Acta Scientific MICROBIOLOGY (ISSN: 2581-3226)

Volume 6 Issue 4 April 2023

Research Article

Study of Major Soil Nutrient Fertility Index, Availability of Some Micronutrient and Microbial Population of Panegaon Village of Newasa Tahasil of District Ahmednagar, Maharashtra India

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DOI: 10.31080/ASMI.2023.06.1237

Received: March 02, 2023

Published: March 24, 2023

Abstract

Present study was carried out during 2021-2022. 57 soil samples were collected from different agriculture lands of Panegaon village, Newasa Tahasil, Dist. Ahmednagar (Maharashtra) for the present study. Total area of the village is 635 hectares. The area under agriculture is 576 hectares. Total 57 soil samples were taken randomly. The parameters such as available major nutrients like nitrogen, phosphate, potassium, available micronutrients like zinc, ferrous, copper, manganese, and Percent organic carbon, microbial population were analyzed. Total 57 samples were analyzed for present investigation. On the basis of results obtained, it was recorded that, available nitrogen and phosphates were found lower; while available potassium was found very high. Soils for micronutrients were deficient in Ferrous (100%) followed by zinc (8.77%) while there was no deficiency of manganese and copper were recorded. The mean of percent organic carbon was recorded (0.3%) and microbial population were recorded 300000no. colonies per gm soil. Overall decrease in organic carbon and microbial population resulted in decrease in availability of nutrient in soil of the village panegaon.

Keywords: Soil; Micronutrients; Nutrient Status

Introduction

Soil is wonderful gift of nature for living creature. Soil supports good crop as an important environmental factor, because it has a close reciprocal relationship with the plants growing on it and the soil microbes that exist in it. Soil generally contains variety of nutrients required for plants. Nevertheless nutrient content in agricultural land is slowly reduced because it is absorbed by plants to meet its growth needs [1].

The soil is natural medium to supply essential nutrients for terrestrial crop plants. In India the 70% of rural and 8% urban households are still depending on agriculture [2]. Productivity of the soil goes on decreasing due to imbalance application of chemical fertilizers, heavy irrigation, lack of use of organic fertilizer, less green manuaring and crop rotation (Daji, 1996). In recent years, for obtaining more yield farmers have been using heavy doses of synthetic fertilizers and herbicides which resulted in the changes in the chemical and biological properties of the soil [3].

The availability of plant nutrients from soil is an important issue for crop management and sustainable agriculture [4]. The ability of soil to supply plant nutrients and water in adequate amounts and in suitable proportions is called soil fertility [5].

Soil generally contains variety of nutrients required for plants. Nevertheless nutrient content in agricultural land is slowly reduced because it is absorbed by plants to meet its growth needs [1]. Soil plays important role in the mineral cycle consisting mainly of the nitrogen, phosphorus, sulfur and carbon cycles.

Newasatahasil includes 120 villages comprising 134343 hectare area, out of which 122391 hectors area is under agriculture, 1475 hectors area is under forest. Average rainfall is 531.3 mm [6]. For studying fertility status of the soil, Panegaon village was selected. This village is located at the basin of mula river. The village is irrigated through water canal of mula dam, wells and tube wells.

Materials and Methods

One soil sample per hector area was collected using screw auger. The soil samples were collected from depth of 0-20 cm [7]. The collected soil samples were stored in clean cotton bags. The soil samples were air dried in shade. Plant residues, gravels, and other material were discarded, from collected soil. The soil samples were crushed in wooden mortar pestle and passed through 2 mm sieve, before analysis. Total 57soil samples were collected for present investigation. The parameters analyzed to evaluate the nutrient status were available Nitrogen (Alkaline permanganate method) [8,9], Available Phosphorous (Ascorbic acid method 1954); [9,10]. Available Potassium (Ascorbic acid method 1954) [9,11]. Extraction with 1N ammonium acetate and estimation using flame photometer (Systronics 128) microbial population by soil dilution method (Aneja., *et al*. 2002). The Analysis was done for ferrous, zinc, copper, manganese, by available micronutrient cations in soil sample [9,12]. The method consists of use of DTPA as an attractants which has been widely accepted for the simultaneous extraction of metal micronutrient cations viz., zinc (Zn), copper (Cu), iron (Fe), and manganese (Mn) in neutral and alkaline soils. The content of these cations in the extract is determined on an Atomic Absorption Spectrophotometer. (A.A.S).Fertility index were calculated [13,14]. Classification of nutrient index values was done [2,15].

Sr/no	Major Nutrient	Fertility Index	Fertility level
1	Available Nitrogen	0.88	Low
2	Available Phosphate	0.59	Very Low
3	Available Potash	2.97	Very high

Table 1: Soil Fertility index and fertility level of Major nutrients of Panegaon village.

Sr/no	Testing parameters	Deficient samples	Percentage
1	Ferrous	57	100%
2	Copper	00	0%
3	Manganese	00	0%
4	Zinc	05	8.77%

Table 2: Micronutrients percent deficiency in the soil of Panegaon village.

