Determination of botanical composition of Çamlıhemşin-Trovit plateau

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Abstract
Botanical and floristic composition study was carried out to gather information about the vegetation of the pastures. In this study, canopy covering, botanical composition ratios and pasture condition class were examined. Botanical composition measurements were made in Trovit plateau of Çamlıhemşin district of Rize province. Botanical composition study was determined by using Lup method which is used in vegetation measurements. The lup measurements were conducted by collecting samples from 10 points on 5 main lines. As a result of the study; 4 Poaceae, 2 Fabaceae and 32 taxon from other families were identified. The canopy coverage rate was determined as 79.15%. The botanical composition of study area consist of 21.24% Poaceae, 13.66% Fabaceae and 65.10% other families. The pasture condition was found to be “Weak” with 2.365 pasture degree. Studies should be made to determine suitable pasture breeding method for the region in order to bring "Weak" pasture to at least "Medium" level.

Keywords: Çamlıhemşin-Trovit plateau, canopy cover rate, botanical composition, pasture status.

Introduction
Meadow and pasture areas provide the most important breeding resources for grazing animals (Aydın and Uzun 2002). The 30% of the required roughage (Gökkuş 1994), 68% of raw protein and 62% of starch in the nutrients consumed by stocks in Turkey met from meadow and pasture areas (Okatan and Yüksek 1997, Babalık and Sarıkaya 2015). In recent years, the pastures of in Turkey have been constantly early and over-grazed, and breeding and maintenance procedures have not been applied, so the vegetation cover of the pastures has deteriorated and weed yields have decreased (Yavuz and Sürmen 2016, Sürmen and Kara 2018). This poses a major problem in terms of feed deficit that animals need. In order to solve this problem, the yield and quality of the pastures should be improved by breeding the high weed yield and quality. In order to be successful in pasture breeding, it is necessary to have knowledge about the vegetation of the pasture. Botanical and floristic composition studies provide information about the vegetation of the pasture.
While the pasture area of our country was 45 million hectares in the 1940s, it has decreased to 14.6 million hectares today (TÜİK 2019). In the province of Rize, there is a total of 45.332 ha meadow-pasture area (Anonim 2018).

In the literature, the İspirli et al. (2016) in the natural pastures of 12 villages of Taşköprü-Kastamonu, the average rate of plant-covered areas 83.34%, 1 of the pastures “Good”, 5 “Medium” and 6 “Weak” pasture condition; Babalık and Fakır (2017) Isparta Davraz Mountain Közağacı Plateau Kocapınar pasture in the botanical composition, total grass rate 60.9%, legume rate 14.4%, other families rate 24.7% and plant-covered area rate 24.3%; Sürmen and Kara (2018) the ratio grass in the botanical composition 37.09%, the rate of legumes 4.24% and 58.67% of other family plants; Çınar et al. (2019) in the pasture covered with plants, on average the rate of grass 36.9%, rate of legumes 22.0% and other family plants 41.1%, the range of quality ranged between 2.40-3.92 and pasture status class is weak; Bakoğlu et al. (2019) Rize province Handuzu of the plateau, canopy covering rate 82.4%, the botanical composition grass rate of 33.37%, of legumes 5.75% and other families the rate of 60.88% and pasture condition “Weak” with 2.456 pasture quality degree was indicated studies have been noticed by the researchers. Although the studies revealing vegetative diversity in Rize province (Çobanoğlu 2012, Baykal and Atamov 2016, Baykal and Atamov 2017, Süzen 2017, Baykal and Atamov 2018, Baykal et al. 2018 and Baykal 2019), the Trovit plateau is no study determining the botanical composition property.

In this study, it was aimed to determine the families and species of the plants in the pasture of Trovit plateau of Çamlıhemşin district of Rize province and to determine the ratio of botanical composition and canopy cover of pasture, to have information about the quality degree and condition of the pasture. In this way, it is aimed to give direction to possible improvement principles of pasture and to guide pasture management and breeding programs with more detailed applications in the future.

