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Research Article

STATUS OF MACRO NUTRIENTS IN NON-TRADITIONAL ARECANUT GROWING SOILS

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ABSTRACT

A Study conducted on characterization of surface soils (0-20 cms) to know the Macro nutrient status of Non- traditional areca growing areas by taking 100 representative surface samples from Arecanut gardens of different taluks pertaining to non- traditional areas, where pH ranged from neutral to alkaline in nature and electrical conductivity was with in permissible limit. Most of macro nutrient status indicates that majority of the samples ranged from medium to high.

Key Words: *Non- Traditional Areca Growing Area*

INTRODUCTION

Arecanut is one of the most profitable commercial plantation crops grown in humid tropics of India. In India, it is grown, in an area of 2.68 lakh hectares with production of 3.34 lakh tonnes. Traditionally, Arecanut is grown in Karnataka, Kerala, Assam, West Bengal, parts of Tamilnadu and Maharastra. The Karnataka state has got two distinct tracts viz, the malnad tract and madian (Non- traditional) tract. Malnad tract is said to be the traditional belt where in the crop has been grown with considerable past history. The heavy rainfall, variation in altitude, temperature fluctuation etc. plays a dominant role in determining the soil fertility and productivity also the status of soil fertility determines the level of crop productivity. Karnataka is the leading state with 1,68,000 hactare area and an annual production of 2.24 lakh tones (Anon., 2010). Most of the traditional areca growing soils are acidic in nature while non-traditional areca growing soils are alkaline in nature. For optimum arecanut production soil properties play a dominant role in addition to climatic conditions and water resources facilities. Soil is a basic non-renewable resource and a dynamic medium for plant growth. The status of soil fertility determines the level of crop productivity, variation in type, adverse factors and other soil characteristics influence the crop production.

MATERIALS AND METHODS

Macro nutrient status was studied by taking around 100 representative samples from Non- traditional arecanut belt. The collected soil samples were dried under shade. The laboratory analysis of soil samples was conducted at the Zonal Agricultural Research Station, college of agriculture Shimoga, Karnataka during 2010. The following standard procedures were adopted for analysis of the nutrients in the laboratory- organic carbon by Walkey and Black's wet oxidation method, nitrogen estimation by Kjehl Tech method, phosphorus by spectrophotometry, available potassium as described by (Jackson, 1973,) exchangeable calcium and magnesium by versenate titration method and available sulphur by Turbidometry.

RESULTS AND DISCUSSION

The pH values were moderately acidic to strongly alkaline (Table 1) alkalinity is attributed to the high rate of evaporation with less rainfall and base forming parent material. The electrical conductivity of soils

was found to be low (Table 1). This was due to leaching of soluble salts by irrigation water as well as high rainfall. Low electrical conductivity of soils indicate that the conditions prevailed was not favourable for accumulation of salts (Roy *et al*., 1962). The higher contents of organic matter at the surface are due to management factor like application of FYM and green manures at regular intervals by the growers and eventually CEC was ranged from 9 to 29 (cmol (p^+) kg^{-1}) in surface samples among different taluks. Ananthnarayana *et al*. (1986) further observed in their studies that the soils of Malnad area are low in cation exchange capacity.

Table 1: Chemical properties of surface soils of non-traditional arecanut growing soils of karnataka

Sl. No.	Taluks and No of samples	Depth (in cms)	pH (1:2.5)	EC (dSm^{-1})	OC (g kg^{-1})	CEC (cmol (p^+) kg^{-1})
1	Chitradurga (10)	(0-20)	7.58-8.5	0.08-0.89	4.0-18.0	12.3-29.0
2	Holalkere (10)	(0-20)	7.2-8.4	0.06-0.22	4.0-13.5	16.8-28.0
3	Hosadurga (10)	(0-20)	7.2-8.1	0.06-0.22	4.0-13.3	15.6-24.5
4	Davanagere (10)	(0-20)	6.8-8.04	0.08-0.80	4.5-18.0	10.0-24.0
5	Channagiri (10)	(0-20)	7.7-8.2	0.29 -0.92	8.1-18.1	9.0 -20.8
6	Honnali (10)	(0-20)	7.0-7.73	0.10-0.33	3.3-15.0	12.0-29.00
7	Harihara (10)	(0-20)	7.7-8.06	0.08-0.22	9.6-13.7	9.1-16.20
8	Tarikere (10)	(0-20)	7.3-8.05	0.03-0.28	6.6-16.8	12.8-21.8
9	Bhadravathi (10)	(0-20)	5.6-7.6	0.04-0.18	4.3-19.0	13.1-20.6
10	Kadur (10)	(0-20)	5.78-8.0	0.05-0.84	4.8-16.0	10-25.10

