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Determination of botanical composition of Çamlıhemşin-Trovit plateau

Muhammed İkbal Çatal[1,*], Hüseyin Baykal[2] and Adil Bakoğlu[2]

[1,*] *Department of Field Crops, Faculty of Agriculture and Natural Sciences, Recep Tayyip Erdoğan University, Rize, Turkey*
[2] *Department of Plant and Animal Production, Vocational School of Pazar, Recep Tayyip Erdoğan University, Rize, Turkey*

Corresponding author: muhammed.catal@erdogan.edu.tr

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 literatüre, 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 Kozağacı 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^{o} $51^{'}$ $34^{''}$ N, 41^{o} $03^{'}$ $39^{''}$ 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 the 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.

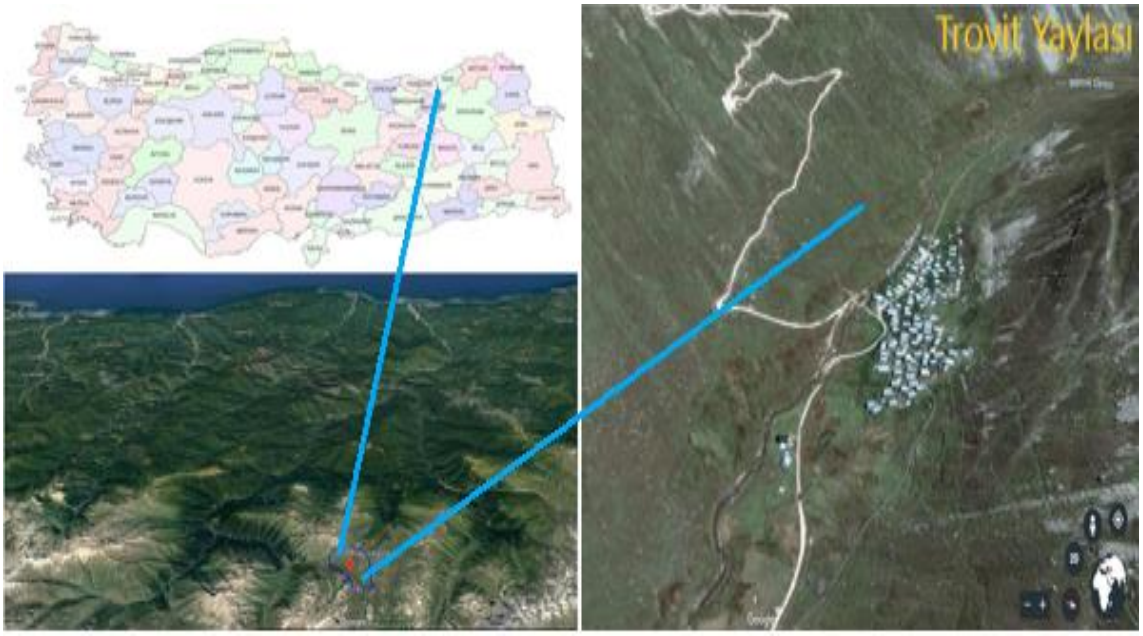

Figure 1: Location of the work area.

Figure 2: The sampled pastures of the study area.

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* Hack. subsp. *woronowii*	Yayla yumağı	2	3.40	3.54	0.071
3	*Poaceae*	*Nardus stricta* L.	Kıl otu	3	12.17	15.90	0.477
4	*Poaceae*	*Phleum alpinum* L.	Alp itkuyruğu	4	0.34	0.42	0.017
			Total		**16.93**	**21.24**	**0.661**
	FABACEAE						
1	*Fabaceae*	*Trifolium canescens* Willd.	Sarı üçgül	7	3.06	3.74	0.262
2	*Fabaceae*	*Trifolium repens* var. *giganteum* Lag.-Foss.	Ak üçgül (G. isim)	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* Waldst. & Kit.	Ayvabala	0	0.34	0.46	0.000
3	*Asteraceae*	*Cirsium vulgare* (Savi) Ten.	Yaygın kangal	1	0.85	0.80	0.008
4	*Asteraceae*	*Crepis paludosa* (L.) Moench	Su kıskısı	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) P.D.Sell & C.West	Ertırnak otu	0	1.19	1.56	0.000
7	*Campanulaceae*	*Campanula rapunculus* subsp. *lambertiana* (A.DC.) Rech.f.	Sidikli çançiçeği	0	0.34	0.36	0.000
8	*Caprifoliaceae*	*Valeriana alliariifolia* 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. *huetiana* (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.	Avcı üzümü	1	0.85	0.80	0.008
14	*Gentianaceae*	*Gentiana verna* subsp. *pontica* (Soltok.) Litard. & Maire	Hemşin gentiyanı	0	0.51	0.70	0.000

