DETERMINATION OF CHEMICAL AND PHYSICAL ANALYSIS TOLERANCE OF SOME ASSOCIATIONS DETECTED IN GYPSIFEROUS AND MARLY SOILS IN ESKİŞEHİR

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Eskişehir is located on the northwest side of Central Anatolia region between 29^{o} 58’ and 32^{o} 04’ east longitude and 39^{o} 06’ ve 40^{o} 09’ north latitude.

The area of Eskisehir is 13.901 km2. Eskisehir covers 1,7 % area of Turkey. The adjacent provinces of Eskisehir are ;Ankara to the east, Konya and Afyon to the south, Kütahya and Bilecik to the west, Bilecik, Bolu and Ankara to the North.
The city center is 801 m above sea level.

Some of the significant floristic diversity of Turkey are, edafic, geologic and geomorphologic varieties and topographical structures.

- The reason of high endemism in the soils thriving on the rocks and including extreme ecological conditions such as Gyps and Marl soils is explained as a geological isolation. These regions are named geologic island or edafic.

Marl consist of natural various combinaiton of clay and calcium carbonate. When calcium carbonate amount is higher than clay, it’s called limestone.

Gypsum is a mineral that chemical compound is calcium sulphate. The variant which has two molecules of crystal water ($CaSO_4 + 2\ H_2O$) is called gypsum. Gypsiferous, Gypsiferous-Marl types of bedrock are very suitable for the endemic species (Akman, 2014).

Region of Reserv	Apparent	The Most	Mean
Kütahya	5	29	15
Denizli	1	2	1,5
Niğde	25	1000	62,5
Sivas	50	500	275
Eskişehir	12	20	16
Ankara	2	10	6
Kars	20	30	25
Çankırı	50	500	275
Total	165	1190	670

Reserves of Turkey Gypsum

Lake formed sediment rocks show a wide spread in the region of Eskişehir. Limestone, dolomite, sepiolite, meerschaum and gypsum formations reside in this region which also has industrial applications.

Some Views of Working Area

Some Views of Working Area

This study was carried out for the aim of to expose the importance of edafic isolation in terms of floristic diversity and endemism.

The flora of Turkey is represented 1.220 genus and 11.707 species and sub-species which belong to 154 family.

Turkey is one of the country that has the richest flora in the World with 11.707 species and sub-species taxa.

Floristic Statement of Steppe in Central Anatolia

According to the study of Turkey's Flora the number of species is more than 2.000 (two thousands). The number of endemic species is higher in Central Anatolia as well as floristic richness (Akman, 2014).

In the steppes of Central Anatoia particularly species of Labiatae, Scrophulariaceae, Caryophyllaceae, Crucifera, Boraginaceae, Cistaceae and Leguminosae families are predominate (Akman, 2014).

	Natural	Endemic	%	Wild	Agriculture	Total
Lycopsida	13	1	8,00	0	0	13
Pteridophyta	73	2	2,74	0	0	73
Gymnospermae	37	6	16,00	4	1	42
Angiospermae	11343	3640	32,09	167	69	11579
Total	11466	3649	31,82	171	70	11707

Floristic summery of Turkey (Güner et al., 2012)

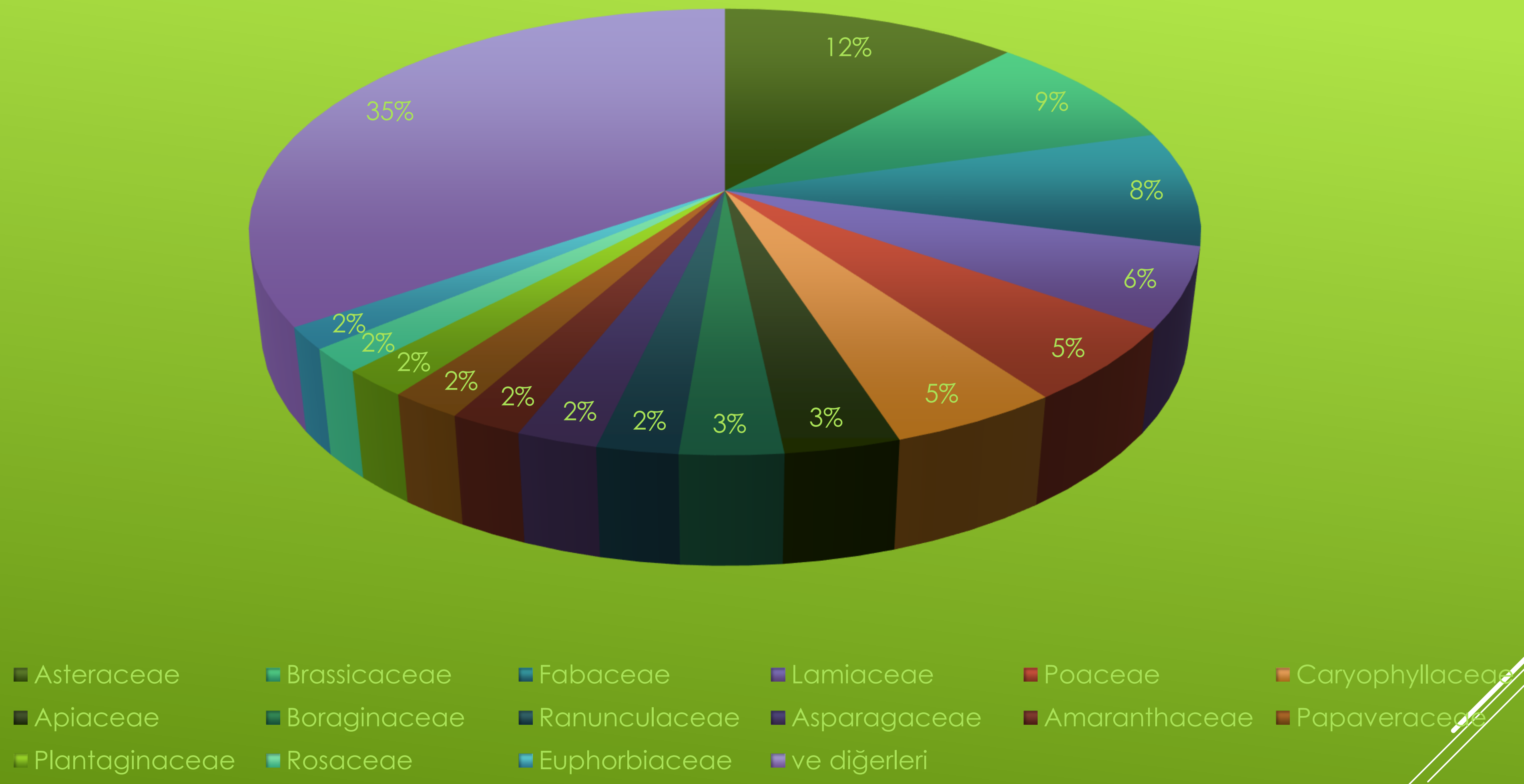
Distrubitions of the Obtained Plants According to the Large Plant Groups

