International Journal of Scientific and Technological Research www.iiste.org
ISSN 2422-8702 (Online), **DOI:** 10.7176/JSTR/5-6-06
Vol.5, No.6, 2019

Anthropogenic Effects of "Sarilar Quarry" In Obrukbasi (Kirsehir) On Mountain-Steppe Vegetation

Omer Eyuboglu
Kirsehir Ahi Evran University, Faculty of Education, Department of Mathematics and Science Education, Department of Science Teaching, Kirsehir-Turkey

Abstract
This research encompasses Quarry in Obrukbasi (Kirsehir) and its environ. With the evaluation of 394 plant specimens collected in 2017-2018 in the research area, 55 families, 150 genera, 170 species were determined. The total taxon number is 170. 24 species are endemic for Turkey.
The distribution and ratios of species in the Phytogeographical regions is as follows: 44 Iranian-Turanian elements (27%), 6 European-Siberian elements (3,5), 5 Mediterranean elements (2,9), 66 Cosmopolitan elements (39%), 3 elements with unknown Phytogeographical region (1,7%). About 40 species are agricultured in culture gardens on the area.

Keywords: Obrukbasi, Quarry, Flora, Taxon.

DOI: 10.7176/JSTR/5-6-06

1. Introduction

Research on flora of Turkey has started with the trips of French botanist Tournefort in northern and northeastern Anatolia during the years 1700-1702 at the start of the 18th century and subsequently, some foreign national botanists had collected plants in Anatolia and its environs. Anatolian trip of Swiss botanist Boissier in 1842 has turned out to be a significant start in the study of flora of Turkey. Work of Boissier titled "Flora Orietntalis" (1) is critical for being the main source, covering the plants of Turkey. Following Boissier, international researchers including Zohary, Sorger, Huber-Morarth and Mc Neill and Turkish researchers including Birand, Kasaplıgil, Karamanoğlu, Akman, Yurdakulol, Ekim and Ketenoğlu (2,3,4,5) have conducted research on flora and vegetation of Turkey.
Number of research on flora of Turkey has increased gradually in this century and showed great advances over the last 25-30 years. Especially the work of P.H. Davis et al, started to be published in 1965 and completed as 10 volumes and called "Flora of Turkey and Eastern Aegean Islands" (6), is the most important step taken in this direction. After the start of flora publication, floristic studies in Turkey have gained importance for Turkish botanists especially and number of studies conducted in this field has increased day by day.
The research area covers "Sarılar Quarry in Obrukbaşı" within the provincial borders of Kırşehir. The investigation area falls in B5 square according to Quadrature System of Davis. Obrukbaşı Quarry is located in Nasuhdede District in Obruk, southwest of city center, 1.5 kilometers away from city center. It is run by Sarılar Company. The altitude is ranged between 1000m-1242m. 80% of the area is consisted of bare cliffs. The rest consists of mountain steppe, artificial forests, culture gardens and pile of debris.
In the operational area, there are quarries, lime plant, concrete plant, cafeteria and administration buildings.
After reviewing the literature, it is determined that no local flora research have been conducted in the research area before, but nearby the research area, researchers have conducted studies of phytosociology and flora.
Even though steppe of Central Anatolia Region have being destroyed for centuries, it was well protected till the last quarter century. However condition of the steppe has changed drastically today. This change of condition is primarily caused by intense agricultural activity, destruction caused by quarries run on mountainside and cliffs, increasing population, urbanization, road construction etc. These areas, with the yearly downfall of 300-350mm and where cereal agriculture is being done, are spoiled and destructed

ISSN 2422-8702 (Online), **DOI:** 10.7176/JSTR/5-6-06
Vol.5, No.6, 2019

very quickly because of dry and mechanized farming. Central Anatolian steppe which is insurance of cultigens and a significant vegetal data source is at great risk. Because the destruction increases day by day.
The purpose in selection of the research subject as the quarry is that the quarry is close to city center (1,5 km); thus, intensive effects of human activities, how crushed-stone business established on rocks affects nature, and how cliff-steppe vegetation changes with anthropogenic effects may be seen and revealed.

Material and Method
Many botany excursions were organized to the research area between March and October in 2017-2018. During these excursions, 390 plant specimens were collected on different times. Photographs showing the structure of land were taken.
After pressing and dessicating in accordance with herbarium technics, collected plant specimens were reduced to herbarium material, and taken into conservation in herbarium built in Ahi Evran University Faculty of Education. Furthermore, an ideal set of these specimens were given to Hacettepe University Herbarium (HUB).
These plants reduced to herbarium material were identified with the help of "Flora of Turkey and the East Aegean Islands." Also, ANKA and HUB herbariums are benefited for identifying.
The order of Turkey Flora is followed for identifying the order of family, genera and species in the article. Whole of the research area, B5 square, falls within the provincial borders of Kırşehir. On the plant list, after stating the scientific names and writer of the plants, phytogeographical regions, EUNIS codes, categories from the list of threatened species (IUCN) and endemic status of the plants are stated.

(IUCN) International Union for Conservation of Nature
(EUNIS) European Nature Information System Habitat Classification

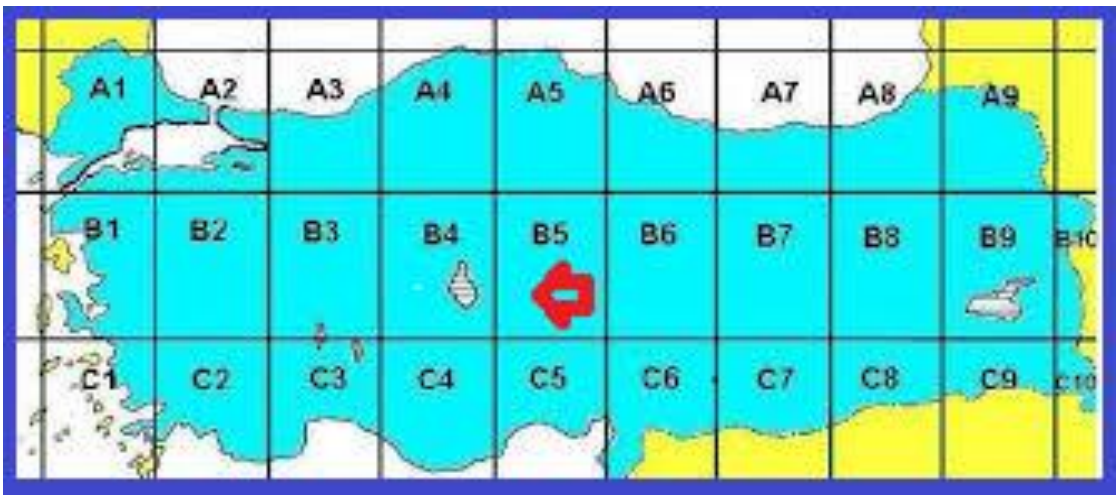

Figure-1. Davis Turkey grid map grid system Kirsehir B5 Frame

Geology of the Research Area
In the research area and its close environ, there are rocks from Paleozoic, Mesozoic and Cenozoic eras. (İlhami Demir, Doctorate Thesis)
Obrukbaşı Quarry is crystalised limestone composed of grey colored, medium grain calcite crystal. Beside the essential mineral calcite, quartzy is observed as secondary mineral (İlhami Demir). Limestones are thick-faulted and fissured. Fissures generally developed as cutting bedding plane and created blocks within unit. The effects of massive tectonism are observed within unit.

