

Fertility Status of Arecanut Garden Soils in Koppa and Sringeri Taluks of Karnataka

Y. VISHWANATH SHETTY, M. S. NAGAMMA, M. DINESH KUMAR AND K. SHESHAGIRI

Agricultural College and Research Station, Shimoga-577 204

THE arecanut is one of the most profitable commercial plantation crops grown in humid tropics of India. In Karnataka, it occupies an area of 88,000 ha. Malnad tract of Karnataka consists of coastal plains of Dakshina & Uttara Kannada, Udupi, parts of Shimoga and hilly terrains of Chickmagalur districts. Apart from climatic features and water resources, soil characteristics play a dominant role in determining the crop health and as well sustained production. Being non-renewable and dynamic resource, soil fertility determines the crop productivity of the individual locations. Hilly region and coastal zone of Karnataka is a traditional home for the crop. Koppa and Sringeri taluks are situated in Chickmagalur district of hill zone of Karnataka and have malnad characters. It is characterized by heavy rainfall, variation in altitude, temperature fluctuations etc. In the present study, an effort was made to determine the physico-chemical properties and their fertility status of the arecanut gardens of Koppa and Sringeri taluks that would focus on adoption of appropriate cultural and nutritional management practices to keep the plants healthy and productive.

A laboratory study was conducted at the Zonal Agricultural Research Station, Shimoga, Karnataka during 2004. Characterization of surface soil (0-20 cm) for fertility status was studied by taking fifty representative soil samples in each taluks of Koppa and Sringeri. They are classified under Typic Haplustalts and Ustic Haplohumults and as many as 21 and 31 locations were covered in these taluks respectively. Major land use pattern of these areas consist of intercropping of arecanut with black pepper, coffee and vanilla. The soils vary in colour that includes brown, light and dark yellowish brown. In general, these soils are characterized by shallow depth, gentle to moderate slope, moderately well drained having acidic pH. The collected soil samples were air dried initially under shade and then in hot air oven at 110° C till it attained a constant weight and standard procedures were adopted for analysis *viz.*, particle size

analysis by Bouyoucos soil hydro meter method; organic carbon by Walkely and Black's wet oxidation method; nitrogen estimation by Kjeldahl method; phosphorus by Spectro photometry; potassium and sodium by Flame photometry; Exchangeable calcium and magnesium by Versenate method; and available sulphur by Turbidimetry. The per cent base saturation was calculated by using following formula

$$\text{Base saturation} = \frac{\text{exchangeable bases}}{\text{CEC}} \times 100$$

The data on different nutrients are presented as a mean of locations under each taluk. Correlations and regressions were also worked out as per the method given by Sundar Raj *et al.* (1972).

Physico-chemical properties : The data on particle size distribution is presented in Tables I and II respectively for Koppa and Sringeri taluks. Soils of different locations of these two taluks contain more than 50 per cent sand and clay content ranged from 9.31 to 34.16 per cent and these soils are texturally classified as sandy loam to sandy clay loam. As indicated earlier, these areas receive high rainfall and as a result clay fraction is always subjected to illuviation (Sahoo *et al.*, 1990). The data on chemical properties for Koppa and Sringeri is presented in Tables III and IV respectively. Bayasegadde and Hariharapura in Koppa taluk recorded lowest pH (5.0) while Nagalapura and Hirikere samples had highest pH (6.6) value and only two villages had neutral pH. For Sringeri taluk, Handigodu village was the only village recorded neutral pH while Kalsapura (4.3), Henur (4.3) and Belndur (4.3) samples recorded very low pH values. As these soils are inherited from granite and granite gneisses they usually lack basic minerals, due to sufficient rainfall with proper distribution and found to possess acidic pH with low electrical conductivity (Anantnarayana *et al.* 1974; Rao 1992). The average pH value was found higher in Koppa taluk. EC values varied from 0.01 to 0.26 dSm⁻¹.

