

The Effect of *Atriplex canisens* planting on Fauna of Zarand Zavieh Region (Case Study: Rat and Termite)

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Abstract. Annually Iran incurs high expenses to improve and develop her rangelands by seedling and shrub planting. Due to the climatic condition of the country, shrub planting is more beneficial. But it retains merits and demerits as well. Of merits, soil conservation, and livestock forage can be numerated. Planting of non-endemic species, however, will give rise to the appearance of another pests and eventually diseases in a particular region. So, it can be regarded as a visible demerit. The aim of this study is investigation of The effect of *Atriplex canisens* planting on fauna of Zarand Zavieh region. This study conducted to investigate the rat population and termite propagation developing relationship with more than 40000 ha of Atriplex rangeland planted in Zarand Zavieh region. The entire region divided into four areas, each by itself grouped into two sections, near to mountains and plains. Each section established 3 quadrates with 15×15 sq meters. The quadrates investigated the existence or non-existence of rats and termites by using T-test standard analysis. Results showed that there is a significant relationship between two sections, near mountains and plains, with regard to rats and termites and growth of Atriplex bushes at 95 percent level. So to speak, the existence of fine and soft texture of soil caused the best growth of Atriplex species. Due to the shrub and soft texture of soil in the region near the plains, the decrease in rat population is observable. It caused by ecological factors such as suitable texture of soil and high moisture reserved for better growth of Atriplex. Fine texture of soil and wind made moles at the foot of the shrubs and improved a perfect condition for termites' destructive activities. Atriplex species planting brings about the diversity of wild life and has a great effect on the diversity of ecosystem of the region.

Keywords: *Atriplex canisens*, Rats, Termites, and Zarand Zavie region.

1. Introduction

Rangelands in addition water and soil conservation have other important role such as: niche of wildlife, utilization of medicinal, aromatic and industrial plants and essential oil, also providing forage for livestock. In rangelands of Iran, now, there is livestock more than three time grazing capacity which are grazing. More grazing pressure caused degradation of rangelands. The root cause of much of the degradation in Iran is due to land reforms in 1968, agro pastoral system where the best grazing land has been taken for cropping, and the most serious causes are associated with heavy grazing or over grazing.

One of the ways to improvement and developments of rangelands is adaptation of non endemic plant cultivation in degraded region which this subject can negative or positive effect on fauna and flora in rangeland. In 1944 FAO (Food Agriculture Organization) for the first time planted and investigated *Atriplex canisens* at Chago area sub region of Shahryar County which this species interred from Australia. Recently years, occasionally rangeland developed and improved due to cultivation of Atriplex species by Rangeland, Forestry and Watershed Organization. So need to study of negative and positive effects in region. Does have planting of this species economical or not according to economic, sociology and environmentally?

This study conducted to investigation of effects of *Atriplex canisens* planting on increasing of rat and termite population and also beside propagation of wildlife in the region.

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Henteh (1990) indicated a fly with name *Asphondylia atriplicis* which doing split on Atriplex stem cause growth diseases and pests on plant. He decelerated in drought years, this species intense attack by rabbit. Also showed that rat in base of plants and destroyed roots by drilling channel which cause plant dry. One of the insects which cause demand to Atriplex species are *Ocludius salicorniae* and *Chromosomus fischer*. On old plants of *Atriplex canisens* in rangeland of Gheshlag Mohammad lue Karaj had been seen termite. Also saw this pest on *Atriplex canisens* planting bank in rangelands of Zarand Saveh, and saw butterfly damager on young trees which feed from leafs of Atriplex. Also saw flea insect on young tree of Atriplex. Khalkhali in 1996 and Naseri in 1997 investigated effects of *Atriplex canisens* planting and environment. Also Naseri (1999) investigated effects ecology of *Atriplex canisens* on under planting fields. Also increasing of rodents (especially rat and other kind of rats which is bigger) observe in Atriplex planting farms. Ahmady (1998) determined one of the reasons to dry shrub of *Atriplex lentiformis* in Chah Afzal (in Yazd province) region is increasing rat and its damage by stem chewing of Atriplex. Also he showed that has been increased number of sand fly insect which generate Aleppo boil (which it host is rats) by increasing rats. Also Tavakoli et al. (1996) reported increasing rats and rats in Atriplex planting farms of Khurasan province. In his research region observed increasing number of under ground nest rodents (especially under shrubs and near main stem of Atriplex shrubs) and reported many number of rats nests. He showed that these shrubs are suitable place for hidden and nesting of rats and rats and it roots suitable to feed of rodents too. Also he says in around of Marave Tapeh region related to Gonbade Kavuos Township majority of children of rural to give a disease to Aleppo boil (which majority are Torkaman kind people) because of increasing sand fly insects which generate Aleppo boil cause to increasing rats conductor in Atriplex planted region.

2. Material and Methods

Investigated the region is Zarand Zavieh dependencies to Saveh small province with 40000 ha. The region limited to mountain from north and plain from south. Medium annual precipitation is between 250 to 300 millimeters. Over grazing in the region observe because of many villages in the region which job pastoralist to sheep and animal husbandry. Medium annual temperature change between -10 to 40 and at some month temperature decrease under zero. *Atriplex canisens* species which cultivated are 5 to 10 years old. This region divided to 4 statistical and sampling sites which one of them divided to two regions such as upward means near mountain and downward means near plain. Reason of this dividing is because of different soil in each region and also for reliable data collection. Majority of upper soil near mountain are stone and there is more percent of stone and gravel and opposing in down soils are tiny texture (microlithic) like clay which this texture cause existence and activities of rats population and development of termites. In each site 3 quadrates with 15×15 m square was which cover medium 10 to 15 Atriplex shrubs. In beside of every site; consider an evidence region for investigation effect of non native plants cultivated on fauna like rat and termite. Plots of this region consider 3 number and with 8×6 m square. Sampling establishment every plot was randomize-systematic. One of the factors was number of rats nest in beside and under of each Atriplex shrubs and dos it attacks Atriplex and other plants by termites or not? Other factors were measurement of high and cover of plants and also vigor of shrubs and in the evidence region measurement of other plants according to termite affects on it's and nest of rats near shrubs.

