., 2013; Vitek et al., 2014; Yıldırım, 2014; Doğan et al., 2015; Tekşen and Karaman, 2015; Fırat and Yıldız, 2016; Gültepe et al., 2016; Fırat, 2017a,b; Pınar, 2017) concerning the endemic plant taxa of Van Lake basin were also traced, and an endemic plant list with 259 taxa was created. Collection localities are given in Table 1. The collected samples are kept in VANF.

The validity of Endemic plants names was checked mainly from The Plant List Version 1.1 (2018). If required The

Euro + Med Plant Base (2018) and The International Plant Names Index (IPNI) were used as secondary or tertiary sources.

3. Results

The compiled list of endemic plant taxa determined in the Lake Van basin is listed as cited in Flora of Turkey,

together with their habitats, locality numbers, collection dates, voucher number(s), IUCN Red Data categories (if known) and the variations from the description given in Flora of Turkey (if determined). IUCN Red Data Categories and the abbreviations are in accordance with Ekim et al. (2000).

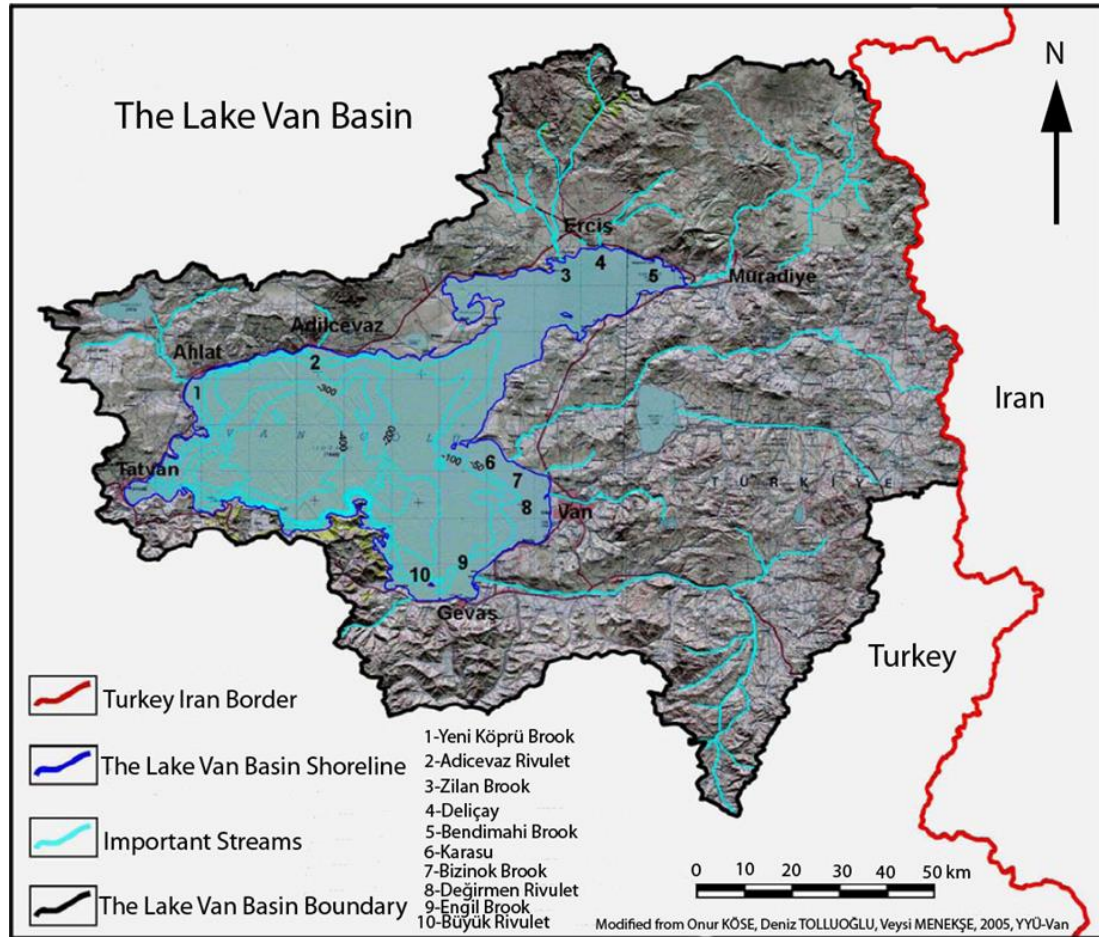


Figure 1. The hydrological border and the main drainage system of the Lake Van basin. (Modified from Çiftçi et al., 2008)

For The Citation Of The Voucher Numbers, Names Of The Collectors Are Abbreviated As Follows: A.Altiok (Aa); Bayram Yıldız (Y); Davut Avlamaz (Da); Doğan & Akaydin (D&A); İsmail Eker (E); Fevzi Özgökçe (Fö); Hasan Özçelik (Hö); Hüseyin Eroğlu (He); H.Yıldırım (Hy); İbrahim Demir (Id); L.Behçet & D. Avlamaz (B&A); Lütfü Behçet (B); M. Gültepe (Mg); Metin Armağan (Ma); Mehmet Fırat (Mf); Mehmet Koyuncu (Mk); Mesut Pinar (Mp); Muzaffer Mükemre (Mm); M.Tekşen (Mt); Nasip Demirkuş (Nd); Murat Ünal (Mü);

Tuncay Dirmenci (Td); Osman Kara Karabacak (Ok); Ömer Bingöl (Öb); Turan Çelik (Tç).

IUCN Red Data categories were cited with the following abbreviations: Critically endangered (cr); Data deficient (dd); Endangered (en); Extinct (ex); Extinct in the wild (ew); Lower risk (lr); Least concern (lc); Conservation dependent (cd); Near threatened (nt); Not evaluated (ne); Vulnerable (vu) (Ekim et al. 2000). The taxa collected by the authors are marked with an asterisk (*).

Table 1. Collection localities of the endemic within Van Lake basin.

No	Locality	Altitude
1	B9 Van: Değirmen Village, Ereğ Mountain	2000-2500 m
2	B9 Van: Değirmen Village, Ereğ Mountain	2000-2300 m
3	B9 Van: Gürpınar, Kurubaş pass	1900 m
4	B9 Van: Hoşap, Güzeldere pass, around guardhouse	2600-2730 m
5	B9 Van: Tevekli and Alaköy meadows	1850 m
6	B9 Van: Hoşap, Güzeldere pass from fountain to gourdhouse	2600-2730 m
7	B9 Van: Van to Erciş 35. Km	1850 m
8	B9 Van: Hoşap, Güzeldere pass	2250 m
9	B9 Van: Hoşap, Güzeldere pass	2500 m

