Türk Tarım ve Doğa Bilimleri Dergisi 5(4): 406–413, 2018

https://doi.org/10.30910/turkjans.471198

TÜRK
TARIM ve DOĞA BİLİMLERİ
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TURKISH
JOURNAL of AGRICULTURAL
and NATURAL SCIENCES

Research Article

Basic Vegetation Characteristics of Village Pastures Connected to Mardin Province and Its Provinces

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Received: 20.03.2018 Received in Revised: 26.07.2018 Accepted: 01.08.2018

Abstract

This study was carried out in 2015 with the aim of determining some vegetation characteristics of pastures of 33 villages of Mardin province and its subprovinces. Modified wheeled loop method was used in the study to determine the vegetation characteristics of these pastures. Total 132 plant species were identified by the vegetation survey. Studied pastures were dominated by 5 decreaser, 5 increaser and 122 invader species. According to the classification of species in pasture vegetation, the proportion of decreaser, increaser and invasive species were determined as 2.08%, 3.15% and 94.77%, respectively. The average plant coverage rate of surveyed pastures was 71.35%. The average proportion of legumes in botanical composition was 40.66%, the proportion of grasses was 22.82% and the proportion of other families was 36.52%. According to the results obtained from the surveys, all of the studied pastures were classified as weak. In terms of pasture health, 19 pastures were determined as problematic, 10 pastures as risky and 4 pastures as healthy. These results show that; a large number of the studied pastures are in a need of utilization with caution where the remaining parts need to be included in rehabilitation programs urgently.

Key words: Rangeland condition, rangeland health, plant coverage rate, botanic composition.

Mardin İl ve İlçelerine Bağlı Köy Meralarının Temel Vejetasyon Özellikleri

Özet

Mardin ili ve ilçesine bağlı 33 köy merasının bazı vejetasyon özelliklerini belirlemek amacı ile bu çalışma 2015 yılında yapılan yürütülmüştür. Vejetasyon ölçümünde modifiye edilmiş tekerlekli lup (halka) metodu kullanılmıştır. Vejetasyon etüdü yapılan meralarda toplam 132 bitki türü tespit edilmiştir. Tespit edilen bitki türlerinin türlerin 5 tanesi azalıcı, 5 tanesi çoğalıcı ve 122 tanesinin de istilacı olduğu belirlenmiştir. Botanik kompozisyonda azalıcılar, çoğalıcılar ve istilacı türlerin oranları sırasıyla %2.08, %3.15 ve %94.77 olarak belirlenmiştir. Araştırmanın yürütüldüğü meraların bitkiyle kaplı alan oranı ortalaması %71.35'tir. Baklagillerin botanik kompozisyondaki ortalama oranı %40.66, buğdaygillerin oranı %22.82 ve diğer familya bitkilerinin oranı da %36.52 olarak tespit edilmiştir. Araştırmadan elde edilen verilere göre; çalışılan meraların tamamı ''zayıf'' mera durumu sınıfına girmiştir. Mera sağlığı açısından yapılan sınıflamada ise 19 mera ''sorunlu'', 10 mera ''riskli'' ve 4 mera ise ''sağlıklı'' olarak belirlenmiştir. Bu sonuçlara göre; çalışılan meraların büyük bir kısmı dikkatli bir şekilde kullanılmaya, diğerleri ise acilen ıslah programına dâhil edilmeye ihtiyaç duyduğu anlaşılmaktadır.

Anahtar kelimeler: Mera durumu, mera sağlığı, bitki ile kaplı alan, botanik kompozisyon.

Introduction

Rangelands are the most important feed source to feed and sustain health of animals due to its high species diversity and nutritional value, especially during fresh conditions. As an example, green rangeland feed contains 12-20% crude

