Soil Factors Affecting the Distribution of Four Salt Tolerant Range Plants in Eastern Azarbaijane Province (Gharakhlar)

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Introdution Correct management of a range land is on the basis of ecological principals . Understanding the ecological processes is the main term of management Mesdaghi (2002) . Environmental variables consist of complex reactions between environmental variables and plants (canopy cover and density) Jangman (et al , 1987) . Various plant types have correlation with soil types . Zahran (et al , 1992) said that in saline areas salt , soil texture and organic carbon are the most important factors in distribution of plant communities . The results showed that index plants were the presidents of ecological soil factors . Layon and Sagers (2003) in misiyory of United states , by using ordination method (CCA , DCA) , came to the conclusion that there is a little correlation between plant vegetation . The goal of this research is determination of relationship between four saline range plants parameters (canopy cover and density) and physico-chemical soil factors to develop range lands , managing the vegetation and conserving the soil and water .

Materials and methods The investigation was undertaken in the part of sub-basin of Ghatoor Chai River , eastern Azarbaijan state in the north eastern of Iran .Mokhtari (2005) . Plant communities analyzed by topographic map (scale : 1/50000) , then in each community introducer site selected . According to the vegetation changes and the goal of research 10 transect with 50 meters long and 100 meters distance from each other lay down in each community . The way of sampling was random-systematic . In each transect the length of each plant's canopy cover recorded . For measuring the density of plants , the way of point-center quarterwas selected , besides soil sample supplied . In each transect soil dug through the depth of 60 cm , samples were removed from 0-20cm , 20-40cm and 40-60cm . In laboratory soil acidity , Electrical conductivity , sodium in saturated extract , (Ca + Mg in saturated exacted) , ratio of absorbed Na (Na .A .R .) , percentage of saturated salts (PSW) and soil moisture calculated in a way of weight .

Results The results of multiple regression analysis of investigating the relation between four index saline range plants and soil factors showed in Tables 1 and 2 .

Conclusions According to the results , there is a close relation between physico-chemical soil factors and density and cover percentage of the predominant plants . The results of multivariable regression showed that *Halocnemum strobilaceum* had direct relation with moisture of the soil , so distributed in the places that ground water was high . *Salsola .denroides* had direct relation with Na from other soil factors ; this was because of high resistance of this plant to the salt of the soil . pH , clay and Na had effect on the distribution of the *Atriplex verruciferum* . Direct relation of this plant with clay percentage was due to the presence of this plant in the heavy and high PH . The weak or none relation of this plant with soil factors in the first layer may be because of the structure of their roots . *Aeluropus littoralis* had inverted relation with the absorbed Na , this was due to the low resistance of this plant to salt compared to the other species . This result confirmed the results of other researchers (Jafari , 2004) , (Zare Chahooki , 2001) , (Mirmohammadi et al , 2002) .According to the relation between density and vegetation percentage with soil features can determine that predominant plant vegetation of the majority of soils with S .A .R .E .C and Na was *Halocnemum strobilaceum* and *Salsola dendroides* . This result was the same as Mirmohammadi (et al , 2002) and Alakh & Rdif (1988) .

Table 1 *Step by step multi regression of different species density*

Species	Depth	Soil factor	R^2	Equation
Hal-str	0-20	moisture	75 .4	Y=-187+ 135moisture
	20-40	moisture	70 .2	Y =1154+ 151moisture
	40-60	moisture	46 .9	Y=-977+ 115 moisture
Sal-den	0-20	-	-	-
	20-40	-	-	-
	40-60	Na	84 .9	Y=190+ 0 .824 Na
Atr-ver	0-20	-	-	-
	20-40	Clay , S .A .R	94 .4	Y=2358+122 clay-31 .9 S .A .R .
	40-60	moisture	32	Y= 0 .056-184moisture
Aelu-litt	0-20	Ca+Mg	32 .1	Y=311-1 .72(Ca+Mg)
	20-40	-	-	-
	40-60	Loam , EC , moisture	83 .1	Y=1157+14 .4 silt-2 .6 EC-4 .77 moisture

Table 2 *Step by step multi regression of different species canopy cover*

Species	Depth	Soil factor	R^2	Equation
Hal-str	0-20	Moisture and sand	71	-Y=-12 .1+56 .1 moisture+0 .381 sand
	20-40	Moisture	29 .1	Y= 5+0 .961 moisture
	40-60	Moisture	21 .2	Y=4 .8+0 .775 moisture
Sal-den	0-20	Na , Ca+Mg , Clay	73 .4	Y=3 .38+0 .00517Na-0 .132Ca+Mg+0 .341 clay
	20-40	-	-	
	40-60	Na	79 .5	-Y= 0 .642+0 .00310Na
Atr-ver	0-20	pH	27	-Y= 156+19 .8 pH
	20-40	Clay , S .A .R	97 .3	Y = 2 .58+0 .728 clay-0 .653 S .A .R
	40-60	Moisture and Clay	64	Y= 54 .5-1 .54 moisture+0 .0365 clay
Aelu-litt	0-20	S .A .R , PSW	64 .4	Y =1 .95-0 .109S .A .R+0 .116 PSW
	20-40	pH	17 .6	Y = 7 .25-0 .737 pH
	40-60	S .A .R .	30 .9	Y= 1 .66-0 .00579S .A .R .