

VEGETATION FEATURES OF ALPINE AND SUBALPINE RANGELANDS IN EASTERN BLACK SEA REGION

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Abstract

This current study was conducted by using modified wheel point method to determine the features of the vegetation of alpine and subalpine rangelands in Giresun province located in Eastern Black Sea Region of Turkey. Plant covered ratios were detected from 33.0 % to 100.00 %. Botanical composition rates of families were determined between 3.71-45.81 % for legumes, 4.59-86.00% for grasses and 8.00-84.13% for other plant species in rangelands. During the vegetation surveys, a total of 148 different species were identified including 25 legumes, 32 grasses, and 91 belonging to other families. In addition, 23 of identified species were classified as decreasing species, 14 of them were classified as increasing species and 111 of them were classified as invasive species. Rangelands in the study area were categorized as healthy-risky rangeland according to range health classification and moderate-poor rangeland according to range condition classification. From the Giresun rangelands, a part, representing 47.17% has been grazed intensively, 35.85% moderately, 9.43% lightly and 7.55% weren't grazed. Research results showed that grazing pressure must be decreased by regulating the grazing systems for Eastern Black Sea Region to improve rangeland quality.

Key words: rangeland vegetation, grazing intensity, range health, range condition.

INTRODUCTION

The grasslands are high-quality forage source for ruminants and natural life areas for wild animals worldwide. Stockbreeding is very important for many countries and mainly depends on rangelands (Ünal et al., 2014). Unfortunately, rangelands in Turkey have been destroyed within the last 70 years, decreasing from 45 million hectares to 14.6 million hectares (Anonymous, 2015). Giresun rangelands (97.9 thousand hectares) in Eastern Black Sea Region are located in alpine and subalpine zones. The remaining rangelands have been overgrazed beyond their capacities, contrary to management rules (Ayan et al., 2007).

Grazing frequency affects botanical composition and productivity of rangeland vegetation (Kadziulis and Kadziulienė, 2006). Thus, a large proportion of rangelands need urgent improvement plans. However, the success of improvement programmes directly related to the vegetation features of rangelands. Forage production is dependent on the management of the rangelands (Rashid and

Abbas, 2011). The vegetation features of rangelands are one of the most important factors in the choice of the improvement program or the grazing system.

The aim of this study was to identify some of the vegetation characteristics of the grasslands in Giresun province, to contribute to the accumulation of knowledge required for future possible improvement programmes.

MATERIALS AND METHODS

In this study, vegetation surveys were carried out by using modified wheel point method at 53 sites (Koç and Çakal, 2004) to determine the features of the vegetation of alpine and subalpine rangelands in Giresun province located in Eastern Black Sea Region of Turkey. This vegetation study was conducted at the flowering period of the plants. Characteristics of rangeland surface such as slope, vector, aspect and altitude were considered. Determining of the cover ratio of the vegetation on the rangeland was based on the study of

Gökkuş et al. (2000), and determining the range health and condition was based on the study of Koç et al. (2003).

RESULTS AND DISCUSSIONS

Plant covered ratios in the rangelands ranged between 33.0 and 100 %. Decreaser species rates in botanical composition varied between 0.0 to 50.95 %, increaser species rates in botanical composition varied between 0.0 % to 52.60 %, and the rates of the invaders species varied between 35.06 to 100 %. In the determined botanical composition rates of families, between 3.71 and 45.81 % belong to legumes, 4.59 to 86.00 % belong to grasses, and 8.00 to 84.13 % belong to other families in rangelands (Table 1).

According to the average value, plant covered rate in rangelands was 71.08 %. The average ratio of the decreaser species in the botanical composition was calculated as 16.24 %, ratio of the increaser species as 15.9%, and ratio of the invaders species as 67.86 %. Average rates of legumes, grasses and other families in the botanical composition were found as 20.74 %, 33.34 % and 45.92 %, respectively. Rangelands in the study area were categorized as healthy-risky rangeland according to range health classification and moderate-poor rangeland according to range condition classification (Table 1).