protein (Arslan, 2008; Ozaslan-Parlak et al., 2011; Cetiner et al., 2012) and the digestibility rate varies between 60-70% (Alcaide et al., 1997; Ozaslan-Parlak et al., 2011). In addition, generally no vitamin and mineral deficiencies occurs in animals grazing on rangelands. According to the Turkish Statistical Institute, 14.6 million ha of rangelandland exists in Turkey (Anonymous, 2016). Most of these areas locate in the inner parts of Turkey where long or short drought conditions exist. The Eastern, Central and Southeastern Anatolian Regions have a total of 10.3 million ha rangeland which covers 78% (about 4/5) of the country's total reserves. Arid and semi-arid climate is inevitably forcing animal growers to low input animal husbandary techniques in these natural rangelands. Drought is the most important environmental stress factor for these rangelands. Arid conditions seriously affect the growth and development of plants and results with decreases in the amount of grass production. Quantity of photosynthetic pigments, utilization of light energy, cell expansion (growth) and organic matter production decreases in drought-stressed plants (Jaleel et al., 2009). Under these conditions, plants appear smaller, less leafy and deep rooted (Taiz and Zeiger, 2008). The grazing of rangeland plants that are trying to cope with drought stress advances the stress. Every grazing activity results with fewer organic matter production capacities due to decreasing leaf areas. In this case, both above-ground and under-ground organs of the plant get supplied deficitly. Therefore, in case of grazing more than 60% of the grass produced by plants, the amount and the depth of roots decreases drastically (Olson and Lacey, 1996).

In this context, plant cover, soil properties and some other features that will form the basis for management and improvement studies have been identified in Mardin natural rangelands, as a continuation of the studies carried out in many regions of Turkey.

Materials and Methods

This study was carried out during April-June 2015, 33 villages of 5 districts of Mardin province in Southeast Anatolian of Turkey (Çağıl, Alanlı, Merkez (Derik), Taşıt, Ilıca, Şanlı, Adakent, Koçyiğit, Beşbudak, Ballı, Üçtepe, Alagöz, Yazır, İşgören, Şenocak, Soylu, Sancaklı, Şanlı, Yukarı Konak, Dikyamaç, Merkez (Mazıdağı), Balpınar, Gürgöze, Ömürlü, Şenyuva, Kışlak, Gümüşpınar, Sultan, Bülbül, Ambar, Avcılar, Akbağ and Yaylı) which are located between 41°47'-41°65' N and 32°16'-32°44' E coordinates where altitudes range between 438 to 1108 m.

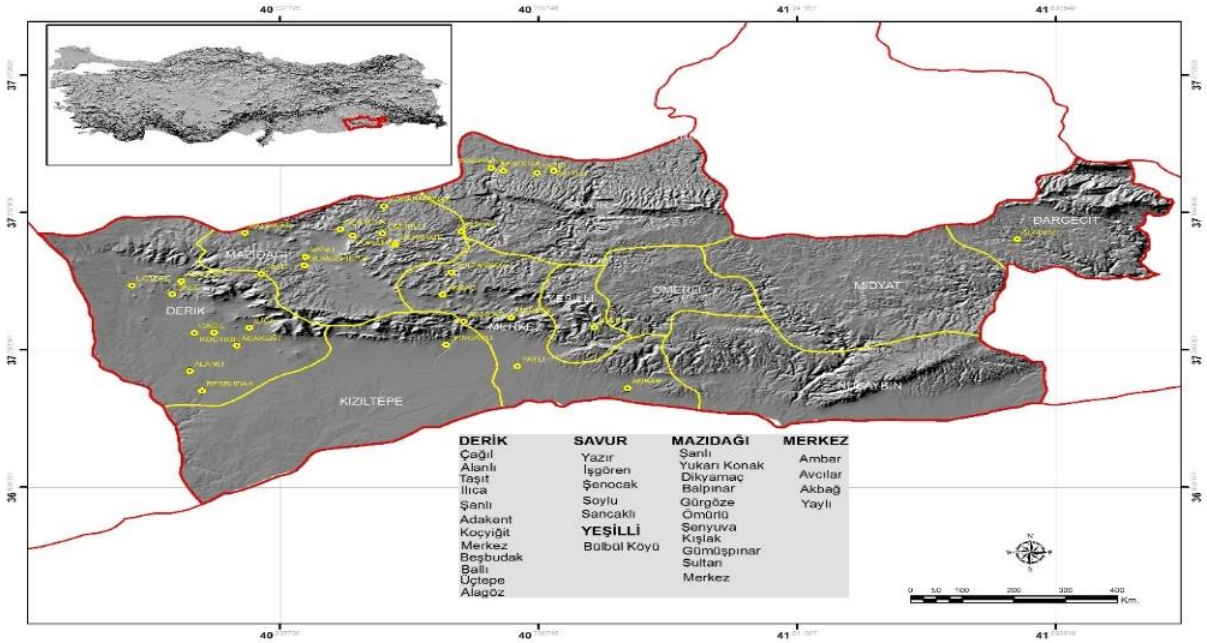

Figure 1. Vegetation survey stations.