	Family	Taxa
Spermatophyta		
Gymnospermae	3	4
Angiospermae		
Dicotyledonae	60	637
Monocotyledonae	9	96
Total	72	737

As the result of the investigations and diagnoses; 354 genus, and 737 species and sub-species taxa that all are under 72 families were determined in the research field,

The determined families have 69 Angiospermae, 3 Gymnospermae and 60 of the Angiospermae are dicotyl, 9 of Angiospermae are monocotyl,

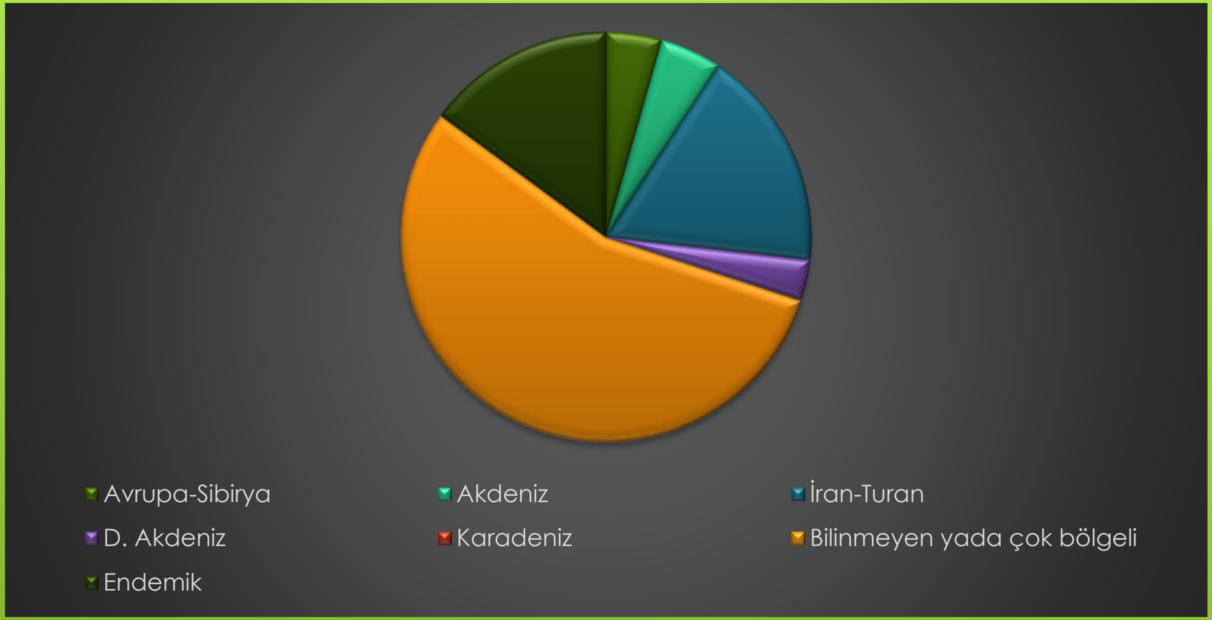
351 of the genus are Angiospermae, 3 of the genus are Gymnospermae. 329 of the genus are dicotyl and 22 of the genus are monocotyl



Family of Asteraceae take apart in the first place of taxa according to the number of species and sub-species which were determined to be specific to the gypsum and marl soils.

Phytogeographic Regions	Number of Taxa	%
Europe-Siberia	38	5,1
Mediterranean	42	5,6
Iran-Turan	152	20,6
E.Mediterranean	27	3,6
Blacksea	1	0,1
Unknown or Multi Regional	477	64,7
Endemic	129	17,5