ISSN 2422-8702 (Online), **DOI:** 10.7176/JSTR/5-6-06
Vol.5, No.6, 2019

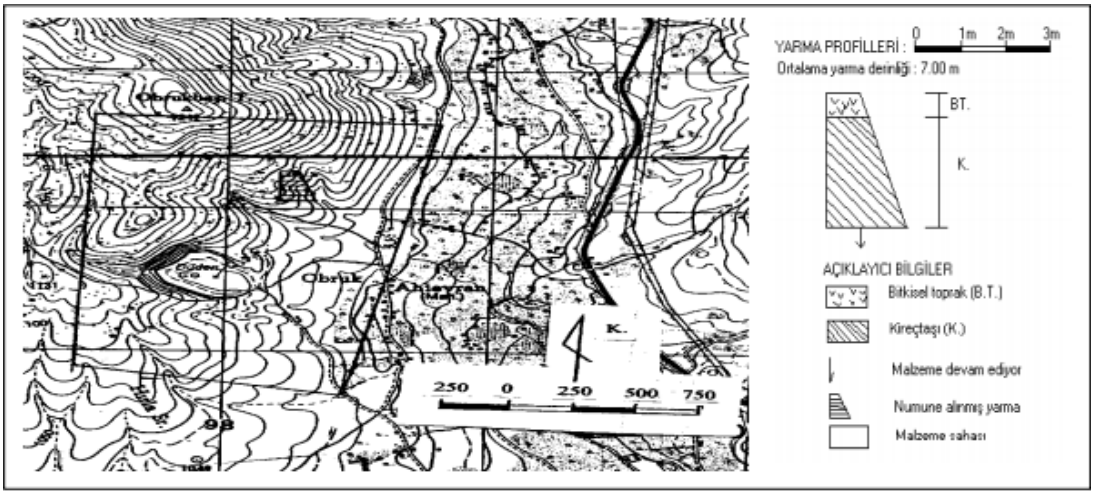

Figure-2. Topographical Map of Obruk Quarry

Climate Condition of the Research Are

The research area, Obrukbaşı Quarry, is located in Nasuhdede District in Obruk, southwest of city center, 1.5 kilometers away from city center and it is run by Sarılar Company.

Because the research area is located very closely to city center of Kırşehir, it has the same climate values as the city center of Kırşehir. No areal change is observed with meteorological characteristics because the research area is a local area. The research area is dominated by a warm and mild climate. It is hot and dry in summer, but cold and rainy in winter. Downfall is observed in every season, and in winter, it is much more and mostly as snowfall. Mean yearly temperature of Kırşehir is 11,2.

Information about climate of the research area was obtained from Kırşehir Regional Directorate of Meteorology. The research area has the same climate values as city center of Kırşehir.

You may see Kırşehir Mean Monthly Temperature of the Last 11 Years on Table 1, Mean Monthly Rainfall Values on Table 2, Mean Monthly Relative Humidity Values on Table 3, and Mean Monthly Wind Velocity (m/sec) on Table 4 and on Mean Flora of the Research area on Table 5

You may see Kırşehir The location of Kırşehir on the map of Turkey is stated as redon Figure 1, Mean Topographical Map of Obruk Quarry on Figure 2,Mean yearly temperature 2008-2018 on Figure 3, Mean Yearly Temperature 2008-2018 on Figure 4, mean yearly relative humidity on Figure 5 and mean monthly wind velocity on Figure 6.

DATA RANGE: 2008 2018				**KIRŞEHİR MEAN MONTHLY TEMPERATURES**							**PERIOD: 11 YEARS**		
YEARS	**JANUARY**	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**	**AVERAGE**
2008	-5,1	-3,6	9,3	13,3	14,7	20,7	23,8	24,9	19,6	12,5	7,8	0,3	11,5
2009	1,3	3,6	4,5	9,6	14,3	20,5	22,6	21,9	17,3	15,6	6,3	4,9	11,9
2010	2,8	5,8	8,2	10,8	16,3	20,8	25,3	26,8	21,6	11,8	9,6	5,5	13,8
2011	0,6	0,8	4,7	9,0	14,0	18,4	24,0	22,7	18,9	10,7	1,6	1,9	10,6
2012	-2,1	-2,8	2,3	13,2	15,5	21,4	25,0	22,9	20,6	15,0	7,5	3,4	11,8
2013	1,4	4,7	7,0	11,8	18,0	21,1	22,7	23,2	17,1	10,5	7,8	-2,1	11,9
2014	1,9	4,4	7,4	13,2	16,3	19,9	25,5	25,9	19,9	13,7	6,5	5,9	13,4
2015	1,2	3,5	7,0	8,8	16,0	18,4	23,0	24,8	23,0	14,5	7,5	-1,1	12,2
2016	-0,2	6,0	7,1	13,8	14,9	21,0	24,2	25,7	18,4	13,3	5,5	-1,3	12,4
2017	-2,4	1,0	7,3	10,7	15,2	20,7	26,0	25,6	23,1	12,4	6,3	4,4	12,5
2018	2,1	6,5	9,7	14,0	17,3	21,5	25,3	25,0	20,2	14,4			13,0
TOTAL	**1,5**	**29,9**	**74,5**	**128,2**	**172,5**	**224,4**	**267,4**	**269,4**	**219,7**	**144,4**	**66,4**	**21,8**	**135,0**
AVR.	**0,1**	**2,7**	**6,8**	**11,7**	**15,7**	**20,4**	**24,3**	**24,5**	**20,0**	**13,1**	**6,0**	**2,0**	**12,3**

