A Study on the Physical Properties and Nutrient Status of Different Types of Soil Samples Selected in and around Shimoga Taluk

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To Cite this Article
N.Nagaraja. A Study on the Physical Properties and Nutrient Status of Different Types of Soil Samples Selected in and around Shimoga Taluk. *International Journal for Modern Trends in Science and Technology* 2021, 7, pp. 214-217. https://doi.org/10.46501/IJMTST0710034.

ABSTRACT

The Physical and nutrient study of soil is based on various parameters like colour Bulk Density, particle density, porosity, PH,ECand status of macro nutrients (N+P+K), status of calcium (Ca), Magnesium (Mg) and Sulphur (S). Soil Characterization of a selected region is an important aspect in relation to sustainable agriculture production. The primary (N+P+k) and secondary (Ca+Mg+S) nutrients are important soil elements that control its fertility and enchances the yield of crops. The soil samples (depth 0-15) were collected randomly in all the five taluks of shimoga district and compared for their Physical and Nutrient Status of soil. These results helps farmer for finding the problems related to soil, nature and nutrient status and improve the agricultural production.

KEYWORDS:-PH, EC,BD, PD, Porosity , Macronutrients, Micronutrients, Soil Colour.

INTRODUCTION

Soil is one of the most important natural resources. It supports the growth of plants by holding the roots firmly and supplying water and nutrients. Soil is essential for agriculture and is an inseparable part of our life. The earth fragrance of soil after the first rain is always refreshing.The transport of minerals, Water and nutrients at the root level and intake of these are equally important from the point of agriculture. Hence physical properties such as bulk density, particle density, compactness, speak about the porosity of the soil. Hence pore space acts like a capillary tube which is based on the principle of surface tension ,on the surface of the soil, water is conducted hydraulically from one place to another place.

Considerable amount of research work has been done on the soil chemistry, but study of soil physics has received less attention in spite of the great importance. Our objective of this work into systematically study the important physical properties of different types of soil found in and around the shimoga taluk. This enables us to draw conclusion regarding possible inter relation between soil properties and plant growth.

MATERIALS AND METHODS

The study area covers five taluks of shimoga district, Three samples were collected from Bhadravathi taluk namely Kammarana Halli(S1), Mavinakere(S2), Baranduru(S3)from Thrithahalli taluk Kuppalli(Su) and Hiredoide(S5) from sagar Haralikoppa grama (S6) and kalmane (S7) from Sorab Hireshankuna (S8) and Annadapura (S9) and Nidige (S10). From shimoga

taluk were selected for the study. Soil samples were collected from each village and composite soil samples (depth 0-15cm) were prepared the soil samples were air dried and processed to pass through 2mm sieve and analyzed for the colour of the soil using munsell chart. The BD,PD, Porosity, PH,EC macronutrients and micronutrients were analyzed as per methods standardized by krishi Vigyana Kendra suitated at Navile, Shimoga. Micronutrients were analysed by atomic absortion spectroscopy (AAS) technique in the soil testing laboratory O.T road shimoga.

RESULTS AND DISCUSSION
Physical properties:-
Bulk Density:-

In our current study bulk densityof soil samples collected from five taluk of shimoga district was done by the over dry method. The results range from 1.240 to 1.502gm/cc (Table 1). It is observed that soi sample of thirthahalli taluk has a high bulk density and less density where as sagar taluk has less bulk density and high porosity. The density values due to there coarse texture and low organic matter content (Swarnam,etal.,2004).

According to soil quality kit published by united states, Department of Agriculture, ideal soil density should be between 1.1 to 1.6 gm/cc, to which most of our values confirm. The soil over 1.80 gm/cc restrict root growth of plants, thus all the soil samples of our study may promote root growth.

Particle Density:-

Particle density of the soil is refered to the mass of the unit volume of the soil particles. In most of mineral soils particle density varies between 2.60 and 2.70gm/cc. The presence of large amount of organic matter may decrease particle density values varied from 2.016 to 3.10 gm/cc sorab and sagar taluk soil samples respectively.(Table-1)

Porosity:-

The result of porosity of the soil were recored in the (Table-1).It is found that the highest and lowest values of porosity were found in the sagar and sorab taluk respectively.

In our study, it is observed that the porosity of soil is inversely proportional to the bulk density.The sagar taluk has less bulk density high porosity and thirthahalli taluk sample has high bulk density and less porosity.

Aariff Khan and Kamalakar, (2012) reported on porosity values in soil samples collected from different soil horizons. In their study, the values of porosity in the profiles ranged from 38 to 60% in the origin of profiles. In our study showed that, the variation in the porosity values may be attributed to the soil particles size or may be due to other physical properties like soil texture(Leelavathi,etal,2009).

CHEMICAL PROPERTIES

Soil PH:-

Soil PH is an important chemical parameter which supports life in the earth including plants animals and for minute organism the Ph of the soil effects on nutrients status and all other parameters of the soil. In our present study, soil PH was done by PH meter and result obtained were interpreted by following the criteria suggested by Brady(1985).
The soil PH varied from 4.97 to 6.749 (Table-2).It is observed that all soil samples shoes neutral values. Thirthahalli taluk soil sample had minimum value of PH of 4.79 and shimoga taluk soil sample has maximum value of 6.74 most of the soil samples were in the ideal range.

