Physical, chemical, and morphological characteristics of forest soils in the Keroudkenar Region of Northern Iran

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Abstract
This Study was carried out of in four stages:(1) collecting of information and records,(2) field Sampling,(3) soil tests, and(4) analysis of results and conclusions. During stage 1, data and information related to climatology, pedology, topography and silviculture were collected. And entered into a Geographic Information System (Arc View GIS Software). Considering the slope aspect, and elevation a map of land-forms was created. Then for each land forms, Plots 2500 meters in size were identified. In the field, Soil pits were dug in the center of each plot and at its four corners, and micro plots were established for identifications and collection of the plants species present. The soil profiles corresponding to each landform were analyzed and their characteristics and vital activities (organisms and plant roots) were examined. Each soil horizon was sampled for physical and chemical tests. The samples of soil and plants were sent to the laboratory for analysis and identification. Physical analysis of the soil included the measuring of soil color, structure, consistency, and the presence or absence of clay films. Chemical analysis of the soils included, potassium, phosphorus, calcium, magnesium, organic maters contents, and electrical conductivity. The results show that the soils of this region are largely acidic neutral their textures vary from clay to sandy clay loam and the surface soil horizons contains large aggregates with strong consistency. The dry color of the soil is largely brown. The nutrients elements occur in satisfactory quantities. The results of this study showed that the plants of this region are growing on nine types of soils as follows: Typic Paleudalfs, Lithic Vermudolls, Inceptic Hapludalfs, Typic Dystrudepts, Typic Hapludalfs, Humic Dystrudepts, Typic Udorthents, Inceptic Haplorendolls, Lithic Udorthents.

Key Words
North of Iran, soil chemistry, Soil physical properties, soil type, Keroudkenar forest

Introduction

Forests are considered as one of the largest and most splendid vegetation on earth .Accumulation of trees, shrubs, and other plants and small and large animals in certain habitats are not by chance at all. Our Caspian forests, which are consider deciduous hard- wood forests, covered the northern edge of the Alborz mountains in a narrow strip from Astra in Guilan Province up to Golidage in the east of Golestan Province from seacoast up to > 2500 meters above sea level. They contain more than 80 tree and shrub species.

Material and methods

This study was carried out in Keroudkenar - catchments in the southeast region of Nowshar city and starts [from sea level and finally ends up at Koleak pastures][s11] .The total area of the catchments is 1090.8 hectares. The purpose of this research was to determine some of the physical and chemical characteristics of the soil in this forest, the qualities of the trees based on the changes in soil types, and classification of the soil down to the subgroups level of Soil Taxonomy. These tasks were carried out in four phases as follows: 1- information and background collection, 2- field sampling, 3- soil testing and 4- statistics analysis.

Results

The masses of trees in the forests of Keroudkenar watershed are classified in categories of soils as follows : Entisols,Inceptisols,Mollisols and Alfisols and nine subgroups : Lithic Vermudolls, Inceptic Hapludolls,Typic Dystrudepts, Typic Hapludalfs,Lithic Udorthents,Inceptic Haplorendolls, Typic Paleudalfs,Humic Dystrudepts,andTypic Udorthents. The pH of these landforms vary from moderately to weakly acid .The texture of the most of the soils under investigation is clay to clay loam. And the structure of the soil surface horizons contains mainly aggregates with strong consistency. The color of the soil in dry state of horizons of excavated profiles is largely brown .In terms of other nutrients elements; they are in

rather satisfactory condition.

Table 1. Results of physical and chemical analysis of soils surface horizons from eighteen profiles from the Keroudkenar region (of Northern Iran).

Horizon	Depth	Sand	Silt	Clay	Texture	OC	OM	C/N	T.N	P	K	Ca	Mg	EC	Color	No	pH
		%				%				ppm		meq/l		ds/m			
A	0-23	15	35	50	C	3.6	6.2	15.6	0.23	12	210	3.6	1.8	0.033	10YR3/3	1	7.2
A	0-20	13	37	50	C	3.3	5.6	38.8	0.085	8	130	1.2	1.2	0.023	7.5YR5/4	2	6.5
A	0-20	27	32	41.2	C	2.93	5.04	8.18	0.358	8.2	190	2.4	0.5	0.015	10YR4/3	3	5.9
A	0-22	32	35	33	C.L	2	3.45	6.8	0.291	9	200	1.2	0.6	0.017	10YR4/3	4	5.7
A	0-21	43.2	30.3	26.5	L	2.4	4.13	18.7	0.128	13.5	230	1.01	0.6	0.018	10YR3/3	5	5.5
A	0-23	39	27	34	C.L	2.02	3.48	8.3	0.241	12	302	1.8	0.7	0.09	10YR4/3	6	5.7
A	0-10	36.56	28.64	34.8	C.L	3.75	6.45	4.8	0.78	16	239	6.8	1.6	0.071	10YR4/4	7	6.5
A	0-17	36.56	36.64	26.8	C.L	3.84	6.6	4.3	0.89	14	220	5	1.88	0.237	10YR4/3	8	6.5
A	0-22	26.4	43.24	30.36	C.L	3.72	6.39	6	0.62	15	240	2	1	0.08	10YR3/2	9	5.9

Table 2. The results of physical and chemical analysis of representative soils from 18 profiles in the study area located in the Namkaneh region (of Northern Iran).

horizon	Depth	pH	Sand	Silt	Clay	texture	OC	OM	C/N	T.N	P	K	Ca	Mg	Ec	Soil color	NO
			%				%				ppm		meq/l		ds/m		
A	0-25	6/8	27/12	32/72	40/16	C	3/45	5/93	6/3	./55	13/5	308	5/76	2/44	0.059	10YR3/2	10
A	0-24	6/8	35/2	28	36/8	C.L	3/61	6/22	4	0.92	14	230	4/6	0.4	0.031	10YR3/2	11
A	0-20	6	37	33	30	C.L	3/61	6/21	5/7	0.63	15	320	1/8	0.6	0.071	7.5YR3/2	12
A	0-20	7	30/2	23/64	46/16	C	3/78	6/5	7/25	0.521	8	169	4/8	0.2	0.056	5YR3/2	13
A	0-20	6/8	30/56	17/64	51/8	C	3/45	5/9	5/5	0.623	9	127	6	1/36	0.027	10YR4/3	14
A	0-20	7/1	30	27/64	42/16	C.L	3/585	6/16	8/5	0.42	6	135	5/8	1	0.036	10YR3/2	15
A	0-25	7/2	46/24	26/36	27/4	L	3/87	6/67	10	0.38	6	142	6	2	0.1	10YR4/2	16
A	0-10	7/7	21/12	28/28	50/6	C	3/75	6/45	17/8	0.21	18	200	4/8	0.4	0.074	7.5YR3/2	17
A	0-30	6/5	32/4	43/6	24	C.L	3/6	6/2	11/2	0.32	19	160	6/4	2	0.152	7.5YR4/1	18

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