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A Research on the Determination of the Botanical Composition of the High Altitudes of Anzer Region (Ikizdere-RIZE)

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Abstract
This study was carried out in 2020 at the pasture areas of high altitudes of the Anzer region in İkizdere district of Rize province of Turkey. In the study, canopy coverage area, botanical composition, pasture quality degree and pasture condition parameters were studied. The vegetation study was carried out in June, when the vegetation reached the climax phase. The vegetation characters of the research area were determined using the "Lup" method. In the research area, 45 taxa belonging to 21 families were identified. Taxa numbers of families; *Poaceae* (5), *Fabaceae* (3), *Apiaceae* (1), *Asteraceae* (9), *Boraginaceae* (2), *Brassicaceae* (1), *Caryophyllaceae* (3), *Crassulaceae* (1), *Compositae* (1), *Cyperaceae* (1), *Gentianaceae* (2), *Geraniaceae* (1), *Hypericaceae* (1), *Lamiaceae* (2), *Liliaceae* (1), *Onagraceae* (1), *Orabanchaceae* (2), *Plantaginaceae* (1), *Polygonaceae* (2), *Primulaceae* (1), *Rosaceae* (3) *and Urticaceae* (1). The canopy coverage rate of pasture area was determined as 72.00%. The botanical composition of the study area was determined as *Poaceae* 26.32%, *Fabaceae* 8.92% and other families 64.76%. With a pasture quality degree of 1.95, the condition of the pasture was determined as "Very Weak".

Keywords: Botanical composition, canopy coverage, Rize, Anzer region

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1. Introduction

Meadows and pastures, in addition to being important natural resources of the country, are the areas where the roughage needs of the animals are met the cheapest. In addition, it has very important duties such as providing biological diversity, being a gene source for cultivated plants, providing shelter for wild animals and protecting the soil surface against erosion (Açıkgöz, 2001).

Meadow-pastures which make up 14.6 million hectares of Turkey's lands (TUIK, 2019) and 45.332 hectares of Rize province (Anonim, 2018), have decreased yield potential and grass quality as a result of improper use (Gökkuş, 1991). This situation negatively affects the country's livestock and economy, as well as leads to the destruction of soil and water resources. In order to solve these problems, pastures with reduced grass yield and quality should be rehabilitated and made to produce quality forage with high efficiency. However, in order to be successful in pasture improvement, it is important to know the vegetation structure of the pasture to be improved (Çınar et al., 2019). One of the studies to be done in order to know the vegetation structure is the botanical composition studies related to the vegetation of that region.

In this study, it was aimed to determine the botanical composition of the higher altitudes of the Anzer

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region. In the study, the botanical composition, canopy coverage rate, the quality of pasture and the pasture condition of the region were determined.

2. Material and Method

Study Area: This study was carried out in 2020 the high altitudes pastures of Anzer region located in İkizdere district of Rize province of Turkey, which is at an average altitude of 2900 m above sea level (N: 40° 32' 32,2"; E:40° 31' 53,6") and about 28 km away from the town of İkizdere district of Rize province. The location of the study area and some photos taken from the study area are given in Figure 1.

The long years average temperature of the research area is 14.5°C and the precipitation amount is 2301.5 mm (Anonim, 2021).