Vegetation studies were conducted by Modified Wheeled Lupe (Ring) Method (Koc and Cakal 2004) to determine the botanical composition of the rangelands in Mardin province. The dominant plants in rangelands were determined during flowering period. Method of Davis (1970) was used for plant identification. Detected plant species are classified as decreaser, increaser or invader. All of the decreasers and 20% of the increasers of the identified plants were used to classify the existing conditions in the study areas. Determination of the vegetation soil coverage ratio was calculated by

proportioning the number of points encountered with plant to the total number of measured points as described in Gokkus et al., (2000). The obtained values of each plant species were proportioned to the total plant number to determine botanical composition. The status and health of the rangelands were classified as described by Avag et al. (2012) (Table 1).

Table 1. Rangeland status and health assessment classes.

Rangeland Status Classification		Rangeland Health Classification	
Proportion of Involved Species (%)	Status Class	Soil Coverage Ratio (%)*	Health Class
76-100	Very good	>70	Healthy
51-75	Good	55-70	Risky
26-50	Medium	55	Problematic
0-25	Weak		

* Adapted according to the data obtained by Wheeled Ring Method

Soil samples were taken from 0-20 cm depths in the research area of rangeland lands and analyzes of the samples were carried out in the laboratory of Central Research Institute of Soil, Fertilizer and Water Resources. Sand, silt and clay ratios of the research area soils were determined between 3.0-55.5%, 12.3-66.8% and 21.6-72.2 respectively. Textures of rangeland observation points were classified and as a result it was determined that 1 point was sandy loam, 2 points were loam, 2 points were silt-loam, 3 points were silt-clay, 6 points were silt-clay-loamy, 9 points were clay-loam and 10 points were clay loam.

Results and Discussion

Status and Health of Rangeland

Rangeland status was identified as 'poor' in total 33 observed rangelands in Mardin province. When rangeland health classes were evaluated, 19 stations were problematic, 10 stations were risky and 4 stations were in healthy rangeland class. The plant-covered area ratio varied between 56.00% and 95.50%, average plant-covered area ratio was 71.35% and landless area ratio was 28.65% (Table 1). Rangeland status and health observations showed that rangelands are corrupted due to overuse and grazed at improper periods. Therefore, appropriate rangeland rehabilitation and management is needed for these rangelands.

In the previous studies in Turkey, rangeland area rate covered with plants was 60.55% in Ankara province (Unal et al., 2012a), 59.1% in Diyarbakir province (Seydosoglu et al., 2015a), 88.2% in Sinop province (Alay et al., 2016), 93.57% in Bartin province (Uzun et al., 2016). These results indicate that the plant-covered area of rangelands was changed significantly due to both regional conditions and utilization methods.

When species of rangelands classified in terms of quality grades, the proportion of decreaser, increaser and invader species were determined as 2.08% (5 rangeland), 3.15% (5 rangeland) and 94.77% (118 rangeland), respectively. The ratio of the important species to determine the value of rangeland in this province was 5.23% which puts these rangelands in 'weak' class.

Table 2. Soil coverage ratio (SCR) and botanical composition (BC) of decreaser and increaser species.

Species	Family	SCR (%)	BC (%)
		Decreaser	
Lolium perenne	Poaceae	0.95	1.34
Trifolium pratense	Fabaceae	0.12	0.17
Sanguisorba minor	Rosaceae	0.27	0.37
Onobrychis galegifolia	Fabaceae	0.09	0.13
Onobrychis kotschyana	Fabaceae	0.05	0.07
Total		1.48	2.08
		Increaser	
Poa bulbosa	Poaceae	1.85	2.59
Hordeum bulbosum	Poaceae	0.05	0.06
Coronilla scorpioides	Fabaceae	0.11	0.16
Stipa arabica	Poaceae	0.14	0.19
Teucrium polium	Lamiaceae	0.11	0.15
Total		2.26	3.15
General Sum		3.74	5.23

Table 3. Soil coverage ratio (SCR) and botanical composition (BC) of degreaser and increaser species.

