Floristic composition and plant cover in Yozgat rangelands, central Turkey

Dogrusoz M.C., Mut H., Basaran U., Gulumser E., Katlan E.

in

Kyriazopoulos A.P. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.), Sklavou P. (ed.). Ecosystem services and socio-economic benefits of Mediterranean grasslands

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 114

2016
pages 411-414

Floristic composition and plant cover in Yozgat rangelands, central Turkey

M. C. Dogrusoz, H. Mut, U. Basaran, E. Gulumser* and E. Katlan

Bozok University, Faculty of Agricultural and Natural Science, Department of Field Crops, Yozgat (Turkey)
*e-mail: erdem.gulumser@bozok.edu.tr

Abstract. This research was conducted to determine floristic compositions and plant cover area in four different rangelands of Yozgat province located in central Turkey. The observations and measurements were carried out in Koccagiz village of Sarikaya district, Taspinar village of Sorgun district, Hacilar and Kordeve district of Yerkoy in May 2014. Investigated rangelands are open to graze. Vegetation measurements sampling in rangelands were performed by using Loop method. Total 34 different plant species were determined in vegetation survey. Plant cover area in Koccagiz, Taspinar, Hacilar and Kordeve district was determined 60.6%, 66.5%, 55.0% and 44.9%, respectively. Over the rangelends, the ratio of legumes, grasses and other families in floristic composition respectively varied between 6.4 and 22.0%, 41.0 and 79.1%, 14.5 and 49.1%. In addition the ratio of decreaser, increaser and invader plant in floristic composition varied from 2.9 to 18.2%, 41.0 to 65.4%, 16.4 – 55.0%, respectively in the investigated rangelands. Koccagiz rangeland was in poor class, other rangelands were in medium class.

Keywords. Floristic composition – Plant covered area – Rangeland – Turkey.

Détermination de la composition botanique et de la surface couverte de plantes dans certaines terres de pâturage à Yozgat, centre de la Turquie

Résumé. *Cette recherche a été menée pour déterminer les compositions botaniques et la surface couverte de plantes en quatre différents pâturages de Yozgat. Cette étude a été réalisée dans le village de Koccagiz à Sarikaya, le village de Taspinar à Sorgun, et les villages Hacilar et Kordeve à Yerkoy en mai 2014. Les pâturages étudiés sont ouverts à brouter. Les mesures de la végétation dans les pâturages ont été effectuées en utilisant la méthode Loop. Un total de 34 espèces de plantes différentes ont été déterminées dans l' étude de la végétation. On a déterminé que les surfaces couvertes de plantes aux villages de Koccagiz, de Taspinar, de Hacilar et de Kordeve étaient de 60,6%, 66,5%, 55,0% et 44,9% respectivement. Les ratios des légumineuses, des graminées et des autres familles dans la composition botanique ont varié entre 6,4 et 22,0%, 41,0 et 79,1%, 14,5 et 49,1%, respectivement, dans les pâturages étudiés. Les pourcentages de plantes « increasers », « decreasers », et envahissantes variaient de 2,9 à 18,2%, de 41,0 à 65,4%, de 16,4 à 55,0%, respectivement. Le pâturage de Koccagiz était en classe faible, d'autres pâturages étaient dans la classe moyenne.*

Mots clés. *Composition botanique – Surface couverte de plantes – Pâturage – Turquie.*

I – Introduction

Grasslands are important as a feed source for livestock (Aydin and Uzun, 2002), as a habitat for wildlife, for environmental protection and for the *in situ* conservation of plant genetic resources (Acikgoz, 2001). It is well known that the grasslands in Turkey have lost productivity and also their quality due to long-term overgrazing; therefore urgent rehabilitation is needed. For this purpose, floristic composition and plant-covered area of pastures should be known. In fact, improving process includes two steps; firstly to determine qualitative and quantitative characters of grassland and secondly, application of rehabilitation methods and then monitoring its effect (Cerit and Altin, 1999).