10	B9 Van: Hoşap, Güzeldere pass	2750 m
11	B9 Van: Gevaş, Artos Mountain, west slopes	2000-2350 m
12	B9 Van: Artos Mountain, north side	2200-2500 m
13	B9 Van: Hoşap, Güzeldere pass	2600-2730 m
14	B9 Van: From Van to Çatak road 70. km	1750-2000 m
15	B9 Van: from Gürpınar to Çatak 35. km	2200-2500 m
16	B9 Van: Çaldıran, Tendürek Mountains	2650 m
17	B9 Van: Ereğ Mountain meadows of Değirmen Village	2600 m
18	B9 Van: Değirmen Village, Ereğ Mountain	2400 m
19	B9 Van: Muradiye, meadows of Yumaklı Village	2250 m
20	B9 Van: Hoşap, Güzeldere pass, around FedaiTaşı	2780-2900 m
21	B9 Van: Hoşap, Güzeldere pass	2650 m
22	B9 Van: Bahçesaray, from Müküs Water Cavern to Sündüs plateau	1700-2000 m
23	B9 Van: Ereğ Mountain, Şuşanis Village steppe slopes	2300 m
24	B9 Van: Hoşap, Güzeldere pass	2400- 2700 m
25	B9 Van: Ereğ Mountain, Şuşanis Village slopes	2400- 2500 m
26	B9 Van: Around Ayanis Villages	1750 m
27	B9 Van: Gürpınar, Kurubaş pass	2000 m
28	B9 Van: Zerne Dam (60-62. Km) north slopes	2000 m
29	B9 Van: Hoşap, Güzeldere pass, around highway station	2750 m
30	B9 Van: Gürpınar, Kurubaş pass	1800-2000 m
31	B9 Van: Hoşap, Güzeldere pass, around sentry	2750 m
32	B9 Van: Hoşap, Güzeldere pass, around highway station	2790 m
33	B9 Van: Özalp road 41. Km	1970 m
34	B9 Van: Kopannis Village, Ereğ Mountain	2150-2700 m
35	B9 Van: Kopannis Village, Ereğ Mountain	2500-2700 m
36	B9 Van: Özalp road 20. Km, slopes	2000 m
37	B9 Van: Hoşap, Güzeldere pass, around fountain	2500-2650 m
38	B9 Van: Hoşap, Güzeldere pass, around FedaiTaşı	2750-2900 m
39	B9 Van: Bahçesaray, Sündüs plateau, valley slopes	2100 m
40	B9 Van: Bahçesaray, from Krapet pass to Liçan Village	2700 m
41	B9 Van: Hoşap, Güzeldere pass, around sentry,	2750-2800 m
42	B9 Van: Bahçesaray, around Liçan Village	1900-2000 m
43	B9 Van: Muradiye, Suphan Lake, meadows of Adaklı Village	2350 -2500 m
44	B9 Van: Around Muradiye Waterfall	2000 m
45	B9 Van: Muradiye, 3 Km to Çaldıran	2150 m
46	B9 Van: Muradiye 2 Km to Çaldıran, Ayrancılar Village	2150-2200 m
47	B9 Van: Hoşap, Güzeldere pass	2500-2750 m
48	B9 Van: Cross of Çatak and Bahçesaray roads	2000 m
49	B9 Van: From Gürpınar to Çatak, before Görentaş Village	2000 m
50	B9 Van: Bahçesaray, from krapet pass to Liçan Village	2500-2800 m
51	B9 Van: Bahçesaray, around Müküs Water Cavern	1800-1850 m
52	B9 Van: Bahçesaray, from Liçan Village to Krapet pass	1800-2500 m
53	B9 Van: Kopannis Village, Ereğ Mountain	3000-3200 m
54	B9 Van: Kopannis Village, Ereğ Mountain	2500-3000 m
55	B9 Van: from Gürpınar to Hoşap 10. Km, around road	1900 m
56	B9 Van: from Van to Tatvan	2500 m
57	B9 Van: Hoşap, Güzeldere pass, around fountain	2650 m
58	B9 Van: Erciş District, northeast of Aksakal village, Kırdekar hill	2692m
59	C9 Van: Çatak, Konalga village, Tanrıverdi hamlet, around Zevviçal	2372 m
60	B9 Van: Miks (Bahçesaray) district, Çırawis Mountains (Çiyayê Çırawis)	3343 m
61	B9 Van: Ahta Dağ, southeast of Kalecik village near Özalp	2500-2700 m
62	B9 Van: Bahçesaray, Karabel (Kırapit) pass	3200-3400 m
63	B9 Van: Çatak, North of Çatak Valley, surroundings of Bilgi Village	1723 m
64	B9 Bitlis: Adilcevaz, Suphan Mountain north of Kıçıklı village	2500 m
65	B9 Van: ,Bahçesaray, from Altındere village to Kavushhahap Mount.	2600m
66	B9 Van, Bahçesaray, Serkani location	1800 m
67	B9 Van: Bahçesaray, Arnos Mountain,	2200m
68	B9 Van: between Çatak and Bahçesaray, north of Yukarınarlı village	2200- 2400 m
69	B9 Van: between Başkale and Van	2052 m
70	B9 Van: Gevaş, Deveboynu peninsula, above İnköy	2100 m
71	B9 Van: Başkale, Çaldıran village	2000-2050 m
72	B9 Van: Muradiye above the Adaklı, village	2300m
73	B9 Van: from Van to Muradiye, Bendi mahi region	1659 m
74	B9 Van: Çatak, Kavuşhahap Mountain, Karapet pass	2750 m
75	B10 Van: Van- Hakkari road, around Başkale	2100 m
76	B9 Van: Gevaş, Artos Mountain	2500 m

77	B9 Van: Gürpınar–Başkale road, around Hoşap (Güzelsu)	2050 m
78	B9 Van: Hoşab (Güzeldere) province, Güzeldere passage	2791 m
79	B9 Van: from Narlıca Village to Bahçesaray, Karapetpass	2885 m
80	B9 Van: between Van-Başkale, Güzeldere pass	2738 m
81	B9 Van: Gürpınar, Işıkpınar to Haciköy, around the pond	2154 m
82	B9 Van: From Vari Krapet pass to Bahçesaray	2500-2700 m
83	B9 Van: Gürpınar, behind Koçgüden village	2500 m
84	B9 Van: Erciş, 1. Km to the Yukarıgöze neighborhood	2000-2200 m
85	B9 Van: Gürpınar, Hamurkesen Village, inside the valley	2400 m
86	B10 Van: Özalp, Aşağı Koçkiran Village, towards Karatepe	2275 m
87	C9 Van: Gürpınar, from Üçdoğan to Bükülmez Village	2153 m
88	B9 Van: Erciş, Taşkapı village, Karakaya	2448 m
89	B9 Van: Gürpınar, in the west of Tutmaç village	2800m
90	B9 Van: Gürpınar, the opposite of Koçgüden village	2300 m
91	B9 Van: Özalp, East of Kırkçalı	1900-2050 m
92	B9 Van: Muradiye, Kemerköprü Village, Akçadağ, Neri Tepe	2000 m
93	B9 Van: Özalp, from Y. Ayazca to Y. Mollahasan village	2003 m
94	B10 Van: Özalp, from Aşağı Tulgalı to Y.Dönerdere Village	2053 m
95	B9 Van: Gürpınar, behind the Koçgüden village	2950 m
96	B9 Van: Çatak, from Çatak to the Kirazlı village, south slope	1800 m
97	C9 Van: Gürpınar, from Topçudeğirmeni to Yalınca Village	2269 m
98	B9 Van: Gürpınarthe behind of Tutmak village	2600 m
99	B9 Van: Gürpınar, Kapçık village, the edge of the creek	2134 m
100	B9 Van: Özalp, A.Sağmallı village, Pirreşit Mountain	2500 m
101	B9 Van: Muradiye, Görecek village, around Şevlii	2200-2500 m
102	B9 Van: Özalp, from Y.Koçkiran to A.Koçkiran village	2300 m
103	B9 Van: Özalp, A.Akçağöl village "Pirreşit" mountain	2293m
104	B10 Van: Özalp, Y.Balçıklı village plateau	2300m
105	B9 Van: Erçek, Erçek Lake shores	1800 m
106	B9 Van: Muradiye, Babacan village	1900 m
107	B9 Van: Erciş, around of Soluhan village	2634 m
108	B9 Van: Erciş, around of Şehirpazarı village	1937 m
109	B9 Van: Gürpınar, from Taşdöndüren village to Belkiş slope	2300 m
110	B9 Bitlis: Tatvan, Tanrıyer village	1700 m
111	B9 Van: Erciş, from Doluca to Gürgürbaba hill	2912 m
112	B9 Van: Gürpınar, from Hamurkesen to Işıkpınar village	2000 m
113	B9 Bitlis: Hizan, from Hizan to Sürmecek village	1500 m
114	B9 Van: Muradiye, Görecek village, around Şevkii	2350 m
115	B9 Van: Gürpınar, from Sarıyaprak to Güleçler village	2300 m
116	B9 Van: Gürpınar, from Cevizalan to Umut Village	2500 m
117	B9 Van: Çatak, Bilgi village, south slopes	1900 m
118	B9 Van: Erciş, from the village of Taşkapı to the ganissipi	2200 m
119	B9 Van: Erciş, Şehirpazarı village, Adalar plateau	1937 m
120	B9 Van: Erciş, Şehirpazarı village, Adalar plateau, behind the spa	1950 m
121	B9 Van: Özalp, Sugeçer and Boğazkesen villages, Ziyaret hill	2400 m
122	B9 Van: Erciş, around Şehirpazarı village	2293 m
123	B9 Van: Erciş, Altundere village, hara surroundings	1845 m
124	B9 Van: Özalp, from Y.Ayazca to Mollahasan village	2003 m
125	B9 Bitlis: around İcmeli village,	1510 m
126	B9 Van: Muradiye Kemerköprü village, around Akçadağ	2200 m
127	B9 Van: Erciş, Şehirpazarı village, Adalar plateau	1950 m
128	B9 Van: Özalp, south of Y. Çavdarlık village	2219 m
129	B9 Van: Gürpınar, from Hoşap to Zerneç barrage, stream edge	1900 m
130	B9 Van: Hoşap, Güzeldere pess	2400 m
131	B9 Van: Özalp Ahta Mountain	2700 m
132	B9 Van: Gürpınar, Geçerli village	1890 m
133	B9 Van: Gürpınar, north of Yedisalkım village	2400 m
134	B9 Van: Kurubaş pass, Doğanlar village	1900 m
135	B9 Van:Gürpınar, Taşdöndüren village roadsides	1900 m
136	B9 Van:Gürpınar, Taşdöndüren village roadsides	1900 m
137	B9 Van: Erciş, around Ilca	1912 m
138	B9 Bitlis: Hizan, Sarpkaya village	2000 m
139	B9 Van: Gürpınar, from Işıkpınarı village to Südis Mountain	2350 m
140	B9 Van: from Dorutay to Aksaağaç and Yumruklu villages	2100m
141	B9 Van: Erciş, from Taşkapı village to Hüdavendigar Mountain	3186 m
142	B10 Van: Başkale,Darıca village road, steppe around the bridge	1920 m
143	B9 Van: Gürpınar, above the Kochgüden village	2800 m