Among different soils studied lowest (120 kg ha^{-1}) and highest (724 kg ha^{-1}) nitrogen were recorded in surface soils of Tarikere and Channagiri taluks respectively. The available nitrogen content varied from 99.76 (low) to 763.68 kg ha-1 (high). Shukla *et al.*(1965) also observed wide variations of nitrogen in their studies, and different soils studied, lowest (3.5 kg ha^{-1}) and highest (42 kg ha^{-1}) phosphorus was recorded in surface soils of Honnali and Hollalkere taluks, in soils of Honnali and Hollalkere Taluks respectively. Among different soils studied, lowest (110 kg ha^{-1}) and highest (920 kg ha^{-1}) potassium were recorded in surface soils of Honnali and Bhadravathi soils. In surface soils lowest (5.1ppm) and highest (19 ppm) sulphur was found in Tarikere and Chitradurga taluks respectively.

These variations in macro nutrients is due to regular management like organic matter application, application of fertilizrers and inherent soil properties and season temperature variations etc. Mohapatra (1977) and Madiratta *et al.* (1985) also observed similar findings Among different soils studied lowest (2.7cmol (p^+) kg^{-1}) and highest (6.6 cmol(p^+) kg^{-1}) calcium contents were recorded in surface soils of Harihara and Bhadravathi. Among the different soils studied, lowest (0.9 cmol(p^+) kg^{-1}) and highest (3.7 cmol(p^+) kg^{-1}) magnesium were recorded in surface soils of Harihara and Honnali. This is in accordance with the findings of Walia and Chamua (1988). The exchangeable bases, calcium and magnesium were dominant cations followed by sodium and potassium. As such surface soils found to possess low cation exchange capacity.

Table 2: Macro- nutrient status of non- traditional arecanut growing soils

Taluks and No of samples and depth(0- 20 cms)	Ph (1:2.5)	N	P	K	S(ppm)	Ca
Chitradurga (10)	7.58-8.5	180- 146	14- 35	132- 648	16- 19	2.60- 5.50
Holalkere (10)	7.2-8.4	138- 582	27- 42	180- 916	16.2- 19	3.97- 5.00
Hosadurga (10)	7.2-8.1	161- 561	27.8 – 37	129- 582	13- 18.1	4.10-6.00
Davanagere (10)	6.8-8.04	210- 570	14- 41.6	178- 876	8-7- 18	3.7- 5.00
Channagiri (10)	7.7-8.2	416- 724	4.8- 25-6	157- 261	8.9- 16.2	3.2- 6.2
Honnali (10)	7.0-7.73	150- 615	3.5- 11.5	110- 810	5.1- 9.6	2.6- 4.70
Harihara (10)	7.7-8.06	546- 648	3.8-11.6	120- 820	9-14	2.7-4.10
Tarikere (10)	7.3-8.05	120- 631	14.6- 32	160- 910	5.1- 12.5	3.90- 5.70
Bhadravathi (10)	5.6-7.6	211- 618	4.8- 25-6	270- 920	9.1- 14	3.20- 6.70
Kadur (10)	5.78-8.0	228- 430	10- 32	264- 548	10.5- 18	3.90- 4.70

The results of the present investigation indicated that the majority of the soils were neutral to alkaline in nature. Because of the application of fertilizers, green manure and organic matter application the majority of the macro nutrients ranging from medium to high.

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