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Bulk density and various physico chemical properties of soils of different mulberry farms of Kashmir valley

Naina Majid*, Zia-ul-Haque, Shabir Ahmed wani.

Temperate Sericulture Research Institute, Mirgund SKUAST –K

ABSTRACT

An experiment was conducted to determine the physico chemical properties of mulberry farms of the three 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 conductivity meter and ranges 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 (dS/m). The bulk density found to be a function of texture of soil and it is related with electrical conductivity of soil. Bulk density decreases as porosity and electrical conductivity increases. Thus it was concluded that soils from Mirgund, Watlab, Arampora, Chagul, Pandithpora and Nunar mulberry farms were categorized as loam, from Chujhama and Yachahama as loamy sand and sandy loam from Lar. It also concluded that bulk density has direct relationship with organic matter but independent to pH.

Key words: Bulk density, soil, porosity, loam, pH

I 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 (Aruga. 2001).

Soils are composed of minerals, organic matter and pores which holds air and water. The bulk density of a soil sample of known volume is the mass (or weight) of that sample divided by the bulk volume. Soil bulk density is a basic soil property influenced by some soil physical and chemical properties.

Bulk densty is influenced by the amount of organic matter in soils, texture, constituent minerals and porosity. Akgul and Ozdemir studied the relationship between soil bulkdensity and some soil properties explained that there constants can be estimated by means of regression model.

Organic carbon influences many soil characteristics including colour, nutrient holding capacity, nutrient turnover and stability, which in turn influence water relations, aeration and workability (Wayne Pluske *et al* 2013). Soil organic matter plays a key role in nutrient cycling and can help improve soil structure (Morisada *et al* 2004, Leifeld *et al* 2005). As organic matter is an important source of nutrients for plants.

Bulkdensity depends upon the porosity, organic carbon and total nutrient content of the soil (Chandharia *et al* 2013).

Sakin (2012) obtained the relationship between organic carbon, organic matter and bulk density in arid and semiarid soils in south east Anatolia region. Increase in organic matter leads to change in nutrient concentration of soil so that available nutrients in the soil may play as important role in the variation of bulk density of soil.

The present study was to determine the bulk density of soil samples and its relationship with organic carbon, electrical conductivity and pH of the various mulberry farms of the Kashmir valley.

II MATERIALS AND METHODS

Study area :- The study was carried out in six districts of the Kashmir valley. 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 and its relationship with different physico chemical properties of soils of different mulberry farms of the Kashmir valley.

Three replicates of soil samples were collected from each district 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). Organic carbon was determined by walkely and Black rapid titration method (1934).

The soil bulk density was selected as dependent variable to determine statistical relationship of particle density, porosity, organic matter content and nutrient concentration with soil bulk density. Bulk density of soil was determined by core mothed given by Jackson (1973).

2.1 Statistical analysis

From the statistical analysis the result is tabulated in Table 1.

Table - 1

Districts	pH	EC(ds/m)	OC %	B.D g/cc
Baramulla	6.95	0.20	1.41	1.31
Kupwara	6.95	0.15	1.22	1.18
Ganderbal	7.80	0.12	1.22	1.22
Srinagar	6.51	0.25	0.81	1.25
Anantnag	7.06	0.026	1.63	1.28
Pulwama	7.08	0.25	1.21	1.25
Overall mean	**7.09**	**0.16**	**0.14**	**1.24**

III RESULT

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.

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 and EC with same depth and season was recorded 0.026 – 0.25 dsm-1 with overall mean of 0.16 dsm-1 . Similarly organic carbon in spring at 0 -30 cm was recorded in the range of 0.81 – 1.63 with overall mean of 1.27

IV CONCLUSION

It was concluded that bulk density has direct relationship with organic matter but independent to pH. The soils from the selected districts were almost loam and few were loamy sand and sandy loam.

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