It was determined that there were no grazing in 4 points, light grazing in 5 points, moderate grazing in 19 points and intensive grazing in 25

points in Giresun rangelands (Table 1). In these rangelands, a part, representing 47.17 % has been grazed intensively, 35.85 % moderately, 9.43 % lightly, and 7.55 % weren't grazed. Thus, it can be said that most of the rangelands were exposed to intensive grazing (Figure 1).

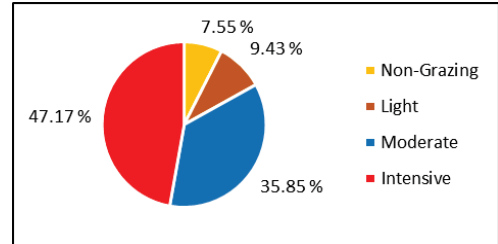


Figure 1. Grazing intensity in Giresun rangelands

Totally, 148 species were identified and these species were classified according to family they belong: 25 of them were legume, 32 were grasses and 91 belong to other families. Also, 23 species were classified as decreaser, 14 of them were increaser and 111 were invaders species (Figure 2).

The vegetation surveys reveal that the ratios of species from legumes, grasses, and other families of identified species were 16.89 %, 21.62 % and 61.49 %, respectively. Among the identified species, 15.54 % of species were found as decreaser, 9.46 % as increaser, 75.00 % as invaders (Figure 2).

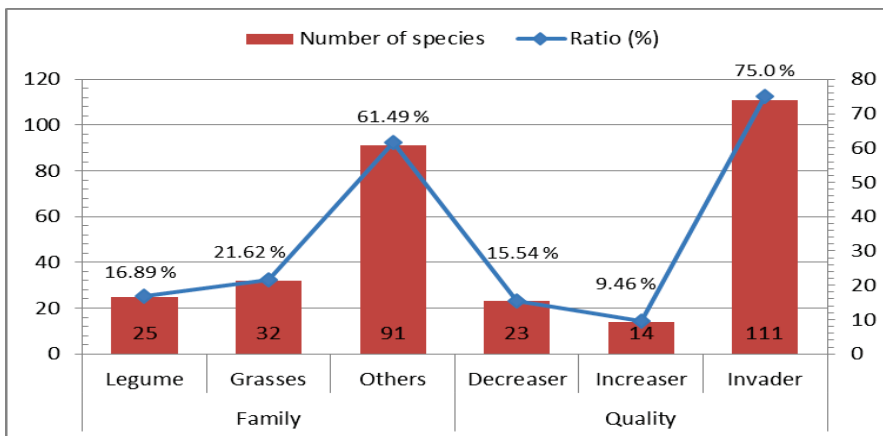


Figure 2. The identified species according to families and quality (number, %)