In earlier studies conducted in different regions of Turkey, plant covered area was 11.1% consisting of 14% legumes, 38.9% grasses and 47.1% others (Alan and Ekiz, 2001). Similarly, ratio of legumes, grasses and other families were 14.36%, 34.17% and 51.47% respectively in

Bartin pastures (Sengonul *et al*., 2009). In Cankiri pastures plant covered area was 65.19% (Unal *et al*., 2012). Cinar *et al*. (2014), reported that plant covered area in a rangeland of Hatay including 41 different species was between 84.4 and 99.0%, and the ratio of legumes, grasses and other families varied from 8.9 to 22.1%, from 48.8 to 58.6% and from 25.6 to 45.0% respectively.

In Yozgat Province there is need to improve feed source for economical animal production. For this reason, it is necessary to improve the pasture yield and quality with suitable improvement methods and appropriate management, as the forage needs for animals are largely covered from pastures. The present study was conducted on four pastures located in Yozgat, Turkey, with the aim of determining plant covered area and floristic composition, thereby shedding light to future rehabilitation studies on these rangelands.

II – Materials and methods

This study was conducted to determine floristic composition and plant covered area of four different rangelands of Yozgat Province in May 2014. These rangelands are grazed uncontrolled during the year and are located in the villages of Koccagiz village (Sarikaya district), Taspinar (Sorgun district), Hacilar and Kordeve (Yerkoy). Vegetation measurements were performed by using Loop Method. Loop measurements were made throughout four directions from center (Sen, 2010) in each rangeland. The ratio of each family in floristic composition was determined by dividing the number of plants belonging to that family to the total number of plants. For plant covered area, the number of the points of interception with the plant species was divided to the number of total measurement points. Rangeland classification was determined according to Bakir (1987) based on the proportions of ground cover of species and their distribution patterns. Range plants are grouped as follows: (i) decreasers: highly productive and palatable species that will decrease on a range when exposed to heavy grazing pressures; (ii) increasers: these species are native plants but they increase in site and number to take the place of decreasers that have been weakened or reduced because of heavy grazing or other range abuse. The increaser plants are normally shorter, lower producing and less palatable to livestock; and (iii) invaders; these are plants that invade and replace the plants that have been reduced or become seriously weakened. They may be annuals, perennials, or shrubs and have little or no grazing value (Wroe *et al*., 2016).

III – Results and discussion

At the end of this study, 34 different species were determined, and plant covered area ranged from 44.9 to 66.5% in the rangelands of Yozgat.

Koccagiz rangeland included 16 different species and was determined in poor class with 60.6% plant covered area (legumes 9.9 %, grasses 41 % and other family plants species 49.1%) (Table 1). Percentage of decreaser plants in Koccagiz was 4%, increaser plants were 41%, and invader plant was 55%. *Bromus tectorum*, *Satureja parnassica* and *Thymus praecox* (36.0%) were dominant species in this rangeland.

Twenty different species were determined in Taspinar rangeland, and plant covered area in this rangeland was 66.5%. Percentage of legumes, grasses and other family plants in the total plant covered area was 19.1, 58.3 and 22.6%, respectively.Ratio of decreaser plants was 6.0%, increaser plants (*Festuca ovina*) 60.4 % and invader plants (*Thymus praecox*) 33.6 %. Rangeland of Taspinar was in medium class (29.5%) (Table 1). In Hacilar rangeland plant covered area 55.0 % with a ratio of legumes (6.4%), grasses (79.1%) and other family plants species (14.5%). Percentage of decreaser plant was 18.2%, increaser plants was 65.4% and invader plant was 16.4% and, dominant species in Haciar were *Festuca ovina*, *Dactylis glomerata* and *Elymus hispidus*. Hacilar Rangeland was in poor class (42.7%) (Table 1).