Distribution of the Species According to the Phytogeographic Regions

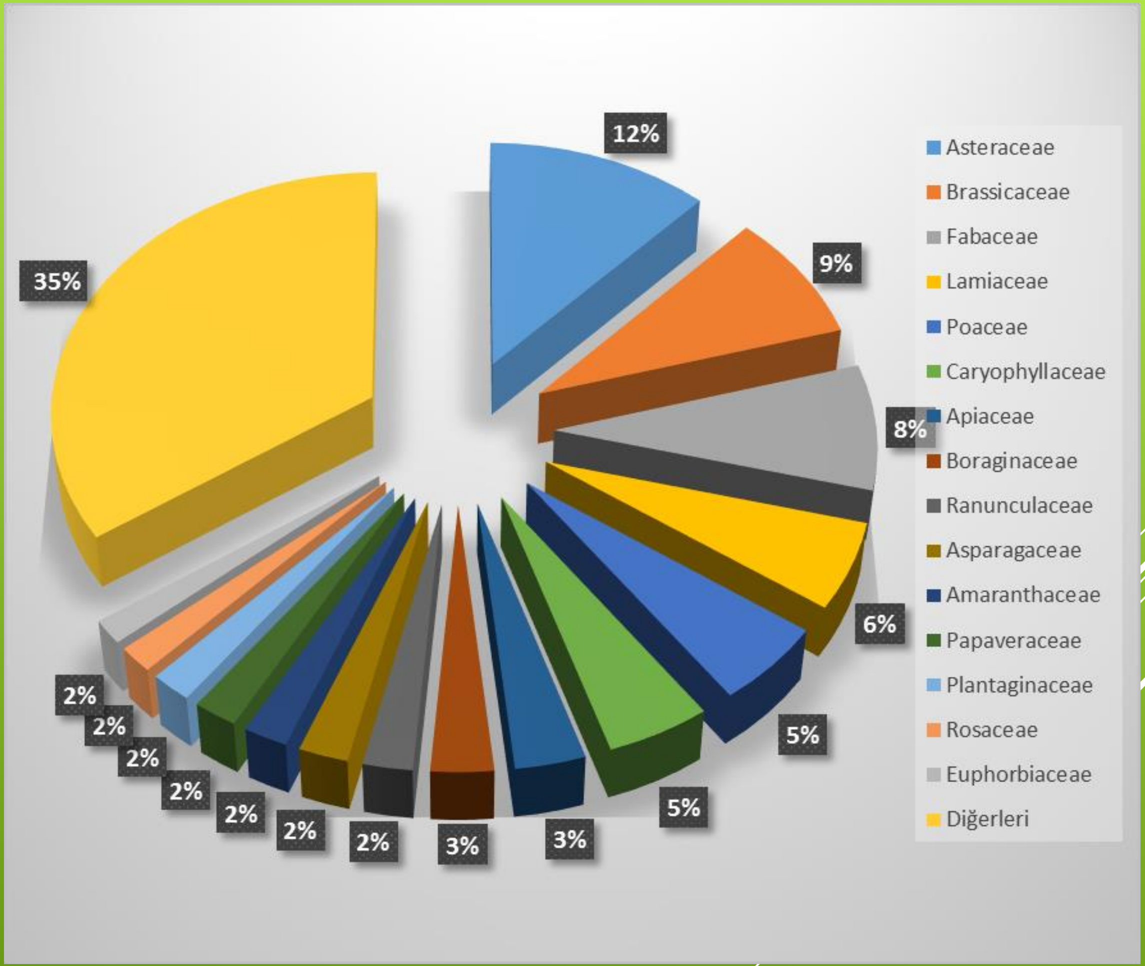


Spectrum of Phytogeographic Regions

In the determined taxa, 152 of them are in Iran-Turan, 42 of them are in Mediterranean, 27 of them are in East-Mediterranean, 38 of them are in Europe-Siberia and 1 of them is in Blacksea phytogeographic region. The phytogeogaphic regions of 477 of them are unknown or they are multi regional.

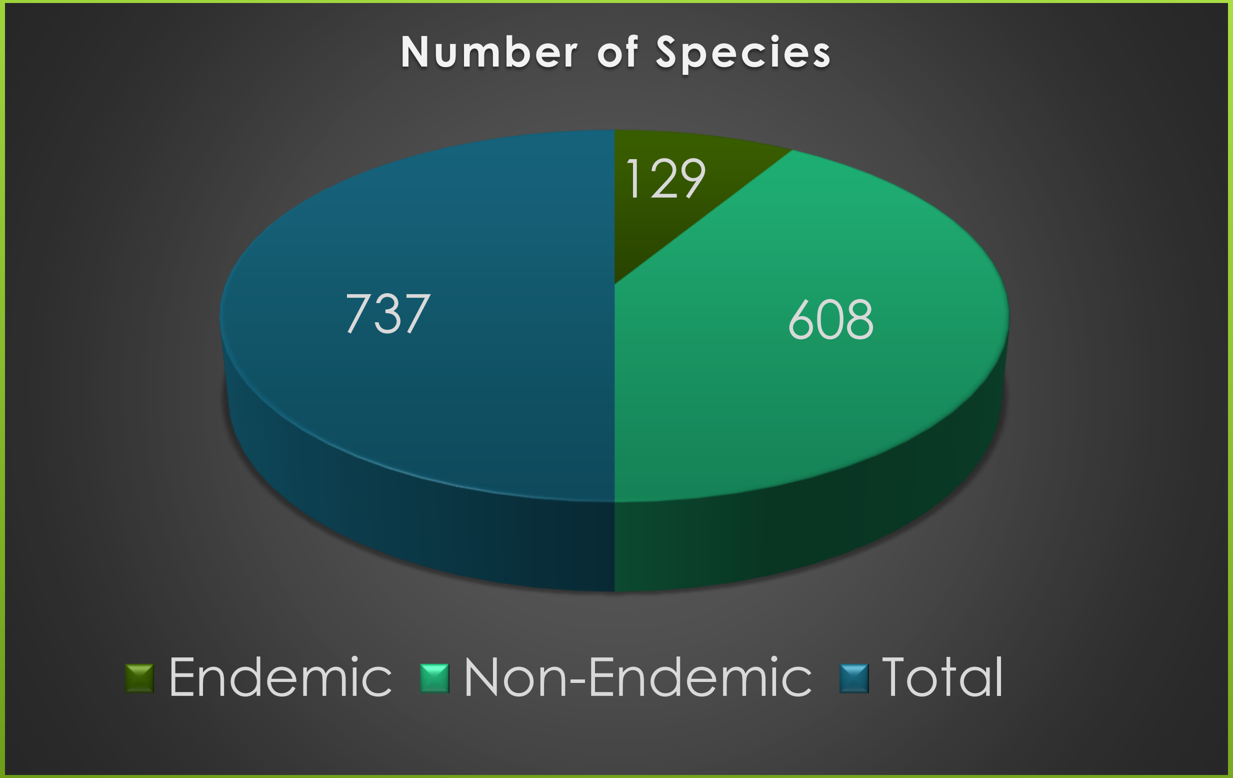
The richest families in the working area

No	Name of Family	Nummber of Species	Ratio (%)
1	Asteraceae	98	13,29
2	Brassicaceae	70	9,49
3	Fabaceae	68	9,22
4	Lamiaceae	47	6,73
5	Poaceae	44	5,97
6	Caryophyllaceae	40	5,42
7	Apiaceae	27	3,66
8	Boraginaceae	24	3,25
9	Ranunculaceae	19	2,57
10	Asparagaceae	19	2,57
11	Amaranthaceae	17	2,30
12	Papaveraceae	17	2,30
13	Plantaginaceae	16	2,17
14	Rosaceae	14	1,89
15	Euphorbiaceae	13	1,76
16	Others	282	38,26
	Total	737	100