Table-1. Kırşehir mean monthly temperatures

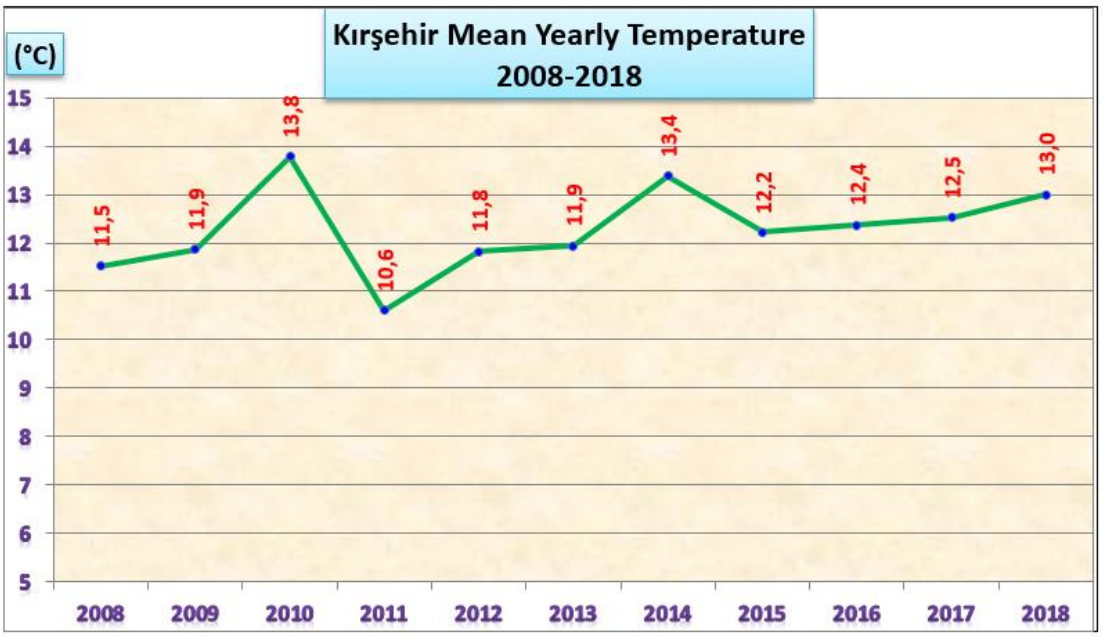

Figure-3. Kırşehir Mean Yearly Temperature 2008-2018

KIRŞEHİR MONTHLY-YEARLY AND MEAN DOWNFALL VALUES

DATA RANGE:		2008	2018									PERİOD:	11	YEARS
YEARS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	YEARLY TOTAL	AVR.
2008	8,5	18,8	19,3	17,0	16,0	6,0	0,4	4,9	69,4	28,5	40,9	41,1	270,8	22,6
2009	92,0	45,0	20,8	55,6	45,2	32,8	24,4	0,0	6,6	3,6	57,4	63,2	446,6	37,2
2010	64,6	28,8	17,0	41,2	24,0	72,0	12,4	0,0	0,8	123,6	12,0	96,6	493,0	41,1
2011	69,6	28,6	39,2	25,2	29,4	81,4	6,2	1,2	4,2	45,2	5,0	15,4	350,6	29,2
2012	87,8	32,0	37,6	21,2	113,0	12,0	1,0	0,0	1,2	59,8	38,0	91,4	**495,0**	41,3
2013	28,4	38,8	14,8	47,8	16,0	1,2	7,2	0,0	32,2	21,4	40,8	10,6	259,2	21,6
2014	48,4	25,0	56,0	23,2	46,6	36,0	13,4	17,0	30,8	36,6	26,4	29,4	388,8	32,4
2015	35,8	30,8	87,8	26,4	27,4	141,1	20,3	12,8	1,8	32,6	9,0	9,6	435,4	36,3
2016	125,2	38,4	44,8	24,0	98,2	18,5	5,8	0,2	42,7	0,0	26,0	40,0	463,8	38,7
2017	28,8	4,9	41,5	29,0	49,9	18,4	0,4	16,0	0,0	20,6	56,0	35,6	301,1	25,1
2018	74,3	17,0	87,7	4,4	69,5	26,5	3,5	3,2	1,2	41,4			328,7	27,4
TOTAL	**663,4**	**308,1**	**466,5**	**315,0**	**535,2**	**445,9**	**95,0**	**55,3**	**190,9**	**413,3**	**311,5**	**432,9**	**4.233,0**	**352,8**
OVR	**60,3**	**28,0**	**42,4**	**28,6**	**48,7**	**40,5**	**8,6**	**5,0**	**17,4**	**37,6**	**28,3**	**39,4**	**384,8**	**32,1**
Max. Values	125,2	45,0	87,8	55,6	113,0	141,1	24,4	17,0	69,4	123,6	57,4	96,6	495,0	41,3

Table-2. Kırşehir monthly-yearly and mean downfall values

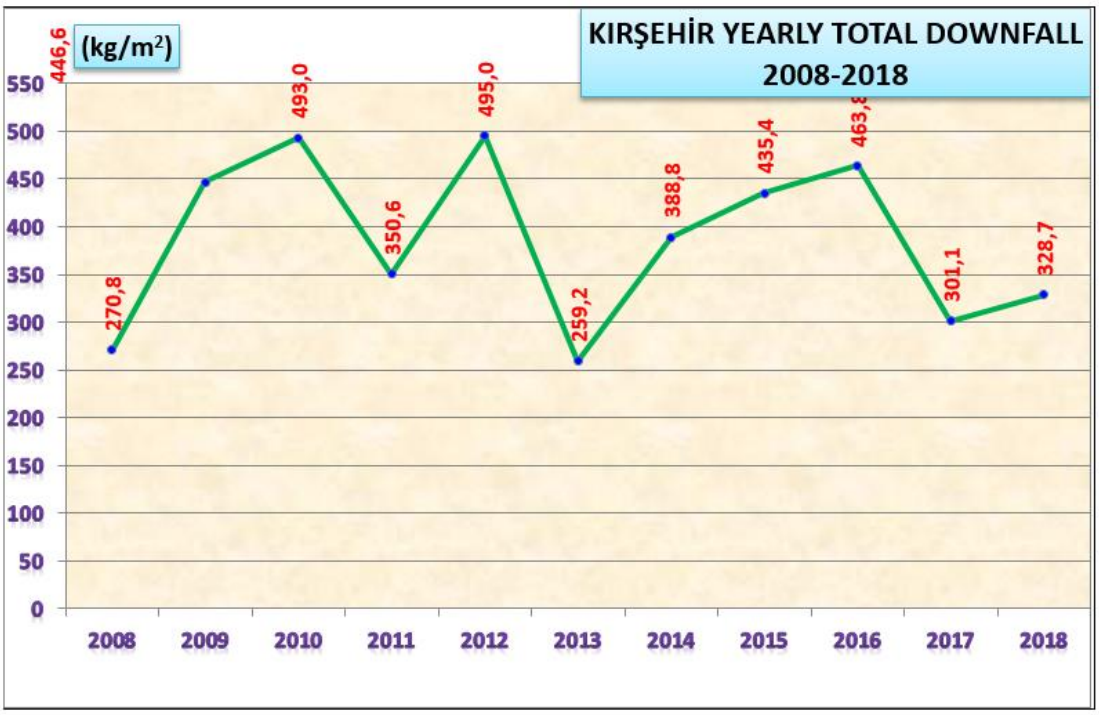

Figure-4. Kırşehir yearly total downfall (2008-2018)

KIRŞEHİR MEAN MONTHLY RELATIVE HUMIDITY

DATA RANGE:	2008	2018									PERIOD:	11	YEARS
YEARS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	AVERAGES
2008	77,7	76,9	60,4	56,0	52,2	43,7	37,1	39,1	50,1	68,8	75,6	87,5	60,4
2009	84,4	82,1	74,4	69,3	63,0	49,1	50,7	37,8	51,6	47,9	80,0	84,3	64,6
2010	82,8	72,3	61,6	61,1	51,4	55,4	46,3	34,2	41,7	74,7	64,5	80,7	60,6
2011	85,7	79,7	73,7	71,7	68,0	61,3	47,6	46,9	44,8	62,3	69,8	70,8	65,2
2012	83,2	78,5	69,3	52,2	67,1	49,7	40,3	43,4	40,5	63,9	82,9	85,8	63,1
2013	83,8	74,7	63,2	63,8	50,9	42,0	41,5	39,6	50,0	53,3	66,7	75,1	58,7
2014	85,8	64,0	64,4	54,8	61,3	54,1	39,2	39,7	50,9	67,0	73,8	88,2	61,9
2015	85,6	77,6	76,2	66,2	58,1	66,9	47,0	47,5	40,8	63,3	58,1	80,5	64,0
2016	76,2	70,8	60,7	47,4	63,7	53,0	42,5	43,8	48,2	49,9	56,7	77,3	57,5
2017	77,9	67,0	60,8	52,4	59,4	54,3	36,0	43,2	31,7	53,0	71,6	77,2	57,0
2018	81,6	68,5	66,2	49,1	64,8	53,4	43,0	39,7	45,9	62,3			47,9
TOTAL	**904,7**	**812,1**	**730,9**	**644,0**	**659,9**	**582,9**	**471,2**	**454,9**	**496,2**	**666,4**	**699,7**	**807,4**	**660,9**
AVR.	**82,2**	**73,8**	**66,4**	**58,5**	**60,0**	**53,0**	**42,8**	**41,4**	**45,1**	**60,6**	**63,6**	**73,4**	**60,1**

