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Study of tree regeneration in the grazed and non-grazed areas in the Iran-o-Turanian Ecological Zones

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ABSTRACT

Regeneration and forest durability guarantee is one of the most important aspects of forest sustainability and it should be placed in forest plans priority. To compare regeneration in the two grazed and non-grazed forest, Baghe-shady forest located in Khatam city (it has the preservative regions that they are 20 years old), Yazd province, Central of Iran was selected. For this purpose, 60 sample plots (30 plots in the grazed and 30 plots in the non-grazed area) were sampled by a randomized-systematic method with 100 m2 square plots (10×10 m) in the Net 100×200 meters were sampled. In every sample plot recorded regeneration and health condition. T-test was used to analysis of mean regeneration differences between grazed and non-grazed area. To analysis data use the SPSS16 software. Results showed the mean of sound seedlings of almond, pistachio and Monpollier maple in the non-grazed region were more than grazed region. These results indicated that non-grazed region more preference than grazed region. Regeneration in non-grazed region was less than grazed region. T-test indicated significant difference between non-grazed and grazed region for sound and height seedlings. Overall results showed that the grazing have a negative effects on regeneration. To manage of this forest authors suggested that continue preservative plans (non-grazed area) and provide foliage for cattle.

Key words: Iran, Yazd province, Bagh-shadi forest, Regeneration, Grazed and non-grazed area.

INTRODUCTION

Regeneration and forest durability guarantee is one of the most important aspects of forest sustainability and it should be placed in forest plans priority. So, due to important role of Zagros forests, comprehensive investigation about regeneration crisis becomes an increasing necessity (Shakeri *et al*, 2009). I.R. of Iran is located in the North Temperate Zone from 25 to 40 latitude and 44 to 63 longitude degrees, with a total area approximately 1,650,000 Km^2 (Haidari *et al*, 2013). A large section of interior is characterized by arid basins. Climatic variations are also great in Iran. The main variation is between the dry, desert interior region and humid Caspian coastal region (Mohajer, 2004 and Haidari *et al*, 2012). With due to attention to climatic conditions of Iran, 65% area includes arid and semi-aireid and degradation rapid of north and west, because of degradation of natural resources will cause to degradation agricultural lands and human environmental (Dastmalchi, 1998). Forests cover about 12 million ha in Iran (Forest and Rangeland Organization, 2002). The Irano-Turanian region covers an area of about 3,452,775 ha with dry and mainly cold climate in winter. They are situated in Khorasan, Azarbaijan, Markazi

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and westem Provinces. Regarding to topographical conditions and diversity of species, the region is divided into plain and mountainous sub - regions. Plain sub – regions located in the less 2000 meter a.s.l and main tree is Pistacia Forests. Pistacia Forests include scattered patches of open degraded forests, in the region of low rainfall (100 to 150 mm) central and southern of Iran (The Irano-Turanian of arid and semi-arid part, approximately 3.1 million hectares) and on the eastern hills along the Afghanistan border. It has a few plant species mainly *Pistacia* spp., *Amygdalus* spp. and *Berberis* spp. (Jafari, 1997). The researcher study of Forest Stand Quantitative Factors in Protected and No protected Areas in Arasbaran Forests and results showed that the number of trees and basal area in protected area was significantly higher than that in no protected forest stands. (Alijanpour et al, 2004). The researcher studied results the most important factors affecting oak regeneration in this region are livestock grazing, fire, acorn collecting by villagers for domestic fodder, summer drought, pests and diseases on acorns and seedlings (Shakeri *et al*, 2009). The researcher studied the natural regeneration of woody species in woodlands of southern slopes of Elborz Mountains and The origin of 33% of regenerations is seed and for 45% is shoot (the origin of others was not detectable). Regenerations of *Juiperus excelsa*, *Cerasus microcarpa*, *Pistacia atlantica* and *Lonicera nummularifolia* are mostly from the seed but *Berberis* spp., *Rosa* spp., *Rhus coriaria*, *Ulmus* sp. and *Malus orientalis* are mostly from the root (Suckers). 46% of regenerations have been supported by auxiliary species or rocks (Ravanbakhsh *et al*, 2010). The researcher studied the natural regeneration of Yew in Arasbaran forests and results showed that the most of these saplings had seed origin and were classified in height class less than 30cm with high vitality and health condition. Regarding to the past history of the area, this results show that the protection of area was effective and successful, so a dense and fresh yew stand in the Arasbaran area is expected in the future, if the protection is continued (Ghanbari Sharafeh *et al*, 2010). The researcher study of plant biodiversity in grazed and non-grazed areas in the Iran-o-Turanian ecological zones and results showed that the So the grazed and non-grazed increase tree, shrub and herbaceous diversity in Irano-Turanian forest, and complete protection (non-grazed) area have higher plant diversity compered the grazed region. Therefore, prevention of livestock grazing and irregular tree cutting in the degraded forest stands can be suggested as a suitable approach for natural restoration and increasing plant diversity (Haidari *et al*, 2012). The aim of this study was compere the tree regeneration in the grazed and non-grazed areas in Baghe-shadi forest, Yazd province, Iran-o-Turanian Ecological Zones in the center of Iran.

