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Original Research Article

Assessment of Soil Fertility Status of Agricultural Research Station, Badnapur, India

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A B S T R A C T

Studies were conducted to assess the soil fertility of Agricultural Research Station, Badnapur. For this purpose100 surface soil samples were collected from five blocks (4 samples from each block) and their sub block of ARS, Badnapur. The data shows that these soils were low in available Nitrogen content, Medium in available phosphorous and high in available potassium. 32 per cent soil samples of ARS were deficient in Sulphur content.

Introduction

Soil fertility is one of the important factors in controlling yields of the crops. Soil characterization in relation to evaluation of fertility status of the soils of an area or region is an important aspect in context of sustainable agricultural production. Because of imbalanced and inadequate fertilizer use coupled with low efficiency of other inputs, the response (production) efficiency of chemical fertilizer nutrients has declined tremendously under intensive agriculture in recent years (Meena *et al.*, 2006).

The physico-chemical properties such as pH, electrical conductivity, organic carbon and calcium carbonate are important in deciding availability of essential nutrients in soil and thereby for crop production. The supply of essential nutrients from soil can be augmented by proper management of these properties. The macronutrients governed the fertility of the soils and control the yield of the crops. Crop nourishment in any region depends remarkably on soil nutrient availability and on their profile similarities. All these problems make it necessary to closely analyze the physico-chemical status of agricultural soils, if they are managed for benefits of the individual farmers and of mankind. For this purpose soil survey was carried out which have given an account of anatomy as well as physiology of soil mantle. It is not only helpful to choose correct fertilizer doses but also keep farmers informed about inherent qualities and deficiencies. Due to intensive cultivation practices and inadequate use of chemical fertilizers, the fertility and productivity of agricultural soil is deflecting. Therefore, an attempt is made to assess the fertility status of soil of Agricultural Research Station, Badnapur,

Materials and Methods

100 representative soil samples were collected randomly from 0-15 cm depth from Agricultural Research Station, Badnapur. The soil samples were grouped in 5 blocks viz B, C, D, E and F which were sub grouped B1, B2, B3, B4, B5, B6, B7, B8, C2, D1, D2, D3, D4, D5, D7, D8, E3, E4, E5, E6, E7, E8, F1, F2 and F3 and four samples from each blocks respectively. The experimental farm of Agricultural Research Station is 84.14 hectare sub grouped into five blocks as B, C, D, E and F. The block covers 25 plots. Four samples collected from each plot. The Collected soil samples were dried, pounded in wooden mortar and passed through 2 mm sieve. Each sample was thoroughly mixed to make it homogenous and preserved in properly labeled polythene bags for a laboratory analysis

Results and Discussion

Range and average values of N, P, K and S nutrients

The data on ranges and mean values of major and minor nutrients of soil of ARS, Badnapur was presented in Table 1. It shows that the available nitrogen of soils was ranged from 137.9 to 269.6, 149.2 to 236.6, 153.6 to 235.6, 150.5 to 268.9 and 137.9 to 269.6 kg ha-1, with an average 203.83, 192.9, 194.6, 209.7 and 203.75 kg ha-1, respectively. The available phosphorus content of soil depicted in fig 8 ranged from 10.75 to 21.09, 20.60 to 27.29, 12.64 to 25.7, 15.71 to 23.74 and 17.16 to 25.32 kg ha-1 with an average 15.92, 23.94, 19.17, 19.72 and 21.24 kg ha-1, respectively. The available potassium content of soil depicted in fig 9 varied between 450.24 to 686.88, 630.56 to 673.12, 540.96 to 722.4, 596.96 to 769.4 and 552.16 to 679.84 with an average 568.56, 651.84, 631.6, 683.2 and 616.0 kg ha-1, respectively. The available Sulphur content of soil depicted in fig 10 varied between 8.6 to 18.27, 13.25 to 14.3, 10.82 to 18.98, 9.09 to 17.32 and 11.69 to 18.65 with an average 13.43, 13.82, 14.65, 13.20 and 15.17 kg ha-1, respectively.

Categorization of soils on the basis of ratings of nutrients

Soils of Agricultural Research Station, Badnapur block were categorized as per the ratings (Parker, 1951) in various categories and the related data are presented as below

Categorization of soils on the basis of ratings of Nutrients

The critical appraisal depicted showed that among 100 samples, only one (01.00 per cent) were categorized very low in available N content and 99 samples (99.00 per cent)low in available N content. Among the various block, B block was having 31 per cent, C block having 4per cent, D block having 28 per cent, E block having 24 per cent and F block having 12 per cent soil samples categorized as low. As regard to available phosphorus content categorized as 2 per cent soils were low, 82 per cent medium and 16 per cent moderately high soils in phosphate. Among various block B block was having 31 per cent, C block having 1 per cent, D block having 21 per cent, E block having 20 per cent and F block having 9 percent soils were categorized as medium in available phosphorus content of B, C, D, E and F block respectively. Available potassium was found to be very high in soils of ARS block.100 per cent soils of all blocks were very high in potassium content. Among various block 32 percent, 4 per cent, 28 per cent, 24 per cent and 12 per cent soils were categorized as very high in potassium content of B, C, D, E and F block respectively.