Table-3. Kırşehir mean monthly relative humidity

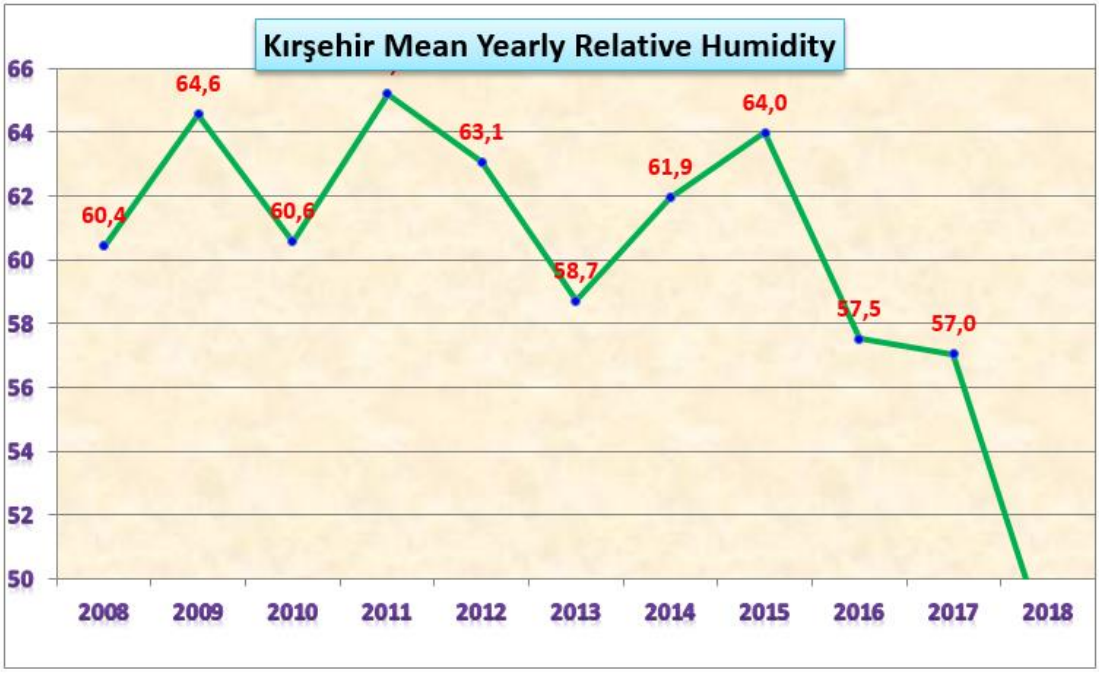

Figure-5. Kırşehir mean yearly relative humidity

Kırşehir Mean Monthly Wind Velocity (m/sec)

DATA RANGE:	**2008**		**2018**								**PERIOD:**	**11**	**YEARS**
	JANUARY	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**	**AVR.**
2008	2,5	2,7	2,7	2,5	2,7	3,7	3,9	4,2	2,9	2,8	2,3	1,9	2,9
2009	1,8	2,3	2,7	2,5	2,9	3,2	3,7	3,9	2,7	2,2	1,8	1,8	2,6
2010	2,1	2,2	2,7	2,9	2,4	2,8	3,4	3,2	3,0	2,1	1,8	1,9	2,5
2011	2,3	2,2	2,5	3,0	2,8	3,0	3,2	4,0	3,4	2,6	2,8	1,9	2,8
2012	2,2	2,9	2,7	2,6	2,1	3,9	4,1	3,9	3,3	2,1	2,2	1,7	2,8
2013	2,2	1,9	2,6	2,6	2,5	3,2	4,4	4,1	2,4	2,6	2,0	2,5	2,8
2014	1,5	2,1	2,9	2,4	2,5	2,8	3,4	3,5	2,7	2,3	2,2	2,0	2,5
2015	2,1	2,9	2,1	2,8	2,4	2,6	3,8	3,6	2,5	2,5	2,1	1,9	2,6
2016	2,2	2,2	2,5	2,4	2,4	3,2	3,9	3,5	3,0	2,4	1,9	2,5	2,7
2017	2,1	2,0	2,4	2,6	2,7	2,5	3,5	3,2	2,3	2,1	1,6	1,7	2,4
2018	2,2	2,0	1,9	2,6	2,1	2,7	3,2	3,7	2,9	2,4			2,1
TOTAL	**23,2**	**25,4**	**27,7**	**28,9**	**27,5**	**33,6**	**40,5**	**40,8**	**31,1**	**26,1**	**20,7**	**19,8**	**28,8**
AVR.	**2,1**	**2,3**	**2,5**	**2,6**	**2,5**	**3,1**	**3,7**	**3,7**	**2,8**	**2,4**	**1,9**	**1,8**	**2,6**

Table-4. Kırşehir mean monthly wind velocity (m/sec)