15	*Hypericaceae*	*Hypericum perfoliatum* L.	Binbirdelik otu	-1	1.87	2.12	-0.021
16	*Hypericaceae*	*Hypericum perforatum* L.	Kantaron	-1	0.85	1.32	-0.013
17	*Lamiaceae*	*Prunella vulgaris* L.	Gelincikleme otu	2	0.68	0.97	0.019
18	*Lamiaceae*	*Stachys macrantha* (K.Koch) Stearn	Kocasoğulcan	2	0.85	1.10	0.022
19	*Lamiaceae*	*Thymus longicaulis* subsp. *longicaulis* C.presl	Aşkekiği	3	1.36	1.53	0.046
20	*Liliaceae*	*Lilium ponticum* K.Koch.	Hemşin zambağı	0	0.17	0.18	0.000
21	*Melanthiaceae*	*Veratrum album* L.	Dokuztepeli	-1	0.17	0.27	-0.003
22	*Orchidaceae*	*Dactylorhiza urvilleana* subsp. *urvilleana* (Steudel) Baumann & Künkele	Balkaymak	2	2.72	4.30	0.086
23	*Plantaginaceae*	*Veronica chamaedrys* L.	Cancan	1	1.02	1.38	0.014
24	*Plantaginaceae*	*Veronica gentianoides* Vahl subsp. *gentianoides*	Kandil çiçeği	1	1.70	2.05	0.021
25	*Polygalaceae*	*Polygala alpestris* Rchb.	Yayla sütotu	1	1.02	0.99	0.010
26	*Polygonaceae*	*Polygonum bistorta* subsp. *carneum* (K.Koch) Coode & Cullen	Dağ lahanası	1	0.34	0.32	0.003
27	*Primulaceae*	*Primula algida* Adams	Dağ tutyası	6	1.87	3.33	0.200
28	*Ranunculaceae*	**Ranunculus dissectus* subsp. *rigidulus* (Boiss.) P.H.Davis	Üçkebikeç (Endemik)	-1	2.55	3.55	-0.036
29	*Rosaceae*	*Alchemilla caucasica* Buser	Kaf şebnemlisi	2	1.02	1.54	0.031
30	*Rosaceae*	*Alchemilla retinervis* Buser	Damarlı keltat	0	4.76	5.97	0.000
31	*Rosaceae*	*Potentilla argentea* L.	Gümüşparmak otu	1	7.31	9.86	0.099
32	*Rosaceae*	*Sibbaldia parviflora* var. *parviflora* Willd.	Fındık otu	1	4.42	5.54	0.055
			Total		**50.83**	**65.10**	**0.648**
			GENERAL TOTAL		**79.15**	**100.00**	**2.365**

*:Endemic, NV: Number of values; CA: Canopy cover; BK: Botanical composistion, PD: Pasture degree.

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*).