Species	Familya	SCR	BC	Species	Family	SCR	BC
Biarum carduchorum	Araceae	0.17	0.23	*Carduus pycnocephalus*	Asteraceae	2.00	2.80
Achillea aleppica	Asteraceae	0.37	0.52	*Centaurea iberica*	Asteraceae	1.79	2.51
Anthemis cotula	Asteraceae	0.41	0.57	*Centaurea solstitialis*	Asteraceae	0.25	0.35
Anthemis wiedemanniana	Asteraceae	0.76	1.06	*Centaurea virgata*	Asteraceae	0.03	0.04
Bombycilaena erecta	Asteraceae	0.18	0.25	*Chardinia orientalis*	Asteraceae	0.31	0.44
Carduus nutans	Asteraceae	0.04	0.05	*Notobasis syriaca*	Asteraceae	0.61	0.85
Picnomon acarna	Asteraceae	0.26	0.36	*Rhagadiolus angulosus*	Asteraceae	0.11	0.16
Rhagadiolus stellatus	Asteraceae	0.09	0.13	*Onopordum carduchorum*	Asteraceae	0.16	0.22
Achillea pseudoaleppica	Asteraceae	0.06	0.08	*Crepis foetida*	Asteraceae	0.28	0.39
Crepis sancta	Asteraceae	1.64	2.30	*Crupina crupinastrum*	Asteraceae	0.10	0.14
Echinops orientalis	Asteraceae	0.77	1.08	*Senecio vernalis*	Asteraceae	1.43	2.01
Silybum marianum	Asteraceae	0.14	0.20	*Tripleurospermum parviflorum*	Asteraceae	0.14	0.19
Hedypnois cretica	Asteraceae	1.19	1.67	*Callipeltis cucullaria*	Asteraceae	0.02	0.02
Centaurea consanguinea	Asteraceae	0.15	0.21	*Anthemis pauciloba*	Asteraceae	0.09	0.13
Alkanna tinctoria	Boraginaceae	0.08	0.12	*Onosma albo-roseum*	Boraginaceae	0.27	0.38
Capsella bursa-pastoris	Brassicaceae	0.99	1.39	*Cardaria draba*	Brassicaceae	0.03	0.04
Hirschfeldia incana	Brassicaceae	1.40	1.96	*Sinapis arvensis*	Brassicaceae	0.22	0.31
Arabis montbretiana	Brassicaceae	0.06	0.08	*Paronychia latifolia*	Caryophyllaceae	0.08	0.12
Silene chaetodonta	Caryophyllaceae	0.02	0.03	*Minuartia picta*	Caryophyllaceae	0.27	0.38
Helianthemum ledifolium	Cistaceae	0.33	0.47	*Convolvulus lanatus*	Convolvulaceae	0.09	0.13
Erysimum repandum	Cruciferae	0.29	0.40	*Scabiosa calocephala*	Dipsacaceae	0.10	0.14
Astragalus hamosus	Fabaceae	1.73	2.43	*Astragalus microcephalus*	Fabaceae	0.53	0.74
Medicago polymorpha	Fabaceae	1.41	1.97	*Medicago radiata*	Fabaceae	0.61	0.86
Medicago rigidula	Fabaceae	3.86	5.42	*Onobrychis cornuta*	Fabaceae	0.15	0.21
Onobrychis crista-galli	Fabaceae	0.11	0.16	*Trifolium stellatum*	Fabaceae	3.33	4.66
Trifolium subterraneum	Fabaceae	0.77	1.08	*Trifolium tomentosum*	Fabaceae	0.36	0.50
Trigonella crassipes	Fabaceae	0.34	0.48	*Trigonella filipes*	Fabaceae	1.79	2.51
Trigonella monantha	Fabaceae	1.07	1.50	*Trigonella spruneriana*	Fabaceae	0.24	0.34
Astragalus asterias	Fabaceae	0.45	0.63	*Trifolium echinatum*	Fabaceae	0.26	0.36
Lens orientalis	Fabaceae	0.53	0.74	*Astragalus suberosus*	Fabaceae	0.03	0.04

