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Macro and Micro Nutrient Status of the Anthill soils of Chikkamagaluru and Haveri Districts of Karnataka

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ABSTRACT

Anthill is the natural geo technical structure that interestingly services natural Hazards in the Present study Anthill soil samples collected randomly from selected Places of Chikkamagaluru and Haveri districts and from each selected place the three composite samples collected randomly for analysis Physical Parameters like PH, Electrical Conductivity (EC), Colour and Chemical Parameters like Nitrogen , Phosphorous , Potassium (N+P+K), Sulphur (S), Boron(B), organic carbon (OC) ,Copper (Cu), Iron (Fe) , Manganese (Mn) and Zinc(Zn) were analyed.

Keywords: pH, Electrical Conductivity, macronutrients, micronutrients, organic carbon and soil colour.

INTRODUCTION

The macronutrients and micronutrients are important soil elements that control its fertility and enhance the yield of crops. If we fail to supply the proper nutrients in the proper concentration, the plant function is affected.

The Chikkamgaluru and Haveri districts of Karnataka was selected for the study. The Anthill soil samples were collected randomly in Chikkamagaluru and Haveri districts and compared for their physic-chemical properties. These results help farmers, researchers, agronomists and agriculture engineers for finding the processes related to soil, nature and nutrients status and help to improve the sustainable agriculture and horticulture production

The soil profile differs from place to place and region to region particularly with respect to their color, depth, and composition (Sumithra, et al 2013).

The total available primary macro nutrients and micronutrients are important soil elements that control its fertility and enhances the yield of crops (Singh 2012). Anthill soils generally have high clay content and this enhances water storage capacity (Ali and Talukder 2008).

The research work was to analyze the Anthill soils of various selected places of Chikkamagaluru, and Haveri districts in terms of their physico-chemical parameters and arrive at a comparative assessment of the similarities and differences that exist due to regional topography and climate and the consequention influence on favored crop type for harvest, their growth prospects and the final yield.

Chikkamagaluru is one of the district of Karnataka state in southern India. Spanning an area of 7.201 sq km. The five major rivers are tunga, Bhadra, Hemavathi, Nethravathi and Vedavati rivers flowing throughout the year. Coffee was first introduced into India through the Chikkamagaluru district when the first coffee crop was grown in the Baba Budan Giri Hills in 1670. It is a tourist heaven of Kemmannugundi, Kuduremukha, Manikadhar, Hebbe and Kallathigiri falls.

Haveri district is exactly in the centre of Karnataka state being equi-distant from Bidar in the far north and Kollegala in the far south. The soil profile differs from place to place and region to region particularly with respect to their color, depth, and composition (Sumithra, et al. 2013). Haveri is famous for its eardamors garlands and Bydagi re chillies. Siddeshwara temple haveri, Galageshwara temple at Galagaratta Mylaralingeshwara temple at Mylara rear Guttajs and Kaginele Mahasamsthana Kanaka Gurupeetha are major Tourism places in the district.

The average annual rainfall of the district was 768mm less by 3%compared to the normal rainfall of 792mm. Varada, Brahma, Kumadwathi and Tungabhadra all the four rivers flowing through Haveri district.

MATERIAL AND METHODS:

The study area covered two selected places like Birur of Chikkamagaluru district Ranebennur of Haveri district. These Anthill soil samples were collected from each place and composite soil samples were prepared the soil samples were air dried and processed to pass through 2mm sieve and analysed for the pH, EC, OC, and macronutrients were analyzed as per methods standardized to agriculture Krishi vigyana Kendra, an institution of Agriculture to University of Agricultural Sciences, Bangalore situated at Navule, Shivamogga. Micronutrients were analyzed by atomic absorption spectroscopy (AAS) technique in the soil test laboratory O.T road Shivamogga.

RESULTS AND DISCUSSION

Table 1: Anthill soil samples

Sl no	sample	place	PH	EC dsm^{-1}	OC %	N $Kgha^{-1}$	P $Kgha^{-1}$	K $Kgha^{-1}$	S Ppm	Z Ppm	B ppm	Fe ppm	Mn ppm	Cu Ppm
1	S 1	Birur	7.5	0.1	0.55	286.14	39.8	625	3.90	0.2	0.36	1.34	1.30	0.96
2	S 2	Birur	6.6	0.1	0.26	132.34	15.5	370.48	4.70	0.2	1.23	1.93	3.50	0.68
3	S 3	Birur	7.1	0.1	0.37	336.22	50.1	246.08	8.20	0.1	0.38	1.48	6.40	0.64
4	S 4	Ranebennur	5.2	0.1	0.65	200.30	11.0	125.43	17.20	0.4	0.31	15.86	14.50	2.14
5	S 5	Ranebennur	5.9	0.1	0.39	377.35	2.90	256.30	16.30	0.3	0.73	10.68	7.80	0.67
6	S 6	Ranebennur	5.7	0.1	0.73	315.55	15.5	171.70	16.80	0.5	0.24	13.11	10.70	1.54

Table 2: Variation of Average values of Physico-chemical properties of Anthill soil samples

Sl no	Sample no	place	pH	EC dsm^{-1}	OC %	N $Kgha^{-1}$	P_2O_5 $Kgha^{-1}$	K_2O $Kgha^{-1}$	S ppm	B ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm
1	S1-S3	Birur	7.06	0.1	0.39	203.87	35.13	413.85	5.6	0.65	0.16	1.58	3.73	0.76
2	S4-S6	Ranebennur	5.06	0.1	0.59	314.62	9.8	184.47	16.76	0.42	0.4	13.21	11.0	1.45

Soil pH and Electrical conductivity

The soil pH was analyzed far the Anthill soils collected from different of selected places of the selected area. The results of the average values of Anthill soil of pH were represented in table 2. The Anthill soil pH varied from 5.60 to 7.06. The data represented in Anthill soil samples of Birur had a maximum value of pH and Ranebennur of Haveri district has minimum Value of PH.