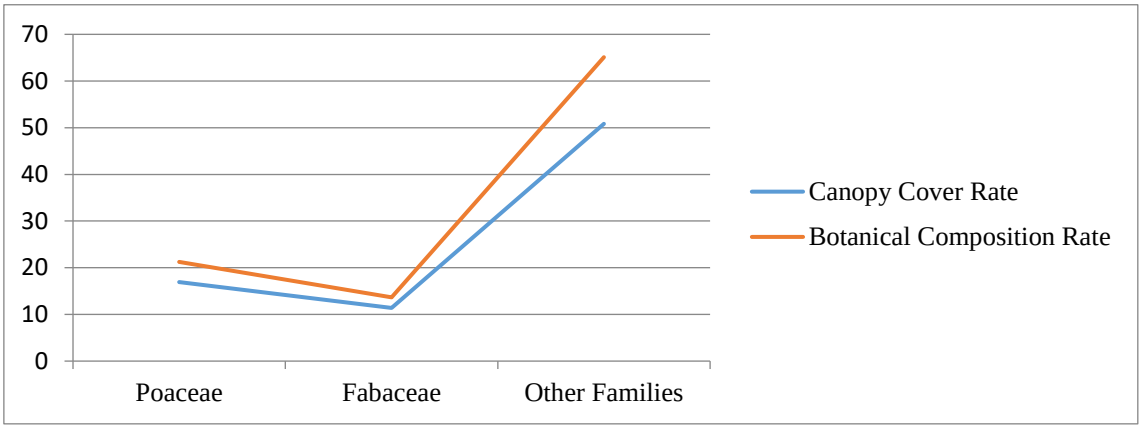

Figure 3. Canopy covering and botanical composition rates of families (%).

The results obtained from the research with other researchers (İspirli et al. 2016, Babalık and Fakır 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.

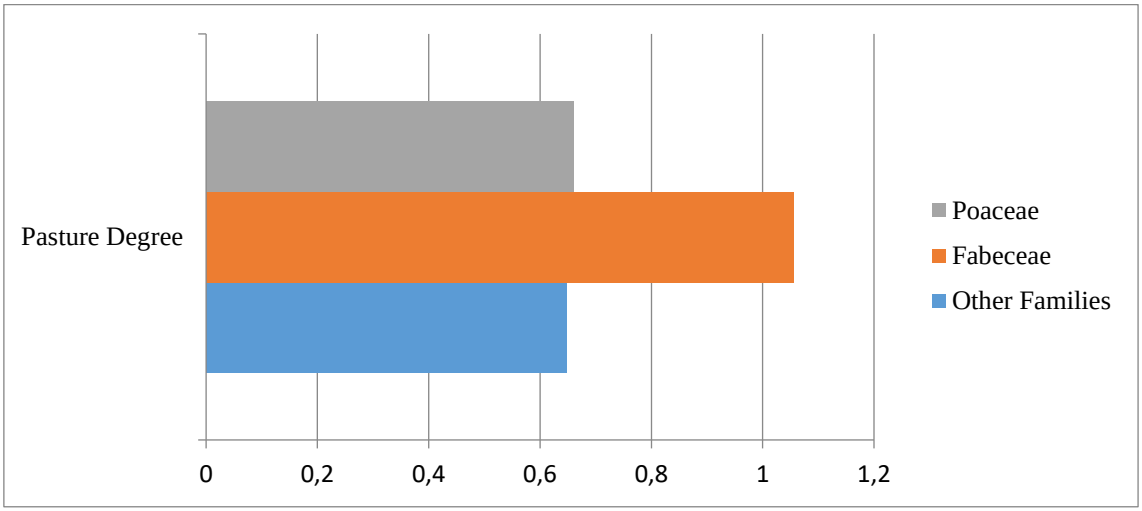

Figure 4. Pasture degrees of families.