The richest families in the working area

The ratio of Endemism of the Species in the Working

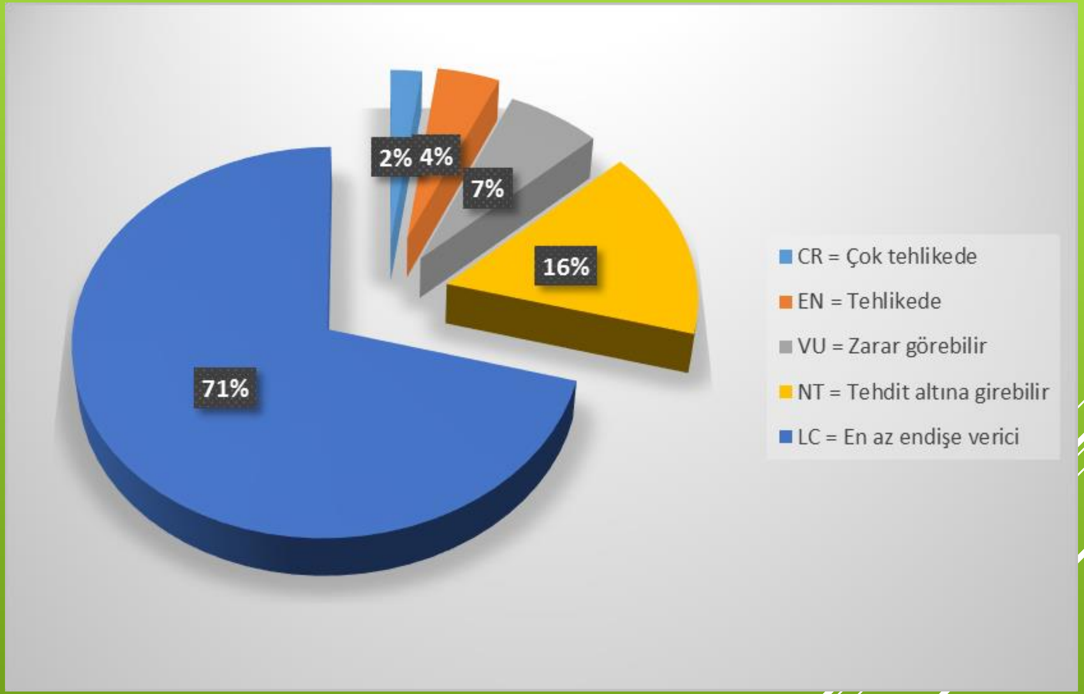


The ratio of Endemism of the Species in the Working Area

In the working area 129 Endemic taxa are determined so far, and the ratio of it is approximately 17,5 %

Distribution of Endemic and Non-Endemic Species According to Red List of IUCN

Categories of Red List	Endemics	Non-Endemics
EX = Extinct	-	-
EW = Extinct in the wild	-	-
CR = Critically endangered	3	1
EN = Endangered	6	-
VU = Vulnerable	9	2
NT = Near threatened	22	-
LC = Least concern	97	5
DD = Data deficient	-	-
Total	137	8



Distribution of Species according to Red List.

In The Categories of Endemic Taxa; 6 of them are in EN, 3 of them are in CR, 9 of them are in VU, 22 of them are in NT and 97 of them LC

Some Views of Working Area

The vegetation of the area was studied according to Braun-Blanquet approach and classified into 7 associations. Associations and their higher units are as follows:

Class: *Astragalo-Brometea* (Quezel, 1973)

Class: *Onobrychido armenae-Thymetalia leucostomi* Akman, Ketenoglu, Quézel

Alyans: *Artragalo karamasici- Gypsophilion eriocalycis* Quézel et Demirörs 1984

1. Association: *Saponario kotschyii-Aethionemetum dumani* ass. nova

2. Association : *Salvio wiedemannii-Artemidetum campestrii* ass. nova

3. Association : *Anthemido gypsicolae-Centauredetum niveae* ass. nova

4. Association : *Hedysario pestalozzae- Convolvuletum phrygiae* ass. nova

5. Association : *Paronychio caricae- Convolvuletum pulvinatii* ass. nova

6. Association : *Lino cariensae- Fumanetum paphlagonicae* ass. nova

7. Association : *Gypsophilo viscosae-Thymetum longicaulii* ass. nova

Comparison of Soil Analyzes According to Plant Associations

In the study area, 59 soil samples were taken from the places that could best characterize the plant associations.

Physical Analysis

Soil specimens taken from 0-20 and 20-40 cm depth were taken from places where plant units were found. There are silt loamy, sandy loamy, loamy, silt, clay, sandy clay, and sandy clay constructions in associations soil.

Physical analysis results of soil samples

Soil Number	Localite	Fiziksel Analizler				
		%				Structure
		Moisture	CLAY	SİLT	SAND	
1	L 5 DEMİRCİK	3,95	11,16	72,88	15,96	Silt loamy
2	To - 6 GÜNYÜZÜ..	1,19	9,23	24,29	66,48	Sand loamy
3	To 88 - 101	3,64	7,39	48,49	44,12	loamy
4		5,37	9,64	86,65	3,71	Silt
5	To 152-153-154	3,71	73,86	8,31	17,83	Clay
6	To - 104 - 107	3,71	26,09	29,08	44,83	Loamy
7	117 - 122	2,09	9,32	69,45	21,23	Siltli loamy
8	L4 To-37-39	4,40	78,58	14,64	6,78	Clay
9	L4 To4 ÖA4	5,48	79,47	6,35	14,18	Clay
10	To 102-103	2,40	7,30	41,72	50,98	Sand loamy
11	ACANTHOLİMON	2,56	81,20	6,16	12,64	Clay
12	To 1 alpu bozan yolu sol tepeler	3,58	38,08	14,52	47,40	Sand Clay loamy
13	ÖA 42 - 43	3,73	69,72	8,31	21,97	Clay
14	L1 T1 YAZIR	3,21	7,36	42,07	50,57	Sand loamy
15	To 135 - 136	3,57	66,37	9,04	24,59	Clay
16	To 158 - 159	4,31	86,86	4,18	8,96	Clay
17	ÖA 13 L 8	4,09	47,05	2,84	50,12	Sand Clay
18	To 138 - 139	2,16	76,94	5,56	17,50	Clay
19	To 21 - 25 BOZAN	2,65	47,09	14,38	38,53	Clay
20	ÖA 10 L5	2,24	48,94	17,10	33,96	Clay
21	ÖA9 L4	2,41	38,77	22,54	38,68	Clay loamy
22	L1 ÖA7	2,56	59,36	20,52	20,12	Clay
23	ÖA 14 L9 To 14	1,83	9,45	27,95	62,60	Sand loamy
24	To 164-165-166-167(Num. Yok)	0,00	0,00	0,00	0,00	0
25	ÖA 19 To 19 L14	3,94	52,64	16,07	31,29	Clay
26	To 141-146	4,03	44,35	14,59	41,07	Clay
27	To 7 L5	3,20	11,65	52,40	35,95	Silt loamy
28	L1 A. KEPEN SİVRİHİSAR	5,02	62,41	18,95	18,64	Clay
29	To 76	5,55	9,23	70,64	20,13	Silt loamy
30	171-172	2,35	60,87	17,29	21,84	Clay
31	L6	3,60	40,17	13,36	46,47	Sand Clay
32	ÖA 16 L11 To 11	1,25	10,13	33,30	56,58	Sand Loamy
33	To 21	4,28	73,88	12,70	13,41	Clay
34	178	2,99	41,23	22,10	36,66	Clay
35	To 160-161-162-163	3,33	70,34	9,02	20,64	Clay
36	To 131-132-133	2,27	8,19	45,76	46,06	loamy
37	ÖA 17 L12 To12	4,79	14,54	54,62	30,85	Siltli Loamy
38	To 20	4,14	8,18	39,64	52,18	Sand Loamy
39	To 2/33 L2	5,29	44,18	19,76	36,06	Clay
40	ÖA 60-72 To	5,95	47,98	24,16	27,87	Clay
41	ÖA - 170	1,53	40,46	14,22	45,32	Sand Clay
42	ÖA 12 L7	3,89	51,86	22,89	25,25	Clay
43	To 130 ÖA 127-128-129-130	0,95	9,93	38,37	51,70	loamy
44	To 9	4,00	59,50	19,50	21,00	Clay
45	To 18	4,33	60,46	12,54	27,00	Clay
46	To 148	2,45	49,04	12,30	38,66	Clay
47	ÖA 18 L13 To 13	2,38	69,50	12,29	18,21	Clay
48	ÖA 73 To 73	3,85	8,15	68,64	23,20	Siltli loamy
49	ÖA 6 L 6 To 6	4,65	70,39	14,68	14,93	Clay
50	ÖA 15 L10 To 15	1,97	11,34	37,46	51,20	loamy
51	To 19	7,94	64,22	10,86	24,92	Clay
52	To 16	3,47	51,63	10,36	38,01	Clay
53	okunmuyor iptal	4,38	54,21	20,92	24,87	Clay
54	To 2 ÖA 2 L 2	5,07	81,24	11,29	7,47	Clay
55	ÖA168-169 nasrettin hoca	3,02	47,27	36,38	16,36	Clay
56	180-183	5,21	62,37	2,87	34,76	Clay
57	173-175	2,93	56,79	21,35	21,87	Clay
58	176-177	5,56	86,66	2,12	11,23	Clay
59	179	4,56	57,75	23,81	18,44	Clay

