The effect of management on the range condition and production, Hossein Abad station, Shiraz

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ABSTRACT: Over capacity and excessive grazing have been happenend in Rangelands of Iran. Therefor this caused regression in ranglands. So, Solving the problems is possible by Reducing the number of livestock from rangelands and applying Range management procedures. In this way, Hossein Abad station was Enclosed. With an area of 6 hectares in 1338. This site is located 20 km west of Shiraz and currently contains 345 ha area. The station was Enclosed In the duration of 1338 – 1384 (46 years). Seeding project and Light grazing were carrird out In some years. Detailed studies of vegetations were performed in 1383. It was including: determine of situation, trends, capacity, typing and Preparing Floristic list. Mentioned steps were taken to surrounding areas at the outside of site and were compared to each other. In present papper'results showed, in the outside of station ranglands canopy cover of plants 20.9%, Composition percentage of class I and II plants 42.41%, Composition percentage of Perennial plants 41.99% and Forage exploitation 86.21% decreased compare to inside station. It was due to overgrazing and grazing off-season. The pressure of Grazing Had not changed composition percentage of the Annual pasture plants. Situation of Inside the station was good with positive trends. On the contrary outside the station had badly situation with negative trends

Keywords: Range condition, production, Canopy Cover, Rangland ecotones

INTRODUCTION

Fars Province with 8.5 million hectares of pasture and approximately 7.5 million livestocks rely on pasture, has a great important role in the country (Fars Province General Office, 2002). The province with a history of livestock and Animal husbandry and the main part of Qashqai nomads, has always been experiencing economic, social and political affairs affecting the country over the past years. Due to ever-increasing human population of province and the need to consume red meat , The number of livestock rely on the pastures in recent decades, especially the past three decades has increased. This livestock increasing were Regardless of the rangeland capacity, therefor will cause vegetation and soil degradation. Research - training station, Hossein Abad is located at 20 kilometers West of Shiraz, Shiraz - kazeroon axis and between geographical lengths 52˚13′15″ – 52˚15′15″and latitude 29˚ 36′ 35″ - 29˚ 37′ 40″. Minimum and maximum height of this station is 1943 and 2012 meters respectively above the sea level. Geological formations is alluvial deposits and etc. The average rainfall is 400 mm. Study case area is 345 hectares. Which natural pasture covers 267.2 hectares of that site. At first,the site were determined as one of the enclosure stations to study the rangelands vegetation at dry forest by experts of the United Nations Development Program in 1959. Studies showed flora was rich in that year and a variety of prickly *Astragalus* species were abundantly found Including Fabaceae family, all types of salsa. The most abundant species of Poaceae familiy was *Bromus tomentellus*. But *Poa bulbosa* and *Stipa barbata* were also seen. *Prunus spp* and *Daphne spp* could be introduced from woody species. The first reaction to remove woody species and prevent livestock grazing, were Poaceae especially *Bromus tomentellus* abundance in the first two years (Sheidaei, 1971). In the management of rangelands, numerous environmental challenges requires efficient management. Natural

resource management requires general observation and ecosystem base. therefor All ecosystem components and their relationships should be recognized. That is a necessity for any planning and decision-making. One of the most important processes in rangelands is grazing and herding process. grazing in pasture will find special importance for the study in exploitation system of Iran.

The deterioration of natural grassland has been attracting many grassland researchers to monitor the grassland condition and dynamics for decades. The grassland ecosystem is a complex system which is formed by soil, vegetation, wildlife and atmosphere(Dandan X. and Xulin G. 2015). By studying three types of sagebrush, meadow and padding in Gorgan, showed Meadows Types contain greatest diversity and plant production in each per hectare. Among the studied factors affecting vegetations, moisture, human and height had most significant role in the creation variety and production of vegetation in the region. The Subject of range management, based on independent planning is recommended in any ecological habitat conditions(Parsaei1994). The quantitative and qualitative positive effects of enclosure had been in increase of the vegetation density, forage harvest, palatable plants, pasture (Grazing) capacity and Reduction of surface runoff and Sediment production. So, despite some unavoidable social and economic negative outcomes that Resulting from the pastures closed. This could be introduced as one of the effective ways in watershed management due to low investment compared with other Methods of watersheds resuscitation in The Country. on the one hand The (affirmative) positive effects of quantitative and qualitative increase in the plant establishment and production and on the other hand Reduction of surface runoff and sediment production (Tavakkoly2000). Mousavi (1999) by compare the area of closed with the area of not grazed area after 13 years showed Percent of the canopy cover was about 13.75%, The total density of the permanent species was 4.2 Square meters, Reproduction 2.32 Seedlings per square meter, The total production 43.5 kg per hectare,these factors were increased in the closed area than grazed area. This test was carried out by assess the amount and trend of production in closed pastures. Within the closed area, The range condition was poor and had significant positive trend. Outside closed area, negative trend and very poor situation was found (Mousavi, 1999). Moderate grazing intensity Compared to non-grazing (control), did not damage the vegetation cover and production plants of salsola rigid and stipa barbata. Even it had increased the production of these two species, the total of annual plants and perennial plants. In ordinary conditions of moderate grazing causes rejuvenation and stimulate growth in plants. Although commonly forage for harvesting consider as 50 % of annual growth (Sheidaei and Nemati, 1976 , Parratt and Rasmussen, 2001). But in relation to available forage, there are other comments. Saeedfar and *et al.* compared the methods of determining the condition of rangelands in the steppe and sub-steppe regions of Isfahan province, And concluded that in the sub-steppe regions, the method of 4 factors and adjusted 4 factors relatively have the ability to properly determine the condition of the rangeland (Saeedfar *et al.* 2010). To determine the intensity of trapper for the Iran pastures,considered the use of coefficient of 50% for Class 1 plants, 30% for class II plants and 10 – 15 % for class III plants. He realized them more functional(Moghadam, 1998). Ohlenbusch and Watson (1994) mentioned that 25% of harvested forage is lost due to insects use, kicked, Other animal uses and decomposition(Ohlenbusch and Watson 1994). In determining the Grazing intensities, must be relied on only 25 % of the total forage production (Lyons and Machen, 2001, Ohlenbusch, and Watson1994)