144	B9 Bitlis: Adilcevaz, the north of the Kıçıklı village	2400-2700 m
145	B9 Van: Muradiye, Derviş Plateau, Hacı Cave, Kom stream	2000-2200 m
146	B9 Van: Gürpınar, Sarıyaprak Plateau-Güleçler village	2400 m
147	B9 Van: Özalp, Mollahasan village	2380 m
148	B9 Van: Gürpınar, behind the Hamurkesen village	2300 m
149	B9 Van: Gürpınar, southeastern slopes of the Başet mountain	2400 m
150	B9 Van: Erciş, around Doluca village	1965 m
151	B10 Van: Başkale, around Oğulveren village	2250 m
152	B9 Van: Gürpınar, from Bölmeçalı to Hacıköy village	2500 m
153	B9 Van: Erciş, the edge of Zilan Creek	1700 m
154	B10 Van: Özalp, around Özalp	2300 m
155	B9 Van: Özalp, Kaşıkara village surroundings	1800 m
156	B9 Van: Muradiye, Beşparmak village surroundings	2300 m
157	B9 Bitlis: Tatvan, Kesan brook 4.km	1700 m
158	B9 Van: Özalp, in the West of Şehittepe village	2435 m
159	B10 Van: Özalp, Yukarı Tulgalı village, Kel hill	2280 m
160	B9 Van: Özalp, from Bodurağaç to Seydibey village	2194 m
161	B9 Van: Gürpınar, from Hamurkesen to Işıkpınar village	2000 m
162	B9 Van: Erciş, from Taşkapı village to Hüdavendigar Mountain	2100-2800 m
163	B9 Van: Erciş, the edge of Zilan creek	1750 m
164	B9 Van: Erçek Lake Coast	1800 m
165	B9 Van: Muradiye, south slopes of the Pirreşit Mountain	2000 m
166	B9 Van: Gürpınar, the back side of Yedisalkım village	2200 m
167	B9 Van: Gürpınar, south of Hamurkesen village	1900 m
168	B9 Van: Erciş, Doluca village, Kuzubulak lake periphery	2535m
169	B9 Van: Özalp, east of Seydibey village	2100 m
170	B9 Van: Gürpınar, the southern slopes of Başet Mountain	2600 m
171	B9 Van: Muradiye, Görecek village, Şevki location	2200-2500 m
172	B9 Van: Özalp, from A.Molahasan to Y.Molahasan village	1800 m
173	B9 Van: Gürpınar, Zerneke barrage, roadside	1850 m
174	B9 Van: Erciş, Sabanbüken village, Çakalı plateau	2825 m
175	B9 Bitlis: Tatvan, at the 7th km of Kesan stream	1700-1800 m
176	B9 Van: Gürpınar north slopes of Zerneke Dam	1900 m
177	B9 Van: Gürpınar, around Yurtbaşı village	2100 m
178	B9 Bitlis: Adilcevaz, from Çanak yayla to Cihangir village,	2300-2500 m
179	B9 Van: Gürpınar, northwest of Koçgüden village	2950 m
180	B9 Van: Erciş, Doluca vilage, Lake Şama, Lignite man. periphery	2634 m
181	B9 Van: Erciş, Altundere stud farm circumference	1845 m
182	B9 Van: Özalp, Kalecik village	2000 m
183	B9 Van: Muradiye, Görecek village, Şevki location	2200-2500 m
184	B9 Van: Van castle, rock crevices	1720 m
185	B9 Van: Erciş, Doluca village, Gürgürebaba hill	2738 m
186	B9 Van: Muradiye, slopes of Pirreşit Mountain opposite Özalp	2000 m
187	B9 Van: Erciş, around the lake İkizçalı	1978 m
188	B9 Bitlis: Tatvan, the Kesan brook 4. km	1700 m
189	B9 Van: Özalp, the south of Y. Koçkiran village	2050 m
190	B9 Bitlis: Adilcevaz, from Harmantepe to Çanakyayla village	2200 m
191	B9 Van: Özalp, the north of Y. Yargılı village, Pirreşit Mountain	2070 m
192	B9 Van: the west of Ereke Mountain	2500 m
193	B9 Van: Özalp, from Özalp to Dorutay village, Koyun yatağı	2072 m
194	B9 Van: Gürpınar, opposite of Koçgüden village	2500 m
195	B9 Van: Gürpınar, from Işıkpınar village to Hacı village	2100 m
196	B9 Van: Erciş, around Ulupamir village, creek edge	1811 m
197	B9 Van: Özalp, Damlacık village, wheat field	2300 m
198	B9 Van: Muradiye, the edges of the valley behind Adaklı village	2400 m
199	B9 Bitlis: Adilcevaz, the north of Bahçedere village	2100 m
200	B9 Van: Özalp, Yukarı Tulgalı village, border plateau	2250 m
201	B9 Van: Gürpınar, Sarıyaprak plateau, valley inside	2800 m
202	B9 Van: Muradiye, along the Yumaklı valley	2200 m
203	B9 Van: Erciş, the northwestern part of Ulupamir village	1871 m
204	B9 Van: Gürpınar, from Zerneke Dam to Üçgen vilage	1700-1900 m
205	B10 Van: Özalp, from A. Koçkiran vilage to Iranian borderı	2200 m
206	B9 Bitlis: Tatvan, Kesan creek 10-15.km, road side	1550 m
207	B9 Van: Muradiye, Ünseli village, Akçadağ (Esruk) mountain	2400 m
208	B10 Van: Başkale, Esenyamaç village 3. km north slope	1976 m
209	B9 Van: Erciş, from İlica to Yeknal plateau	2019 m
210	B9 Van: Muradiye, 3 km to the village of Görecek	1800 m

I. FAM: RANUNCULACEAE

**Delphinium carduchorum* Chowdhuri & P.H.Davis: meadows, locality 29; 19.07.1997, Nd 6191 -Mk 12755; meadows, locality 47; 13.07.1997, Nd 6179, 6191-Mk 12743, 12755; rocky slopes, locality 54; 27.07.1997, Nd 6225 -Mk 12789; locality 56; 23.07.1997, Nd 6304a -Mk 12867a, IUCN: nt.

**Delphinium dolichostachium* Chowdhuri & P.H.Davis: road slopes, steppe, locality 52; 16.07.1997, Nd 5945 -Mk 12509, IUCN: cd.

**Delphinium cyphoplectrum* Boiss. var. *vanense* (Rech. Fil) P.H. Davis: rocky slopes, locality 48 ; 15.07.1997, Nd 5883-Mk 12447; meadows, locality 47; 13.07.1997, Nd 6189-Mk 12753; rocky slopes, locality 54; 27.07.1997, Nd 6238 -Mk 12802; steppe, locality 57; 19.07.1997, Nd 6209 -Mk 12773, IUCN: cd.

Delphinium cyphoplectrum Boiss. var. *stenophyllum* Boiss.: steppe, locality 83; 31.07.2002, Mü 7800.

Ranunculus crateris* P.H. Davis : meadows, locality 17; 08.06.1997, Mk 11836-Nd 5266, IUCN: cd. **Variations: Stems up to 12 flowered (stems 1-6 flowered), all sepals not reflexed (sepals reflexed).

**Ranunculus fenzi* Boiss.: steppe, locality 21; 13.06.1997, Mk 11901, 11922 -Nd 5331, 5352, IUCN: lc.

Ranunculus bingoldaghensis A.Engin: locality 84; 19.05.2002, Ok 2931 IUCN: en.

Ranunculus vanensis* P.H. Davis: B9 Van: steppe, locality 38; 27.06.1997, Mk 12260-Nd 5688, IUCN: cd. **Variations: Early stage of upper leaves linear lanceolate, later divided to linear lobes, some samples include undivided and divided upper leaves. Early stage of achene semicircular, later semicircular to slender. Posterior of achene beak brownish to blackish (unknown).

**Ranunculus munzurensis* S.Erik & Yildirimli: Rocky slopes, locality 12; 26.05.1997, Nd 5211 -Mk 11747, IUCN: cd.

II. FAM: PAPAVERACEAE

Papaver persicum Lindl. subsp. *fulvum* Kit-Tan & Sorger: steppe, locality 85; 23.07.2003, Mü 8832, IUCN: lc.

**Papaver fugax* Poir. var. *platydiscus* Cullen: steppe, locality 31; 21.06.1997, Mk 12053-Nd 5480; steppe locality 38; 27.06.1997, Mk 12224 - Nd 5652, IUCN: lc.

III. FAM: BRASSICACEAE

Isatis cappadocica Desv. subsp. *alyssifolia* (Boiss.) P.H. Davis: locality 86; 05.07.1997, Fö 4767, IUCN: nt.

Isatis erzurumica P.H.Davis: creek edge, locality 87; 16.06.2007, Mf 1856, IUCN: nt.