Table 1. Some features of the rangeland vegetation of Giresun province

| District | Village | *PCR (%) | RDBC (%) | RIBC (%) | RINBC (%) | RLBC (%) | RGBC (%) | ROBC (%) | Grazing Intensity | Range Health | Range Condition |
|----------------|-------------|----------|----------|----------|-----------|----------|----------|----------|-------------------|--------------|-----------------|
| Alucra | Arda | 64.00 | 34.37 | 18.76 | 46.87 | 15.63 | 46.88 | 37.49 | Moderate | Risky | Good |
| Alucra | Hacıhasan | 57.00 | 23.68 | 15.80 | 60.52 | 43.86 | 14.92 | 41.22 | Intensive | Risky | Moderate |
| Alucra | Yeşilyurt | 45.00 | 20.00 | 22.23 | 57.77 | 24.45 | 24.45 | 51.10 | Intensive | Problem | Moderate |
| Alucra | Yeşilyurt | 62.00 | 16.12 | 35.50 | 48.38 | 16.13 | 46.78 | 37.09 | Intensive | Risky | Moderate |
| Alucra | Konaklı | 56.00 | 5.35 | 10.73 | 83.92 | 10.72 | 21.43 | 67.85 | Intensive | Risky | Poor |
| Alucra | Demirözü | 75.75 | 7.59 | 23.77 | 68.64 | 22.12 | 34.33 | 43.55 | Intensive | Healthy | Moderate |
| Alucra | Beylerce | 79.75 | 6.26 | 16.32 | 77.42 | 21.32 | 22.58 | 56.10 | Light | Healthy | Poor |
| Alucra | Kavaklıdere | 59.50 | 21.84 | 10.10 | 68.06 | 18.49 | 31.94 | 49.57 | Moderate | Risky | Moderate |
| Alucra | Suyurdu | 54.50 | 14.67 | 13.78 | 71.55 | 11.93 | 29.36 | 58.71 | No grazing | Problem | Moderate |
| Alucra | Aktepe | 65.00 | 6.15 | 0.0 | 93.85 | 27.70 | 16.93 | 55.37 | No grazing | Risky | Poor |
| Alucra | Bereketli | 77.50 | 3.87 | 0.0 | 96.13 | 32.26 | 29.68 | 38.06 | Intensive | Healthy | Poor |
| Alucra | Çakrak | 81.00 | 3.70 | 0.0 | 96.30 | 3.71 | 16.05 | 80.24 | Light | Healthy | Poor |
| Alucra | Tohumluk | 81.00 | 3.70 | 0.0 | 96.30 | 3.71 | 16.05 | 80.24 | Moderate | Healthy | Poor |
| Alucra | Tohumluk | 82.00 | 4.87 | 23.18 | 71.95 | 25.61 | 36.59 | 37.80 | Light | Healthy | Poor |
| Alucra | Elmacık | 81.00 | 3.70 | 0.0 | 96.30 | 3.71 | 16.05 | 80.24 | Moderate | Healthy | Poor |
| Bulancak | Tokmaden | 100.00 | 0.0 | 20.00 | 80.00 | 4.00 | 66.00 | 30.00 | Moderate | Healthy | Poor |
| Çamoluk | Peliteli | 74.50 | 32.88 | 16.12 | 51.00 | 33.56 | 29.54 | 36.90 | Moderate | Healthy | Moderate |
| Çamoluk | Yenice | 76.00 | 13.15 | 30.28 | 56.57 | 25.00 | 35.53 | 39.47 | Moderate | Healthy | Moderate |
| Çamoluk | Karadikmen | 65.50 | 4.58 | 0.0 | 95.42 | 45.81 | 4.59 | 49.60 | Moderate | Risky | Poor |
| Çamoluk | Kayacak | 62.00 | 38.70 | 9.69 | 51.61 | 19.36 | 40.33 | 40.31 | Moderate | Risky | Moderate |
| Çamoluk | Yeniköy | 37.00 | 21.62 | 18.93 | 59.45 | 10.82 | 37.84 | 51.34 | Moderate | Problem | Moderate |
| Çamoluk | Haşdemir | 65.50 | 4.58 | 0.0 | 95.42 | 45.81 | 4.59 | 49.60 | Intensive | Risky | Poor |
| Çamoluk | T.Ahmetoğlu | 51.50 | 19.41 | 3.90 | 76.69 | 21.36 | 13.60 | 65.04 | Intensive | Problem | Poor |
| Dereli | Kümbet | 91.25 | 34.24 | 23.03 | 42.73 | 41.37 | 24.66 | 33.97 | Moderate | Healthy | Moderate |
| Dereli | Tamdere | 100.00 | 2.00 | 36.00 | 62.00 | 6.00 | 86.00 | 8.00 | No grazing | Healthy | Poor |
| Dereli | Tamdere | 77.00 | 23.37 | 16.89 | 59.74 | 28.58 | 36.37 | 35.05 | Moderate | Healthy | Moderate |