TABLE I
Particle size distribution of surface soils of Koppa taluk

Nam of the village	Sand (%)	Silt (%)	Clay (%)
Singadala	74.84	5.00	20.16
Nagalapur	65.3-74.44(69.22)	6.25-10.0(7.65)	9.31-27.61(20.67)
Hariharapura	64.84-71.27(66.98)	5.0-7.96(6.08)	23.45-30.16(25.93)
Komti	64.84-68.3(66.57)	9.8-10.0(9.96)	21.9-30.16(25.93)
Belagadde	64.84	9.83	25.33
Hosakoppa	69.84-71.38(70.61)	7.0-9.0(8.0)	19.62-23.16(21.39)
Byasegadde	60.82	11.82	27.36
Kombatti	65.30-75.48(71.03)	5.81-7.83(7.26)	18.71-26.60(21.87)
Kulur	65.30-66.44(65.87)	7.9-8.7(8.3)	25.66-26.60(26.13)
Kawl Estate	55.16-74.19(69.9)	5.25-7.28(6.26)	20.56-27.96(23.86)
Guddethota	71.69	7.25	21.06
Somlapur	66.53	9.30	24.14
Thanoodi	73.30	7.42	19.35
Kachagol	65.09	8.41	21.50
Kalasapur	69.32	9.50	21.18
Andagar	64.02	11.08	24.90
Bettagiri	61.96	11.89	26.15
Ardikoppa	65.35	11.57	23.08
Kadige	64.85-71.57(68.21)	8.25-8.8(8.52)	20.18-26.53(23.26)
Kalkere	62.37	8.91	28.72
Begalur	69.99	7.36	22.65
Makkikoppa	65.46	8.05	25.49
Navilarekela	70.03-74.31(72.17)	6.57-7.09(6.83)	18.6-23.4(21.0)
Kacchiga	68.14-72.06(70.1)	4.89-6.52(5.70)	21.42-26.97(24.19)
Hirikere	65.38-70.3(67.84)	8.17-9.4(8.78)	20.3-26.45(23.37)
Yadehally	68.05-71.22(69.50)	8.36-9.31(8.86)	19.86-23.59(21.63)
Jaipura	69.36-73.56(71.46)	5.2-9.64(7.4)	21.0-21.24(21.12)
Uluva	67.42-72.36(69.67)	5.53-8.66(7.67)	22.12-25.81(23.99)
Bandlapura	74.21	5.57	20.22

Figures in parenthesis indicate mean value

Among the exchangeable bases, Ca and Mg were dominant cations followed by sodium and potassium. As such the surface soils found to possess low cation exchange capacity. This is in accordance with the findings of Walia and Chamua (1988), Sahoo *et al.*(1990) and Alur (1994). Soils from two taluks had fairly even distribution of exchangeable bases.

However, Ca content of the soils was slightly higher in Koppa taluk. Twelve and nine villages recorded exchangeable Ca value of $>5 \text{ cmol}(p^+) \text{ kg}^{-1}$ respectively in Koppa and Sringeri taluks. Among the different villages studied cation exchange capacity of $>30 \text{ cmol}(p^+) \text{ kg}^{-1}$ was noticed in six villages of both Koppa and Sringeri taluks. Further the base saturation was

generally of low status. Base saturation of 30 per cent was noticed in 24 villages of Koppa taluk and 14 villages of Sringeri taluk respectively. This might be attributed to textural variations and difference in the status of organic matter (Rao, 1992). Ananthnarayana *et al.* (1986) further observed in his studies that the soils of Malnad area are low in cation exchange capacity.