Electrical Conductivity(EC):-

Electrical conductivity is an important parameter used to dectect the quality of the soil. Electrical Conductivity depends on the salt concentration in the soil and vice-versa. The result obtained in this study varied from 0.015 to 0.06 dsm-1 (Table-2) which fall under low conductivity group. Sagar taluk has a minimum value of conductivity and shimoga taluk has a maximum value of conductivity. The electrical conductivity may be ascribed to the leaching of salts to lower horizons(Singh, 2012).

Nitrogen:-

The data represented in Table-2 shows the Nitrogen status varied from 244.61 to 564,48 kgha-1. On the basis of the ratings suggested by Subbiah and

Asija,1956, the nitrogen was found to be medium in all soil samples. Thirthahalli soil has maximum value of nitrogen 564.48 kgha-1 (S4), and minimum value of nitrogen found in thirthahalli taluk of sample 5.The presence of nitrogen enhances plant growth , quality of yield seed and fruit production.

Phosphorus:-

Table-2 shows the phosphorus content varying from 8.14 to 458.75 kgha-1,Minimum and maximum amount of phosphorus were found in the bhadravathi and shimoga taluk respectively. Phosphorus improves root development, rapid growth and encourages blooming.

Potassium:-

The data represented in Table-2 shows the potassium status varied from 120.96 to 221.76 kgha-1. The potassium content is medium in all th soil samples except one soil sample (S7) of sagar taluk and it has minimum potassium content and maximum potassium is found in sorab (S9) taluk. Potassium is an important macronutrient which is present in sedmimentary and metamorphic rocks and also about 98% of potassium content in the soil is present in the form minerals (Chauhan, 2001). The potassium is used to build proteins.

Calcium (Ca):-

As Table-2 further elucidates the available calcium status varied from 2.20 to 5.5PPM. Availability of calcium is influenced by various soil factors and calcium content in various soils vary widely with the type of soil.

The minimum value of calcium content was found in Bhadravati taluk and maximum value of calcium content was found in the sagar taluk.

Magnesium:-

The data represented in Table-2 shows available Magnesium status which varies from 0.6 to 2.2 PPM. The minimum value of Magnesium status is in sorab taluk and the soil sample (S7)m of sagar taluk has a maximum value of Magnesium.

Sulphur Content:-

Table-2 shows the soil samples from different taluks exhibited a variation in available sulphur content in the soil. It is observed that the sulphur content varied from 7.2 to 10.5 PPM, all the soil samples shows have medium sulphur content. In this study, it is observed that Bhadravati taluk has minimum sulphur content and sorab taluk has a maximum value of sulphur content was recorded.

Table 1:-Physical Properties of Soil Samples

SL.No	Place	Bulk Density gm/cc	Particle Density gm/cc	Porosity %	Colour
1	Bhadravati	1.4344	2.3906	40%	Bright Yellowish Brown
2	Bhadravati	1.3908	2.4835	44%	Brown
3	Bhadravati	1.4728	2.456	40%	Bright Yellowish Brown
4	Thirthahalli	1.2748	2.4515	48%	Bright Yellowish Brown
5	Thirthahalli	1.5024	2.8892	38%	Dull Reddish Brown
6	Sagar	1.24	3.1	60%	Bright Yellowish Brown
7	Sagar	1.38	2.30	40%	Dark Brown
8	Sorab	1.336	2.834	60%	Dull Reddish Brown
9	Sorab	1.2096	2.016	40%	Olive Brown
10	Shimoga	1.266	2.2607	44%	Yellowish Brown

Table 2:- Chemical Properties of Soil Samples

Sl. no	Place	PH	EC dsm-1	N kgha-1	P_2O_5 kgha-1	K_2O kgha-1	Ca ppm	Mg ppm	S ppm
1	Bhadravati	5.44	0.032	457.86	145.33	133.28	2.2	0.8	9.2
2	Bhadravati	6.24	0.04	420.22	8.14	172.48	3.6	1.3	7.2
3	Bhadravati	6.35	0.026	244.61	154.73	188.16	2.8	1.8	8.9
4	Thirthahalli	4.97	0.024	564.48	8.82	173.6	3.1	1.3	6.9

5	Thirthahalli	6.04	0.019	244.60	24.43	151.2	4.2	2.0	7.9
6	Sagar	5.68	0.026	479.81	11.54	165.76	4.4	1.8	10.2
7	Sagar	5.65	0.015	357.50	91.61	120.96	5.5	2.2	8.0
8	Sorab	5.17	0.029	244.61	25.11	192.64	3.2	1.4	8.5
9	Sorab	5.45	0.018	301.06	17.64	221.76	2.6	0.6	10.5
10	Shimoga	6.74	0.06	260.29	458.75	165.76	4.8	2.0	8.5

CONCLUSION

From this study the results revealed that physical properties of a soil are also as important as their chemical nature in the overall assessment of quality of soils. The BD,PD, Porosity, PH, EC, Colour, primary and secondary nutrients of all five taluks of shimoga district are within permissible limits and therefore the soil seems to be suitable for both horiticultural and agricultural crops.

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