Material and Methods

Study Area

This research was carried out in 2019 at the Trovit plateau at an altitude of 2490 m (40° 51' 34" N, 41° 03' 39" E) and 8 km away from Çamlıhemşin district of Rize province (Figure 1). The sampled pastures of the study area given in Figure 2.

The long-term average temperature, rainfall and relative humidity of the study area are as follows 14.3 ° C, 2296 mm and 80%, respectively (Anonim 2019).

Material

The measurements were made in June-July, during the period of complete vegetative development of the plants and when they are in the generative cycle, i.e. the flowering period of the plants. Taxon from measurement was identified by the aid of Turkey flora (Davis 1965-1985, Davis et al. 1988), Turkey Plants List and controls through utilizing Turkish Plants Data Service data was performed.

Methods

In determining the botanical composition, Tosun (1968) taking into consideration the principles stated in 5 main line and 10 line on each main line, were measured. Lup measurements of plants in the Lup area, divided by the total area of the Lup area was determined to canopy cover the area (Gökkuş et al. 1993). The botanical composition of the plants determined by Gökkuş et al. (1993) and Bakoglu (1999) are in accordance with the principles. Pasture degree detected
Anonim (2008) according to the status of plants as feed is given between -1 and 10 points and then, by multiplying the ratios in the botanical composition. By adding the values of all species, pasture quality degree and status class were found.

![Figure 1: Location of the work area.](image1)

![Figure 2: The sampled pastures of the study area.](image2)

**Result and Discussion**

List of taxon family, canopy covering and botanical composition ratio and pasture degree determined in the study are shown in Table 1; canopy covering and botanical composition ratios of families shown in Figure 3; pasture degree according to families Figure 4 and number of taxon according to families Figure 5 is also given.
Table 1. Families, species, number of values, canopy covering and botanical composition ratios, pasture degree of plants in the pasture area of Trovit plateau.

