Research Article

Physico - Chemical Properties of Soils in Different Mulberry Farms of Various Districts of Kashmir

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Abstract

Soil samples were collected to determine the physico chemical properties of mulberry farms of the six districts of the Kashmir valley viz., Baramulla, Ganderbal, Kupwara, Srinagar, Pulwama and Anantnag to study the relation of bulk density with other soil characters. The samples were taken from 0-30 cm depth and were analyzed by using standard procedures. The pH was measured by pH meter and the values ranged from 6.51-7.80 and electrical conductivity also measured by conductivity meter, ranges from 0.026 - 0.25(dS/m). The organic carbon ranged from 0.08-1.69 (%). Whereas bulk density was found in the range of 1.20-1.29 g cm−3 and the porosity was 43- 49.8%. The overall texture was found loam with few exceptions where sandy loam was found. Soil bulk density is a basic property influenced by some soil physical and chemical properties, mostly influenced by the amount of organic matter in soils, their texture, constituent minerals and porosity. Bulk density decreases as porosity and electrical conductivity increases irrespective of the varied pH. Thus it was concluded that soils from Mirgund, Watlab, Arampora, Chagul, Nunar, Aloochi Bagh, Krangus, Vessu, Tumlihaal and Galander mulberry farms were categorized as loam, from Lar and New Theed as sandy loam. It also concluded that bulk density has direct relationship with organic matter but independent to pH.

Keywords: Bulk Density; Soil; Porosity; Loam; pH

Introduction

Mulberry plays important role for the sustenance of sericulture industry, as mulberry leaves are the only feed for mulberry silkworm larvae. The status of sericulture industry when viewed from a stable rearing of silkworms can't be merely judged on the basis of a massive leaf crop. Besides, from the point of view of nutrition of silkworm larvae, the mulberry leaves should also be excellent qualitatively, depends upon the fertility of soil [1]. Soil is composed of minerals and organic matter which has pores to holds air and water. The bulk density of a soil is an indicator of soil compaction which is calculated as the dry weight of soil divided by its volume. This volume includes the volume of soil particles and the volume of pores among soil particals. Akgul and Ozdemir (1986) [2] studied the relationship between' soil bulk density and some soil proper-

ties explained that there constants can be estimated by means of regression model. While as according to Wayne Pluske., *et al*. (2013) [3] organic carbon improves many soil characteristics including colour, nutrient holding capacity, nutrient turnover and stability, which in turn influence water relations, aeration and workability. Sakin (2012) [4] too have found the relationship between organic carbon, organic matter and bulk density in some regions. Organic carbon influences many soil characteristics including colour, nutrient holding capacity, nutrient turnover and stability, which in turn influence water relations, aeration and workability Keeping in view the available literature on importance of soil fertilization and phsico properties of different mulberry soils of Kashmir valley so that problem of soils as an impediment in the enhancement of cocoon production and a probable reason for decreasing productivity of

cocoons be addressed in accordingly. Thus the present study was to determine the bulk density of soil samples along with organic carbon, electrical conductivity and pH of the various mulberry farms of the Kashmir.

Materials and Methods
Study area

The soil analysis was carried out in six districts of the Kashmir. Two districts from each zone of the valley covering north, central and south of the Kashmir valley. The aim of this study was to determine bulk density of soil samples along with different physico chemical properties of soils of different mulberry farms of the Kashmir. The soil samples were collected in three replicates at the depth of 0-30 cm. The samples were dried in shade, ground in a wooden pestle and mortal, passed through a 2mm sieve and analyzed for physico chemical properties using standard procedures. The pH and EC were determined in soil/water (1: 2:5) suspension kept overnight by conductivity meter (Jackson 1973) [5]. Organic carbon was calculated by Walkely and Black rapid titration method (1934) [6]. The soil bulk density was taken as dependent variable in order to find the statistical relationship of particle density, porosity, organic matter content and nutrient concentration with soil bulk density. Bulk density of soil was estimated by core mothed given by Jackson (1973).

Statistical analysis

The soil analysis was carried out with the confidence Interval of 95%. Calculations are presented in table 1 and 2.

Districts	pH	EC (ds/m)	OC %	B.D g/cc	Porosity %
Baramulla	6.95	0.20	1.41	1.31	40.1
Kupwara	6.95	0.15	1.22	1.18	51.8
Ganderbal	7.80	0.12	1.22	1.22	48.2
Srinagar	6.51	0.25	0.81	1.25	45.5
Anantnag	7.06	0.26	1.63	1.28	42.8
Pulwama	7.08	0.25	1.21	1.25	45.5
95% C.I LB-UB	7.02-7.44	0.14- 0.31	0.67-0.92	1.20-1.29	36.1-55.2
Overall mean	7.09	0.16	0.14	1.24	45.6

Table 1: Physico - chemical properties of the soils of mulberry farms of study area.

District	Farm	Coarse Sand %	Fine Sand %	Silt %	Clay%	Texture
Baramulla	Mirgund	0.198	47.802	40	12	Loam
	Watlab	0.196	45.804	41	13	Loam
Kupwara	Arampora	0.183	43.817	42	14	Loam
	Chagul	0.188	44.812	40	15	Loam
Srinagar	Aloochi Bagh	0.555	45.445	40	14	Loam
	New Theed	0.978	50.022	39	10	Sandy loam
Ganderbal	Lar	0.959	51.041	38	10	Sandy loam
	Nunar	0.679	45.321	42	12	Loam
Anantnag	Krangus	0.179	47.821	41	11	Loam
	Vessu	0.199	47.801	42	10	Loam
Pulwama	Tumlihaal	0.198	46.802	42	11	Loam
	Galander	1.508	48.492	40	10	Loam

Table 2: Soil texture of the mulberry farms of study area.

Result and Discussion

Bulk density is very essential for soil management and planning of modern farming techniques [7] and is influenced by texture, minerals and porosity [8]. The bulk density indirectly provides a measure of the soil porosity. Soil porosity is the ratio of the volume of soil pores to the total soil volume. Thus the bulk density of a soil is inversely related to the porosity. The bulk density was found in the range* of 1.20 - 1.29 with the overall mean of 1.24 g/cc. It was observed that the bulk density of district Kupwara was least 1.18 and higher in Baramulla 1.31g/cc. And the porosity ranged 36.1 - 55.2 with the overall mean of 51.8%. The results are also in agreement with the findings of Shazia (2016) [9] who recorded similar results for bulk density and porosity in some parts of Kashmir valley.

Soil pH is an important characteristic that determines not only the suitability of soil for crop production but also influences soil physical activities like structure and permeability. The soil pH recorded in spring at 0 - 30 cm depth was found in the range of 6.51 - 7.80 with the overall mean of 7.9. Similar observation was made by Farida (1997) [10] while working with soils of Kashmir also reported varied pH.

EC with same depth and season was recorded 0.026 - 0.25 dsm^{-1} with overall mean of 0.16dsm^{-1}. Similarly Soil organic carbon was found in the range of 0.67 - 0.92 with the overall mean of 0.14%. The resulted are also in conformity with the findings of Dandroo (2001) [11] while carrying studies in apple orchards under Kashmir climatic conditions also indicated similar observations. As organic carbon is found very important as it represents the soil fertility and productivity. Soil organic carbon appears to be an important parameter that controls sustainability of crop production [12,13].

range*: 95% of confidence Interval at lower bound and upper bound

Conclusion

It was concluded that the soil with least bulk density showed highest porosity. The farms under study showed varied pH, Electrical conductivity and Organic carbon. The soils from the selected districts were almost loam and few were sandy loam.

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