**Isatis candolleana* Boiss.: steppe, locality 41; 19.07.1997, Nd 6100, IUCN: lc.

**Isatis undulata* Aucher ex Boiss.: wet meadows, locality 35; 22.06.1997, Mk 12157-Nd5585, IUCN: en.

**Isatis aucheri* Boiss : rocky slopes, locality 34; 22.06.1997, Mk 12114, 12159 -Nd5542, 5587; meadows, locality 43; 12.07.1997, Nd 5792 -Mk 12353, IUCN: lc.

**Isatis glauca* Aucher&Boiss.

subsp. *icaonia* (Boiss. & Heldr.) P.H. Davis: rocky slopes, locality 26; 19.06.1997, Mk 11974 - Nd 5403; slopes, locality 36; 26.06.1997, Mk 12212 - Nd 5640, IUCN: lc.

Isatis spatella P.H. Davis : sandy soil area, locality 39; 02.05.1999, Mf; 1013, IUCN: en.

Physocardamum davisii Hedge : steppe, calcareous soil, locality 88; 21.06.2007, Ok 6558, IUCN: vu.

Aethionema froedinii Rech. fil.: road slopes, locality 50; 15.07.1997, Mf 1162. IUCN: lc.

**Aethionema eunomioides* (Boiss.) Bornm.: rocky slopes, locality 53; 16.07.1997, Nd 7016, IUCN: lc.

Aethionema iberideum (Boiss.) Boiss : steppe area, locality 89; 08.06.2003, Mü 8358.

Aethionema caespitosum (Boiss.) Boiss.: steppe area, locality 89; 08.06.2003, Mü 8359., IUCN: nt.

**Bornmuellera cappadocica* (DC.) Cullen & Dudley: steppe, locality 38; 27.06.1997, Mk 12234-Nd 5662, IUCN: lc.

Alyssum huetii Boiss.: steppe, locality 90; 27.05.2001, Mü4935b, IUCN: lc.

Alyssum blepharocarpum Dudley&Hub.-Mor.: locality 91; 27.06.1996, Fö 2530, IUCN: nt.

Alyssum ochroleucum Boiss.: steppe, locality 92; 21.06.2001, Ok 1859, IUCN: lc.

Alyssum aurantiacum Boiss.: locality 93; 02.07.1997, F 5155, IUCN: cd.

Alyssum niveum Dudley: steppe, locality 94; 10.07.1997, F 4916, IUCN: en.

Alyssum pateri Nyár. subsp. *prostratum* (Nyár.) Dudley: steppe, locality 95; 31.07.2002, Mü 7798, IUCN: lc.

Alyssum filiforme Nyár.: steppe, locality 96; 21.06.2003, Mp 1973, IUCN: lc.

Alyssum haussknechtii Boiss.: steppe, locality 97; 26.07.2006, Mf 392, IUCN: Lr (cd)

**Draba rosularis* Boiss.: steppe, locality 10; 24.05.1997, Mk11697-Nd 5163; steppe, locality 21; 13.06.1997, Mk 11906- Nd 5336, IUCN: lc.

**Draba cappadocica* Boiss. & Bal.: steppe, locality 38; 27.06.1997, Mk 12226- Nd 5654, IUCN: lc.

Draba orientalis Karabacak & Behçet: Holotype, rocky crevices, locality 58; 28.05.2007, Ok 6081.

Arabis carduchorum Boiss.: steppe, locality 98; 23.07.2002 , Mü 7563, IUCN: nt.

Sterigmotemum sulphureum Bornm. subsp. *glandulosum* Hub.-Mor. & Reese: the edge of the creek, locality 99; 16.06.2007, Mf 1721, IUCN: vu.

Erysimum sintenisianum Bornm.: steppe, locality 100; 26.06.1997, Fö 3513, IUCN: lc.

Erysimum echinellum Hand.-Mazz.: steppe, locality 142; 31.05.2008, Da 1246b, IUCN: en.

IV. FAM: CARYOPHYLLACEAE

**Minuartia umbellifera* (Boiss.) Mc Neill subsp. *umbellifera* var. *kurdica* McNeil: meadows, locality 29; 19.07.1997, Nd 6114 -Mk 12676; rocky slopes, locality 53; 16.07.1997, Nd 5951, 5973, 6001- Mk 12515, 12535, 12564, IUCN: nt.

Minuartia anatolica (Boiss.) Woronow var. *anatolica*: steppe, locality 143; 16.07.2002, Mü7349, IUCN: cd.

**Minuartia glandulosa* (Boiss. & Huet) Bormm.: rocky slopes, locality 54; 27.07.1997, Nd 6232 -Mk 12796, IUCN: lc.

**Cerastium araraticum* Rupr.: rocky slopes, locality 53; 16.07.1997, Nd 5968 -Mk12531, IUCN: lc.

**Cerastium gnaphalodes* Fenzl : rocky slopes, locality 53; 16.07.1997, Nd 5967, IUCN: lc.

**Dianthus lactiflorus* Fenzl : rocky slopes, locality 53; 16.07.1997, Nd 5966, IUCN: cd.

**Dianthus erythrocoleus* Boiss.: meadows locality 29; 19.07.1997, Nd 6204- Mk 12768, Nd 6059, 6101- Mk 12622, 12663; meadows , locality 46; 13.07.1997, Nd 5834 -Mk 12395; meadows, locality 47; 13.07.1997, Nd 6133 -Mk 12695; rocky slopes, locality 53; 16.07.1997, Nd 5970, 6022- Mk 12533, 12585; rocky slopes, locality 54; 27.07.1997, Nd 5765 -Mk 12327, IUCN: lc.

**Dianthus masmaneus* Boiss. var. *glabrescens* Boiss. : meadows, locality 43; 12.07.1997, Nd 5804 -Mk 12365, IUCN: lc.

Dianthus muschianus Kotschy & Boiss.: wet meadows, locality 24: 23.07.1997, Mf 1835, Nd 6884z, IUCN: lc.

**Dianthus zederbaueri* Vierh.: meadows, locality 43; 12.07. 1997, Nd 5803, IUCN: cd.

Dianthus vanensis Behçet & İlçim: , steppe, locality 59; 25.06.2010, Mm 300.

**Gypsophila adenophylla* Bark.: slopes, steppe, locality 52; 16.07.1997, Nd 5971 -Mk 12534, IUCN: lc.

**Gypsophila bitlisensis* Bark.: steppe slopes, locality 27; 21.06.1997, Mk 12023-Nd 5451, IUCN: cd.

**Silene capitellata* Boiss.: meadows, locality 15; 05.06.1997, Mk 11755, IUCN: lc.

**Silene muradica* Schschkin.: steppe, locality 44; 13.07.1997, Nd 5811 -Mk 12372, IUCN: lc.

Silene cartilaginea Hub.-Mor.: steppe, locality 30; 13.06.1999, Ma 1603, IUCN: cd.

**Silene lucida* Chowdh. subsp. *lucida*: steppe, locality 38; 27.06.1997, Nd 5680, 6799, IUCN: lc.

**Silene sclerophylla* Chowdh.: steppe, locality 30; 13.06.1999, Nd 6598d, IUCN: lc.

Silene miksensis Firat & K.Yıldız: limestone and rocky slopes, locality 60; 10.08.2011, Mf 27345.

Silene acaulis (L.) Jacq. subsp. *vanensis* Özgökçe & Kit Tan: locality 61; 15.05.1998, Fö 5911

V. FAM: POLYGONACEAE

Rumex ponticus E.H. L. Krause: steppe rocky place,

locality 101; 08.07.2001, Ok 2076. IUCN: lc.

VI. FAM: HYPERICACEAE

Hypericum thymbrifolium Boiss. & Noë: steppe, locality 102; 04.07.1997, Fö 4610, IUCN: cd.

VII. FAM: LINACEAE

Linum unguiculatum Da P.H. Davis vis: steppe, locality 103; 26.06.1997, Fö 3407. IUCN: lc.

Linum obtusatum (Boiss.) Stapf: steppe, locality 104; 23.5.1998, Fö 5946, IUCN: lc.

VIII. FAM: GERANIACEAE

Geranium ibericum Cav. subsp. *jubatum* (Hand.-Mazz.) Da P.H. Davis: damp rocky, locality 144; 08.07.2001, B 6648, IUCN: lc.

Erodium hakkiaricum P.H.Davis: steppe, locality 146; 18.07.2001, Mü 6068, IUCN: en.

Erodium amanum Boiss. & Kotschy: locality 144; 09.07.1987, B 346, IUCN: lc.

IX. FAM: RUTACEAE

Haplophyllum cappadocicum Spach: steppe, locality 147; 30.06.1998, Fö 8168, IUCN: nt.

X. FAM: FABACEAE

Astragalus hirsutus Vahl: rocky-steppe, locality 148; 22.05.2002, Mü 6805, IUCN: lc.

