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RESEARCH ARTICLE

Evaluation of Early Spring Grazing on Meadow in Erzurum, Turkey

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ABSTRACT

This study was conducted in irrigated meadow with deep water table level in 2014 in Erzurum, Narman, Demirdag, and aimed to evaluate the effects of early spring grazing on meadows. Soil properties and dry matter yield and some quality parameters such as dry hay yield, crude protein, ADF, NDF and crude ash rates were assessed in meadow. Average dry matter yield was lover in spring grazed site than that of the ungrazed meadow site. Crude protein content was determined as 8.25%, 8.35% in grazed and ungrazed meadow sites, respectively. In spring grazed site ADF and NDF ratio were lower than that of the ungrazed one (36.95%, 36.72%; 55.98%, 56.82%). In grazed meadow site digestible dry matter ratio (60.29%) was lower than that of the ungrazed site (61.40%). Based on the results of the study, it is important to prevent of spring grazing in meadows for increasing of dry matter yield and forage quality.

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Introduction

Animal production is an important agricultural activity in Turkey and in addition to rangelands forage crop production areas meadows is one of the main food sources for livestock in winter periods because the high quality roughage need of livestock in long winter periods is mainly obtained from natural meadows. Our country has 1 449 313 ha of meadow area and the dry forage production is approximately 4 347 939 ton per year from this area (Topcu and Ozkan, 2017).

Meadows are mainly managed to produce dry hay for livestock needed the winter period by individual owners. Also, meadows are grazed in early spring or late summer after harvesting. Although, this practice is providing food for animals, grazing of meadows in early spring periods leads to decrease in yield and forage quality. Unlike the spring grazing, it is expressed that there is no negative effect of late fall grazing on yield and forage quality of meadows after harvest (Gokkus, 1989). In Eastern region due to the vegetation period is pretty short and forage plants dries early, meadows can be an important feed sources for animal in the fall period (Altin et al., 2005).

The aims of this study to evaluate the effects of spring grazing on yield and forage quality of irrigated meadows.

Materials and Methods

This study was carry out in irrigated meadow with deep water table level in 2014 in Erzurum, Narman, Demirdag. The enclosed meadow area was fenced in the early spring of the year 2014 to protect animal grazing. Meadow irrigated three times along the year and fertilized with animal manure at doses 1 ton ha^{-1}. The experiment was designed in a randomized complete block design, replicated three times. The size of grazing plots was 1 da for grazing treatments, 300 m^2 for enclosure treatment.

Grazing treatment plots freely grazed by cattle from the early spring, middle of April to the first week of May. It was about 15-20 days period, traditionally practiced in meadows of the region.

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Figure 1. A meadow in Eastern Region of Turkey