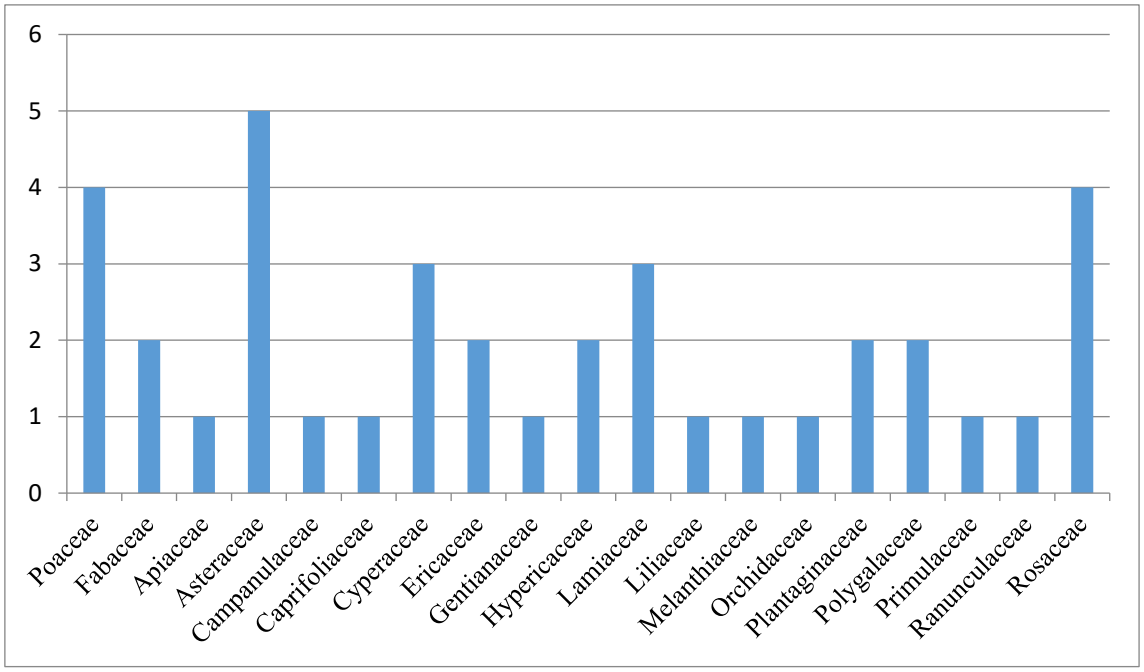

Figure 5. Number of taxon of families.

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.

References

Anonim, (2008). Türkiye’nin çayır ve mera bitkileri. Tarım ve Köyişleri Bakanlığı Tarımsal Üretim ve Geliştirme Genel Müdürlüğü Yayınları, 468 s.

Anonim, (2018). Rize Mera Alanı. https://rize.tarim.gov.tr/Menu/13/Ekonomi (24.03.2019).

Anonim, (2019). T.C. Başbakanlık Devlet Meteoroloji İşleri Genel Müdürlüğü, Rize İl Müdürlüğü Kayıtları.

Aydın, İ. & Uzun, F. (2002). Çayır-mera amenajmanı ve ıslahı. Ondokuz Mayıs Üniversitesi Ziraat Fakültesi Ders Kitabı, Samsun.

Babalık A.A. & Fakır H. (2017). Korunan ve otlatılan mera alanlarında vejetasyon özelliklerinin karşılaştırılması: Kocapınar Merası örneği. Türkiye Ormancılık Dergisi, 18(3): 207-211.

Babalık, A.A. & Sarıkaya, H. (2015). Isparta ili Zengi Merasında ot verimi ve botanik kompozisyonun tespiti üzerine bir araştırma. Türkiye Ormancılık Dergisi, 16(2): 96-101.

Bakoğlu, A. (1999). Otlatılan ve Korunan İki farklı Mera kesiminin Bazı Toprak ve Bitki Örtüsü Özelliklerinin Karşılaştırılması. Atatürk Üniv. Fen Bil. Ens. Tarla Bit. Anabilim Dalı (Doktora Tezi), Erzurum.

Bakoğlu, A., Baykal, H. & Çatal, M.İ. (2019). Handüzü Yaylasının Botanik Kompozisyonu Üzerine Bir Çalışma. Turkish Journal of Agriculture - Food Science and Technology, 7(9): 1339-1343. DOI:10.24925/turjaf.v7i9.1339-343.2561.

Baykal, H. & Atamov, V. (2016). Floristic diversity in Bashemsin Valley of Kackar Mountains National Park of Rize, Turkey. Pakistan Journal of Botany, 48 (5):1871-1876.

Baykal, H. & Atamov, V. (2017). Ethnobotanical Documentationof Plants of Başhemşin Valley, Kaçkar Mountains National Park, Rize, Turkey. Bangladesh Journal of Botany, 46(2),767-773.