Astragalus ovatus DC.: steppe, locality 149; Mü 8503, 10.07.2003, IUCN: dd.

**Astragalus dasycarpus* Chamberlain: meadows, locality 29; 19.07.1997, Nd 6105 -Mk 12657, IUCN: nt.

**Astragalus sachanewii* Sirj.: rocky slopes, locality 53; 16.07.1997, Nd 6017 -Mk12580, IUCN: nt.

Astragalus bashkalensis* Chamberlain: meadows, locality 29; 19.07.1997, Nd 6095 -Mk 12657, rocky slopes locality 34; 22.06.1997, Mk 12126-Nd 5554; steppe, locality 37; 27.06.1997, Mk 12073-Nd5502, Mk 12289-Nd 5717; steppe, locality 38 ; 27.06.1997, Nd 5693, 5704 -Mk 12265,12276; rocky slopes, locality 54; 27.07.1997, Nd 6280 -Mk 12843, IUCN: vu. **Variations: Legume; c. 16 mm villous with long white and short black hairy, ovoid sessile to short stipitate (legume unknown).

**Astragalus tauricolus* Boiss.: steppe, locality 7; 22.05.1997, Mk 11681, IUCN: lc.

**Astragalus pinetorum* Boiss.: steppe slopes, locality 27; 21.06.1997, Nd 5121 -Mk 11629, IUCN: lc.

**Astragalus icmadophilus* Hand.-Mazz.: rocky slopes, locality 53; 16.07.1997, Nd 5996, IUCN: lc.

Astragalus rechingeri* Sirj.: road slopes, locality 50; 15.07.1997, Nd 5910 -Mk 12474; rocky slopes, locality 53 ; 16.07.1997, Nd 5996 -Mk 12559. IUCN: nt. **Variations: Calyx black and white hairy (sparsely black hairy).

**Astragalus trifoliastrum* Hub.-Mor. & Matthews: steppe slopes, locality 23; 18.06.1997, Mk 11933-Nd 5362; rocky slopes, locality 26; 19.06.1997, Mk 11994-Nd 5422; locality 36; 26.06.1997, Mk 12210- Nd 5638, IUCN: nt.

**Astragalus ermineus* Matthews: rocky slopes, locality 53; 16.07.1997, Nd 5902a, 6032 -Mk 12466a, 12595, IUCN: cd.

**Astragalus halicacabus* Lam.: meadows, locality 43; 12.07. 1997 Nd 5785 -Mk 12534, IUCN: lc.

Astragalus gymnalopecias Reich. fil.: locality 42; 15.06.1999, Mf 1599, IUCN: en.

**Astragalus ascicalyx* Bunge : locality 25; 18.06.1997, Mk 11931-Nd 5360; rocky slopes, locality 26; 19.06.1997, Mk 11978-Nd 5407, IUCN: lc.

Astragalus karamasicus Boiss. & Balansa : steppe, locality 105; 08.06.1991 B 1731, IUCN: lc.

Astragalus lycius Boiss. : steppe, locality 106; 28.05.2002, Ok 2997, IUCN: lc.

**Astragalus fumosus* Boriss. : around road, locality 28; 21.06.1997, Mk 12030-Nd 5458, IUCN: nt.

Astragalus xerophilus Ledeb.: steppe, locality 107; 12.07.2007, Ok 6773, IUCN: nt.

Astragalus bicolor Lam.: steppe, locality 108; 26.06.2005, Ok 3941.

**Astragalus globosus* Vahl: locality 11; 25.05.1997, Nd 6426k, IUCN: lc.

Astragalus armeniacus Boiss.: steppe, locality 109; 07.06.2003, Mü 8282.

Astragalus schizopterus Boiss.: steppe, locality 109; 07.06.2003, Mü 8233.

Astragalus nitens Boiss. & Heldr.: steppe, locality 177; 07.06.2003, Mü 8217.

**Astragalus campylosema* Boiss. subsp. *nigripilis* Hub.-Mor. & Chamb.: steppe, locality 3; 10.08.1996, Nd 5061a, IUCN: lc.

**Astragalus cinereus* Willd.: steppe, locality 21; 13.06.1997, Mk 11923-Nd 5353; meadows, locality 29; 19.07.1997, Nd 6093 -Mk 12655; rocky slopes, locality 34; 22.06.1997, Mk 12107b, 12135-Nd 5538 b, 5563; steppe, locality 38; 27.06.1997, Mk 12222-Nd 5650; meadows, locality 47; 13.07.1997, Nd 6143 -Mk 12706; rocky crevices, locality 58; 28.05.2007, Mk 12065- Nd 5492, IUCN: lc.

**Astragalus davisii* Chamb. & Matthews: locality 1; 04.06.1996, Nd 4991; rocky slopes, locality 18; 08.06.1997, Mk 11821-Nd 5252; road slopes, locality 50; 15.07.1997, Nd 5930 -Mk 12494, IUCN: cd.

Variations: Legume c. 20 x 9 mm white tomentose to felted hairy (unknown).

**Astragalus chaldiranicus* Kit Tan & Sorger: meadows, locality 46; 13.07.1997, Nd 5839, 5860 -Mk 12400, IUCN: vu.

**Astragalus comosoides* Chamb. & Matthews: meadows, locality 8; 24.05.1997, Nd 5155, 7065, IUCN: lc.

Astragalus bahcesarayensis Akan, Fırat & Ekici: stony places, locality 62; 05.08.2004, Mf 4221.

Cicer pinnatifidum Jaub. & Spach: rocky slopes , locality 110; 04.05.2003, Aa 2956.

Vicia alpestris Stev. subsp. *hypoleuca* (Boiss) P.H. Davis: steppe , locality 111; 12.07.2007, Ok 6852. , IUCN: lc.

**Lathyrus brachypterus* Cel. var. *haussknechtii* (Sirj) D P.H. Davis: meadows, locality 19; 12.06. 1997, Mk 11855- Nd 5285, IUCN: lc.

Lathyrus nivalis Hand.-Mazz.: rocky slopes, locality 82; 21.06.2000, Mf 2590, IUCN: lc.

Trifolium longidentatum Nábělek: meadow, rocky, locality 201; 18.08.2002, M 7952b,

Hedysarum vanense Hedge & Hub.-Mor.: steppe, locality 204; 10.06.2007, İd 443, IUCN: vu.

**Hedysarum cappadocicum* Boiss.: steppe, locality 38; 27.06.1997, Mk 12227-Nd 5655, IUCN: lc.

**Hedysarum erythroleucum* Boiss.: rocky slopes, locality 53; 16.07.1997, Nd 6026- Mk12562, IUCN: lc.

Onobrychis stenostachya Freyn subsp. *sosnowskyi* (Grossh.) Hedge: steppe, locality 205; 26.07.1997, Fö 5386, IUCN: vu.

Onobrychis fallax Freyn & Sint.: steppe meadows, locality 4; 22.07.2001, Ma.1217, IUCN: lc.

Onobrychis huetiana Boiss.: meadow, locality 208; 31.05.2008, Da 1222, IUCN: nt.

XI. FAM: ROSACEAE

Prunus kurdica Fenzl ex Fritsch: roadside, locality 206; 14.07.2001, Tç 747, IUCN: en.

**Potentilla anatolica* Peşmen: meadows, locality 29; 19.07.1997, Nd 6057- Mk 12620; meadows, locality 43; 12.07. 1997, Nd 5781- Mk 12342; rocky slopes rocky slopes, locality 54; 27.07.1997, 27.07.1997, Nd 6231 -Mk 12795, IUCN: lc.

Potentilla armeniaca Siegf. ex Th.Wolf steppe, locality 209; 05.08.2007, Ok 7533, IUCN: vu.

**Rosa pisiformis* (Christ.) D. Sosn.: around road, locality 55; 19.07.1997, Nd 7056, IUCN: nt.

XII. FAM: LYTHRACEAE

Lythrum anatolicum Leblebici & Seçmen subsp. *vanense* Pınar: wet and sandy places, locality 63; 25.8.2002, Mp 1229

XIII. FAM: CRASSULACEAE

Rosularia davisii Muirhead: rocky place, locality 112; 03.07.2003, Mü 8404a, IUCN: cd.

Sempervivum armenum Boiss.&Huet var. *armenum*: steppe rocky place, locality 114; 15.07.2002, Ok 3561, IUCN: lc.

XIV. FAM: GROSSULARIACEAE

Ribes anatolica Behçet: moving stone area, locality 64; 01.08.2013, B 318.

XV. FAM: APIACEAE

Chaerophyllum hakkiaricum Hedge&Lamand.: steppe, locality 115; 18.07.2001, Mü 6110, IUCN: vu.

**Prangos uechtrizii* Boiss. & Hausskn.: meadows, locality 29; 19.07.1997, Nd 6102 -Mk12664, IUCN: lc.

Cymbocarpum wiedemanii Boiss.: arable field place, locality 116; 21.06.2008, İd 1369, IUCN: cd.

