

Determination of soil physical and chemical properties in pure stands of oak (*Quercus Castaneifolia*) in Galandroud forest (North of Iran)

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1. Abstract

This research was carried out at four stages: 1-information and background collection, 2-field sampling, 3 – soil test 4 – statistics analysis. At first stage, all information related to silviculture, climatology, geology, pedology, hydrology and etc were collected. At second stage, three distincts of galandroud forest which were located in north of Iran and contain pure stands of oak, were selected. In each distinct, six samples with 2000 square meter area were allocated. Then in the center of each sample, soil profile was dug with 1.5 m depth. Moreover, 30 dominant trees of oak were chosen and statistical parameters of them was measured, then, the accompanied plants were identified. At third stage, many parameters of soil samples were tested. The results showed that oak trees grow on six different soil types: Typic Haplumbrepts, Typic udorthents, Mollic Hapludalfs, Typic Rendolls, Lithic Udorthents, Typic udisamments. The mean of diameter and height in three elevation classes (lower than 500m, 500-1000m, higher than 1000m) was evaluated and it was confirmed that there is a significant difference between measured parameters in three localities with different subgroups of soil and the highest value of parameters were occurred in Typic udorthents soils.

Key-words: Galandroud forest, Oak tree, soil physics, soil chemical.

2. Introduction

The forests of *Quercus castanefolia* (North Oak) after beech tree are among the most valuable forest types, and for this reason, and also because of the different traditional and industrial consumptions of the wood of *Quercus castanefolia* (oak), these forests have been highly utilized long before. The cases such as highly reduction of levels of these forests, because of being located in plains and also slow steepness and changing these forests into agricultural lands, the lack of enough reconstruction or forestation with these species, and from another aspect with attention to the different usages of the wood of *Quercus Castanefolia* in industries, have made the necessity of urgent research plans for this species.

3. Methods

This study in the forest Galandroud watershed in North of Iran has been carried out and the goal of this research was the determination of some of physical and chemical characteristics of the soil of tree plantation site *Quercus castanefolia* (oak). The determination of the changes of quality of oak masses on the basis of the change of soil subgroup, classification of the type of soil under subgroup according to the soil Taxonomy USDA-NRCS 2006, and the comparison of the quality of the *Quercus Castanefolia* (oak) in different altitudes. These tasks were carried out in four phases as follows: 1- information and background collection, 2- field sampling, 3- soil test 4- statistics analysis.

4. Results

The masses of *Quercus castanefolia* (oak) located in the forests of Galandroud watershed are classified in categories of soils as follows: Entisols, Inceptisols, Mollisols and Alfisols, six soil subgroups, and the pH of these plots differ from acidity to alkaline. The texture of the most of the plots of soil under the investigation is clay and clay loam. So the conclusion is that the *Quercus castanefolia* (oak) grow of ten in the soils of heavy and semi heavy texture, and these profiles in their horizons contain a high percentage of sands and especially in Pmod series 11 have better quality in comparison with the other series. The results of statistical analysis of oaks trees in terms of diameter and height also showed that the species of oaks located in 1000m above sea level in comparison with two heights less than 500m and 500m up to 1000m. Had a better average of diameter and height.

Table 1 Results analysis physical and chemical soils samplings surface horizons eighteen profiles in three series Galandrood forests

horizon	depth	% sand	% silt	% clay	texture	% o.c	% o.m	C/N	T.N	P ppm	K ppm	ca meq/l	mg meq/l	EC ds/m	color	No	pH
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

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