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## The effects of range enclosure on vegetation composition and density in upland grasslands of Iran

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**Introduction** Livestock and plants are in a constant interaction at range ecosystems. Overgrazing pressure due to the increment of human population cause a significant reduction in plant growth vigor, reproduction ability and poor establishment of valuable plants which lead to plant composition change and lower density of class I category range plants (Brand and Goetz, 1986, and Warren et al. 1986).

**Materials and methods** The experiment was conducted in Hanna rangeland in Isfahan province, central par of Iran. The non-grazed range site was closed to grazing for 25 years. The data collection was carried out for two years (2004 and 2005) in the closed and opened range sites. Plant density, vegetation cover, floristic list of plant composition of class I (palatable plant), II (moderate palatable) and III (non palatable) plants were collected in two dominant vegetation types both in grazed and non-grazed sites by proper number of quadrates (Wayne and Stubbendieck, 1986).

**Results and discussions** There was a significant difference between the class I plant density in grazed and non-grazed range sites (Table 1). Enclosure of range land enhanced the population and density of class I range plants which was due to providing a better opportunity for reproduction and establishment of those species in non-grazed range sites. In grazed areas the class II range plant had a better opportunity because of grazing pressure to develop and increase their population. In a similar experiment by Warren et al (1986) in range sites grazed by cattle, 13 important range species decreased in density after five years.

**Table 1** Vegetation Cover Rate in Non-grazed and Grazed Areas.

Palatability Class	Vegetation Cover in Non-grazed (%)	Vegetation Cover in Grazed (%)	T- value
I	56.9	21.2**	25.21
II	12	10.8 <sup>NS</sup>	5.76
III	3.4	20.6**	42.1

\*\* Significant difference ( $p < 0.01$ )      <sup>NS</sup> = no significant difference ( $p < 0.01$ )

The result in Table 2 showed that the enclosure was significant enhanced the total biomass cover. The percent of vegetation cover of class I in grazed treatment compared to class III was significantly reduced which could be explained by heavy grazing, soil humus destruction due to water erosion, livestock trampling and lock of seed resources for natural re-vegetation. Passera and Boresta (1996) in their experiment conducted in Argentina concluded that the reproduction of palatable perennial grass plants in plots closed to grazing was much faster than these grazed.

**Table 2** Analysis of variance for Vegetation Cover Rate in on-grazed and Grazed Areas.

Palatability Class	df	SS	MS	F
Vegetation Cover	1	6903.1	6903.1	78.18**
Error between samples	70	6180.8	88.3	-
Sum	71	13083.9	-	-

\*\* Significant difference ( $p < 0.01$ )

The results of the present experiment support the positive effect of range site exclusion on vegetation development in semi-arid rangelands of Iran.