Diplotaenia turcica Pimenov & Kljuykov: moving stone area, locality 65; 01.08.2013, Mf 30469, IUCN: nt.

Laserpitium carduchorum Hedge & Lemond.: arable field place, locality 116; 21.06.2008, Mp 2537.

Malabaila lasiocarpa Boiss.: steppe, locality 150; 29.06.2006, Ok4791, IUCN: lc.

Heracleum crenatifolium Boiss.: the slopes of the valley, locality 118; 29.06.2006, Ok 4884, IUCN: nt.

Trigonosciadium tuberosum Boiss.: steppe, locality 119; 21.06.2007, Ok 6713, IUCN: dd.

Trigonosciadium intermedium Freyn&Sint.: oak clearance slope, locality 120; 09.06.2012, He 1020, IUCN: en.

XVI. FAM: VALERIANACEAE

Valerianella glomerata Boiss & Bal.: locality 121; 28.06.1997, Fö 4280, IUCN: lc.

XVII. FAM: DIPSACACEAE

Cephalaria anatolica Shkhiyan: steppe, locality 151; 18.07.2008, Da 1314, IUCN: cr.

Cephalaria sparsipilosa Matthews: meadows, locality 122; 30.07.2007, Ok 7384, IUCN: cd.

Scabiosa rufescens Freyn & Sint.: meadows, locality 152; 25.06.2002, Mü 7274, IUCN: cd.

XVIII. FAM: ASTERACEAE

Inula helenium L. subsp. *orgyalis* (Boiss.) Grierson: meadow, locality 123; 25.08.2007, Ok7627, IUCN: nt.

Pulicaria armena Boiss. & Kotschy: the edge of Zilan Creek, locality 153; 07.08.2006, Ok5179, IUCN: lc.

Helichrysum compactum Boiss.: steppe, locality 172; 07.08.1996, Fö 2575, IUCN: en.

Helichrysum arenarium (L.) Moench subsp. *aucheri* (Boiss.) P.H. Davis & Kupicha: steppe, locality 173; 07.06.2008, İ 1185, IUCN: lc.

Helichrysum arenarium (L.) Moench subsp. *erzincanicum* P.H. Davis & Kupicha: steppe, locality 174; 16.08.2007 Ok 7580, IUCN: vu.

**Anthemis wiedemanniana* Fish. & Mey.: meadows, locality 5; 03.06.1997, Nd 7076, IUCN: lc.

Anacyclus anaticus Behçet & Almanar: steppe, locality 175; 09.05.2004, Tç 92,

Achillea cappadocica Hausskn. & Bornm.:alpine steppe, locality 178; 20.07.1988, B1317, IUCN: lc.

**Tanacetum zahlbruckneri* (Nab.) Grierson: rocky slopes, locality 34; 22.06.1997, Mk 12121,12166-Nd 5549,5494; road slopes, locality 50; 15.07.1997, Nd 5926 -Mk 12490, IUCN: lc.

Tanacetum heterotomum (Bornm.) Grierson: steppe, locality 182; 25.05.1996, Fö 393, IUCN: vu.

Tanacetum nitens (Boiss. & Noë) Grierson: steppe-rocky areas, locality 183; 08.07.2001, Ok 2144, IUCN: lc.

Tanacetum cadmeum(Boiss.) Heywood subsp. *orientale* Grierson: steppe fields, locality 1194; 23.07.2001, Mü 5968, IUCN: lc.

**Tripleurospermum callosum* (Boiss. & Heldr.) E. Hossain: road slopes, locality 50; 15.07.1997, Nd 5925-12489, IUCN: lc.

**Tripleurospermum monticulum* (Boiss. & Huet) Bornm.: meadows, locality 46; 13.07.1997, Nd 5831 -Mk 12392, IUCN: lc.

**Cousinia bicolor* Freyn & Sint.: rocky slopes, locality 26; 19.06.1997, Mk 12016, Nd 5444, IUCN: lc.

**Cousinia eriocephala* Boiss. & Hausskn.: road slopes, locality 50; 15.07.1997, Mk 100798, IUCN: lc.

Cousinia nabelekii Bornm.: steppe, locality 6; 22.07.2001, Ma 1605, IUCN: nt.

Cousinia hakkarica Hub.-Mor.: steppe, locality 179; 31.07.2002, Mü 7809, IUCN: vu.

**Cousinia vanensis* Hub.-Mor.: meadows, locality 8; 24.05.1997, Nd 7009, IUCN: lc.

Cirsium peshmenianum Yıldız, Dirmenci & Arabacı: conglomerate locality 68; 18.08. 2008, BY 16958

Carduus lanuginosus* Willd.: rocky slopes meadows, locality 47; 13.07.1997, Nd 6215, IUCN: lc. **Variations: Capitula to 4x4 cm (2-3x2-3 cm), spines 1-7 mm (2-10 mm).

Gundelia dersim Vitek, Yüce & Ergin: steppe areas, locality 66; 10.5.2017, Mf 33729

Gundelia colemerikensis Fırat: dry steppe fields, locality 67; 10.05.2017, Mf 33744

Jurinea cataonica Boiss.& Hausskn.: steppe, locality 180; 12.07.2007, Ok6790, IUCN: lc.

**Centaurea saligna* (C.Koch) Wagenitz: creek edge steppe, locality 51; 16.07.1997, Mk 12884, IUCN: lc.

Centaurea sessilis J.F.Gmel.;steppe, May 1986, Hö 1745, IUCN: lc.

Centaurea armena Boiss.: steppe, locality 185; 12.07.2007, Ok6912, IUCN: lc.

Centaurea demirizii Wagenitz: steppe, locality 186; 30.06.1998, Mü3468, IUCN: vu.

Centaurea fenzi Reichardt: steppe, locality 187; 29.07.2007, Ok7289, IUCN: lc.

Centaurea lydia Boiss.: locality 193; 09.06.1996 Fö964, IUCN: cd.

Echinops pungens Trautvt. var. *adenocladus* Hedge: steppe, locality 195; 01.08.2001, M6411 195, IUCN: nt.

Echinops orientalis Trautv.: steppe, locality 202; 19.10.1997, M2240,.

Scorzonera semicana DC.: meadows, locality 203; 26.05.2007 Ok5940, IUCN: lc.

**Scorzonera eriophora* DC.: creek edge steppe, locality 51; 16.07.1997, Mk 12881, IUCN: lc.

Tragopogon aureus Boiss.: steppe, locality 207; 11.06.2001, Ok1639, IUCN: lc.

Tragopogon vanensis Gültepe, Coşkunç. & Makbul: locality 69; 08.04.2010, Mg 267.

Taraxacum davisii Van Soest.: meadow area, locality 210; 5.05.2002, Ok2890, IUCN: en.

**Crepis dioritica* Schott. & Ky. ex Boiss.: rocky slopes, locality 53; 16.07.1997, Nd 5949 -Mk 12514, IUCN: lc.

**Crepis macropus* Boiss. & Heldr.: meadows, locality 29; Nd 6110 -Mk 12672; rocky slopes, locality 54; 27.07.1997, Nd 6222- Mk IUCN: lc.

**Crepis armena* DC.: rocky slopes, locality 34; 22.06.1997, Mk 12110-Nd 5539, rocky slopes, locality 53; 16.07.1997, Nd 6034- Mk 12597, IUCN: lc.

Crepis gemicii Yıldırım, Bingöl & Armağan: meadows and openings in *Quercus petraea* subsp. *pinnatifolia*, a.s.l. locality 70; 17.07.2002, Öb 12199.

Psephellus vanensis A. Duran, Behçet & B. Doğan: steppe fields, a.s.l, locality 71; 17.06.2009, B&A 1603

XIX. FAM: CAMPANULACEAE

**Campanula coriacea* P.H. Davis: basalt rocky slopes, locality 45; 13.07.1997, Mk 12415-Nd 5852, IUCN: lc.

Campanula hedgei P.H.Davis: steppe, locality 154; 09.08.1998, Fö 5480, IUCN: cd.

Campanula bornmuelleri* Nab.: steppe, locality 25; 18.06.1997, Mk11955-Nd5385; rocky slopes, locality 48; 15.07.1997, Mk11768; rocky slopes, locality 53; 16.07.1997, Nd5948, 6016 -Mk 12512, 12579; rocky slopes, locality 54; 27.07.1997, Nd 6240- Mk 12804, IUCN: cd. **Variations: Some samples; Leaves glabrous both sides (leaves hirsute both sides) and stem usually 2-4 flowered (usually one flowered).

Campanula saxonorum* Gandoger: steppe slopes, locality 14; 05.06.1997, Mk 11772, IUCN: lc. **Variations: Stems, 5-20 cm [(10) 15-25(30) cm].

Asyneuma limonifolium (L.) Janch. subsp. *pestalozzae* (Boiss.) Damboldt: steppe, locality 124; 07.07.1997, Fö 5172, IUCN: lc.