| Family          | Taxon name                          | Turkish            | NV  | CC   | BK  | PD   |
|-----------------|-------------------------------------|--------------------|-----|------|-----|------|
| **POACEAE**     |                                     |                    |     |      |     |      |
| 1 Poaceae       | Dactylis glomerata subsp. glomerata L. | Domuz ayrığı       | 7   | 1.02 | 1.38| 0.097|
| 2 Poaceae       | Festuca woronowii                   | Yayla yumağı       | 2   | 3.40 | 3.54| 0.071|
| 3 Poaceae       | Nardus stricta L.                   | Kil otu            | 3   | 12.17| 15.90| 0.477|
| 4 Poaceae       | Phleum alpinum L.                   | Alp itkuuruğu      | 4   | 0.34 | 0.42| 0.017|
|                 | Total                               |                    | 16.93  | 21.24| 0.661|
| **FABACEAE**    |                                     |                    |     |      |     |      |
| 1 Fabaceae      | Trifolium canescens                 | Sarı üçgül         | 7   | 3.06 | 3.74| 0.262|
| 2 Fabaceae      | Trifolium repens var. giganteum     | Ak üçgül           | 8   | 8.33 | 9.92| 0.794|
|                 | Total                               |                    | 11.39  | 13.66| 1.055|
| **OTHER FAMILIES** |                                     |                    |     |      |     |      |
| 1 Apiaceae      | Carum caucasicum (M.Bieb.) Boiss.   | Halal              | 0   | 4.42 | 4.27| 0.000|
| 2 Asteraceae    | Achillea setacea                    | Ayvabala           | 0   | 0.34 | 0.46| 0.000|
| 3 Asteraceae    | Cirsium vulgare (Savi)              | Yaygın kangal      | 1   | 0.85 | 0.80| 0.008|
| 4 Asteraceae    | Crepis paludosa (L.)                | Su kıkısı           | 1   | 0.34 | 0.53| 0.005|
| 5 Asteraceae    | Erigeron caucasicus subsp. venustus (Botsch.) Grierson | Zarif şifaotu | 1 | 0.34 | 0.36 | 0.004 |
| 6 Asteraceae    | Pilosella hoppeana subsp. troica (Zahn) | Erırmak otu | 0 | 1.19 | 1.56 | 0.000 |
| 7 Campanulaceae | Campanula rapunculus subsp. lambertiana (A.DC.) Rech.f. | Sidikli çançığı | 0 | 0.34 | 0.36 | 0.000 |
| 8 Caprifoliaceae | Valeriana alliarifolia Adams | Pis ot | -1 | 0.34 | 0.36 | -0.004 |
| 9 Cyperaceae    | Carex nigra subsp. dacica (Heuff.) Soó | Rumenayak otu | 1 | 3.91 | 5.11 | 0.051 |
| 10 Cyperaceae   | Carex pallescens L.                 | Soluk saparna      | 3   | 1.36 | 1.47| 0.044|
| 11 Cyperaceae   | Carex umbrosa subsp. huertiana (Boiss.) Soó | Kırkayak otu | 3 | 0.51 | 0.48 | 0.014 |
| 12 Ericaceae    | Rhododendron caucasicum Pall.       | Dağ kumarı         | -1  | 0.85 | 1.52| -0.015|
| 13 Ericaceae    | Vaccinium uliginosum L.             | Avçi üzümü         | 1   | 0.85 | 0.80| 0.008|
| 14 Gentianaceae | Gentiana verna subsp. pontica (Soltok.) |                |     |      |     |      |
Table 1 shows that the total canopy coverage of the pasture studied 79.15%, the rate of Poaceae, Fabaceae and other families, respectively 16.93%; 11.39%; 50.83%. The botanical composition of Poaceae, Fabaceae and other families according to canopy coverage area was 21.24%; 13.66%; 65.10%. Pasture quality degree was found to be “Weak” condition with 2.365 value. Nardus stricta (15.90%) of plants from Poaceae, Trifolium repens var. giganteum (9.92%) from Fabaceae and Potentilla argentea (9.86%) from other families species are the first in the botanical composition. Furthermore, Ranunculus dissectus subsp. rigidulus, which is one of the endemic species identified in the pasture studied.
In the pasture vegetation, 38 taxon in 19 families were identified and 4 of them were Poaceae, 2 Fabaceae and 32 other plants. When we look at other families species have been identified that 5 from Asteraceae; 4 from Rosaceae; 3 from Cyperaceae and Lamiaceae; 2 from Ericaceae, Hypericaceae, Plantaginaceae and Polygalaceae; and 1 each from others (Apiaceae, Campanulaceae, Caprifoliaceae, Gentianaceae, Liliaceae, Melanthiaceae, Orchidaceae, Primulaceae, Ranunculaceae).

The results obtained from the research with other researchers (İspirli et al. 2016, Babalık and Fakir 2017, Sürmen and Kara 2018, Çınar et al. 2019, Bakoğlu et al. 2019) between the findings are similarities and differences. It has been determined that the emergence of differences may be due to different vegetation conditions and practices. The high level of Nardus stricta L. (15.90%) is due to the fact that the plant adapts to moist areas and is not preferred by animals.
Conclusions
As a result of the study; a total of 38 taxon were identified, including 4 Poaceae, 2 Fabaceae and 32 plants from other families. The canopy coverage rate was determined as 79.15%. The botanical composition of study area consist of 21.24 % Poaceae, 13.66 % Fabaceae and 65.10% other families. The highest coverage for the species were detected as Nardus stricta (15.90%) (Poaceae family), Trifolium repens var. giganteum (9.92%) (Fabaceae family) and Potentilla argentea (9.86%) which belongs to other families. Pasture quality degree condition was found “Weak” with 2.365 value. According to the results of the research, pasture and similar ecological conditions should be taken under control by avoiding over-, irregular and untimely grazing. Studies should be made to determine suitable pasture breeding method for the region in order to bring ”Weak” pasture to at least ”Medium” level.

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