The pH of the soil provides information regarding the potency of toxic substances present (Baruah 1999). The electrical conductivity of all Anthill soil samples found to be constant is 0.1 dsm^{-1}. On the basis of limits suggested by muhr et. al (1995). Used for judging salinity of soils. All anthill soil samples of study area comes under low conductivity group. The electrical conductivity may be ascribed to the leading of salts to lower horizons (Singh 2012).

Organic Carbon (OC)

Organic carbon represents the carbon contents in the soil sample. This carbon is present in the soil in the form of organic matter, formed by the action decomposition process of plant and animals materials with the microorganisms. The result obtained from this study reveals that the organic carbon content of the average values the anthill soil samples is low in Birur of the chikkamagaluru district and high values of organic carbon content of the anthill soil samples in Ranebennur of Haveri district.The deficiency in organic carbon may due to hyperthermic temperature and good

aeration in the soil, water increases the rate of oxidating of organic matter (Singh and Mishra, 2012).

Nitrogen (N)

Nitrogen is an important macronutrient which plays a critical role in the determination of the nutrient status of the soil. The nitrogen content present in the soil is due to the continuous addition of residual content of plant and animals on the soil after decomposition. The data represented in table-2 Shows the average values available nitrogen content is minimum in Birur of chikkamagaluru district and maximum in Ranebennur of Haveri district varied on the basis of the ratings suggested by subsiah and Asija 1956.

Phosphorous (P_2O_5)

Phosphorus content is present in the form of phosphorous pentaoxide which is easily associated by the plants. The obtained results in the study indicate that, the mean value of the available phosphorous content of Anthill soil .According to observations of singh and Rathore (2013) soils of higher topography have higher phosphorous content from the soils of lower topography. In our present study lower topographic soil of Ranebennur had lower phosphorous content compare to higher topographic soil of chikamagalur.The phosphorous improves root development, rapid growth and encourage blooming.

Potassium (k_2O)

The potassium content present in the soil depends on the favorable soil environment with the pressure of organic matter Muhar et.al. 1963. The potassium is used to build protiens. In this current study, the results of available potassium content in the data tabulated in (table 2) shows the average value of available potassium status of anthill soil samples varying between 184.47 $kgha^{-1}$ to 413.85 $kgha^{-1}$. The minimum potassium content is found in Ranebennur of Haveri district and maximum potassium content was found in Birur of Chikkamagaluru district.

Sulphur content (S)

Table 2 shows the value of available sulphur content of anthill soil samples is varied from 5.62 ppm to 16.76 ppm. In our present study also revealed that the anthill soil samples in Birur of Chikkamagalur district has minimum sulphur content. Ranebennur of Haveri district has maximum sulphur content (table 2).

Boran (B)

The data represented in table 2 should that the Anthill Soil samples of Ranebennur of Haveri district has low boron content where as soil samples of Birur of Chikkamagalur district has high Boron content

Zinc content (Zn)

As table 2 farther elucidates the available zinc stauts of Anthill soil samples.The average values of Zn content revealed that Birur of Chikkamagalur district has minimum zinc content and Ranebennur of Haveri district has Maximum zinc content .Zinc is an important trace element which plays a major role in the growth and development of plants by promoting the production of growth hormones.

Iron (Fe)

Iron is very important micronutrients which plays an important role in synthesis and maintaince of chlorophyll pigment in plants and also involved in protein synthesis (Parkpean,et al 1986 and Partpien et al. 1988). Ranebennur of Haveri district has high iron content where as soil samples of Birur of Chikkamagalur district has low Iron content.

Manganese (Mn)

Manganese is an important micronutrient present in the soils which are utilized by the plants in trace amounts. Manganese also plays a important role in the process of photosynthesis. The data represented in (table 2) shows the available manganese status of anthill soil is minimum in Birur of Chikkamagalur district where as the soil sample of Ranebennur of Haveri district shows high manganese content.

Copper (Cu)

This present data indicates that all the anthill soil samples have high copper content.Minimum value of copper content present soil sample of Birur of Chikkamagalur district and Ranebennur of Haveri district has maximum value of copper content (table 2).

CONCLUSIONS

From this study we draw the following conclusions

1. The anthill soil samples of Birur of Chikkamgalur district belonging to the dry region had low organic carbon content compare to the Ranebennur of Haveri district.
2. Highest amount of potassium was found in anthill soil samples of Birur of chikkamagalur district and lowest amount of potassium of anthill soil samples was found in Ranebennur of Haveri district.
3. The Macro and Micro Nutrient status of all Anthill soil samples of Birur of chikkamagalur district and Ranebennur of Haveri district are within the permissible limits and it helps to enhance the fertility of soil.

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