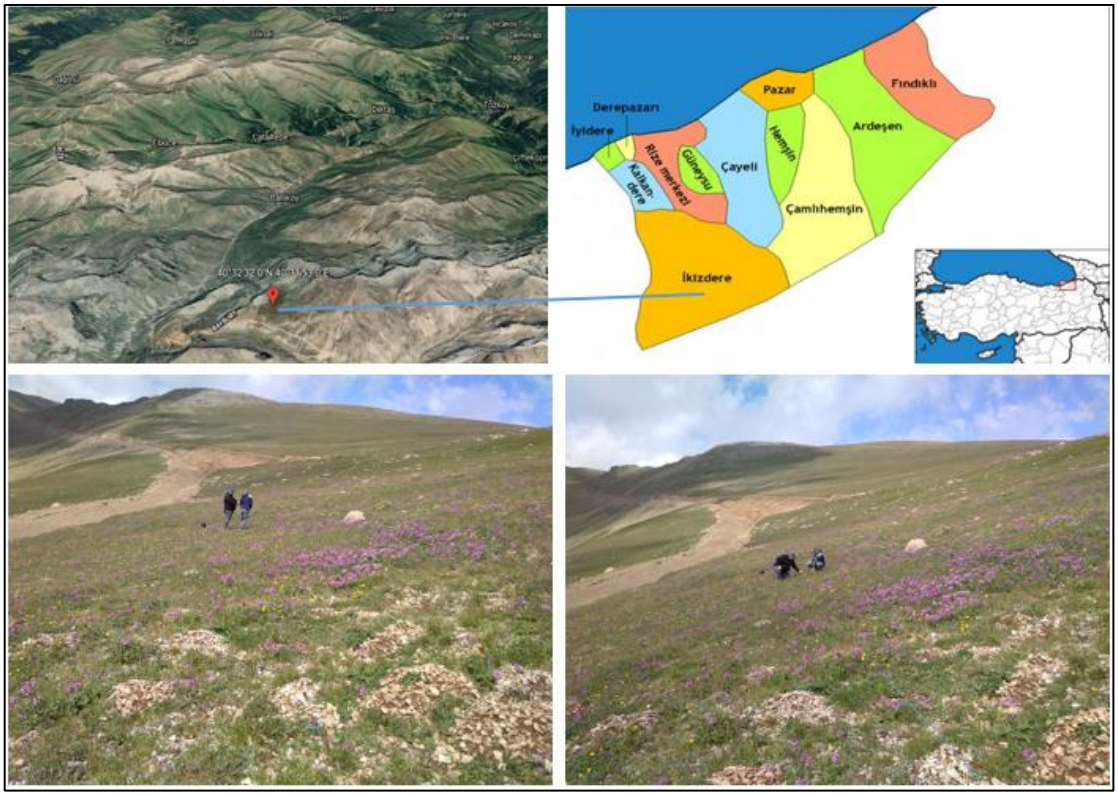

Figure 1: Location of the Study Area and Some Photos

Materials and Methods: Field studies were carried out in the pasture areas of high altitudes pastures of the Anzer region in June 2020, when the vegetation reached the climax phase. The material of the study consisted of plant samples obtained from pasture vegetation. 3 plants were collected for each taxon, dried according to the herbarium rules (Erik et al., 1996) and glued to the cardboards and taken under protection in Recep Tayyip Erdoğan University Pazar Vocational School. Plant samples were identified with the help of Flora of Turkey and Aegean Islands (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000). Family, taxon and author names are given according to Güner et al., (2012).

Vegetation characteristics of the pasture were determined using the Lup method. A total of 100 lup values were measured in a lup line, with a lup line of 20 m in length and a measurement distance of 20 cm between two lup. In determining the botanical composition, the plant taxon falling into each lup was recorded on the measurement scale. Plant specimens that fell into the lup were collected and identified with all their organs.

In determining the botanical composition of the pasture, 5 main lines were measured, with 10 lup lines on each main line, taking into account the principles stated by Tosun (1968). The canopy coverage area was determined by dividing the lup areas where the plant was found in the lup measurements by the total lup area (Gökkuş et al., 1993). The plants included in the botanical composition were given scores between -1 and 10 according to the principles stated by Gökkuş et al., (1993) and Bakoğlu (1999) and

according to the evaluation of plants as forage in Anonim (2008). Then, it was multiplied with the ratios in the botanical composition and by summing the values of all taxa, the pasture condition was determined according to the pasture quality degree (Table 1).

Table 1: Pasture Condition Scale (De Vries et al., 1951)

Quality Degree	Pasture Condition
8.1 – 10	Very Good
6.1 – 8	Good
4.1 – 6	Midddle
2.1 – 4	Weak
0.0 - 2	Very Weak

3. Findings and Discussion

The family, taxon names, value of numbers, canopy coverage rates, botanical composition ratios and pasture quality degree of the plants identified in the study are given in Table 2. The graph about the canopy coverage and botanical composition ratios of the families is given in Figure 2.