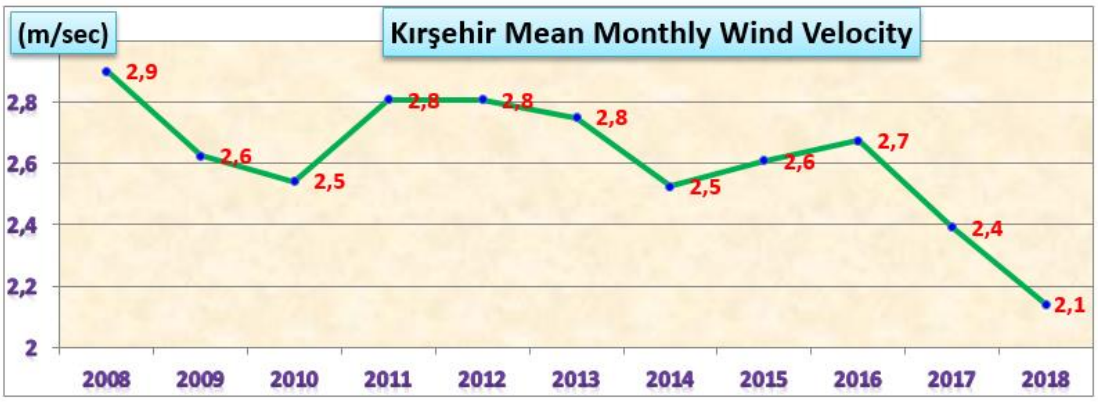

Figure-6. Kırşehir mean monthly wind velocity

Flora of the Research Area

No	Family	Species	EUNIS Habitat code	Endemism	Phytogeographical Region	Endangerment statue
	PTERIDOPHYTA					
1	*Athyriaceae*	*Cysstopteris fragilis* (L.) Bernh.	E1.1	—	Cosmopolit	LC
	SPERMATOPHYTA					
	GYMNOSPERMAE					
2	*Pinaceae*	*Cedrus libani* A. Rich.	G3.4	—	Culture	LC
3	*Pinaceae*	*Pinus nigra* Arn.	G3.4	—	Culture	LC
4	*Cupressaceae*	*Cupressus arizonica*	G3.4	—	Culture	
5	*Ephedraceae*	*Ephedra majör* Host	H3.6	—	Cosmopolit	LC
	ANGIOSPERMAE					
6	*Ranunculaceae*	*Nigella arvensis* L.*var. glauca* Boiss.	E1.1	—	Cosmopolit	VU
7	*Ranunculaceae*	*Delphinium venulosum* Boiss.	E1.1	Endemic	Ir.-Tur.ele.	LC
8	*Ranunculaceae*	*Consolida orientalis (Gay)* Schröd	E1.1	—	Ir-Tur.ele.	LC
9	*Ranunculaceae*	*Clematis orientalis* L.	E1.1	—	Cosmopolit	LC
10	*Ranunculaceae*	*Adonis aestivalis* L. *subsp. aestivalis*	E1.1	—	Cosmopolit	LC
11	*Ranunculaceae*	*Adonis flammea* Jacq.	E1.1	—	Cosmopolit	LC
12	*Ranunculaceae*	*Ranunculus fenzlii* Boiss.	E1.1	Endemic	Ir.-Tur.ele.	LC
13	*Ranunculaceae*	*Ranunculus isthmicus* Boiss. *subsp stepporum* Dawis	E1.1	—	Ir.-Tur.ele.	LC
14	*Ranunculaceae*	*Ceratocephalus falcatus (*L.*)* Pers.	E1.1	—	Cosmopolit	LC
15	*Beriberidaceae*	*Berberis crataegina* DC.	C2.6	—	Cosmopolit	LC
16	*Papaveraaceae*	*Glaucium leiocarpum* Boiss.	E1.2	—	Cosmopolit	LC
17	*Papaveraaceae*	*Papaver bracteatum* Lindl.	E1.2	—	Ir.-Tur.ele.	LC
18	*Papaveraaceae*	*Hypecoum imberbe* sibth. et Sm.	E1.2	—	Cosmopolit	LC

19	*Papaveraaceae*	*Fumaria asepala* Boiss.	E1.2	—	Ir.-Tur.ele.	LC
20	*Brassicaceae*	*Crambe orientalis* L.	E1.2	—	Ir.-Tur.ele.	LC
21	*Brassicaceae*	*Lepidium perfoliatum* L.	E1.2	—	Cosmopolit	LC
22	*Brassicaceae*	*Lepidium caespitosum* Desv.	E1.2	Endemic	Ir.-Tur.ele.	LC
23	*Brassicaceae*	*Cardaria draba* (L.) Desv.	J6.6	—	Cosmopolit	LC
24	*Brassicaceae*	*Isatis floribunda* Boiss. ex Bornm.	E1.2	Endemic	Ir.-Tur.ele.	LC
25	*Brassicaceae*	*Thlaspi perfoliatum* L.	E1.2	—	Cosmopolit	LC
26	*Brassicaceae*	*Capsella bursa-pastoris* (L.) Medik	J6.6	—	Cosmopolit	LC
27	*Brassicaceae*	*Alyssum murale* Waldst et Kit. *var. murale*	E1.2	—	Cosmopolit	LC
28	*Brassicaceae*	*Erysimum smyrnaeum* Boiss. et Bal.	E1.1	—	Cosmopolit	LC
29	*Brassicaceae*	*Descurainia sophia* (L.) Webb. ex Prantl	J6.6	—	Cosmopolit	LC
30	*Resedaceae*	*Reseda lutea* L. *var. lutea*	E5.1	—	Cosmopolit	LC
31	*Cistaceae*	*Helianthemum canum* (L.) Baumy	E1.1	—	Cosmopolit	LC
32	*Cistaceae*	*Fumana procumbens* (Dun.) Gren. et Godr.	E1.1	—	Cosmopolit	LC
33	*Polygalaceae*	*Polygula pruinosa* Boiss.	J6.6	—	Cosmopolit	LC
34	*Caryuphyllaceae*	*Avenarra rotumulifolia* Beib *subsp. vodundifolia*	El.1	—	Cosmopolit	LC
35	*Caryuphyllaceae*	*Avenaria ledebouriana* Fenzl. *var. ledebouriana*	E1.1	Endemic	—	LC
36	*Caryuphyllaceae*	*Minuartia hamata* (Hausskn) Mattf.	H3.6	—	—	LC
37	*Caryuphyllaceae*	*Minuartia anatolica* (Boiss.) Woran *var. arachnoidea* Mc Neill	El.1	Endemic	Ir.-Tur.ele.	LC
38	*Caryuphyllaceae*	*Cerastium dichotomum* L. *subsp. dichotomum*	E5.1	—	Cosmopolit	LC
39	*Caryuphyllaceae*	*Dianthus anotolicus* Boiss.	E1.1	Endemic	—	LC
40	*Caryuphyllaceae*	*Saponaria prostrata* Wild. *subsp prostrata*	E5.1	Endemic	Ir.-Tur.ele	LC
41	*Caryuphyllaceae*	*Gypsophila pilosa* Hudson	E5.1	—	Ir.-Tur.ele.	LC
42	*Caryuphyllaceae*	*Silene otites* (L.) Wibel	E1.1	—	Cosmopolit	LC
43	*Caryuphyllaceae*	*Silene dichotoma* Ehrh. *subsp. dichotoma*	El.1	—	Cosmopolit	LC
44	*Caryuphyllaceae*	*Herniaria incana* Lam.	E1.1	—	Cosmopolit	LC
45	*İllecebraceae*	*Paronychia kurdica* Boiss. *subsp kurdica*	El.1	—	Cosmopolit	LC
46	*Polygonaceae*	*Polygonum lapathifolium* L.	E1.2	—	Cosmopolit	LC
47	*Polygonaceae*	*Rumex acetosella* L.	E5.1	—	Cosmopolit	LC
48	*Chenopodiaceae*	*Chenopodium foliosum* (Moench) Aschers	E5.1	—	Cosmopolit	LC
49	*Chenopodiaceae*	*Atriplex nitens* Schkuhr	E5.1	—	Cosmopolit	LC
50	*Tamaricaceae*	*Tamarix smyrnensis* Bunge	C2.6	—	Cosmopolit	LC
51	*Hypericaceae*	*Hypericum hyssopifolium chaix var. elongatum* Ledeb.	E1.1	—	Ir.-Tur.ele	LC
52	*Malvaceae*	*Malva neglecta* Wallr.	E5.1	—	Cosmopolit	LC
53	*Linaceae*	*Linum flavum* L. *subsp. scabrenerve* (Davis) Davis	E1.2	Endemic	Ir.-Tur.ele	LC
54	*Zygophyllaceae*	*Zygophyllum fabago* L.	E5.1	—	Ir.-Tur. ele.	LC
55	*Zygophyllaceae*	*Tribulus terrestris* L.	E5.1	—	Cosmopolit	LC
56	*Zygophyllaceae*	*Peganum harmala* L..	E1.2	—	Cosmopolit	LC