Asyneuma trichostegium (Boiss.) Bornm.: meadows, locality 155; 14.08.1997, Fö 1617, IUCN: dd.

Asyneuma linifolium (Boiss. & Heldr.) Bornm. subsp. *eximium* (Rech.f.) Damboldt: steppe, locality 156; 17.07.1997, Mü 1672.

XX. FAM: CONVULVACEAE

**Convolvulus galaticus* Rostan ex Choisy: valley slopes, locality 49; 15.07.1997, Nd 5861- Mk12424, IUCN: lc.

XXI. FAM: BORAGINACEAE

Cynoglossum vanense Sutorý : locality 72; 22.07. 1998 Mü 4533

Rochelia disperma (L.f.) K.Koch var. *microcalycina* (Bornm.) Edmondson: steppe, locality 168; 12.07.2007, Ok 6822, IUCN: lc.

Myosotis platyphylla Boiss: meadows, locality 181; 25.08.2007, Ok 7662, IUCN: vu.

**Rindera caespitosa* (A.DC.) Bunge: plateau, locality 22; 02.04.1999, Mf 1045, IUCN: lc.

Onosma neglecta Riedl: meadow area, locality 188; 20.07.2005, Tç 825, IUCN: cd.

**Onosma polioxantha* Rech. f.: rocky slopes, locality 26; 19.06.1997, Nd 5438, 6337a, IUCN: lc.

Onosma argentata Hub- Mor.: steppe, locality 189; 28.06.1996, Fö 2542, IUCN: vu.

Onosma velutina Boiss.: steppe, locality 190; 10.06.1987, B 710, IUCN: cd.

Onosma procera Boiss: steppe, locality 191; 26.06.1997. Fö 3633, IUCN: nt.

**Onosma isauricum* Boiss. & Heldr.: Çatak, valley slopes, locality 49; 15.07.1997, Nd 5864 -Mk 12427, IUCN: lc.

Onosma bracteosa Hausskn. & Bornm.: wet meadows, locality 13; 10.06.2001, Ma1309.IUCN: lc.

Onosma mutabile* Boiss.: meadows, locality 47; 13.07.1997, Mk 11924- Nd 5354, IUCN: lc. **Variations: Stems up to 8 (1-4) some basal leaves not widest (basal leaves widest).

*Onosma armena*DC.: steppe, locality 192: 19.07.1986, Hö 878, IUCN: lc.

Onosma proballanthera Rech. fil.: rocky slopes, locality 20; 23.09.200, Ma. 2129, IUCN: cd.

Anchusa leptophylla Roemer & Schultz subsp. *incana* (Ledeb.) D. F. Chamb.: creek edge, locality 196; 17.06.2006, Ok 5440, IUCN: cd.

Nonea karsensis M.Popov.: wheat field, locality 197; 02.08.1996, F 616, IUCN: dd.

Nonea stenosolen Boiss. & Balansa: steppe, locality 198; 10.05.1998, M 2362, IUCN: lc.

Alkanna tubulosa Boiss.: alpine meadow, locality 199; 10.05.1998, B 687, IUCN: lc.

Alkanna froedinii Rech.fil.: border plateau, locality 200; 18.07.1997, Fö5870, IUCN: lc.

XXII. FAM: SOLANACEAE

**Lycium anatolicum* A. Baytop & R. Mill: steppe slopes, locality 23; 18.06.1997, Mk, 11962-Nd 5392, IUCN: lc.

XXIII. FAM: SCROPHULARIACEAE

Verbascum kurdicum Hub.-Mor.: steppe, locality 125; 25.05.2002, Aa 2342, IUCN: lc.

Verbascum oreophilum C. Koch var. *oreophilum*: meadow, locality 157; 12.06.2005, Tç 589, IUCN: lc.

Verbascum vanense Hub.-Mor.: steppe, locality 126; 21.06.2001, Ok1787, IUCN: cd.

Verbascum golawanense Firat: fallow fields, edge of fields, locality 73; 01.07.2011, Mf 27749.

Rhynchocorys kurdica Nábělek: plateau, moist area, locality 127; 26.06.2005, B718.

**Scrophularia pulverulenta* Boiss. & Nöe: Çatak, slopes, locality 49; 15.07.1997, Nd 5876 -Mk 12439, IUCN: lc.

**Scrophularia libanotica* Boiss. subsp. *libanotica* var. *urartuensis* R. Mill: rocky slopes, locality 2; 03.08.1996

Nd 5001; rocky slopes, locality 18; 08.06.1997, Mk 11838-Nd 5268; steppe, locality 21; 13.06.1997, Mk 11925-Nd 5355; wet meadows, locality 24; 23.07.1997, Mk 11960-Nd 5390; rocky slopes, locality 26; 19.06.1997, Mk 1190-Nd 5418; valley slopes, locality 49; 15.07.1997, Nd 5876 -Mk12439, Nd 5962,5994- Mk 12525 , 12557, IUCN: lc.

Scrophularia versicolor Boiss.: steppe, locality 128; 10.08.1996, Fö 2630 , IUCN: vu.

Chaenorhinum minus (L.) Lange subsp. *anatolicum* P.H.Davis: sandy area, locality 129; 26.07.2007, İd 819, IUCN: lc.

Linaria genistifolia (L.) Miller subsp. *confertiflora* (Boiss.) P.H.Davis: steppe, locality 158; 29.06.1996, Fö 2684, IUCN: lc.

Linaria corifolia Desf.: steppe, locality 159; 05.10.1997, Fö 1440 , IUCN: lc.

Veronica fridericae M.A. Fischer: meadows, locality 32; 21.07.2002, Ma 2874,IUCN: cd.

Bunaea trifida (Vahl) C.A.Meyer: steppe, locality 130; 07.06.2002, Ma 2452.

XXIV. FAM: LAMIACEAE

Ajuga bombycina Boiss.: steppe, locality 131; 15.05.1996, Fö 1164, IUCN: nt.

**Scutellaria orientalis* L. subsp. *santaloides* (Hauskn. ex Bornm.) Edmonson: locality 33; 03.07.1997, Nd 5729, IUCN: lc.

**Phlomis armeniaca* Willd.: Özalp road 20. Km, slopes, locality 36; Mk 12201- Nd 5629; meadows, locality 47; 13.07.1997, Nd 6135- Mk12967, IUCN: lc.

**Marrubium parviflorum* Fisch. & C. A. Mey. subsp. *oligodon* (Boiss.) Seybold: locality 55; Nd 6050- Mk 12613; steppe, locality 57; 19.07.1997, Nd 6211- Mk 12775, IUCN: lc.

Marrubium vanense Hub.-Mor.: steppe, locality 132; 29.07.2006, Mf627, IUCN: en.

Marrubium vulcanicum Hub.-Mor.: steppe, locality 133; 23.07.2003, Mü 8826, IUCN: vu.

Stachys ramosissima Montbret & Aucher ex Benth.var. *ramosissima*: steppe, locality 160; 29.06.1997, Fö 4444 , IUCN: cd.

Lophanthus turcicus Dirmenci, Yıldız & Hedge: rocky and stony north slope, locality 74; 24.07.2009, Td 3707

**Micromeria cristata* (Hampe) Griseb. subsp. *orientalis* P.H. Davis: creek edge steppe, locality 51; 16.07.1997, Nd 5933 -Mk 12497, IUCN: lc.

Micromeria cremnophila Boiss. & Heldr. subsp. *anatolica* P.H.Davis: rocky cracks, locality 167; 15.07.2003, Mü8595, IUCN: lc.

**Cyclotrichium glabrescens* (Boiss. & Kotschy ex Rech. fil.) Leblebici: creek edge steppe, locality 51; 16.07.1997, Mk 12883, Nd 5936 -Mk 12500, IUCN: cd.

**Thymus brachychilus* Jalas: rocky slopes, locality 53; 16.07.1997, Nd 5979 -Mk 12542, IUCN: lc.

**Salvia kronenburgii* Rech. fil.: steppe slopes, locality 27; 21.06.1997, Mk11201-Nd 5449, IUCN: vu.

Salvia longipedicellata Hedge.: steppe, locality 139; 22.05.2002, Mü 7015, IUCN: nt.

Salvia dichroantha Stapf.: steppe, locality 140; 09.06.1997, Fö1899, IUCN: lc.

XXV. FAM: PLUMBAGINACEAE

**Limonium vanense* Kit-Tan & Sorger : meadows, locality 46; 13.07.1997, Nd 5848 -Mk 12411, IUCN: vu.

Limoniopsis davisii Bokhari: rocky and stone steppe, locality 161; 03.07.2003, Mü8413, IUCN: en.

Acantholimon venustum Boiss. var. *assyriacum* (Boiss.) Boiss.: steppe, locality 162; 16.07.2006, Ok5007, IUCN: nt.

Acantholimon acerosum (Willd.) Boiss. var. *brachystachyum* Boiss.: steppe, locality 170; 14.07.2001, Mü5224a, IUCN: vu.