Material and methods

In this study, rangland ecotones area identified by scrolling through the station area and use of gps. Then, for plant coverage studying, In any type 10 to 15 plots Was placed. They were randomly and dimensions 2 (1 * 2) meters in square area. In each plot all the species listed and each species Canopy cover percent was recorded separately. Determine the status was performed by four-factor method. The trend was set by means of scoring method and the relevant forms were completed. clipping and weighing method were applied To determine the capacity. In this way about the bushes, Growing belong to this year (twigs) and about grasses and forbs, from the bottom were cutted. These actions were done to calculate their current year growth. Any species was separately placed in the paper bag with the Name of type , Number of plot, Date of collection and The species name. After 14 days, when the species were completely dried, inside paper bags were weighted By a digital balance with precision 0.001g . To assess the capacity of plants Class I, II, III, were calculated by Removal Coefficient 50, 30 and 10% repectively(Moghadam, 1998). To obtain AUM, 2 kg of rangland dry forage was considered as the amount of forage required each unit animal in a day.

Discussion

Studies of vegetation were carried out within the enclosure stations and out of the station. The outside including surrounding areas of East, West and South that were similar with the station in terms of the territorial units. study area of outside was considered at a distance of 800 meters from the station area.

The results of the studies were conducted as follows:

1- Studying the vegetation(Typing)

With detailed studies, station had 3 types. The number of species collected and identified were 71 cases of 45 genera and 23 families.

Type I:

Bromus tomentellus + Astragalus cephalanthus

The area of this type were 108.1 hectares. This type were located in north west , part of northern and central station. This type contain: The mean canopy cover 24.1%, Surface leaf litter 7% , Stones and pebbles 7% and Bare soil 43.9%. The forage exploitation (With regard to Removal Coefficient) were obtained 337.5 kg per ha thus AUM were estimated 5.625. The site were calculated well with positive trend by summing Score 39.1 (table 1).

Here 15 plotes were applied. The number of species on the flora list were 24 cases. The minimum and maximum species composition percentage were estimated 0.8% and 21.43% respectively. Species composition based on growth form Include: Annual species 25.88%, Perennial species 47.78% and Bush species 26.34% and according to palatability class covering: Class I, II and III were 23.49, 22.55 and 46.04 % respectively. Minimum canopy cover percentage were obtained 26% and maximum 67% by measurements that were taken from plots.

Type II:

Asteragalus cephalantus + Brumus tomentellus+ Astragalus cemerinus

The area of this type were 75.7 hectares. This type were located in the part of the west and south-west and north-west to south of site. This type contain: The mean canopy cover 38.3%, Surface leaf litter 6% , Stones and pebbles 8% and Bare soil 47.7%. The forage exploitation were obtained 266.8 kg per ha thus AUM was estimated 4.447. The site were calculated good with positive trend by summing Score 39 (table 1). In this type plots were used 26 cases of species were entered in the flora list. The minimum species composition percentage were estimated 0.7% and maximum was obtained 17.51%. Species composition based on growth form Include: Annual species 22.79%, Perennial species 42.99% and Bush species 34.22% and according to palatability class covering: Class I, II and III were 17.93%, 26.82 % and 55.25% respectively. Afeter plot measurements, minimum canopy percentage were obtained 21% and maximum 53%.