MATERIAL AND METHOD

Site description

To compare regeneration in the two grazed and non-grazed forest, Baghe-shady forest located in Khatam city (it has the preservative regions that they are 20 years old), Yazd province, Central of Iran was selected (Figure 1). Two areas include complete protection (non-grazed) and grazed area was selected. The study area that was 120 hectare (60 hectare in the non-grazed and 60 hectare in the grazed area (non-protection). The high pressure of cattle cause to sever damages to pistachio and almond. About 20000 to 25000 cattle are in this region in which they cause to sever damages to tree and shrub. The main woody species in Baghe-Shadi are *Pictacia khinjuk*, *Pistacia mutica*, *Amygdalus communis*, *Amygdalus scoparia*, *Acer monspessulanum* and *Crataegus* sp. The dominant species in our research area is *Pistacia khinjuk*. Herbaceous vegetation in the forest encompasses *Bromus tectorum*, *Stipa barbata*, *Stachys* sp. And *Hordeum* sp. The climate is very

dry; Mean annual air temperature is 17.4°C. The region receives 227 mm of precipitation annually. Climate of the region is semi-arid and arid (Mirshamsi, 1997).

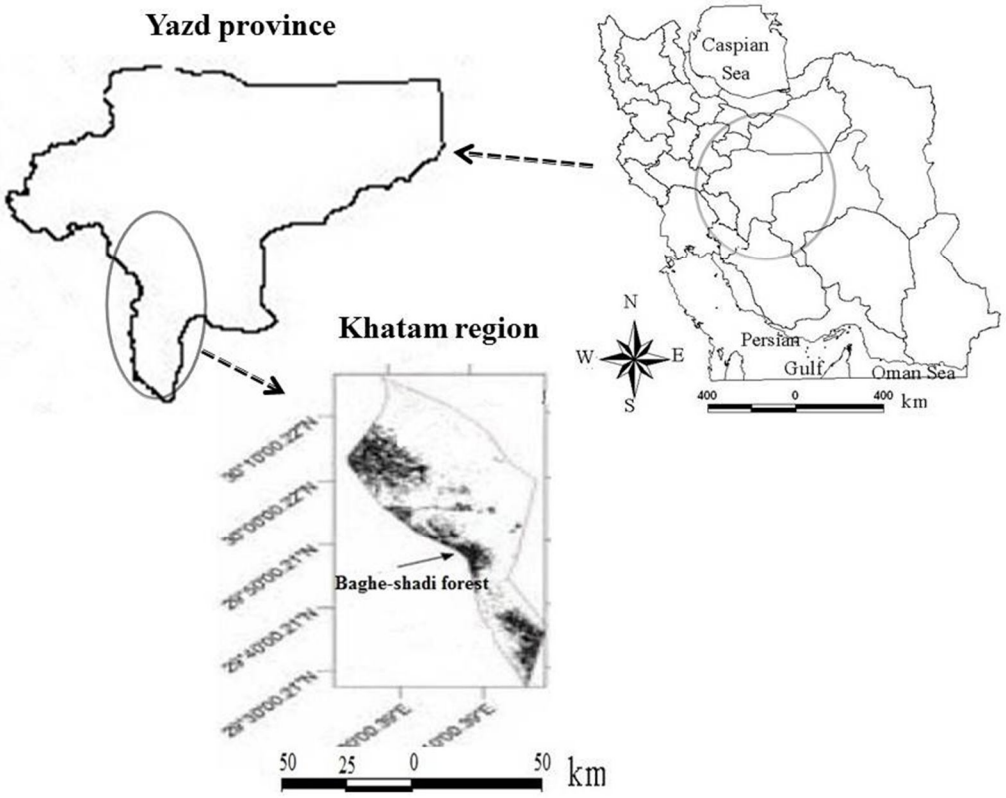

Figure 1. Study site location in the Yazd Province, Iran-o-Turanian Ecological Zones, central Iranian state of Iran.

Data collection and analysis:

For this purpose, 60 sample plots (30 plots in the grazed and 30 plots in the non-grazed area) were sampled by a randomized-systematic method with 100 m^2 square plots (10×10 m) in the Net 100×200 meters were sampled. In every sample plot recorded regeneration and health condition. T-test was used to analysis of mean regeneration differences between grazed and non-grazed area. To analysis data use the SPSS16 software.

RESULT AND DISCUSSION

The Iran-o-Turanian zone in areas where enough rain falls to support habitation, humans have degraded the landscape. Agriculture, pastoralism, and woodcutting have caused the loss of natural vegetation.

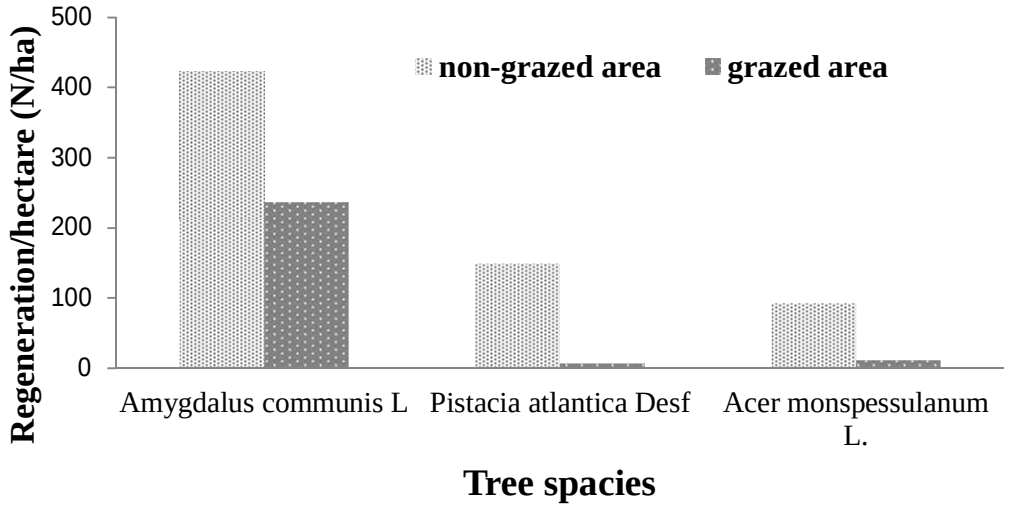

Figure 2: compere of the regeneration in the two non-grazed and grazed areas

Figure 2 showed that the mean of *Amygdalus communis* L, *Pistacia atlantica* Desf and *Acer monspessulanum* L regeneration in the non-grazed area are 424, 150 and 93, and in the grazed area this quantity are 237, 8 and 12, receptively.