Nutrient status : Variations were observed in organic carbon content. Out of two taluks studied, only three villages *viz.*, Honne (4.8 g/kg), Kauchadi (4.8 g/kg) and few samples of Shidla (1.9 g/kg) had lower organic carbon while all other villages had sufficiency range. In Koppa and Shingeri taluk, as many as 24 and 22 villages had > 10 g/kg organic carbon. The distribution of organic carbon was fairly good in these taluks. Variations are accounted due to

TABLE II
Particle size distribution of surface soils of Sringeri taluk

Name of the village	Sand (%)	Silt (%)	Clay (%)
Hadagadde	73.12	4.72	22.16
Uluve	56.12	9.72	34.16
Kauchadi	63.92	8.92	27.16
Muruvinakombe	68.56-71.94(70.46)	8.59-12.28(10.12)	18.56-20.51(19.41)
Shidle	66.6-73.49(70.0)	7.25-8.25(7.88)	18.26-25.6(22.11)
Mense	63.83	14.07	22.10
Doddahonne	72.35-73.56(72.95)	9.28-11.01(10.12)	16.64-17.16(16.9)
Henur	61.52-70.12(66.13)	8.24-13.36(11.15)	19.85-25.5(22.71)
Mandegodu	68.3-71.2(69.75)	7.8-10.7(9.25)	21.0-21.2(21.1)
Belandur	77.71	5.62	16.97
Nemmar	72.69	6.25	21.06
Haggudi	69.19	10.25	20.56
Bagod	73.69	6.50	17.85
Thorehalli	68.69	12.25	19.06
Benkikudduge	66.94	8.96	24.41
Thekkur	65.69	12.3	22.01
Handigodu	68.19	8.75	23.60
Doddamane	72.69	7.08	20.26
Bandlapur	71.44-72.61(72.02)	7.37-9.28(8.32)	20.02-20.26(20.14)
Knagod	66.52-72.06(69.29)	8.87-8.89(8.88)	19.07-24.59(21.83)
Kuppanamakki	64.13-73.23(67.88)	10.12-13.55(11.7)	14.7-25.75(20.44)
Valabe	73.49	6.39	20.12
Komballi	64.31-73.65(69.60)	7.57-12.9(10.70)	15.63-25.92(19.68)
Kawli Estate	65.29-75.7(70.49)	10.25-12.57(11.44)	15.05-22.14(18.59)
Kalasapura	62.21-66.38(66.29)	12.22-13.41(12.81)	20.21-21.57(20.89)
Honne	66.82	9.02	24.16
Gudde Thota	68.12-72.53(70.32)	6.39-12.55(9.47)	19.43-21.08(20.25)