Type III:

Bromus tomentellus + Hordeum bulbosum

The area of this type were 83.4 hectares. This type were located in the central part of the north , west and north-west to this type contain: The mean Canopy cover 45.6%, Surface leaf litter 9% , Stones and pebbles 7% and Bare soil 38.4%. The forage exploitation were obtained 425.7 kg per ha and AUM was estimated 7.095. The site were calculated good with positive trend by summing Score 43.8 (table 1). 15 plotes were applied in this type. on the flora list, 21 cases of species that were entered, The minimum and maximum species composition percentage were estimated 0.29% and 33.78% respectively. Species composition based on growth form include: Annual species 28.06%, Perennial species 67.26% and Bush species 4.68% and based on Palatability class including: Class I, II and III were 35.97%, 40.06% and 23.38% respectively (table 2). Minimum canopy cover percentage were obtained 26% and maximum 70% by measurements that been taken from plots

2- Studying the vegetation out of the station

Only one type (*Astragalus cemerinus*) was recognized In this region. This type contain: The mean Canopy cover 33.3%, Surface leaf litter 2% , Stones and pebbles 10% and Bare soil 54.7%. The forage exploitation were obtained 46 kg per ha and AUM was estimated 0.767. The site were calculated poor with negetive trend by summing Score 25.5 (table 1). 10 plots were applied. The number of species on the flora list were 17 cases, The minimum and maximum species composition percentage were estimated 0.3% and 59.46% respectively. Species composition based on growth form Include: Annual species 25.83%, Perennial species 10.51% and Bush species 63.66% and based on palatability class including: Class I, II and III were 8.12%, 4.5% and 87.38% respectively (table 2). Minimum canopy cover percentage were obtained 15% and maximum 49% by measurements that been taken from plots.

Table 1: The average scores were calculated by four-factor for determining the range condition(SCS method) of I, II and III types of station plots and the out of Hossein Abad station,s types in Shiraz

Location	Type	Freshness and Vitality	Plant Composition	Canopy Cover	soil	Total Score	Range Condition
Site	I	7	6.1	8.4	17.6	39.1	well
	II	7.2	7.2	7.6	17.1	39	well
	III	8.4	8.4	9	18	43.8	well
Out of site	I	2	2	6.5	12	25.5	weak

Table 2: Plant composition percent based on growth form and Palatability class in I, II and III types of station and the out of Hossein Abad station,s types in Shiraz

Location	Type	Growth form			Palatability Class		
		Annuals	Perennial	Bushes	I	II	III
Site	I	25.88	47.78	26.34	23.49	22.55	53.96
	II	22.79	42.99	34.22	17.93	26.82	55.25
	III	28.06	67.26	4.68	35.97	40.06	23.97
Out of site	I	25.83	10.51	63.66	8.12	4.5	78.38

Conclusion
According to the results, the following conclusions can be inferred:
1. Based on studies conducted in three types of Hossein Abad Station, plant composition percent based on growth, Through weight include: Herbaceous Annual 25.69%, grasses and forbs Perennial 52.50% and bushes 21.81%. With respect to the composition plant percent of outside the station based on growth form (table 2), Percentage of annuals has increased 14% at outside the station range. This difference is not significant. but the percentage of perennial grasses and forbs composition extremely decreased at the same place (41.99%). This represents, the sharp decline in perennial plants(Forbes and Grasses) and remaining woody prickly plants are the result of overgrazing and improper management of pasture. The pressure of grazing had not changed composition percentage of the annual pasture plants.
2. According to studies were carried out in three types of Hossein Abad, plant composition percent based on palatability class, Through weight include: Class I, II and III were 25.8%, 29.23% and 44.96% respectively. With regard to the composition plant percent of outside the station based on palatability class (table 2), Can be declared that The extremely decline in class I and II plants are the result of overgrazing and improper management of pastures (42.41%). Only class III remained.
3. Overgrazing and out of appropriate season and improper management of pastures at the outside of station, had a significant impact on the four situation factors and the situation had changed from good to poor, these factors include: Freshness and vitality, plant composition, The canopy cover and soil conditions.
4. At pastures located outside the station, Percent of surface leaflitter had decreased about 70% compared to pastures located inside station.
5. The average forage exploitation was estimated 333.66 kg per hectares of dry forage. This was done by weighing method in three types of Hossein Abad Station. This was 7.25 times the average forage exploitation should be outside the station. This causes economically notability.
6. In three types, the average of canopy cover was estimated 42.12% By weighing method. The average of canopy cover were 33.3% at the outside of station. According to these values The reduction rate of canopy cover was 8.82%. So, when prickly woody *Astragalus spp* is the type species in rangelands, Grazing pressure on these rangelands causes decrease in herbaceous perennial plants and provides a situation for these milk vetchs competition.

The average species richness was calculated 23.7 at three types inside the station and it was obtained 15 at outside the station. Rate of types inside the station was 7.25 times more than the average species richness at the outside of station. This represents, pasture inside station is more sustainable and in terms of feed variety has more value.

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