57	*Rutaceae*	*Haplophyllum thesioides* (Fisch. ex DC.) G. Don.	E1.1	—	Cosmopolit	LC
58	*Simaroubaceae*	*Ailanthus altissima* (Miller) Swingle	FA.2	—	Culture	—
59	*Aceraceae*	*Acer negundo* L.	FA.2	—	Culture	—
60	*Vitaceae*	*Vitis sylvestris* Gmelin	FA.2	—	Culture	—
61	*Rhamnaceae*	*Rhamnus petiolaris* Boiss.	H3.6	Endemic	—	LC
62	*Fabaceae*	*Robinia pseudoacacia* L.	FA.2	—	Culture	—
63	*Fabaceae*	*Genista albida* Willd.	E1.1	—	Cosmopolit	LC
64	*Fabaceae*	*Astragalus macroscepus* Boiss	E1.1	Endemic	Ir.-Tur.ele	LC
65	*Fabaceae*	*Astragalus condensatus* Ledeb.	E1.1	Endemic	Ir.-Tur.ele	LC
66	*Fabaceae*	*Astragalus wiedemannianus* Fischer	E1.1	Endemic	Ir.-Tur. ele.	LC
67	*Fabaceae*	*Astragalus setulosus* Boiss. et Bal.	E1.1	Endemic	—	LC
68	*Fabaceae*	*Astragalus strigillosus* Bunge	E1.1	Endemic	Ir.-Tur. ele.	LC
69	*Fabaceae*	*Cicer anatolicum* Alef.	E1.1	—	Ir.-Tur.ele	LC
70	*Fabaceae*	*Cicer arietinum* L.	E5.1	—	Culture	—
71	*Fabaceae*	*Vicia cracca* L. *subsp. Stenophylla* Vel.	E1.2	—	Cosmopolit	LC
72	*Fabaceae*	*Vicia faba* L.	E5.1	—	Cosmopolit	—
73	*Fabaceae*	*Lens culinaris* Medik	E5.1	—	Cosmopolit	LC
74	*Fabaceae*	.Lathyrus cicera L.	E1.1	—	Cosmopolit	LC
75	*Fabaceae*	*Pisum sativum* L.	E5.1	—	Cosmopolit	LC
76	*Fabaceae*	*Ononis spinosa* L. *subsp. leiosperma* (Boiss) Sırj.	E1.2	—	Cosmopolit	LC
77	*Fabaceae*	*Tirifolium camperstre* Schreb.	E1.2	—	Cosmopolit	LC
78	*Fabaceae*	*Melilotus officinalis* (L.) Desv.	E1.2	—	Cosmopolit	LC
79	*Fabaceae*	*Trigonella fischeriana* Ser.	E1.1	—	Ir.-Tur. ele.	LC
80	*Fabaceae*	*Medicago radiata* L.	E1.1	—	Ir.-Tur.ele	LC
81	*Fabaceae*	*Medicago sativa* L. *subsp sativa*	E1.2	—	Cosmopolit	LC
82	*Fabaceae*	*Lotus corniculatus* L. *var corniculatus*	E1.1	—	Cosmopolit.	LC
83	*Fabaceae*	*Coronilla varia* L. *subsp varia*	E2.1	—	Cosmopolit	LC
84	*Fabaceae*	*Onobrychis tournefortii* (Willd.) Desv.	E1.1	Endemic	—	LC
85	*Fabaceae*	*Alhagi piseudalhagi* (Bieb.) Desv.	E1.2	—	Ir.-Tur. ele.	LC
86	*Rosaceae*	Prunus x domestica L.	FA.2	—	Culture	—
87	*Rosaceae*	Cerasus avium (L.) Moench.	FA.2	—	Culture	—
88	*Rosaceae*	*Cerasus vulgaris* Mill.	FA.2	—	Culture	—
89	*Rosaceae*	*Amygdalus communis* L.	FA.2	—	Culture	—
90	*Rosaceae*	*Rubus sanctus* schreber	C2.6	—	Cosmopolit	LC
91	*Rosaceae*	*Sanguisorba minör* Scop *subsp. muricata* (Spach) Briq	E5.1	—	Cosmopolit	LC
92	*Rosaceae*	Rosa canina L.	E1.1	—	Cosmopolit	LC
93	*Rosaceae*	*Pyracantha coccinea* Roemer	FA.2	—	Culture	—
94	*Rosaceae*	*Malus sylvestris* Miller	FA.2	—	Culture	—
95	*Rosaceae*	*Pyrus communis* L.	FA.2	—	Culture	—

96	*Punicaceae*	*Punica granatum* L.	FA.2	—	Culture	—
97	*Cucurbitaceae*	*Ecballium elaterium* (L.) A. Rich.	E1.2	—	Medit.ele.	LC
98	*Crassulaceae*	*Sedum album* L.	H3.6	—	Cosmopolit	LC
99	*Apiaceae*	*Eryngium bithynicum* Boiss.	E1.1	Endemic	Ir.-Tur.ele	LC
100	*Apiaceae*	*Echinophora tenuifolia* L. *subsp. sibthorpiana* (Gass) Tutin	E1.1	—	Ir.-Tur.ele	LC
101	*Apiaceae*	*Scandix stellata* Banks et Sol	E1.2	—	Cosmopolit	LC
102	*Apiaceae*	*Bublurum creoceum* Fenzl.	E1.2	—	Ir.-Tur.ele	LC
103	*Apiaceae*	Falcaria vulgaris Benh.	**E1.1**	**----**	**Cosmopolit**	**LC**
104	*Apiaceae*	*Caucalis platycarpus* L.	E1.1	—	Cosmopolit	LC
105	*Dipsacaceae*	*Dipsacus laciniatus* L.	E1.2	—	Cosmopolit	LC
106	*Asteraceae*	*Xanthium spinosum* L.	E1.2	—	Cosmopolit	LC
107	*Asteraceae*	*Senecio vernalis* Waldst et Kit.	E5.1	—	Cosmopolit	LC
108	*Asteraceae*	*Anthemis cretica* L. subsp. anatolica (Boiss) Grierson	E1.1	—	Cosmopolit	LC
109	*Asteraceae*	*Achillea lycaonica* Boiss. et Heldr.	H3.6	Endemic	Ir.-Tur.ele	LC
110	*Asteraceae*	*Tripleurospermum oreades* (Boiss) Rich. *var. oreades*	H3.6	—	Cosmopolit	LC
111	*Asteraceae*	*Artemisia taurica* Willd.	E1.2	—	Cosmopolit	LC
112	*Asteraceae*	*Cousinia halysensis* Hub.- Mor.	E1.2	Endemic	Ir.-Tur.ele	LC
113	*Asteraceae*	*Cirsium arvense* (L.) Scop. *subsp. vestitum* (Wimmer et Grab.) Petrak	E5.1	—	Cosmopolit	LC
114	*Asteraceae*	*Acroptilon repens* (L.) DC.	E5.1	—	Ir.-Tur.ele	LC
115	*Asteraceae*	*Centaurea solstitialis* L. *subsp. solstitialis*	E1.2	—	Cosmopolit	LC
116	*Asteraceae*	*Centaurea iberica* Trev. Ex Sprengel	E1.2	—	Cosmopolit	LC
117	*Asteraceae*	*Centaurea urvillei* DC. *subsp. stepposa* Wagenitz	E1.1	—	Ir.-Tur.ele	LC
118	*Asteraceae*	*Xeranthemum annum* L.	E1.1	—	Cosmopolit	LC
119	*Asteraceae*	*Echinops ritro L.*	E1.1	—	Cosmopolit	LC
120	*Asteraceae*	*Cichorium intybus* L.	E5.1	—	Cosmopolit	LC
121	*Asteraceae*	Tragopogon longirostris Brich ex Schultz *var.* longirostris	**E5.1**	**-----**	**Cosmopolit**	**LC**
122	*Asteraceae*	*Taraxacum serotinum* (Waldst et Kit) Poiret	E5.1	—	Cosmopolit	LC
123	*Primulaceae*	*Anagallis* arvensis L. *var.* arvensis	H3.5	—	Cosmopolit	LC
124	*Oleaceae*	Jasminum fruticans L.	H3.6	—	Medit.ele.	LC
125	*Convolvulaceae*	*Convolvulus galaticus* Rostan	E1.1	Endemic	Ir.-Tur.ele.	LC
126	*Convolvulaceae*	*Convolvulus arvensis* L.	E5.1	—	Cosmopolit	LC
127	*Boraginaceae*	*Heliotropium europaeum* L.	E5.1	—	Cosmopolit	LC
128	*Boraginaceae*	*Echium italicum* L.	E5.1	—	Medit.ele.	LC
129	*Boraginaceae*	*Onosma isauricum* Boiss et Heldr	E1.1	Endemic	Ir.-Tur. ele.	LC
130	*Boraginaceae*	*Anchusa leptophylla* Roemer et Schultes *subsp. leptophylla*	E1.2	—	Cosmopolit	LC
131	*Solonaceae*	*Hyoscyamus niger* L.	E1.2	—	Cosmopolit	LC
132	*Scrophulariaceae*	*Verbascum vulcanicum* Boiss. et Heldr. *var. vulcanicum*	E1.2	Endemic	Ir.-Tur.ele	LC
133	*Scrophulariaceae*	*Veronica arvensis* L.	E1.1	—	Euro.-Sib.ele.	LC