Table 1. Determined plant species and percentage of plants in experimental lands

Species	Koccagiz		Taspinar		Hacilar		Kordeve	
	PCA	FC	PCA	FC	PCA	FC	PCA	FC
Legumes								
Astragalus angustifolius	-	-	1.5	2.3	-	-	-	-
Astragalus argaeus	2.3	3.8	0.8	1.2	-	-	-	-
Astragalus bicolor	0.8	1.3	3.8	5.7	-	-	1.3	2.9
Astragalus lineatus	0.5	0.8	-	-	0.5	0.9	2.3	5.1
Coronilla varia	-	-	0.8	1.2	1.5	2.7	1.0	2.2
Medicago minima	-	-	3.8	5.7	1.0	1.8	4.0	8.9
Onobrychis cana	2.4	4.0	2.0	3.0	0.5	0.9	1.3	2.9
Total Legumes	***6.0***	***9.9***	***12.7***	***19.1***	***3.5***	***6.4***	***9.9***	***22.0***
Grasses								
Bromus tectorum	21.8	36.0	4.3	6.5	3.5	6.4	19.7	43.9
Cynodon dactylon	-	-	-	-	11.0	20.0	2.3	5.1
Dactylis glomerata	-	-	-	-	0.5	0.9	-	-
Elymus hispidus	-	-	-	-	8.5	15.5	-	-
Festuca ovina	3.0	5.0	34.5	51.9	19.0	34.5	0.7	1.6
Poa bulbosa	-	-	-	-	0.5	0.9	-	-
Stipa holosericea	-	-	-	-	0.5	0.9	3.0	6.7
Total Grasses	***24.8***	***41.0***	***38.8***	***58.3***	***43.5***	***79.1***	***25.7***	***57.3***
Other Family Plants								
Adonis aestivalis	-	-	0.5	0.8	-	-	0.3	0.7
Allium atroviolaceum	-	-	-	-	0.5	0.9	1.3	2.9
Anthemis austriaca	0.5	0.8	0.3	0.5	2.0	3.6	-	-
Artemisia splendens	2.3	3.8	0.3	0.5	-	-	0.7	1.6
Carduus nutans	0.8	1.3	-	-	-	-	-	-
Convolvus betonicifolius							0.3	0.7
Eryginum campestre	0.5	0.8	0.5	0.8	1.0	1.8	1.0	2.2
Euphorbia sp.	-	-	0.5	0.8	-	-	-	-
Helianthemum nummularium	-	-	2.3	3.5	-	-	3.7	8.2
Noanea mucronata	0.8	1.3	-	-	-	-	-	-
Phlomis sieheana	3.3	5.4	-	-	3.0	5.5	-	-
Plantago maritima	-	-	0.5	0.8	-	-	1.3	2.9
Potentilla recta	-	-	0.5	0.8	-	-	-	-
Sanguisorba minor	-	-	2.0	3.0	0.5	0.9	-	-
Satureja parnassica	10.3	17.0	0.5	0.8	-	-	-	-
Scorzonera hieraciifolia	-	-	0.3	0.5	-	-	-	-
Scutellaria orientalis	1.5	2.5	-	-	-	-	-	-
Taraxacum officinalis	-	-	-	-	1.0	1.8	0.7	1.6
Thymus praecox	8.8	14.5	6.8	10.2	-	-	-	-
Verbascum lasianthum	1.0	1.7	-	-	-	-	-	-
Total Other Family Plants	***29.8***	***49.1***	***15.0***	***22.6***	***8.0***	***14.5***	***9.3***	***20.7***
Plant Covered Area	***60.6***		***66.5***		***55.0***		***44.9***	

PCA: Plant Covered Area (%), **FC**: Floristic composition (%).

Kordeve rangeland was classified as medium (36.4) (Table 1) with a total of 17 different species and 44.9% of plant covered area. The ratioa of legumes, grasses and other family plants in the total plant covered area were 22.0, 57.3 and 2.7%, respectively. Percentages of decreaser

plants, increaser plants (*Bromus tectorum*), and invader plants (*Medicago minima*), were 2.9%, 62.4% and 34.7% respectively.

In three rangelands (Taspinar, Hacilar Kordeve), grasses have the highest portion in floristic composition, and then comes other families and legumes. However, in Koccagız, other family plants were dominant in the vegetation and grasses and legumes were lesser; therefore, it was classified as a poor rangeland. Our findings are consistent with earlier studies showing that grass species are generally dominant in rangelands (Gokkus *et al.* 1993; Koc and Gokkus, 1994; Kendir, 1999; Ipek Gergin, 2001; Oner, 2006; Babalik, 2008; Mut, 2009; Sen, 2010; Tasdemir, 2015). In most areas in Turkey, grasses which were generally invader plants are the dominant species in the climax plant community of rangelands (Oztas *et al*., 2003).