Sr/no	Testing parameters	Values
1	% Organic Carbon	0.3%
2	Microbial Population/gram soil	3 00000/gram soil.

Table 3: %t organic Carbon and Microbial Population in the soil of Panegaon village.

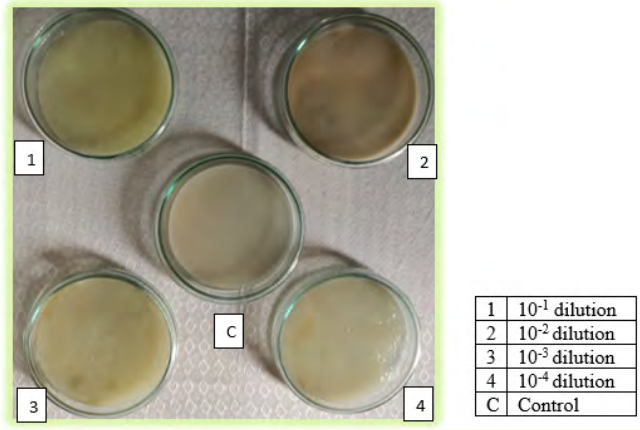

Photo Plate 1: Microbial Population the soil of Panegaon village.

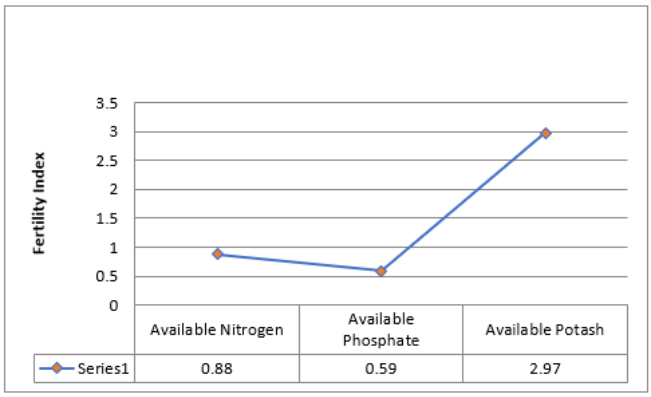

Figure 1: Soil Fertility index of Major nutrients of Panegaon village.

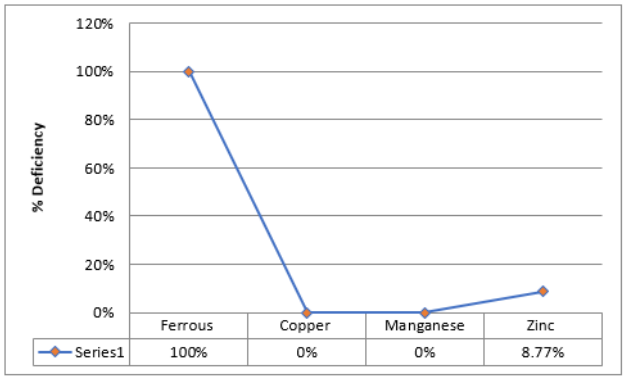

Figure 2: Micronutrients percent deficiency in the soil of Panegaon village.

Discussion

In above analyzed samples the available nitrogen phosphate was recorded very low and potassium was recorded very high. Out of these, 57soil samples were deficient in Ferrous 100%, 8.77% soil samples were deficient in zinc while there was no deficiency in copper and manganese were recorded. The percent organic carbon and microbial population were also recorded very low.

Conclusion

It is concluded that, the agriculture soil of panegaon village of newasa tahasil of ahmednagar district is sufficient in potassium, and deficit in organic carbon, nitrogen, phosphates, micronutrient like ferrous and zinc.

Overall the decreasing productivity of soils of Panegaon village is due decrease in organic carbon and microbial population resulted decrease in availability of nutrient like nitrogen, phosphates, ferrous and zinc. Copper and manganese were in sufficient quantity. To overcome problem of deficiency, farmer should adopt soil test based fertilizer recommendations and their application. They should go for green manuaring; organic fertilizers and sugarcane thrash and crop residue management practices along with proper drainage. It will help to improve the productivity of Soil and crop yield of Panegaon village of Newasa tahasil of Ahmednagar district of Maharashtra India.

Acknowledgement

Authors are thankful to Honorable Chairman, MLA Dr. Narendra Ghule Patil, Hon. MLA Chandrashekhar Ghule Patil, Dr. Kshitij Ghule Patil, Vice chairman Abhang Saheb and board of directors, Managing Director Anil P. Shewale, Secretary R.N. Mote, Loknete Marutrao Ghule Patil DSSK Ltd Bhende, Principal R.J. Barnbas, Bhaskar Pandurang Hiwale Education Societies Ahmednagar college Ahmednagar, Dr. R.G. Khose Former Head Dept. of Botany New Arts commerce and Science College Ahmednagar for their kind support during research work.

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