134	*Acanthaceae*	*Acanthus hirsutus* Boiss.	E1.2	Endemic	Ir.-Tur.ele.	LC
135	*Globulariaceae*	*Globularia trichhosantha* Fisch et Mey	E1.2	—	Ir.-Tur.ele.	LC
136	*Lamiaceae*	*Teucrium chamaedrys* L. *subsp. syspirense* (C. Koch) Rech	E1.2	—	Ir.-Tur.ele.	LC
137	*Lamiaceae*	*Phlomis pungens* Willd. *var. pungens*	E1.1	—	Cosmopolit	LC
138	*Lamiaceae*	*Stachys annua* (L.) L. *var. lycaonica* Bhattacharjee	**E1.1**	**-----**	**Ir.-Tur.ele.**	**LC**
139	*Lamiaceae*	*Thymus sipyleus* Boiss. *var. sipyleus*	E1.2	Endemic	—	LC
140	*Lamiaceae*	*Ziziphora capitata* L.	E1.1	—	Ir.-Tur.ele.	LC
141	*Lamiaceae*	*Salvia cryptantha* Montbret et Aucher	E1.1	Endemic	Ir.-Tur.ele.	LC
142	*Plumbaginaceae*	*Plumbago europaea* L.	E5.1	—	Euro.-Sib.ele.	LC
143	*Plumbaginaceae*	*Acantholimon ecerosum* (Willd.) Boiss. *var. ecerosum*	H3.5	—	Ir.-Tur.ele	LC
144	*Plantaginaceae*	*Plantago lanceolata* L.	FA.2	—	Cosmopolit	LC
145	*Elaeaginaceae*	*Elaeagnus angustifolia* L.	E5.1	—	Cosmopolit	LC
146	*Euphorbiaceae*	*Euphorbia falcata* L. *subsp. falcata*	E1.1	—	Cosmopolit	LC
147	*Moraceae*	*Morus alba* L.	FA.2	—	Culture	—
148	*Ulmaceae*	*Ulmus minör* Miller. *subsp. minör*	C2.6	—	Cosmopolit	LC
149	*Juglandaceae*	*Juglans regia* L.	FA.2	—	Culture	—
150	*Salicaceae*	*Salix babylonica* L.	FA.2	—	Culture	—
151	*Salicaceae*	*Populus alba* L.	FA.2	—	Culture.	—
152	*Rubiaceae*	*Galium verum* L. *subsp. verum*	E1.1	—	Euro.-Sib.ele.	LC
153	*Rubiaceae*	*Cruciata taurica* (Pallas ex Willd.) Ehrend.	E1.1	—	Ir.-Tur.ele	LC
154	*Liliaceae*	*Allium atroviolaceum* Boiss.	E1.1	—	Cosmopolit	LC
155	*Liliaceae*	*Gagea villosa* (Bieb.) Duby *var. villosa*	E1.1	—	Medit.ele.	LC
156	*Juncaceae*	*Juncus inflexus* L.	E1.2	—	Cosmopolit	LC
157	*Juncaceae*	*Carex otrubae* Podp.	E1.2	—	Euro.-Sib.ele.	LC
158	*Poaceae*	*Aegilops umbellulata* Zhukovsky *subsp. umbellulata*	E1.2	—	Ir.-Tur.ele.	LC
159	*Poaceae*	*Tiriticum aestivum* L.	E1.2	—	Culture	—
160	*Poaceae*	*Hordeum vulgare* L.	E1.2	—	Cosmopolit	LC
161	*Poaceae*	*Bromus tectorum* L.	E1.2	—	Cosmopolit	LC
162	*Poaceae*	*Bromus cappadocicus* Boiss.	E1.1	—	Ir.-Tur.ele.	LC
163	*Poaceae*	*Festuca valesiaca* Schleischer ex Gaudin	E1.1	—	Cosmopolit	LC
164	*Poaceae*	*Festuca callieri* (Hacker ex St- Yves) F. Markgraf *subsp. callieri*	E1.1	—	—	—
165	*Poaceae*	*Poa bulbosa* L.	E1.2	—	Cosmopolit	LC
166	*Poaceae*	*Dactylis glomerata* L. *subsp. hispanica* (Roth) Nyman	E1.1	—	Cosmopolit	LC
167	*Poaceae*	*Stipa holosericea* Trin	E1.1	—	Ir.-Tur.ele.	LC
168	*Poaceae*	*Phragmites australis* (Lav) Trin ex Studel	E1.2	—	Euro.-Sib.ele.	LC
169	*Poaceae*	*Cynodon dactylon* (L.) Pers. *var. villosus* Regel	E5.1	—	—	—
170	*Poaceae*	*Zea mays* L.	E5.1	—	Culture	—

Table -5. Flora of the Research Area

ISSN 2422-8702 (Online), **DOI:** 10.7176/JSTR/5-6-06
Vol.5, No.6, 2019

Conclusion and Discussion

Rapid population growth and industrialisation in 20th century led to several problems. These problems may be summarised as global climate change, decreasing biodiversity and desertification.