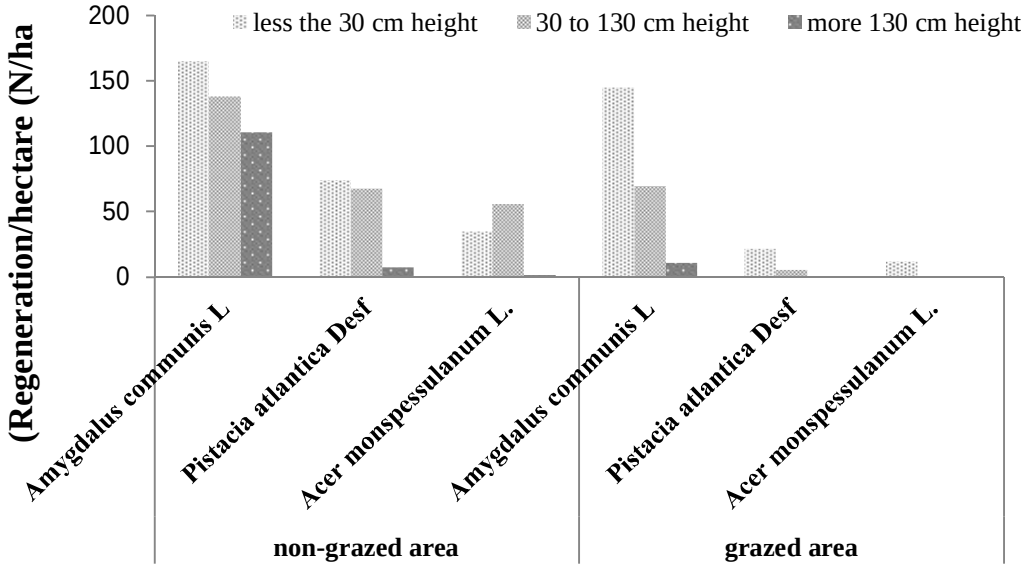

Figure 3: compere of the regeneration in different height classes in the two non-grazed and grazed areas

Figure 3 showed that the mean of *Amygdalus communis* L, *Pistacia atlantica* Desf and *Acer monspessulanum* L less the 30 cm height regeneration classes in the non-grazed area are 165, 74 and 35 seedling, and in the grazed area this quantity are 145, 22 and 12, receptively.