Soil specimens were taken 5-20 cm deep. The soil structures and min.-max. values of the associations are given in the table below.

Associations	Structure	Clay rate		Silt rate		Sand rate	
		Min.(%)	Max. (%)	Min. (%)	Max. (%)	Min. (%)	Max. (%)
Saponario kotschyii-Aethionemetum dumanii	Sandy loamy, clay and silts loamy	9.32	47.04	9.04	69.45	24.59	62.60
Salvio wiedemannii-Artemidetum campestrii	Clay loamy, clay and silts loamy	9.23	73.88	12.70	72.88	13.41	38.68
Anthemido gypsicolae-Centauredetum niveae	Clay and silt loamy	9.25	86.86	4.18	70.64	8.96	38.66
Hedysario pestalozzae- Convolvuletum phrygiae	clay, sandy clay, loamy and silt loamy	7.39	86.66	2.12	69.45	6.78	52.18
Paronychio caricae- Convolvuletum pulvinatii	Clay and loamy	7.45	73.86	8.31	48.49	13.41	56.58
Lino cariensae- Fumanetum paphlagonicae	Clay, loamy and silt loamy	8.19	85.07	8.15	69.45	69.45	46.06
Gypsophilo viscosae-Thymetum longicaulii	Silt loamy and loamy clay	7.40	76.94	5.56	86.65	3.71	51.70

Soil Number	Ph	Total Salt (%)	Organic substances (%)	Lime (%)	Phosphorus (P2O5)	Potassium (K2O)	Soil Type
1	7,43	0,07863	0,8462	33,9619	4,122	117,4973	Gypsum
2	7,41	0,0244	3,5644	12,3498	3,9503	42,1785	Gypsum
3	7,48	0,068	3,1768	52,4865	4,4655	93,3953	Gypsum
4	7,57	0,0895	1,8389	41,6805	4,4083	207,8798	Gypsum
5	8,26	0,0131	2,1368	69,4675	2,6908	57,2423	Marl
6	7,96	0,0108	3,9473	67,9237	5,267	72,306	Marl
7	8,08	0,0123	1,716	86,4484	3,893	7,5319	Marl
8	8,04	0,0359	3,2288	67,9237	3,893	75,3187	Marl
9	8,06	0,029	2,2738	58,6614	2,1183	132,561	Marl
10	7,66	0,0482	2,5008	43,2242	1,4885	48,204	Gypsum
11	8,09	0,0166	2,808	86,4484	2,061	81,3443	Marl
12	8,01	0,0142	3,9426	58,6614	4,4083	132,561	Marl
13	8,18	0,0196	3,4084	81,8172	1,603	75,3187	Marl
14	7,81	0,0393	3,4935	37,0493	1,3167	48,204	Gypsum
15	8,2	0,0188	2,8837	78,7298	3,7213	24,102	Marl
16	8,33	0,017	2,7229	64,8363	2,519	132,561	Marl
17	8,19	0,027	3,0539	18,5247	2,29	222,9435	Gypsum
18	8,23	0,0174	2,7466	83,3609	5,725	108,459	Marl
19	8,3	0,0085	1,9477	52,4865	3,435	87,3698	Gypsum
20	8,11	0,014	3,8953	74,0986	2,29	72,306	Marl
21	7,91	0,0122	4,6706	74,0986	2,061	72,306	Marl
22	8,01	0,0147	1,7727	84,9047	2,1183	81,3443	Marl
23	7,68	0,026	2,6898	7,7186	1,374	66,2805	Gypsum
24	7,99	0,017	2,9215	46,3116	2,1183	201,8543	Gypsum
25	8,07	0,0125	3,9284	67,9237	2,1183	96,438	Marl
26	8,11	0,0137	3,7109	71,0112	2,9198	54,2295	Marl
27	7,69	0,0347	3,6968	32,4181	2,8625	159,5758	Gypsum
28	8,05	0,0232	3,5549	61,7488	2,8625	138,5865	Marl
29	7,86	0,0608	3,0302	9,2623	7,557	331,4025	Gypsum
30	8,16	0,0137	1,6404	89,5358	2,6908	81,3443	Marl
31	8,12	0,0142	2,5008	58,6614	1,9465	45,1913	Marl
32	7,8	0,0438	3,8953	21,6121	1,4313	7,5319	Gypsum
33	8,02	0,0331	3,0775	61,7488	1,7748	138,5865	Marl
34	8,12	0,0134	3,919	71,0112	1,832	114,4845	Marl
35	8,12	0,0157	3,1342	58,6614	2,1183	159,6058	Marl
36	7,8	0,0608	3,744	52,4865	1,7748	39,1658	Gypsum
37	7,87	0,0973	3,64	55,574	2,1183	99,4208	Marl
38	7,77	0,0457	3,919	16,9809	2,4618	24,102	Gypsum
39	8,06	0,0147	3,1579	20,0684	2,4045	250,0583	Gypsum
40	8,11	0,0277	0,6949	20,0684	1,9465	349,479	Gypsum
41	8	0,0054	3,4368	80,2735	4,0648	63,2678	Marl
42	8,12	0,0203	3,2666	58,6614	2,2328	138,5865	Marl
43	7,81	0,0281	2,444	9,2623	1,832	18,0765	Gypsum
44	7,79	0,0353	3,1862	66,38	4,9235	204,867	Gypsum
45	7,88	0,0258	3,016	60,2051	5,3815	135,5738	Marl
46	7,82	0,0306	4,3113	77,1861	2,2328	87,3698	Marl
47	8,42	0,0123	2,5197	78,7298	1,9465	39,1658	Marl
48	7,86	0,0619	3,2902	32,4181	2,6908	150,6375	Gypsum
49	8,11	0,0289	66,38	2,6142	210,8925	3,664	Gypsum
50	7,55	0,0529	3,5644	33,9619	4,122	117,4973	Gypsum
51	7,8	0,0427	1,3946	33,9619	1,374	250,0583	Gypsum
52	8,08	0,021	2,8695	66,38	3,1488	114,4845	Marl
53	7,94	0,0261	3,5077	64,8363	1,832	99,4208	Marl
54	8,22	0,0296	2,2077	49,3991	3,8358	241,02	Gypsum
55	8,29	0,0144	3,0444	61,7488	4,0648	126,5355	Marl
56	8,13	0,0297	2,2171	72,5549	1,8893	174,7395	Marl
57	8,2	0,0171	1,6829	74,0986	3,893	105,4463	Marl
58	8,36	0,0279	3,1295	57,1177	1,4313	114,4845	Marl
59	7,92	0,0301	3,172	50,9428	4,7518	165,7013	Gypsum