Baykal, H. & Atamov, V. (2018). Isırlık Doğa Parkı ve çevresinin florası, Ot Sistematik Botanik, 25(2), 151-170.

Baykal, H., Atamov, V. & Yüksek, T. (2018). Flora of Tunca Valley Natural Park and environs (Ardeşen-Rize/Turkey)", Biological Diversity and Conservation, 11, 6-24.

Baykal, H. (2019). Flora of Akyamaç Waterfall Natural Park and environs (Rize/Turkey), Biological Diversity and Conservation, 12, 128-137. DOI: 10.5505/biodicon.2019.98608.

Çınar, S., Hatipoğlu, R., Avcı, M., Yücel, C. & İnal, İ. (2019). Adana İli Tufanbeyli İlçesi Meralarının Vejetasyon Yapısı Üzerine Bir Araştırma. KSÜ Tarım ve Doğa Derg 22(1):143-152, DOI: 10.18016/ksutarimdoga.vi.448421

Çobanoğlu, M. (2012). Güneysu-Çağrankaya arası bölgenin flora ve vejetasyonu, Recep Tayyip Erdoğan Üniversitesi Fen Bilimleri Enstitüsü. Rize, Türkiye, 153s.

Davis, P.H. (1965-1985). Flora of Turkey and The East Aegean Islands, Vol. 1-9, Edinburgh University Press,Edinburgh.

Davis, P.H., Mill, R.R. & Tan, K. (1988). Flora of Turkey and The East Aegean Islands, Vol. 10, Edinburgh University Press, Edinburgh.

Gökkuş, A., Koç, A. & Çomaklı, B. (1993). Çayır-mera uygulama kılavuzu. A.Ü. Ziraat Fakültesi Yayınları No:142, A.Ü. Ziraat Fakültesi Ofset Tesisi, Erzurum.

Gökkuş, A. (1994). Türkiye'nin Kaba Yem Üretiminde Çayır-Mera ve Yem Bitkilerinin Yeri ve Önemi. Atatürk Üniversitesi Ziraat Fakültesi Dergisi, 25: 250-261.

İspirli, K., Alay, F., Uzun, F. & Çankaya, N. (2016). Doğal Meralardaki Vejetasyon Örtüsü ve Yapısı Üzerine Otlatma ve Topografyanın Etkisi. Türkiye Tarımsal Araştırmalar Dergisi, 3(1), 14-22.

Okatan, A. & Yüksek, T. (1997). Aşırı Otlatılan Mera Parsellerinde Adi Korunga (Onobrychis viciifolia Scop.)'nın Yetiştirilmesi ve Verim Potansiyeli Üzerine Araştırmalar. Türkiye 2. Tarla Bitkileri Kongresi, Ondokuz Mayıs Üniversitesi Ziraat Fakültesi, Samsun, s.492-498.

Sürmen, M. & Kara, E. (2018). Aydın ili ekolojik koşullarında farklı eğimlerdeki mera vejetasyonlarının verim ve kalite özellikleri. Derim, 35**,** (1): 67-72, doi:10.16882/derim.2018.343428

Süzen, A. (2017). Ambarlık Yaylası (Çamlıhemşin/Rize)'nın florası ve vejetasyonu. Recep Tayyip Erdoğan Üniversitesi Fen Bilimleri Enstitüsü, Rize, Türkiye, 172s.

Tosun, F. (1968). Doğu Ana dolu Kıraç Meralarının Islahında Uygulanabilecek Teknik Metodların Tesbiti Üzerine Bir Araştırma. Zirai Araştırma Enstitüsü Araştırma Bülteni No: 29, Ankara.

TÜİK. (2019). Bitkisel Üretim İstatistikleri. http://www.tuik.gov.tr (30.07.2019).

Yavuz, T. & Sürmen, M. (2016). Vegetation features of alpine and subalpine rangelands in Eastern Black Sea region. Scientific Papers Series A Agronomy, 54**:**474-477.3.

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