Table 2. Families, taxa, value numbers, canopy coverage and botanical composition ratios, pasture quality degree of plants in the pasture area

	Familia	***Taxon Name***	**NV**	**CCR**	**BC**	**PQD**
	POACEAE					
1	*Poaceae*	*Anthoxanthum odoratum* L. subsp. *alpinum* (A.Löve & D.Löve) B.M.G.Jones & Melderis	0	7.00	13.17	0.00
2	*Poaceae*	*Bromus tomentellus* Boiss.	7	2.00	3.84	0.27
3	*Poaceae*	*Festuca heterophylla* Lam.	2	6.00	4.11	0.08
4	*Poaceae*	*Phleum alpinum* L.	4	2.00	4.51	0.18
5	*Poaceae*	*Poa alpina* L.	5	1.00	0.69	0.03
		Total		**18.00**	**26.32**	**0.57**
	FABACEAE					
1	*Fabaceae*	*Astragalus fragrans* Willd.	3	4.00	2.74	0.08
2	*Fabaceae*	*Trifolium montanum* L. subsp. *humboldtianum* (A.Braun & Asch.) Hossain	8	1.50	2.50	0.20
3	*Fabaceae*	*Vicia alpestris* Steven subsp. *alpestris*	3	2.50	3.68	0.11
		Total		**8.00**	**8.92**	**0.39**
	OTHER FAMİLİAS					
1	*Apiaceae*	*Carum carvi* L.	0	0.50	1.67	0.00
2	*Asteraceae*	**Anthemis cretica* L. subsp. *argaea* (Boiss. & Balansa) Grierson	2	0.50	0.83	0.02
3	*Asteraceae*	**Cirsium sommieri* Petr.	0	0.50	1.00	0.00
4	*Asteraceae*	**Crepis armena* DC.	2	0.50	0.34	0.01
5	*Asteraceae*	*Erigeron caucasicus* Steven subsp. *caucasicus*	1	1.00	1.83	0.02
6	*Asteraceae*	*Helichrysum graveolens* (M.Bieb.) Sweet	0	1.50	3.50	0.00
7	*Asteraceae*	*Pilosella hoppeana* (Schult.) F.W.Schultz & Sch.Bip. subsp. *testimonialis* (Nägeli ex Peter) P.D.Sell & C.West	0	1.00	1.67	0.00
8	*Asteraceae*	*Scorzonera cana* (C.A.Mey.) Griseb. *var. alpina* (Boiss.) D.F.Chamb.	7	1.50	3.50	0.25
9	*Asteraceae*	*Senecio vernalis* Waldst. & Kit.	-1	0.50	0.34	0.00
10	*Asteraceae*	*Solidago virgaurea* L. subsp. *alpestris* (Waldst. & Kit.) Gaudin	0	0.50	1.00	0.00