Species	Familya	SCR	BC	Species	Family	SCR	BC
Hippocrepis unisiliquosa	Fabaceae	0.17	0.23	*Hymenocarpus circinnatus*	Fabaceae	0.04	0.05
Lathyrus cicera	Fabaceae	0.61	0.86	*Medicago minima*	Fabaceae	0.29	0.40
Medicago orbicularis	Fabaceae	0.09	0.13	*Trifolium campestre*	Fabaceae	0.84	1.18
Trifolium hirtum	Fabaceae	0.16	0.22	*Trifolium pilulare*	Fabaceae	0.67	0.93
Trifolium purpureum	Fabaceae	0.14	0.19	*Trifolium resupinatum*	Fabaceae	0.13	0.18
Trifolium scabrum	Fabaceae	1.85	2.59	*Trifolium spumosum*	Fabaceae	0.13	0.18
Vicia ervilia	Fabaceae	0.11	0.16	*Vicia peregrina*	Fabaceae	0.08	0.12
Vicia sativa	Fabaceae	0.23	0.32	*Vicia anatolica*	Fabaceae	0.09	0.13
Trifolium nigrescens	Fabaceae	2.93	4.11	*Trifolium bullatum*	Fabaceae	0.47	0.66
Lathyrus inconspicuus	Fabaceae	0.03	0.04	*Trigonella astroites*	Fabaceae	0.08	0.11
Lathyrus vinealis	Fabaceae	0.02	0.02	*Vicia lathyroides*	Fabaceae	0.27	0.37
Trifolium dasyurum	Fabaceae	1.23	1.72	*Trigonella smyrnea*	Fabaceae	0.42	0.58
Hypecoum imberbe	Fumariaceae	0.23	0.33	*Erodium moschatum*	Geraniaceae	0.12	0.17
Erodium cicutarium	Geraniaceae	1.62	2.27	*Geranium tuberosum*	Geraniaceae	0.18	0.25
Phlomis bruguieri	Lamiaceae	0.93	1.31	*Salvia multicaulis*	Lamiaceae	0.44	0.62
Salvia palestina	Lamiaceae	0.14	0.20	*Phlomis kurdica*	Lamiaceae	1.72	2.41
Linum mucronatum	Linaceae	0.32	0.45	*Malva nicaeensis*	Malvaceae	0.73	1.03
Plantago cretica	Plantaginaceae	0.09	0.13	*Plantago afra*	Plantaginaceae	0.10	0.14
Aegilops neglecta	Poaceae	1.16	1.62	*Aegilops triuncialis*	Poaceae	0.72	1.01
Avena sterilis	Poaceae	3.19	4.47	*Bromus lanceolatus*	Poaceae	0.13	0.18
Bromus rubens	Poaceae	0.58	0.82	*Bromus scoparius*	Poaceae	0.30	0.41
Bromus tectorum	Poaceae	2.78	3.90	*Valerianella vesicaria*	Valerianaceae	0.03	0.04
Alopecurus utriculatus	Poaceae	0.14	0.20	*Aegilops kotschyi*	Poaceae	0.23	0.32
Echinaria capitata	Poaceae	0.51	0.71	*Hordeum murinum*	Poaceae	1.38	1.93
Hordeum spontaneum	Poaceae	0.52	0.73	*Taeniatherum caput-medusae*	Poaceae	1.02	1.43
Trachynia distachya	Poaceae	0.16	0.22	*Heteranthelium piliferum*	Poaceae	0.31	0.44
Bromus rigidus	Poaceae	0.17	0.23	*Ranunculus dissectus*	Ranunculaceae	0.25	0.35
Adonis microcarpa	Ranunculaceae	0.05	0.06	*Ranunculus macrorhynchus*	Ranunculaceae	0.09	0.13
Parentucellia latifolia	Scrophulariaceae	0.05	0.06	*Eryngium campestre*	Umbelliferae	0.27	0.38
Scandix iberica	Umbelliferae	0.02	0.03	*Scandix stellata*	Umbelliferae	0.13	0.18
Torilis leptophylla	Umbelliferae	0.30	0.42	*Urtica pilulifera*	Urticaceae	0.07	0.10
Total						67.61	94.77