Figures in parentheses indicate mean value

TABLE III
Chemical properties of the surface soils of Koppa taluk

Name of the village	pH	EC (dsm ⁻¹)	OC (g kg ⁻¹)	Available		Exchangeable bases [cmol (p ⁺) kg ⁻¹]				CEC [cmol (p ⁺) kg ⁻¹]	B.S (%)	
				N(kg ha ⁻¹)	P ₂ O ₅ (kg ha ⁻¹)	K ₂ O(kg ha ⁻¹)	Ca ²⁺	Mg ²⁺	Na ⁺			K ⁺
Singadala	5.6	0.06	15.3	526.32	28.12	411.84	4.0	1.0	1.30	0.44	16.79	34.18
Nagalapur	5.6-6.7 (6.1)	0.01-0.11 (0.07)	13.4-18.0 (15.95)	460.9-619.2 (548.68)	18.2-28.93 (23.05)	262.08-327.6 (292.3)	3.9-6.2 (4.85)	1.2-4.3 (2.8)	0.49-0.8 (0.67)	0.28-0.35 (0.31)	21.3-30.86 (26.27)	23.97-40.07 (33.71)
Hariharpura	5.6	0.04-0.06 (0.05)	10.9-17.1 (13.1)	374.9-588.2 (450.6)	12.54-31.32 (21.33)	243.4-327.6 (287.04)	4.4-2 (4.1)	1.3-6 (2.56)	0.31-0.99 (0.69)	0.26-0.35 (0.31)	23.45-36.66 (28.10)	16.41-37.19 (29.18)
Komti	5.5-5.6 (5.6)	0.08-0.24 (0.16)	6.9-12 (9.45)	237.4-412.8 (325.08)	17.83-31.32 (24.57)	131.04-243.4 (187.2)	4.4-2 (4.1)	1.8-3.3 (2.56)	0.77-0.92 (0.84)	0.14-0.17 (0.15)	19.48-21.9 (20.7)	16.41-38.17 (27.3)
Belagadde	5.8	0.10	14.7	505.68	22.36	131.04	6.4	0.40	0.62	0.14	25.99	29.08
Hosakoppa	5.8-6.3 (6.1)	0.06-0.09 (0.07)	8.1-8.7 (8.4)	278.6-299.3 (288.96)	7.38-26.56 (16.97)	234.4-411.84 (322.92)	3.8-5.6 (4.7)	2.0-4.8 (3.4)	0.49-0.78 (0.63)	0.25-0.44 (0.34)	19.62-28.72 (24.17)	22.77-59.22 (40.99)
Byasagadde	5.0	0.05	14.8	509.12	36.64	346.32	0.2	0.80	0.62	0.37	23.26	8.55
Kombatti	5.2-6.5 (5.6)	0.02-0.03 (0.025)	13.2-15.9 (14.85)	454.1-546.9 (510.84)	16.09-28.89 (20.14)	234-346.32 (383.76)	3.9-5.8 (4.87)	1.4-2.7 (2.12)	0.35-0.76 (0.56)	0.25-0.37 (0.33)	21.96-29.96 (26.2)	22.29-35.20 (30.56)
Kulur	5.7-6.2 (5.9)	0.07-0.09 (0.08)	12.8-14.6 (13.7)	440.3-502.3 (471.3)	16.9-25.8 (21.14)	336.9-430.6 (383.76)	6.4-6.9 (6.65)	1.6-6.3 (3.95)	0.56-0.62 (0.59)	0.36-0.46 (0.41)	25.56-25.97 (25.67)	35.2-55.24 (45.22)
Kawi Estate	5.3-6.2 (5.7)	0.13-0.26 (0.19)	12-14.1 (13.05)	412.8-485.1 (448.92)	17.83-27.17 (22.5)	243.36-402.5 (322.92)	4.6-6.1 (5.35)	2.4-4.8 (3.6)	0.52-0.58 (0.55)	0.26-0.43 (0.34)	19.45-25.56 (24.93)	25.77-60.92 (43.34)
Guddethota	6.3	0.10	12.9	443.76	15.49	196.56	4.2	2.90	0.47	0.21	23.62	32.93
Somlapur	5.5	0.03	13.2	454.08	10.07	252.72	7.9	5.0	0.41	0.27	32.71	41.51
Thanoodi	5.8	0.03	13.2	454.08	17.78	336.96	5.5	2.9	0.77	0.36	27.13	35.12
Kachagol	6.3	0.04	9.0	309.60	19.61	177.84	4.7	3.5	0.50	0.19	17.47	50.88
Kalassapur	5.2	0.07	9.6	330.24	10.53	383.76	5.3	4.2	0.67	0.41	19.35	54.67
Andagar	6.1	0.02	6.6	227.04	18.70	346.32	5.2	4.0	0.48	0.37	24.19	41.54
Bettagiri	5.6	0.06	15.3	526.32	28.12	411.84	4.0	1.0	1.30	0.44	16.79	34.18