IV – Conclusions

The results of this study indicated that the rangelands around Yozgat Province are under overgrazing pressure. Consequently, in these rangelands suitable improvement methods and management principles should be implemented.

References

Acıkgoz E., 2001. Forage Crops. Uludag University Pub. (3. press). 58: 584 p, Bursa, Turkey.

Alan M., and Ekiz H., 2001. Study of Vegetation in Bala (Ankara) Rangelands. In: *Journal Agriculture Science*, *University of Ankara,* 7(4), p. 62-69.

Aydin I., and Uzun F., 2002. Rangeland Management and Improvement. In: *Journal of Agriculture Science, Ondokuz Mayıs University,* No: 9.

Babalik A.A., 2008. Relationship of Vegetation Structure with Soil Features and Topographic Factors in Isparta. (PhD Thesis). Instute of Science, Suleyman Demirel University, 164 p.

Bakir O., 1987. Rangeland Management. *Journal of Agriculture Science, University of Ankara,* (292), 362 p.

Cerit T., and Altın M., 1999. Vegetation and Some Ecological Features in Tekirdag Grassland. The 3rd Congress on Field Crops, Turkey.

Cınar S., Hatipoglu R., Avcı M., Inal I., Yücel C., and Avag A., 2014. Research of vegetation of a rangeland in Kırıkhan District of Province Hatay. *Journal of the Agricultural Faculty of Gaziosmanpasa University*, 31(2), p. 52-60 p.

Gokkus A., Avcı M., Aydın A., Mermer A., and Ulutas Z., 1993. Effect of height, slope and vector on grassland vegetation, Republic of Turkey Ministry of Food, Agriculture and Livestock. *Journal of the Eastern Anatolia Agricultural Research Institute*, (13). Erzurum.

Ipek Gergin M. S., 2001. Research Hay Yield, Quality and Floristic Composition Grassland Caypinar Vilage of Province Mardin (Master Thesis). Institute of Science, Harran University, 42 p.

Kendir H., 1999. Vegetation, Hay yield and Rangeland Structures on Natural Grassland of Province Ankara. In: *Journal of Agriculture Faculty, Ankara University,* 5 (1), p. 104-110.

Koc A., and Gokkus A., 1994. Determination of Botanical Composition, Plant Covered Area and Plant of Straw Heigh. In: *Journal of Turkish Agriculture and Forestry*, 18 (6).

Mut H., 2009. Determination of Effectiveness of Different Improvement Methods on a Plowed and Abondoned Pature. (PhD Thesis) Ondokuz Mayis University Institute of Science, 148 p.

Oztas T., Koc A., and Comakli B., 2003. Changes in vegetation and soil properties along a slope on overgrazed and roded rangelands. *Journal of Arid Environments*, 55, p. 93-100.

Sen C., 2010. Research on the Vegetation Structures of the Rangelands ın some Villages of Province Kilis (Master thesis) University of Cukurova, Instute of Science. 96 p.

Sengonul K., Kara O., Palta S., and Sensoy H., 2009. Determination of some Qualitative Traits and Ecological Structure on Grasslands of Uluyayla Vilage, Province of Bartin. *Journal of Forest Faculty*, 11 (16), p. 81-94p.

Tasdemir V., 2015. Research on the Hay Yield and Floristic Composition of a Rangeland in Bahcecik Village, Karakocan-Elazığ (Master Thesis). Institute of Science Bingol University,107p.

Unal S., Mutlu Z., Mermer A., Urla O., Unal E., Ozaydın K. A., Avag A., Yıldız H., Aydogmus O., Sahın B., and Aslan S., 2012. Determination of Rangelands Status and Health. In: *Journal Agriculture Research Science*, 5 (2), p. 131-135.

Wroe R.A., Smoliak S., and Wheeler G.W., 2016. Alberta Range Plants and Their Classification. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex146/$file/3400600.pdf?OpenElement (available : 20.01.2016).