Plant Species

132 different species were identified during vegetation surveys. It was determined that 20 of the detected species (22.82%) were grasses, 46 species (40.66%) were leguminous and 66 species were members of other families (36.52%). In general, botanical composition of rangelands form a group expressed as "other family dominant rangeland" like mentioned as Comakli et al. (2012). Dominant leguminous species in the studied rangelands were *Trifolium dasyurum* (1.72%), *Trifolium nigrescens* (4.11%), *Trifolium stellatum* (4.66%), *Trigonella filipes* (2.51%), *Trigonella monantha* (1.50%), *Medicago rigidula* (5.42%), *Medicago polymorpha* (1.97%), *Astragalus hamosus* (2.43%), *Trifolium scabrum* (2.59%). While, *Aegilops neglecta* (1.62%), *Avena sterilis* (4.47%), *Bromus tectorum* (3.90%), *Hordeum murinum* (1.93%) and *Poa bulbosa* (%1.43) were dominant grasses (Table 3). Frequent encountered other family members were *Carduus pycnocephalus* (2.80%), *Centaurea iberica* (2.51%), *Crepis sancta* (2.30%), *Erodium cicutarium* (2.27%), *Hirschfeldia incana* (1.96%), *Senecio vernalis* (2.01%), *Phlomis kurdica* (2.41%) and *Hedypnois cretica* (%1.67).

The vast majority of the studied rangelands were occupied by invader species. In other studies conducted in different regions of Turkey, it was reported that invader species constitute the majority of rangeland vegetation (Erden et al., 1994; Aydin and Uzun, 2000; Sahinoglu, 2010; Uzun et al., 2010; Unal et al., 2011; Koc and Kadioglu, 2012; Unal et al., 2012a and 2012b; Yavuz et al., 2012; Unal et al., 2013; Unal et al., 2014; Seydosoglu et al., 2015a, 2015b and 2015c; Uzun et al., 2016; Alay et al., 2016; Ispirli et al., 2016).

The proportions of the decreasing species in botanical composition were *Sanguisorba minor* (0.27%), *Trifolium pratense* (0.12%), *Lolium perenne* (0.95%), *Onobrychis galegifolia* (0.90%) and *Onobrychis kotschyana* (0.05%); increaser species were *Coronilla scorpioides* (0.11%), *Hordeum bulbosum* (0.05%), *Poa bulbosa* (1.85%), *Stipa arabica* (0.14%) and *Teucrium polium* (0.11%) respectively. The most common invader species were *Avena sterilis* (3.19%), *Trifolium stellatum* (3.33%), *Medicago rigidula* (3.86%), *Trifolium nigrescens* (2.93%), *Bromus tectorum* (2.78%), *Carduus pycnocephalus* (2.00%) (Table 3). Especially the grass type invader species are found in most natural rangelands in Turkey (Unal et al., 2011; Unal et al., 2012a and 2012b; Yavuz et al., 2012; Unal et al., 2013; Unal et al., 2014; Seydosoglu et al., 2015a; Alay et al., 2016; Ispirli et al., 2016; Uzun et al., 2016).

Conclusion

The general rangeland status of Mardin province was determined as 'weak' where 19 rangelands were problematic, 10 rangelands were 'risky' and 4 rangelands were 'healthy' according to the rangeland health classification.

It is necessary to shift to appropriate grazing systems in 'weak' rangelands. Rangelands should be closed for grazing in the starting stage of these new grazing systems. At the same time, rehabilitation should be initiated both by seeding and weed struggle. Native decreasing grass and leguminous species should be preferred for re-seeding, these species might include *Lolium perenne*, *Trifolium pratense*, *Onobrychis galegifolia* and *Onobrychis kotschyana*. Changes in rangeland vegetation should be monitored and recorded. These studies should be supported by forage crops in separate areas. Cropping feeds in separate areas. Sustainable rangeland management methods should be carried out in later periods of management systems.

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