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Effects of livestock grazing intensity on reproductive changes in *Festuca ovina* L.

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Introduction

Reproduction and re-generation strategies, whether by sexual or asexual means, are important attributes of grazed plants. The *Gramineae* family is the main element of rangelands, grasslands and grassland ecosystems by virtue of their seed production and distribution mechanisms, and their tolerance of environment stresses (cold, heat, drought). *Festuca ovina* is a highly palatable and productive plant that has been recommended for drilling and sowing in the steppe and semi-steppe rangelands of Iran. The aim of this study, which was located in the Ghorkhoud region in North-east Iran, was to investigate the effects of different grazing intensities on reproduction of this grass species.

Methods

Four grazing intensity treatments were evaluated: areas of nil (protected), light, medium and heavy grazing intensity were selected along transects from heavily grazed to lightly grazed areas. Four transects were deployed, and on each transect 10 randomly selected samples of *Festuca ovina* grass clumps were dug up for dissection from each of the four grazing intensity areas. The samples were separated into their components (roots, leaves, stems and flowers), which were dried and weighed. The data obtained, which measured the response of *F. ovina* to grazing, were compared using ANOVA and Tukey tests available in the SPSS 16 software package.

Results

The results are shown in Figures 1, 2, and 3, and Tables 1 and 2.

Table 1. Comparing flower height means in different grazing intensities with the Tukey method.

Treatment	N	Mean	Group
Light	38	8.361	a
Medium	40	7.362	b
No grazing	40	6.057	c
Heavy	40	4.495	d

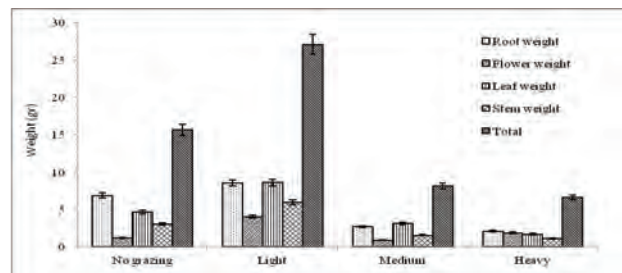


Figure 1. The total and component weights of *Festuca ovina* L. plants taken from fields with different grazing intensities.

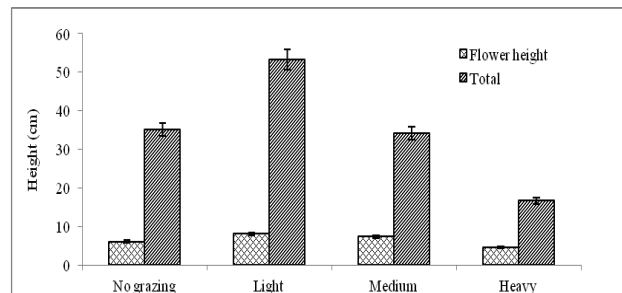


Figure 2. Total and flower height of *Festuca ovina* L. at different grazing intensity.

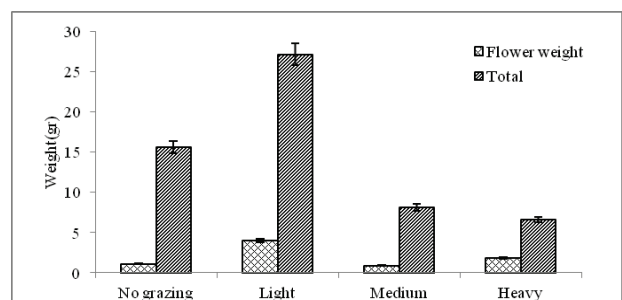


Figure 3. Total and flower weight of *Festuca ovina* L. at different grazing intensities.

Table 2. Comparing flower weight means in different grazing intensities with the Tukey method.

Treatment	N	Mean	Group
Light	38	0.4909	a
Heavy	40	0.1728	b
No grazing	40	0.0081	c
Medium	40	-0.1317	c

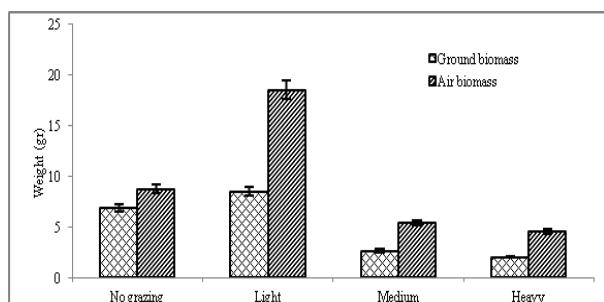


Figure 4. The effect of grazing intensity on above and below ground biomass of *Festuca ovina* L.

Grazing influenced on air and ground biomass of plant (Fig. 4).

Conclusion

Grazing intensity affected the height and weight of plant organs. This study showed that the potential of *Festuca*

ovina seed production changed with grazing intensity. Highest seed production occurred under light grazing and lowest was in heavy grazing. Heavy grazing at this site is near the nomadic tent and corral. Analysis of information in one way ANOVA ($P < 0.05$) showed a significant difference between all intensities in terms of flower height, but in flower weight there was no significant difference between the medium and no grazing treatments.

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