| Dereli | Kızıлтаş | 84.00 | 19.04 | 21.44 | 59.52 | 21.43 | 60.72 | 17.85 | Intensive | Healthy | Moderate |
| Dereli | Aksuk | 83.00 | 19.27 | 24.11 | 56.62 | 16.87 | 53.02 | 30.11 | Intensive | Healthy | Moderate |
| Dereli | Güzyurdu | 92.00 | 0.00 | 30.44 | 69.56 | 17.40 | 60.87 | 21.73 | Moderate | Healthy | Poor |
| Dereli | Güzyurdu | 100.00 | 0.00 | 20.00 | 80.00 | 4.00 | 66.00 | 30.00 | Moderate | Healthy | Poor |
| Şebinkarahisar | Ahrıcık | 67.50 | 0.00 | 52.60 | 47.40 | 14.45 | 52.97 | 32.58 | Intensive | Risky | Moderate |
| Şebinkarahisar | Hocaoğlu | 57.75 | 24.24 | 15.59 | 60.17 | 30.74 | 34.64 | 34.62 | Intensive | Risky | Moderate |
| Şebinkarahisar | Ovacık | 78.75 | 26.66 | 34.30 | 39.04 | 30.48 | 43.18 | 26.34 | Intensive | Healthy | Moderate |
| Şebinkarahisar | Evcili | 74.00 | 12.16 | 31.09 | 56.75 | 18.92 | 37.84 | 43.24 | Moderate | Healthy | Moderate |
| Şebinkarahisar | Evcili | 77.00 | 19.48 | 14.29 | 66.23 | 16.89 | 23.38 | 59.73 | Intensive | Healthy | Moderate |
| Şebinkarahisar | Dereköy | 67.75 | 0.0 | 12.92 | 87.08 | 4.43 | 11.44 | 84.13 | Moderate | Risky | Poor |
| Şebinkarahisar | Arsınsah | 94.00 | 0.0 | 14.90 | 85.10 | 6.39 | 21.28 | 72.33 | Intensive | Healthy | Poor |
| Şebinkarahisar | Evcili | 80.00 | 16.25 | 17.50 | 66.25 | 22.50 | 33.75 | 43.75 | Intensive | Healthy | Moderate |
| Şebinkarahisar | Şaplıca | 66.00 | 21.21 | 4.55 | 74.24 | 34.85 | 9.10 | 56.05 | Intensive | Risky | Poor |
| Şebinkarahisar | Bayhasan | 33.00 | 9.09 | 9.10 | 81.81 | 24.25 | 15.16 | 60.59 | Intensive | Problem | Poor |
| Şebinkarahisar | Duman | 62.50 | 12.80 | 14.40 | 72.80 | 11.20 | 36.80 | 52.00 | Intensive | Risky | Moderate |
| Şebinkarahisar | Ekecek | 46.00 | 28.26 | 13.05 | 58.69 | 30.44 | 17.40 | 52.16 | Moderate | Problem | Moderate |
| Şebinkarahisar | Ozanlı | 68.00 | 20.58 | 5.90 | 73.52 | 14.71 | 19.12 | 66.17 | Intensive | Risky | Moderate |
| Şebinkarahisar | Gündoğdu | 71.00 | 45.07 | 19.72 | 35.21 | 28.17 | 39.44 | 32.39 | Moderate | Healthy | Good |
| Şebinkarahisar | Tekkaya | 60.00 | 43.33 | 3.34 | 53.33 | 13.34 | 43.34 | 43.32 | Moderate | Risky | Moderate |
| Şebinkarahisar | Ocaктаşı | 79.00 | 13.92 | 20.26 | 65.82 | 25.32 | 43.04 | 31.64 | Intensive | Healthy | Moderate |
| Şebinkarahisar | Yeniyoğ | 78.50 | 50.95 | 7.65 | 41.40 | 31.85 | 29.30 | 38.85 | Intensive | Healthy | Good |
| Şebinkarahisar | Sarıyer | 73.00 | 28.76 | 12.34 | 58.90 | 17.81 | 30.14 | 52.05 | Light | Healthy | Moderate |
| Şebinkarahisar | Yırtarıç | 70.50 | 35.46 | 2.84 | 61.70 | 11.35 | 29.79 | 58.86 | Intensive | Risky | Moderate |
| Şebinkarahisar | Gökçetaş | 51.00 | 0.0 | 0.0 | 100.00 | 19.61 | 27.46 | 52.93 | No grazing | Problem | Poor |
| Yağlıdere | Akpınar | 77.50 | 15.48 | 11.62 | 72.90 | 23.23 | 43.88 | 32.89 | Intensive | Healthy | Moderate |
| Yağlıdere | Akpınar | 77.50 | 15.48 | 11.62 | 72.90 | 23.23 | 43.88 | 32.89 | Moderate | Healthy | Moderate |
| Yavuzkema | Tamdere | 77.00 | 12.98 | 51.96 | 35.06 | 22.08 | 57.15 | 20.77 | Intensive | Healthy | Moderate |
| Average | | 71.08 | 16.24 | 15.9 | 67.86 | 20.74 | 33.34 | 45.92 | | | |