These problems threating the world are named as desertification, land degradation (demolition) caused by various factors including climate change and human activities in regions with arid, semi-arid and humid climate characteristics (UNCCD,1995). Desertification is not a region becoming desert, but land which is nonrenewable resource losing its fertility.The essential factors in pedogenesis are bedrock, climate, vegetation, topography and time.

In regions similar to Central Anatolia, Kırşehir is located in this region, with semi-arid climate conditions of Turkey, sediments are found as bedrock. Limestones developed from sediment bedrocks in various epoches such as Eocene or Miocene are mostly common. Generally rocky and clay soils are developed from limestones.

Anthropogenic steppe developed by degradation of oak, larch and juniperus forests with xerophilous characteristics is seen in Central Anatolia, generally in lands higher than 1000m. This steppe is also named as mountain steppe.

The research area is Obrukbaşı Quarry, near Nasuhdede District, 1,5 km away from city center of Kırşehir and run by Sarılar Company, and its environ. It is located very closely to human settlement. Thus, it is rather open to anthropogenic effects. The altitude of the area is ranged between 1000m-1248m. Obrukbaşı Quarry started to be run in 1978. When the quarry is no longer to be in use, that area is forested by the operational company. Foresting works dates back to 30 years ago(Company Director).

The species chosen for planting is as follows.

The species such as Cedrus libani, Pinus nigra subsp pallasiana, Cupressus arizonica, Ailanthus altissima, Acer negundo, Vitis sylvestris, Robinia pseudoacacia, Prunus spx, Cerasus avium, Cerasus vulgaris, Amygdalus sp., Rosa sp., Pyracantha coccinea, Malus sylvestris, Pyrus communis, Punica granatum, Elaeagnus angustifolia, Morus sp., Juglans regia, Salix babylonica, Populus alba were chosen.

Larch and cedarwood are the mostly used species in the forested area. There are ones planted 30 years ago. Thus, mountain steppe vegetation disappeared and formed a secondary vegetation in these areas. The area planted with white poplar is irrigated continuously. In this area, watermeadow plants have replaced mountain steppe.

The forested area is deprived of mountain steppe plants no longer. Species adapting to new enviroment and with wide distribution have settled these areas.

All companies operating the quarry have considered the forestation and landscaping as significant and a pretty succesful forestation work have been performed in the area.

Variety and abundancy of mountain steppe plants have decreased. However, by forestating the bare fields, the area is prevented from erosion and convection to some extend.

If future forestation works are supported chosing species applicable to geological structure of the land, it will contribute to the protection of natural flora.

Whether indigenous or alien species are used, choosing tree species which have high capasity of nitrogen fixation such as Robinia and Gleditschia will lead up to richen these areas with the lack of nourishments at mid and long term.

By this way, development of nitrogen cycle and natural vegetation on the land will increase. (Evanes and Turnball, 2004)

The other suggested tree species:

Ash Tree (*Fraxinus*), Oriental Plane *(Platanus orientalis*) , Hawthorn (*Crataegus monogyna*) , Oak (*Quercus pubescens*) , Wild Pear (*Pyrus elaeagnifolia*) may be considered in the area. (Uslu,1959; 1970 Yaltırık,1984; Odabaşı and Boydak,1984; Boydak,1988; Ürgenç,1998.

Objectives Of The Research

1- Reveal flora of the area, determine the importance for plant bio-diversity,
2- Identify if there is unknown plant species and create data resource to protect endangered ones,
3- Reveal how quarries and limekilns changes the vegetation on cliffs and mountain steppe areas,
4- Contribute to floristic studies to be performed in quarries on mountain steppe areas and cliffs similar to the research area.

Bibliography

- Akman, Y., Climate and Bio-climate, Palme Press, Ankara, 1990
- Birand H., Barren plant varieties in Salt Lake, A.O. Faculty of Science, 1952
- Boissier, E., Flora Orientalis, 1-6, Geneve et Basel, 1867-1888
- Boydak,M.,Forests Functions and Their Evaliations From the View Point of İstanbul Region Journal of the Faculty of Forestry İÜ SerİaI B 38 (1)
- Davis, P.H., Flora of Turkey and the East Aegean Islands, 1-10, Edinburg,1985.
- Demir ,İ., Utility Characteristics of Kırşehir Rocks as Crushedstone Aggregate, Politeknik Magazine Volume:8. Issue 1.2005
- EUNIS: European Nature Information System Habitat Classification
- Eyüpoğlu,Ö. Yurdakul ,E. Endemic Plants of Seyfe Lake Basin (Kırşehir), Enviroment and Human, Ministry of Enviroment Media Organ, Issue 40,1998.Ankara
- Hamzaoğlu,E.(2000).Vegetation of Naldöken and Bozsal Mountains (Kırşehir).Gazi University Institute of Science Magazine 13(2),381-392.
- Hamzaoğlu,E. And Aydoğdu,M.(2000) Vegetation of Kargasekmez Mountain (Kırşehir). Gazi University Institute of Science Magazine 13(1),127-139.
- Hamzaoğlu,E.(1999) Steppe Vegetation of Kervansaray Mountain (Kırşehir). Gazi University Institute of Science Magazine 13(2),381-392
- Kırşehir Regional Directorate of Meteorology
- Kırşehir Limekiln Limestone Quarry Ç.E.D. Preliminary Survey Report, Barkisan A.Ş.Kırşehir,7.8.2000
- Guide for Forestation and Rehabilitation on Arid and Semi-arid Areas, R.T. Directorate General of Forestry and Water Affairs, March-2013
- Nezahat Gökyiğit, Botanic Garden and ANG Charity, List of Endangered Plant Species
- Odabaşı,T.,Boydak,M., " The importance and contribution of forestry in Southeastern Anatolia Project (GAP) "Journal of the Faculty of Forestry İÜ 34 (2016) 33-48
- Ömer and his friend, Rehabilitation of Semi-arid Areas in Central Anatolia, Anatolia Forest Research Magazine,2016
- Uslu,S., "The problem of deforestation in Central Anatolia" Journal of the Faculty of Forestry İstanbul Üniversty (1970)
- Ürgenç,S., Reforestation Technique "Emek printing", Istanbul University Rectorate, release number:3994 Journal of the Faculty of Forestry release number : 441 ISBN 975-404-446-5 İstanbul
- Yaltırık,F.,1984 "Turkey oak diagnostic guidelines" , Ministry of Agriculture, Forestry and Rural Affairs - Publication of the General Directorate of Forestry S.7,30-31, Map 5,64 Page + Pictures and Maps Innovation Printing House, Istanbul
- Yurdakulol E. , Ercoşkun, T., Ecologic and Syntaxonomic Study on Vegetation of Arid Areas in Central Anatolia, TUBITAK Nature-Tr. J, of Botany, 14;109-123,1990
- Yurdakulol E., Aydoğdu,M. And Çetin,B.(1990). Research of Kırıkkale-Kalecik-Kırşehir Steppe Vegetation for Phytosociology. Doğu Tr,J.of Butany 14(3),215-234.
- Zohary, M., Ecological Studies in the Vegetation the Near Eastern Deserts, 1: Israel. Exp. J., 2.4: 201-15, 1952.