Figure 2. Fencing of meadow to protect animal grazing in early spring

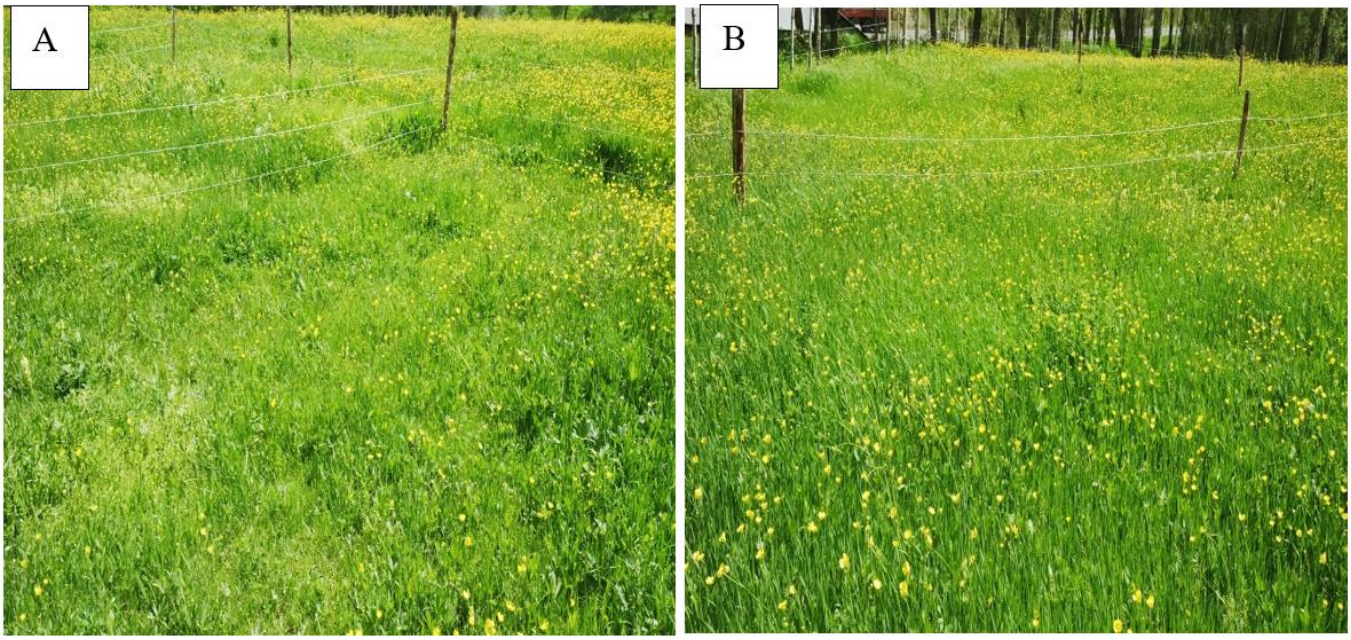

Figure 3. Grazed meadow site in spring time (A) and ungrazed meadow site (B)

Dominant plant species were Buttercup (*Ranunculus sp*), meadow fescue (*Festuca pratensis*) and Timothy (*Phleum sp*). Also, orchard grass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), Clower (*Trifolium sp*) and Docks (*Rumex sp*) were determined common plant species in the vegation of meadow.

Long term average temperature was 5.6 °C, total annual precipitation was 403.3 mm, and in study year average temperature was 3.24 °C, and total annual precipitation was 362.5 mm.

Three composite soil samples were collected from the surface layer of each plots and analyzed for physical and chemical properties. The soil texture was determined by a Bouyoucos hydrometer (Gee and Bauder, 1986) as sandy clay loam, the soil pH, determined by a pH meter (McLean, 1982) with glass electrode (1:2.5 soil-water suspension) for meadow as 7.25. Soil organic matter content was determined by SmithWeldon method (Nelson and Sommers, 1982) as 2.75%; available K was determined by a flame photometry (Thomas, 1982) as 130.2 and Olsen P content was determined by moliybdophosphoric blue color method (Olsen and Sommers, 1982) as 4.21. $CaCO_3$ content was determined by a Scheibler calcimeter (Nelson, 1982) as 5.24%.

Dry matter yield was determined by harvested three quadrats (1 m^2) area of central part of each plots when dominant species at flowering period and weighing after oven dried at 70 °C for 24 h. Total N content was determined by the Kjeldahl method and multiplied by 6.25 to give crude protein content (Jones, 2001).

Acid detergent fiber and Neutral detergent fiber analyzes were determined by (Anon, 1995). Total digestible dry matter was determined by (Moore and Undersander, 2002; Schroeder, 2004) equations [TDN%=88.9-(0.779 x ADF %)].

All data were subjected to analysis of variance using the SPSS (SPSS for Windows). Means were separated using the t test.

Results and Discussion

Average dry matter yield was determined 302.7 kg da^{-1}, in meadow area and dry matter yield significantly different in two meadow sites; it was higher in ungrazed site than grazed site. Average crude protein (%), ADF (%), NDF (%) and DDM (%) were 8.32, 36.83, 54.40, and 60.84, respectively. The results showed that in grazed site crude protein content (%) was higher than ungrazed site; on the other hand ADF, NDF, DDM ratios were higher in ungrazed site than grazed site. But there were no significant difference between meadow sites based on crude protein content, ADF, NDF and DDM ratios.

Table 1. Dry matter yield in early spring grazed and ungrazed meadow sites (kg da^{-1})

	Grazed Site	Ungrazed site	Average
Dry Matter Yield (kg da^{-1})	253.0 **B**	352.3 **A**	302.7
Crude Protein Ratio (%)	8.35	8.29	8.32
ADF (%)	36.72	36.95	36.83
NDF (%)	56.82	55.98	54.40
DDM (%)	60.29	61.40	60.84

The higher dry matter yield in grazed site than ungrazed site is most probably resulted from decreasing effects of early spring animal grazing on yield in grazed site. Some study results supported our results stated that early spring animal grazing decreases dry matter yield in meadows (Gökkuş, 1989; Wenick et al., 2007).

Crude protein content may change depend on plant species, plant growth stage, leaf/stem ratio, and some other environmental conditions (Ball et al., 2001). In grazed site, legumes with high protein content selectively grazed and on the other hand effects of grazing the vegetation may be greener than ungrazed site. This two-way effect may be revealed any significant difference between grazed and ungrazed sites based on crude protein content. Most probably, the same effects of grazing may be caused to near values ADF, NDF and DDM in both sites.

Conclusion

According to one year results of this study indicated that early grazing may effects on dry matter yield of meadows but there were no significant difference between early spring grazing treatment and enclosure treatment. Also, the study should be continued more than one year for more stubble results.

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