Categorization of soils on the basis of ratings of Nutrients

Soil property	Block					
	B	**C**	**D**	**E**	**F**	**Total**
Available N (Kg ha^{-1})						
Very low	01 (01.00)	Nil	Nil	Nil	Nil	01 (01.00)
Low	31 (31.00)	04 (04.00)	28 (28.00)	24 (24.00)	12 (12.00)	99 (99.00)
Medium	Nil	Nil	Nil	Nil	Nil	Nil
Moderately high	Nil	Nil	Nil	Nil	Nil	Nil
High	Nil	Nil	Nil	Nil	Nil	Nil
Very high	Nil	Nil	Nil	Nil	Nil	Nil
Very low	Nil	Nil	Nil	Nil	Nil	Nil
Available P_2O_5 (Kg ha^{-1})						
Very low	Nil	Nil	Nil	Nil	Nil	Nil
Low	01 (01.00)	Nil	01 (01.00)	Nil	Nil	02 (02.00)
Medium	31 (31.00)	01 (01.00)	21 (21.00)	20 (20.00)	09 (09.00)	82 (82.00)
Moderately high	Nil	03 (03.00)	06 (06.00)	04 (04.00)	03 (03.00)	16 (16.00)
High	Nil	Nil	Nil	Nil	Nil	Nil
Very high	Nil	Nil	Nil	Nil	Nil	Nil
Available K (Kg ha^{-1})						
Very low	Nil	Nil	Nil	Nil	Nil	Nil
Low	Nil	Nil	Nil	Nil	Nil	Nil
Medium	Nil	Nil	Nil	Nil	Nil	Nil
Moderately high	Nil	Nil	Nil	Nil	Nil	Nil
High	Nil	Nil	Nil	Nil	Nil	Nil
Very high	32 (32.00)	4 (04.00)	28 (28.00)	24 (24.00)	12 (12.00)	100 (100)
Available S (Kg ha^{-1})						
Deficient	17 (17.00)	Nil	4 (04.00)	9 (09.00)	2 (02.00)	32 (32.00)
Sufficient	15 (15.00)	4 (04.00)	24 (24.00)	15 (15.00)	10 (10.00)	68 (68.00)

Table.1 Range and average values of nutrient status of soil of Agricultural Research Station, Badnapur

Sr. No	Block	Total samples	Available N (Kg ha^{-1})	Available P_2O_5 (Kg ha^{-1})	Available K_2O (Kg ha^{-1})	Available sulphur (Kg ha^{-1})
1	B	32	137.9-269.6 (203.83)	10.75-21.09 (15.92)	450.24-686.88 (568.56)	8.6-18.27 (13.43)
2	C	04	149.2-236.6 (192.9)	20.60-27.29 (23.94)	630.56-673.12 (651.84)	13.25-14.39 (13.82)
3	D	28	153.6-235.6 (194.67)	12.64-25.70 (19.17)	540.96-722.4 (631.68)	10.82-18.98 (14.65)
4	E	24	150.5-268.9 (209.73)	15.71-23.74 (19.72)	596.96-769.44 (683.2)	9.09-17.32 (13.20)
5	F	12	137.9-269.6 (203.75)	17.16-25.32 (21.24)	522.16-679.84 (616.0)	11.69-18.65 (15.17)

Figures in parentheses indicate average.

Table.2 Nutrient index values of ARS block soil

Sr. No.	Nutrients	NIV	Category
1	Available Nitrogen (N)	1	Low
2	Available Phosphorus (P_2O_5)	1	Low
3	Available Potassium (K)	3	High
4	Available Sulphur (S)	1.68	Medium

Available Sulphur content of ARS, block was deficient in 32 per cent soil samples in Sulphur