Chemical analysis results of soil samples

1. Phosphorus (P_2O_5) determination in plants: According to the Olsen method, the amount of phosphorus passing through the soil extract using 0.5 M sodium bicarbonate (pH: 8,5) was found by spectrophotometer (Bremner, 1965).

2. Potassium (K_2O) available to plants: The flammable photometric potassium principle is the principle of potassium flame photometer readout method of extracting potassium from the soil with ammonium acetate solution.

3. Determination of organic matter: The determination of organic matter in soils is based on the Smith and Weldon method (Smith and Weldon, 1941).

4. Calcium carbonate ($CaCO_3$) determination: Volumetric method using calmeter.

5. Total salt (EC) determination: Calculated by measuring the electrical conductivity of the water extract in the soil (USDA, 1954).

6. Soil reaction (pH): Soil sature is prepared by adding pure water to the ground and determined by zerometric pH meter with glass electrode in saturating paste.

Associations	PH		LIME		ORGANIC MATERIAL(%)	
	Min.	Max.	Min.	Max.	Min.	Max.
Saponario kotschyii-Aethionemetum dumanii	7.68	8.3	7.7	86.4	1.71	2.88
Salvio wiedemannii-Artemidetum campestrii	7.43	9.92	9.26	74.09	0.06	4.67
Anthemido gypsicolae-Centauredetum niveae	7.82	8.33	9.26	77.18	0.69	4.31
Hedysario pestalozzae- Convolvuletum phrygiae	7.48	8.36	20.06	86.44	1.94	4.31
Paronychio caricae- Convolvuletum pulvinatii	7.48	8.42	20.06	78.72	0.69	3.89
Lino cariensae- Fumanetum paphlagonicae	7.55	8.33	20.06	86.44	0.69	4.31
Gypsophilo viscosae-Thymetum longicaulii	7.43	8.26	9.26	83.36	0.84	3.74

Associations	TOTAL SALT(%)		Phosphorus (P_2O_5)kg/da		Potassium (K_2O) kg/da	
	Min.	Max.	Min.	Max.	Min.	Max.
Saponario kotschyii-Aethionemetum dumanii	0.0085	0.0188	1.374	3.893	7.5319	87.3698
Salvio wiedemannii-Artemidetum campestrii	0.0147	0.07863	1.7748	7.557	72.306	331.4025
Anthemido gypsicolae-Centauredetum niveae	0.0147	0.0306	1.9465	7.557	87.3698	349.479
Hedysario pestalozzae- Convolvuletum phrygiae	0.0085	0.068	1.4313	5.267	24.102	250.0583
Paronychio caricae- Convolvuletum pulvinatii	0.0085	0.068	1.4313	4.4655	7.5319	349.479
Lino cariensae- Fumanetum paphlagonicae	0.0085	0.0608	1.7748	4.122	7.5319	349.479
Gypsophilo viscosae-Thymetum longicaulii	0.0131	0.07863	1.7748	7.557	18.0765	331.4025

PH

Plant roots absorb the nutrients in the soil at best pH values of 6.5-7.5.

As the acidity in the soil increases, the cell membranes of the plant roots become deteriorated and the permeability increases, and the matter passes from inside the cell to the outside.

In some cases, changing the pH value of the medium makes it difficult for plants to utilize the nutrients in the soil.

- It is difficult to obtain nutrients from plants below or above these values.

- As a result, the plant can not benefit from its nutrients. There is a close relationship between pH values and availability of plant nutrients.

- Because when the pH value changes, the insoluble compounds of the nutrients may still be present.
- In this case plants can not take these substances
- .

TOTAL SALT

Soil salinity indicates the amount of soluble salts present in the soil in the unit volume. In the soils there are mostly cations such as sodium, calcium, magnesium and potassium with anions such as chlorine, sulphate, carbonate and bicarbonate.

These anions and cations in the soil combine to form salts. These anions and cations are so salty that they damage the plant.

Salinity affects the structure of soil negatively, reduces water retention capacity, prevents water intake of plant roots. Apart from these, some elements such as sodium, chlorine and boron which are high in the structure of soluble salts show toxic effect for plants.

LIME

- As the amount of lime in the soil increases, calcium, iron and phosphorus ions in the environment form compounds with very low solubility.
- Because these compounds are insoluble in water, they can not be used by plants.

LIME

- Phosphorus availability decreases as excess calcareous soils form compounds such as phosphorus, calcium phosphate or magnesium phosphates.
- The fact that the amount of lime is too low is too bad for plant nutrition.

LIME

- Because of the high content of aluminum, iron and manganese in the acid-earth soil, these elements react with phosphorus, reducing the phosphorus availability.
- The application of the pyrethrum to such soil increases the availability of phosphorus because aluminum, iron and manganese will become inactive.

The organic matter has an important effect on the physical, chemical and biological properties of the soil. The physical properties of the soil, such as its ability to acquire a good structure, increase the water holding capacity, maintain its aeration and temperate state, is largely related to organic matter.

