

Effects of *Haloxylon* plantation on some soil characteristics and vegetation cover

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Key words: *Haloxylon* plantation, soil characteristics, control region, Qom province.

Introduction Because of its geography and frequent strong winds, about 80 percent of Iran has dry and semiarid climates. In this area soil erosion and desertification threaten water and soil resources. Plantations of *Haloxylon* have been established to stabilize sand dunes, reclaim degraded lands and reduce wind erosion damage in the Hossein Abad-e-Mishmast region of Qom province. The objective of the research was to evaluate *Haloxylon* plantation effects on soil characteristics and vegetation cover.

Material and methods Four sites were selected in each plantation and in control (unplanted) regions. Sampling was undertaken using a randomized-systematic method. Three transects of length 500 m were established in each site and 10 plots were selected in each transect. Floristic list, cover percentage and number of plants were recorded within each plot. Also, yield, density, frequency and species composition were determined. A soil profile was dug in each transect, and soil texture, organic matter, electrical conductivity (EC), acidity (pH), phosphorous, nitrogen, sodium and potassium were measured. T-tests were used to compare the soil characteristics between any two regions.

Results and discussion Percentage cover, yield and homogeneity of vegetation increased and species composition was better in plantation lands than in the control regions. Also, there were significant differences between soil characteristics except for soluble sodium. Organic matter, potassium, phosphorus and nitrogen were higher in plantation lands than in control regions. In addition, in plantation lands, alkalinity and salinity were increased more than the control region. (Table 1)

Table 1 Comparison of soil characteristics in *Haloxylon* plantation regions and control regions in the Hossein Abad-e-Mishmast area.

soil characteristics	depth	control region	<i>Haloxylon</i> plantation region	Result
EC ds/m	First	0.7025	0.85	*
	Second	0.9075	1.25	**
pH	First	9.225	9.6	**
	Second	9.7	9.925	**
Organic matter (%)	First	0.5075	0.685	***
	Second	0.4575	0.49	**
Nitrogen (%)	First	0.0725	0.115	**
	Second	0.0350	0.0045	n.s
Potassium (ppm)	First	45.25	64.75	**
	Second	36	51.5	**
Phosphorus (ppm)	First	55.17	60.5325	**
	Second	54.5325	56.02	*
Sodium (ppm)	First	553	509	n.s
	Second	1164.50	1016.75	n.s

Conclusions *Haloxylon* plantations have positive effects on some soil characteristics and microclimate of the area, increasing both the yield and percentage of vegetation cover, and the organic matter, potassium, phosphorus and nitrogen contents of the soil. Atkham Shoara (1994) and Bailey (1970) reported similar results. In addition, in plantation lands, alkalinity and salinity were increased more than the control region.

References

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