Acantholimon calvertii Boiss.: rocky steppe, locality 171; 08.07.2001, Ok2075, IUCN: lc.

**Acantholimon reflexifolium* Bokhari :rocky slopes, locality 54; 27.07.1997, Nd 6235 -Mk 12799, IUCN: nt.

Acantholimon bashkaleicum Doğan & Akaydın: steppe, locality 75; 06.07.2002, D&A 7544.

Acantholimon artosense Doğan & Akaydın: steppe, locality 76; 05.07.2002, D&A 7532.

Acantholimon hoshapicum Doğan & Akaydın:steppe, locality 77; D&A 7540.

XXVI. FAM: PLANTAGINACEAE

**Plantago anatolica* Tutel & R. Mill.: meadows, locality 19; 12.06.1997, Mk 11850- Nd 5280, IUCN: cd.

XXVII. FAM: EUPHORBIACEAE

**Euphorbia grisophylla* M. L. S. Khan: plateau, locality 22; 02.04.1999, Mf 2062, IUCN: lc.

Euphorbia falcata L. subsp. *macrostegia* (Bornm.) O.Schwartz: steppe, locality 113; 08.09.2007, İ 848, IUCN: lc.

XXVIII. FAM: FAGACEAE

**Quercus petraea* (Mattuschka) Liebl. subsp. *pinnatifida* (C. Koch) Menitsky: steppe, locality 42;15.06.1999,Mf 1776, 53;Mf1542, IUCN: lc.

XXIX. FAM: RUBIACEAE

Galium margaceum Ehrend. & Schönb.-Tem. : rocky slope, locality 134; 20.06.1992, Fö 1404, IUCN: lc.

XXX. FAM: LILIACEAE

**Allium microspatum* Ekberg: rocky slopes, locality 54; 27.07.1997, Mk:12785-Nd 6221, IUCN: cd.

Allium tauricola Boiss.: rocky slopes, locality 166; 04.08.2001, Mü 6533, IUCN: lc.

**Allium stearnianum* Koyuncu, Özhatay & Kollmann subsp. *vanense* Kollmann & Koyuncu : wet meadows, locality 24; 23.07.1997,Mk 12861-Nd 6298; steppe,

locality 38; 27.06.1997, Mk 12280-Nd 5708; : meadows, locality 47; 13.07.1997, Mk 12685-Nd 6123; road slopes, steppe, locality 52; 16.07.1997, Mk 12508-Nd 5944; rocky slopes, locality 53; 16.07.1997, Mk 12545-Nd 5982; steppe, locality 57; 19.07.1997, Mk 12772-Nd 6208; steppe, locality 41; 19.07.1997, Mk 12769-Nd6205, IUCN: nt.

**Allium shatakiense* Rech. fil.: wet meadows, locality 35; 22.06.1997, Mk 12132-Nd 5560, IUCN: nt.

Allium armenum Boiss. & Kotschy: rocky steppe, locality 141; 02.09.2007, Ok 7833, IUCN: lc.

Allium hoshabicum Firat: Holotype, steppe and meadow, elevation, locality 78; 21.07.2012, Mf 28979.

Puschkinia bilgineri Yıldırım: alpine meadows, locality 79; 19.06.2014, Hy 2695.

**Bellevalia rixi* Wendelbo: meadows, locality 9; 24.05.1997 Mk 11704-Nd5170; steppe, locality 21; 13.06.1997, Mk 11894-Nd5324, locality 37; Mk 12069-Nd 5498: steppe, locality 38; 27.06.1997, Mk 12279-Nd 5707, IUCN: en.

**Fritillaria michailovskyi* Fomin: steppe slopes, locality 16; 07.06.1997, Mk 11798-Nd 5229, IUCN: cd.

**Fritillaria minima* Rix: rocky slopes, locality 12; 26.05.1997, Mk 11736-Nd 5200, steppe slopes, locality 16; 07.06.1997, Mk 11798-Nd 5229, rocky slopes, locality 53; 16.07.1997, Mk 12520- Nd 5957, IUCN: vu.

Tulipa koyuncui Eker & Babaç: steppe, locality 80; 13.05.2010, E 1565.

Gagea vanensis Tekşen & Karaman: rocky slopes, locality 81; 21.06.2000, Mt 2460

XXXI. FAM: IRIDACEAE

**Iris sari* Schott ex Baker: road slopes, locality 40; 16.05.1999, Mf 1292, IUCN: lc.

XXXII. FAM: ORCIDACEAE

Dactylorhiza osmanica (Klinge) P.F.Hunt & Summerh. subsp. *osmaniaca*: the edge of Zilan creek, locality 163; 29.05.2006, Ok 4386. IUCN: lc.

XXXIII. FAM: CYPERACEAE

Carex distans L.: meadows, locality 136; 07.06.2003, Mü 8309a

XXXIV. FAM: POACEAE

Bromus macrocladus Boiss.: steppe, locality 137; 17.06.2007, Ok 631, IUCN: en.

Festuca anatolica Markgr.-Dann. subsp. *borealis* Markgr.-Dannenb.: steppe, locality 164; 08.06.1991, B1696, IUCN: cd.

Festuca anatolica Markgr.-Dann. subsp. *anatolica*: steppe, locality 165; 30.06.1998, Mü 3749, IUCN: lc.

Eremopoa mardinensis R.Mill: steppe, locality 138; 30.06.1990, B 3204, IUCN: en.

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4. Discussions

With this study, 259 endemic taxa belonging to 34 families and 117 genera were compiled in the Lake Van Basin. Twenty three of them, within 20 genera, are unique to the Lake Van Basin.

The distribution of 117 genera and 259 taxa within 34 families are as follows: *Asteraceae*- 20 genera 41 taxa; *Fabaceae*- 7 genera 40 taxa; *Brassicaceae*- 9 genera 29 taxa; *Boraginaceae*- 8 genera 20 taxa; *Caryophyllaceae*- 5 genera, 20 taxa; *Lamiaceae*- 10 genera 15 taxa; *Scrophulariaceae*- 7 genera 13 taxa; *Liliaceae*- 6 genera 12 taxa; *Apiaceae*- 8 genera 9 taxa; *Plumbaginaceae*- 3 genera, 9 taxa; *Ranunculaceae*; 2 genera 9 taxa; *Campanulaceae*- 2 genera 7 taxa; *Poaceae*- 3 genera 4 taxa; *Rosaceae*- 3 genera 4 taxa; *Dipsacaceae*- 2 genera 3 taxa; *Geraniaceae*- 2 genera 3 taxa; *Crassulaceae*- 2 genera 2 taxa; *Papaveraceae*- 2 genera 2 taxa; *Euphorbiaceae*- 1genus 2 taxa; *Linaceae*- 1genus 2 taxa; *Convolvulaceae*- 1 genus 1 taxon; *Cyperaceae*- 1 genus 1 taxon; *Fagaceae*- 1 genus 1 taxon; *Grossulariaceae*- 1 genus 1 taxon; *Hypericaceae*- 1 genus 1 taxon; *Iridaceae*-1 genus 1 taxon; *Lythraceae*-1 genus 1 taxon; *Orchidaceae*- 1 genus 1 taxon; *Plantaginaceae*- 1 genus 1 taxon; *Polygonaceae*- 1 genus 1 taxon; *Rubiaceae*- 1 genus 1 taxon; *Rutaceae*- 1 genus 1 taxon; *Solanaceae*- 1 genus 1 taxon; *Valerianaceae*- 1 genus 1 taxon.

Most of the endemic taxa have been located around Güzeldere pass (Çuh pass), Artos, Kavuşşahap and Ispiriz mountains respectively (Davis et al., 1988; Ekim, 2005; Özhatay et al., 2009).

Among the endemic taxa, *Acantholimon artosense*, *Acantholimon bashkaleicum*, *Acantholimon hoshapicum*, *Astragalus bahcesarayensis*, *Cirsium peshmenianum*, *Crepis gemicii*, *Dianthus vanensis*, *Draba orientalis*, *Fritillaria minima*, *Gagea vanensis*, *Limoniopsis davisii*, *Limonium vanense*, *Lophanthus turcicus*, *Lythrum anatolicum* subsp. *vanense*, *Psephellus vanensis*, *Puschkinia bilgineri*, *Ranunculus vanensis*, *Ribes anatolica*, *Silene acaulis* subsp. *vanensis*, *Silene miksensis*, *Tragopogon vanensis*, *Tulipa koyuncui* and *Verbascum golawanense* are unique to Lake Van basin.

IUCN Red Data Categories (if known) of 259 taxa in our study are as follows (Ekim et al. 2000): IUCN: Lr (lc) 118, IUCN: Lr (cd) 33, IUCN: Lr (nt) 28, IUCN: vu 20, IUCN: en 16, IUCN: dd 4, IUCN: cr 1. IUCN Red Data categories of 40 taxa are unknown.

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