ORGANIC MATERIAL

Organic matter sees the storage of plant nutrients in the soil.

The organic matter helps to convert the inorganic phosphorus, iron, manganese and other elements in the soil into useful forms for the plants.

Carbon dioxide is released during the continuous decomposition of organic matter by microorganisms. Carbonic acid increases the solubility of other elements.

Phosphorus

- Phosphorus contents of plants are generally between 0.2-0.8% of dry weight. In the case of deficiency, this ratio falls below 0,1%. Phosphorus is found in the seeds and fruits of the plant more than leaves and other parts.

Phosphorus

- Although there are different symptoms due to the lack of phosphorus and the rate of deficiency, the root system can not develop in general, the plants can not grow normally, the fruits are poor, the product is poor and poor quality and the ripening is delayed.

Phosphorus

- Often fruity shows deformity, dark red color and cracks. Phosphorus excess; potassium, calcium, iron, copper and zinc. It is found in the form of phosphorus pentaoxide (P2O5) which is close to the whole of the phosphorus in the plant and the soil.

Potassium

Potassium is an important nutrient for plant growth and proliferation. Potassium provides water balance and plants production and transport of photosynthesis products. Activates some enzyme systems.

Potassium is very important especially in terms of fruits. Potassium is responsible for the durability of the fruit; there is a positive effect on the increase of fat and starch ratios.

If there is too much phosphorus in the soil, it will prevent early ripening. Potassium excess can cause magnesium and calcium deficiency.

	Lovest	Highest
Ph	*Achillea gypsicola Hub.-Mor.*	*Scabiosa hololeuca Bornm.*
	Convolvulus phrygius Bornm	*Sideritis gulendamii H.Duman & Karaveliogullari*
	Astracantha strictispina (Boiss.) Podl.	*Convolvulus pulvinatus Sa'ad*
	Convolvulus pulvinatus Sa'ad	*Cousinia iconica Hub.-Mor.*
	Cousinia iconica Hub.-Mor.	*Thymus leucostomus Hausskn. & Velen*
	Dianthus cibrarius Clem.	
	Salvia tchihatcheffii (Fisch. & C.A.Mey.) Boiss.	
	Scabiosa pseudograminifolia Hub.-Mor.	
	Scorzonera pygmaea subsp. nutans (Czeczott) D.F.Chamb.	
	Thymus leucostomus Hausskn. & Velen	
Total Salt (%)	*Anthemis kotschyana Boiss. var. gypsicola H.Duman*	*Achillea ketenoglui H.Duman*
	Convolvulus phrygius Bornm	*Onobrychis paucijuga Bornm.*
	Thymus leucostomus Hausskn. & Velen	*Astracantha strictispina (Boiss.) Podl.*
Organic substances (%)	*Anthemis kotschyana Boiss. var. gypsicola H.Duman*	*Convolvulus phrygius Bornm*
	Convolvulus phrygius Bornm	*Cousinia iconica Hub.-Mor.*
	Iris pumila subsp. attica (Boiss. & Heldr.) K.Richt.	*Thymus leucostomus Hausskn. & Velen*
	Centaurea nivea (Bornm.) Wagenitz	
	Cephalaria aytachii Göktürk & Sümbül	
	Astracantha strictispina (Boiss.) Podl.	
	Convolvulus pulvinatus Sa'ad	
	Cousinia iconica Hub.-Mor.	
	Salvia tchihatcheffii (Fisch. & C.A.Mey.) Boiss.	
	Thymus leucostomus Hausskn. & Velen	
Lime (%)	*Cousinia iconica Hub.-Mor.*	*Aethionema dumanii Vural & Adigüzel*
	Thymus leucostomus Hausskn. & Velen	*Convolvulus pulvinatus Sa'ad*
		Alkanna orientalis var. leucantha (Bornm.) Hub.-Mor.
		Cousinia iconica Hub.-Mor.
		Thymus leucostomus Hausskn. & Velen
Phosphorus (P2O5)	*Cousinia iconica Hub.-Mor.*	*Achillea gypsicola Hub.-Mor.*
	Thymus leucostomus Hausskn. & Velen	*Cephalaria aytachii Göktürk & Sümbül*
		Thymus leucostomus Hausskn. & Velen
Potassium (K2O)	*Cousinia iconica Hub.-Mor.*	*Achillea gypsicola Hub.-Mor.*
	Thymus leucostomus Hausskn. & Velen	*Cephalaria aytachii Göktürk & Sümbül*
		Thymus leucostomus Hausskn. & Velen

As a result of the physical and cehmical analysis of soil samples, the lovest and the highest level of pH, total salt, lime, phosphorus and potassium have been determined in the plant species.

The IUCN (The International Union for Conservation of Nature,) Red List of Threatened Species

EN = **Endangered:** High risk of extinction in the wild.

- *Achillea ketenoglui* H.Duman
- *Alyssum niveum* Dudley
- *Anthemis kotschyana Boiss.* var. *gypsicola* H.Duman
- *Scabiosa hololeuca* Bornm.
- *Sideritis gulendamii* H.Duman & Karaveliogullari
- *Verbascum gypsicola* Vural & Aydoğdu

VU = **Vulnerable:** High risk of endangerment in the wild

- *Achillea gypsicola* Hub.-Mor.
- *Aethionema dumanii* Vural & *Adigüzel*
- *Astragalus kochakii* Aytaç & *H.Duman*
- *Convolvulus phrygius* Bornm.
- *Hesperis kotschyi* Boiss.
- *Iris pumila* subsp. *attica* (Boiss. & Heldr.) K.Richt.
- *Onobrychis paucijuga* Bornm.
- *Plantago crassifolia* Forssk.
- *Thesium scabriflorum* P.H.Davis