*PCR: Plant covered ratio, RDBC: Ratio of deceiver in the botanical composition, RIBC: Ratio of increaser in the botanical composition, RINBC: Ratio of invaders in the botanical composition, RLBC: Ratio of legume family in the botanical composition, RGBC: Ratio of grasses family in the botanical composition, ROBC: Ratio of other families in the botanical composition

CONCLUSIONS

According to results, the rangelands in Giresun were classified as healthy-risky rangeland according to range health classification and as moderate-poor rangeland by range condition classification. A large part of rangelands has been grazing intensively with forcing their capacity. Results obtained from Giresun rangelands have suggested that grazing

pressure must be decreased by controlling grazing in Eastern Black Sea Region to improve rangeland quality.

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REFERENCES

- Anonymous, 2015. Crop Production Statistics. Turkish Statistical Institute, (www.tuik.gov.tr, 05.05.2015).
- Ayan İ., Mut H., Acar Z., Başaran U., Töngel M.Ö., Aşçı Ö., 2007. Soil characters, botanical composition and some problems of lowland pastures in coastal region of Samsun province. VII. Turkey Field Crops Congress, June25-27, Erzurum, p. 54-57.
- Gökkuş A., Koç A., Çomaklı B., 2000. Grassland Practical Guide. Atatürk University, Faculty of Agriculture publications, publication number:142, Erzurum, Turkey, 139 pages.
- Kadziulis L., Kadziuliene Z., 2006. Seasonal changes in biomass and composition of legume based swards under moderate and extensive grazing. In: Lloveras, J., González-Rodríguez, A., Vázquez-Yañez, O., Piñeiro, J., Santamaría, O., Olea, L. and Poblaciones, M.J. (Eds.), Sustainable grassland productivity: Proceedings of the 21st General Meeting of the European Grassland Federation, Badajoz, Spain, 3-6 April, p., 191-193.
- Koç A., Çakal Ş., 2004. Comparison of some rangeland canopy coverage methods. Int. Soil Cong. On Natural Resource Manage. For Sust. Develop., June 7-10, 2004, Erzurum, Turkey, 41-45.
- Koç A., Gökkuş A., Altın M., 2003. Comparison of the world-widely used methods in definition of range condition and a suggestion for Turkey. VII. Turkey Field Crops Congress, October 13-17, Diyarbakır, Turkey, p. 36-42.
- Rashid M., Abbas S.H., 2011. Pasture management in high altitude Phasti valley of Chitral. Pakistan Journal of Weed Science Research, 17(4), 351-36.
- Ünal Ü., Mermer A., Yıldız H., 2014. Assessment of rangeland vegetation condition from time series. Journal of Field Crops Central Research Institute, 23 (1): 14-21.