	Familia	***Taxon Name***	**NV**	**CCR**	**BC**	**PQD**
11	*Boraginaceae*	*Myosotis lithospermifolia* (Willd.) Hornem.	2	0.50	0.82	0.02
12	*Boraginaceae*	*Myosotis olympica* Boiss.	3	1.00	1.00	0.03
13	*Brassicaceae*	*Draba bruniifolia* Steven subsp. *bruniifolia*	0	0.50	0.83	0.00
14	*Caryophyllaceae*	*Cerastium cerastoides* (L.) Britton	6	0.50	0.83	0.05
15	*Caryophyllaceae*	*Minuartia juniperina* (L.) Maire & Petitm.	3	0.50	1.00	0.03
16	*Caryophyllaceae*	*Petrorhagia alpina* (Hablitz) P.W.Ball & Heywood subsp. *alpina*	0	1.00	1.18	0.00
17	*Crassulaceae*	*Sedum annuum* L.	0	0.50	0.83	0.00
18	*Compositae*	*Archantemis marschalliana* (Willd.) L. Presti&Oberd subsp. *pectinata* (Boiss.) L. Presti&Oberd	0	1.50	1.03	0.00
19	*Cyperaceae*	*Carex atrata* L. subsp. *aterrima* (Hoppe) Hartm.	1	0.50	1.00	0.01
20	*Gentianaceae*	*Gentiana pyrenaica* L.	0	0.50	1.00	0.00
21	*Gentianaceae*	*Gentiana septemfida* Pall.	4	0.50	1.67	0.07
22	*Geraniaceae*	**Geranium ponticum* (P.H.Davis & J.Roberts) Aedo	2	7.50	5.14	0.10
23	*Hypericaceae*	*Hypericum armenum* Jaub. & Spach	0	1.00	1.67	0.00
24	*Lamiaceae*	*Ajuga orientalis* L.	0	1.00	0.69	0.00
25	*Lamiaceae*	*Stachys macrantha* (K.Koch) Stearn	2	7.50	5.14	0.10
26	*Liliaceae*	*Fritillaria caucasica* Adam	0	0.50	0.34	0.00
27	*Onagraceae*	*Epilobium algidum* M.Bieb.	0	0.50	1.67	0.00
28	*Orobanchaceae*	*Euphrasia minima* Jacq. ex DC.	0	1.50	3.50	0.00
29	*Orobanchaceae*	*Rhynchocorys stricta* (K.Koch) Albov	0	1.00	2.67	0.00
30	*Plantaginaceae*	**Veronica gentianoides* Vahl. subsp. *gentianoides* var. *alpina* A.Öztürk & M.A.Fisch.	1	0.50	0.83	0.01
31	*Polygonaceae*	*Rumex acetosella* L.	0	0.50	0.83	0.00
32	*Polygonaceae*	**Rumex ponticus* E.H.L.Krause	1	1.00	2.00	0.02
33	*Primulaceae*	*Primula auriculata* Lam.	3	1.00	3.33	0.10
34	*Rosaceae*	*Alchemilla retinervis* Buser	0	0.50	1.67	0.00
35	*Rosaceae*	*Filipendula ulmaria* (L.) Maxim.	3	1.50	3.00	0.09
36	*Rosaceae*	*Sibbaldia parviflora* Willd. var. *parviflora*	1	4.00	2.74	0.03
37	*Urticaceae*	*Urtica dioica* L.	2	1.00	2.67	0.05
		Total		**46.00**	**64.76**	**0.99**
		GENERAL TOTAL		**72.00**	**100.00**	**1.95**

*:Endemic, NV: Number of Value, CCR: Canopy Coverage Rate, BC: Botanical Composition, PQD: Pasture Quality Degree

When Table 2 is examined, the total canopy coverage rate of the pasture vegetation in the research area is 72.00%, the rate of *Poaceae, Fabaceae* and other families is 18.00%; 8.00%; 46.00% respectively. Botanical compositions of *Poaceae, Fabaceae* and other families according to the canopy coverage area were determined as 26.32%; 8.92%; 64.76% respectively. With a pasture quality degree of 1.95, the condition of the pasture was determined as "Very Weak".

In the pasture vegetation studied, a total of 45 taxa belonging to 21 families were identified, including 5 in *Poaceae*, 3 in *Fabaceae* and 37 from other families. Taxa numbers of other families; *Apiaceae* (1), *Asteraceae* (9), *Boraginaceae* (2), *Brassicaceae* (1), *Caryophyllaceae* (3), *Crassulaceae* (1), *Compositae* (1), *Cyperaceae* (1), *Gentianaceae* (2), *Geraniaceae* (1), *Hypericaceae* (1), *Lamiaceae* (2), *Liliaceae* (1), *Onagraceae* (1), *Orabanchaceae* (2), *Plantaginaceae* (1), *Polygonaceae* (2), *Primulaceae* (1), *Rosaceae* (3) *and Urticaceae* (1).

In addition, *Anthemis cretica* subsp. *argaea, Cirsium sommieri, Crepis armena, Geranium ponticum,*

Veronica gentianoides subsp. *gentianides* var. *alpina* and *Rumex ponticus* taxa are endemic.