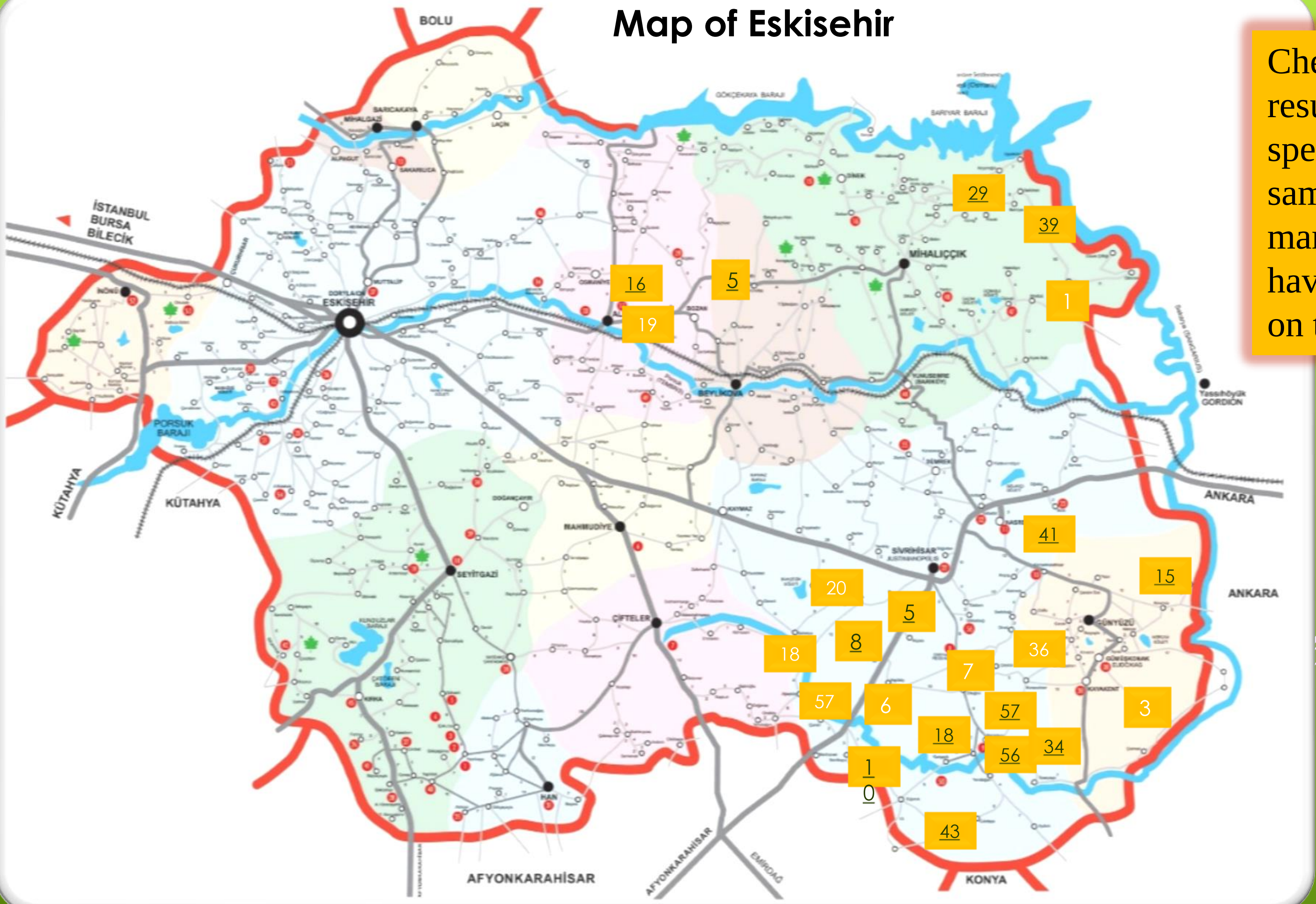
CR = **Critically Endangered:** Extremely high risk of extinction in the wild

- *Centaurea nivea* (Bornm.) Wagenitz
- *Cephalaria aytachii* Göktürk & Sümbül

NT = **Near Threatened:** Likely to become endangered in the near future.

- *Aethionema subulatum* (Boiss. & Heldr.) Boiss.
- *Aethionema turcica* H.Duman & Aytaç
- *Alkanna orientalis* var. *leucantha* (Bornm.) Hub.-Mor.
- *Astracantha strictispina* (Boiss.) Podl.
- *Astragalus macrocephalus* subsp. *finitimus* (Bunge) D.F.Chamb.
- *Bupleurum turcicum* Snogerup
- *Cirsium sintenisii* Freyn
- *Convolvulus pulvinatus* Sa'ad
- *Cousinia iconica* Hub.-Mor.
- *Dianthus cibrarius* Clem.
- *Fritillaria fleischeriana* Steud. & Hochst. ex Schult. & Schult.f.
- *Hesperis balansae* E. Fourn.
- *Hyacinthella micrantha* (Boiss.) Chouard
- *Matthiola anchoniifolia* Hub.-Mor.
- *Ornithogalum alpigenum* Stapf
- *Paronychia dudleyi* Chaudhri
- *Salvia tchihatcheffii* (Fisch. & C.A.Mey.) Boiss.
- *Scabiosa pseudograminifolia* Hub.-Mor.
- *Scorzonera pygmaea subsp. nutans* (Czeczott) *Sideritis galatica* Bornm.
- *Thlaspi jaubertii* Hedge
- *Thymus leucostomus* Hausskn. & Velen.

Map of Eskisehir



Chemical analysis results of plant species and soil samples in the marked locality, have been shown on this map.

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Bozan Çevresi (Eskişehir) Bozuk Orman ve Bozkır Vejetasyonu

Münevver ARSLAN[1,*], Neslihan ERDOĞAN[2], M. Ümit BİNGÖL[3], Nejat ÇELİK[1]

Degraded Forest and Steppe Vegetation in the Environs of Bozan (Eskişehir)

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Biological Diversity and Conservation
Biyolojik Çeşitlilik ve Koruma
1 / 2 (2008) 59-73

Assessment to the relationships between vegetation and site properties accordance with similarity values between quadrat pairs

Kürşad ÖZKAN*
S.D.Ü. Orman Fakültesi, Orman Fakültesi, Toprak İlmi ve Ekoloji Anabilimdalı, 32260, Çünür/ISPARTA

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Fatmagül Geven[1]*, Osman Ketenoğlu[1], Ümit Bingöl[1], Kerim Güney[2]
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NESLİHAN ARSLANTÜRK

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Sivrihisar Dağları (Eskişehir/Türkiye) Vejetasyon Tiplerinin Floristik Kompozisyonu Üzerine Bir Araştırma

Neslihan ERDOĞAN[1*], Osman KETENOĞLU[2], M. Ümit BİNGÖL[2], Fatmagül GEVEN[2] ve Münevver ARSLAN[3]

A Research on the Floristic Composition of the Vegetation Types of Sivrihisar Mountains (Eskişehir/Turkey)

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YÜKSEK LİSANS TEZİ

BAZI JİPSOFİL VE JİPSOVAG TÜRLERİN JİPS STRESİNE UYUM STRATEJİLERİ ÜZERİNE BİR ARAŞTIRMA

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Thanks You for Listening

You can send your questions to dervisozturkk@gmail.com mail address.