Sampling was among one year. In this study considered plants which more attack by termite in two region; evidence and plan. Because for termite activity need to soil with microlithic for transporting by wind then deposit bench of many plants which have cushion form for termite activities. Results analyzed by Regression analyzed between evidence and plan region (48 m square plots) and between two region mountain macrolithic and plain microlithic. SPSS and Excel and other needed software used and analyzed by T-test experiment for two region and results.

3. Results and Discussion

Results showed that there is significant difference between two region mountain macrolithic and plain microlithic based on rat nest. This subject shows that there is more number of mouse nests in plain, so, population and activities of rats are more in this region. This is because of high depth of soil in plain region and finest soil texture so, result more activities of rats in this area (table 1).

Table 1: The analysis of T-test according to means of rat nest in two regions, near mountainside and plain

Variable	Cases	Mean	SD	SE of Mean	CI (95%)	T	2-Tail Sig
Region1	24	0.5833	1.501	0.306	-1.041, 0.458	-0.78	0.437
Region2	24	0.8750	1.035	0.211			

This result has seen for two regions which compared check and Atriplex planted (treatment) (table 2).

Table 2: The analysis of T-test according to means of rat nest in two regions, check and treatment

Variable	Cases	Mean	SD	SE of Mean	CI (95%)	T	2-Tail Sig
Check	24	0.4167	0.717	0.146	-1.356, 0.106	-1.72	0.092
Treatment	24	1.0417	1.628	0.332			

This result show that existence of bushes can good niche for rats activities and it causes increasing of rats populating and it causes appearance of bird of prey such as owl and hawk in the region. Other animal and bird likes partridge, porcupine, wolf, fox, tortoise, wild pigeon and so on, those population has been increased in the plant cultivated. In the meanwhile livestock like cows and sheep use forage of Atriplex and it causes economical boost of villagers who have been left their villages in the past years because of rangeland degradation (Photo1).



Photo 1. Brushes of Atriplex cultivated and grazing of sheep

On the other hand, according to local people, there is no trace of any special diseases by planting such species. The only abnormality has been reported multiparous birth in goats. Also T-test showed that there is no significant different in 99% probability between two area mountainside with pain and treatment with witness area in respect to termite activities (table3).

Table 3: The analysis of T-test according to means of termite in two regions, near mountainside and plain

Variable	Cases	Mean	SD	SE of Mean	CI (95%)	T	2-Tail Sig
Region1	24	1.0417	1.706	0.348	-0.069, 1.485	1.86	0.073
Region2	24	0.3333	0.761	0.155			

The reason is suitable environment like wind existence for transforming of microlithic and sediment back of shrubs in comparable area.

Also results showed that there is significant difference between two areas according to termite activity in check and cultivated (table 4).

Table 4: The analysis of T-test according to means of termite in two regions, check and treatment

Variable	Cases	Mean	SD	SE of Mean	CI (95%)	T	2-Tail Sig
Check	24	0.8750	1.484	0.303	-0.413, 1.163	0.96	0.343
Treatment	24	0.5000	1.216	0.248			

In this manner T-test determined that (in 95% probability) there is significant difference between *Atriplex* diameter and plain and mountain area. The reason is high depth of soil and more storage of humidity in plain area, because root of this species infiltrate into soil and more growth by attracting of nutrient factors. There is not significant different between High and diameter of species and also those have positive correlation with rats activity. This study showed that the most of rat's activity has saw on *Atriplex* species. In some area there is nest of rats under *Artemisia herba-alba* species. Majority activity of rats was in area which has microlithic soil transformed by wind back of shrubs. In some area in spite of surface of soil covered by sand and stone, there was rat nest may be because of ware and rainy erosion to show stones and sands. So because rat there is in soft soil and to dig the ground, may be soft soil under ground and microlithic texture. According to the local villagers number of rats has been increased because of existence *Atriplex* species. Existence of hare in the region, show effect of plant covers in wild diversity. Effect of trim on freshness has been observed because some species which broken their branches has been grew. The termites often have been seen on dry branches of *Atriplex*.

With comparison to this results and results of other researchers has been observed that increasing of rodents especially rat to be caused ecological situation change by cultivation of non native and native species especially shrubs (Hente 1990; Khalkhali 1996; Naseri 1997; Ahmadi 1998 and Tavakoli et al. 1996). Because *Atriplex*es are suitable nest for living and hidden and also their roots are good food for rodents. On the other hand rats have been taken his needs to water by skin absorption because in the under of shrubs and beside of roots humidity is high and rats prefer to remove need of water and avoid of hot weather used this area to living. Although birds of prey can establish ecological equilibrium in the region, but seem rats population dominant to other animals. As we know Aleppo boil disease is cause of transportation by rat from insect to human, but has been no seen in the region. Some researchers have been stated that termites cause damage to *Atriplex* species which this research confirms this subject on native plant such as *Astragalus* and non native plant such as *Atriplex*.

4. Reference

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