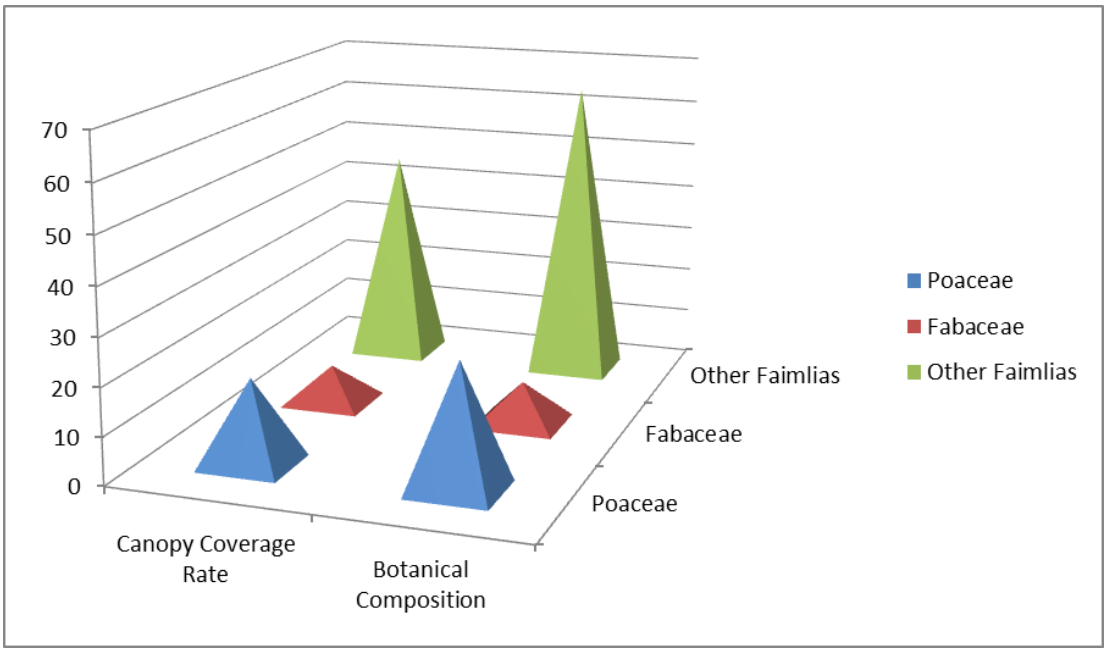

Figure 2: Canopy Coverage and Botanical Composition Ratios of Families (%).

When we look at the studies on botanical composition throughout the province of Rize; Baykal et al., (2020) in their study in the Palovit plateau pasture of Rize province, determined the canopy coverage rate as 70.75%, the proportion of *Poaceae, Fabaceae* and other families in the botanical composition as 54.98%, 2.88, 42.14%, respectively, and they found the pasture condition to be "Weak" with a pasture degree of 2.383. ; Çatal et al., (2020) in their study in the Trovit plateau pasture, the canopy coverage rate as 79.15%, and the botanical composition *of Poaceae, Fabaceae* and other families as 21.24%, 13.66, 65.10% respectively and they found the condition of the pasture to be "Weak" with a range of 2.365 degree; Bakoğlu et al., (2021) stated that they determined the canopy coverage rate of the Zorkal plateau pasture area as 83.40% and the botanical composition of the *Poaceae* 13.07%, *Fabaceae* 28.11% and other families as 58.82%, and they found the pasture condition to be "Weak" with a pasture quality degree of 2.65.
There are similarities and differences between the results obtained from the our study and the findings of other researchers (Baykal et al., 2020; Çatal et al., 2020; Bakoğlu et al., 2021). The emergence of differences may be caused by the different ecological conditions of the pasture and different vegetation measurement methods and applications.

4. Results

As a result, a total of 45 taxa belonging to 21 families were identified, 5 of which were from *Poaceae*, 3 from *Fabaceae* and 37 from other families. It was determined that the canopy coverage rate of the pasture plants was 72.00%, the botanical compositions according to the canopy coverage area were *Poaceae* 26.32%, *Fabaceae* 8.92% and other families 64.76%. With a pasture quality degree of 1.95, the condition of the pasture was determined as "Very Weak". In order to improve the very weak pasture, studies should be carried out to determine the appropriate breeding method for the pasture.

Conflict of Interests: The authors declare that they have no conflict of interest.

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