The result presented in Table 1 showed that low organic matter content of 12 per cent soil sample were low, 87 per cent soil were moderate and only 1 per cent soils moderately high in soil. The soils of ARS block were low in N content. The variation in available N content in soil could be attributed not only to the differences in their physiography, differential cultivation and management practices of these soils but also removal of N by the crop, losses through leaching, denitrification and volatization takes place. Some nitrogen is immobilized by soil microbes. These results were in confirmatory with results reported by Ambulgekar (1995) available nitrogen content in deep and medium black soils varied from 160.0 to 311.0, 144.50 and 123.0 to 231.0 kg ha-1. Malewar *et al.*, (1998) reported that the available nitrogen content in soils of semi-arid area of northern Marathwada were low to medium in nitrogen content, which were ranged between 78.42 to 266.96 kg ha-1.The variation in the available nitrogen content in soils could be due to difference in organic carbon content. The soils of ARS block were low to moderately high in available phosphorus content. 82 percent soil sample from ARS, Badnapur soils were medium. The variation in the availability of phosphorus might be due to variation in CaCO3 content of the soil, different soil properties and agronomic practices. The similar results were also reported by Bharambe *et al.*, (2001), they had reported

that the available P content in soils of Majalgoan command area were ranged between 9.6 to 24.0 kg ha-1.

The soils of ARS rated as high in potassium. This could be attributed due to the presence of potassium bearing mineral like, Feldspar and mica in the parent material. These results were in confirmatory with results of Malewar G.U. (1995) reported that the available potassium content in soils of Maharashtra was varied from 318.0 to 616 Kg ha-1. Waikar *et al.,* (2004) analyzed the soils of Marathwada region and reported that the available potassium content was ranges from 303 to 512 Kg ha-1. The Sulphur deficiency came up to the extent of 32 percent showed that high amount of clay content in soils which can adsorb varying amounts of S. This might be expected due to presence of Fe and Al oxides in surface soils Singh *et al.,* (2006). These results were in confirmatory with results of Mali and Raut (2001). These soils require urgent attention as must be supplied with sulphur. Patil *et al.,* (2000) surveyed the oilseed growing soils of Parbhani and Latur district one and half decade before reported sulphur deficiency was upto the extent of 30-40 per cent, which now found to be increased. This might be due to more mining of sulphur from these soils as indicative of increasing S deficiency.

Nutrient Index

The data on nutrient index value of ARS, block is presented in table 2. According to nutrient index value the soils of ARS block for Nitrogen and Phosphorus were found low in category and high nutrient index value for potassium as well as sulphur found in medium category. The data on nutrient index value revealed that the soil of ARS block was rated as low in Nitrogen and Phosphorus. Thus the soils of various blocks were expected to respond to added nitrogenous and phosphorous fertilizer to the greater magnitude. The soils containing low phosphorus may be because of its continuous uptake by field crops from soil and more calcium content of soil which applied phosphatic fertilizer in soil. The data presented in table 2 revels that the nutrient value of ARS, block soils is found in low category for nitrogen and phosphorous and potassium was high and sulphur is medium category respectively.

References

Ambulgekar, M.S. 1995. Assessment of nutrient status of grape orchard in Latur and Osmanabad district by soil and plant analysis. M.Sc. (Agri.) Thesis, submitted to MKV, Parbhani.

Bharambe, P. R., S. G. Kadam, S.D. Shinde, and D.K. Shelke, 2001. Characterization of soils Majalgaon canal command area (Jayakwadi project stage II) 47 (4): 749-754.

Kanthaliya, P.C. and Bhatta, P.L. 1991. Relation between organic carbon and available nutrients in some soils of Sub humid zone. *J. Indian Soc. Soil. Sci*. 39: 781-782

Mahapatra, P.K. and Sahu, S.K. 1996. Relationship between some major secondary and micronutrient status of soils growing groundnut

Malewar, G. U., A. L. Dhamak, and Syed Ismail 1998.Inter-relationship of forms of Fe with properties of soils of semi-arid area of Northern Marathwada. *J. Maharashrta Agric Univ.*, 23 (2): 199-201.

Malewar, G.U. 1995. Micronutrient availability as influenced by cropping pattern in Marathwada region of Maharashtra. *J. Maharashtra Agric. Univ.*20 (3): 330-333.

Mali, C.V. and P.D. Raut 2001. Available

sulphur and physico-chemical characteristics of oil seed dominated area of Latur district. *J. Maharashtra agric. Univ*., 26 (1):117-118.

Meena, H.B., R.P. Sharma, and U.S. Rawat 2006. Status of macro and micronutrients in some soils of Tonk district of Rajasthan. *J. Indian Soc. Soil Sci.* 54(4): 508-512.

Patil, V.D., C.V. Mali, G.U Malewar and P. B. Chalwade 2000 state level seminar on "Soil Health Management for Sustainable Agriculture" Akola chapter of Indian Society of soil science Dept. ACSS. Dr. PDKV Akola.

Waikar, S.L., G.U. Malewar, and S.D. More, 2004.Elemental composition of Humic and Fulvic acid in soils of Marathwada region of Maharashtra. *J. Maharashtra Agric. Univ.* 29 (2): 127-129.