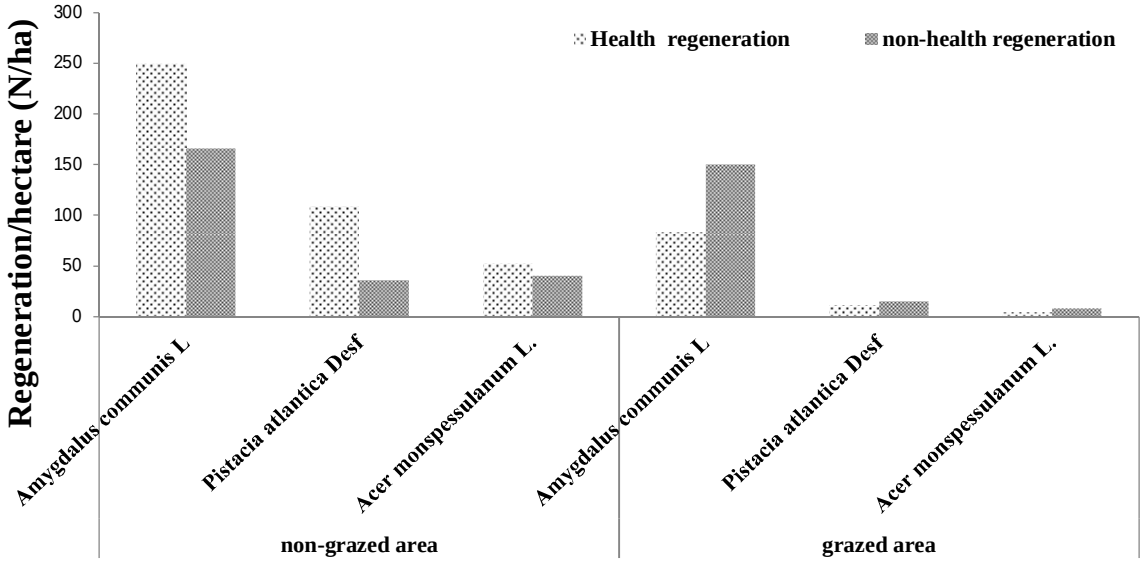

Figure 4: compere of the regeneration in regeneration health classes in the two non grazed and grazed areas

Figure 4 showed that the mean of *Amygdalus communis* L, *Pistacia atlantica* Desf and *Acer monspessulanum* L health regeneration classes in the non-grazed area are 250, 109 and 52 seedling, and in the grazed area this quantity are 83, 11 and 4, receptively.

Table 1: T-test analysis the regeneration between the two areas

classes	df	t	Sig.
total	178	6.803	0.000**
health regeneration	178	10.614	0.000**
non-health regeneration	178	4.634	0.045*
less the 30 cm height	178	3.807	0.010**
30 t0 130 cm height	178	11.162	0.024*
more the 130 cm height	178	6.268	0.000**

* Different letters indicate significant differences in 5% level ** Different letters indicate significant differences in 1% level

Table 1 showed that the different between mean total regeneration, health, non-health, less the 30 cm height, 30 t0 130 cm height and more the 130 cm height in the non-grazed and grazed area have significant. One of the serious threats to most of the Iranian ecosystems is drought, because much of Iran lies in the arid or semiarid regions. The other threats for plants are: overgrazing, fuel wood extraction, conversion of forest and other wild lands for agriculture, road construction, overexploitation, and unscientific extraction of plant resources for medicine, food. Different researches paid attention to Comparison of forest characters and regeneration in two protected

and non-protected area (Haidari *et al*, 2012; Alijanpour *et al*, 2004; Ghanbari Sharafeh *et al*, 2010 and Shakeri *et al*, 2010). Results showed that the mean of regeneration in the non-grazed area was higher the grazed area (figure 2). The higher regeneration in the study area was located in the less 30 cm height classes. The quantity regeneration in the less the 30 cm height, 30 t0 130 cm height and more the 130 cm height classes in the non-grazed area higher the grazed area (figure 3). T –test analysis showed that the different between mean total regeneration, health, non-health, less the 30 cm height, 30 t0 130 cm height and more the 130 cm height in the non-grazed and grazed area have significant. Overall results showed that the regeneration condition (density (regeneration/ha), health and height) in the non-grazed area higher the grazed area and this studied emphasis this results (Haidari *et al*, 2012; Alijanpour *et al*, 2004; Ghanbari Sharafeh *et al*, 2010 and Shakeri *et al*, 2010). So that grazing has a negative effect on the forest regeneration. Therefore, prevention of livestock grazing and irregular tree cutting in the degraded forest stands can be suggested as a suitable approach for natural restoration and increasing plant diversity.

CONCLUSION

Grazing is a global, dominant land use covering more than 25% of the terrestrial surface of the globe and a larger geographic area than any other land use (Asner *et al*, 2004). Grazing affects plant communities and associated fauna, with implications for biodiversity and ecosystem processes (Huntly, 1991; Rooney, 2003). Overall results showed that the regeneration condition (density (regeneration/ha), health and height) in the non-grazed area higher the grazed area, and grazing has a negative effect on the forest regeneration.

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