Ardikoppa	5.6-6.7 (6.1)	0.01-0.11 (0.07)	13.4-18.0 (15.95)	460.96-619.2 (548.68)	18.2-28.93 (23.05)	262.08-327.6 (292.3)	3.9-6.2 (4.85)	1.2-4.3 (2.8)	0.49-0.8 (0.67)	0.28-0.35 (0.31)	21.3-30.86 (26.27)	23.97-40.07 (33.71)
Kadige	5.0-6.0 (5.5)	0.04-0.06 (0.05)	10.9-17.1 (13.1)	374.96-588.2 (450.64)	12.5-31.32 (21.33)	243.36-327.6 (287.04)	4.4-2 (4.1)	1.3-6 (2.56)	0.3-0.99 (0.69)	0.26-0.35 (0.30)	23.5-36.66 (28.10)	16.41-37.19 (21-9.98)
Kalkere	5.9	0.04	14.4	495.36	18.32	252.75	6.10	4.8	0.83	0.27	24.65	48.68
Begalur	6.1	0.05	10.9	374.96	17.78	140.40	3.7	2.4	1.46	0.15	30.54	25.24
Makkikappa	5.8	0.03	10.2	350.88	16.41	187.20	3.2	2.4	0.47	0.20	26.12	23.23
Navilarekela	5.2-5.6 (5.4)	0.03-0.05 (0.04)	14.0-15.9 (14.95)	481.6-546.96 (514.38)	16.96-25.8 (21.38)	157.1-205.92 (188.52)	3.5-4.2 (3.85)	2.4-3.4 (2.9)	0.3-0.63 (0.46)	0.17-0.22 (0.19)	18.6-23.4 (21.0)	34.65-36.02 (35.33)
Kacchiga	5.4-5.7 (5.6)	0.01-0.13 (0.07)	9.0-21.6 (15.3)	309.6-743.04 (526.32)	16.1-19.15 (17.62)	187.2-299.52 (243.36)	3.8-6.4 (5.1)	3.6-4.9 (4.25)	0.4-0.45 (0.43)	0.2-0.32 (0.26)	21.4-26.97 (24.19)	29.84-56.2 (43.02)
Hirikere	5.4-6.6 (6.0)	0.01-0.05 (0.03)	11-12.1 (11.55)	378.4-416.24 (397.32)	11.0-15.26 (13.21)	224.6-243.36 (234.0)	6.1-6.5 (6.3)	3.2-4.9 (4.05)	0.4-0.55 (0.46)	0.24-0.26 (0.25)	20.3-26.45 (23.32)	38.22-59.21 (48.71)
Yadehalli	5.0-6.0 (5.5)	0.02-0.05 (0.03)	8.2-14.6 (11.7)	282.1-502.24 (447.2)	17.4-28.89 (21.36)	224.6-299.52 (262.08)	3.5-4.6 (3.96)	2.7-3.8 (3.13)	0.6-0.85 (0.75)	0.28-0.32 (0.28)	19.9-23.59 (21.63)	32.21-47.43 (37.99)
Jaipura	5.1-5.7 (5.4)	0.1-0.04 (0.07)	7.8-10.8 (9.3)	268.3-371.52 (319.92)	12.0-19.16 (15.6)	102.96-365.0 (234.0)	3.8-5.4 (4.6)	2.9-3.6 (3.25)	0.7-0.86 (0.79)	0.11-0.39 (0.24)	21.0-21.24 (21.12)	36.52-47.64 (42.08)
Uluva	5.5-5.9 (5.7)	0.05-0.04 (0.05)	9.3-14.1 (11.0)	330.2-483.04 (378.4)	14.61-18.7 (16.89)	243.4-346.32 (296.44)	4.9-6.9 (5.83)	4.2-6.6 (5.0)	0.7-0.94 (0.86)	0.26-0.37 (0.31)	22.1-25.81 (23.99)	40.29-66.78 (50.76)
Bandlapura	5.6	0.03	13.8	474.72	15.83	215.28	5.9	4.5	0.46	0.23	20.22	54.84

Figures in parenthesis indicate mean value

TABLE IV
Chemical properties of the surface soils of Sringeri taluk

Name of the village	pH	EC (dsm ⁻¹)	OC (g kg ⁻¹)	Available		Exchangeable bases [cmol (p ⁺) kg ⁻¹]				CEC [cmol (p ⁺) kg ⁻¹]	B.S (%)	
				N(kg ha ⁻¹)	P ₂ O ₅ (kg ha ⁻¹)	K ₂ O(kg ha ⁻¹)	Ca ²⁺	Mg ²⁺	Na ⁺			K ⁺
Hadagadde	4.7	0.1	15.6	536.64	44.28	346.32	1.4	0.76	1.1	0.37	27.70	13.1
Uluve	5.4	0.02	18.9	650.16	26.24	421.20	4.4	0.58	2.8	0.45	28.31	29.07
Kauchadi	5.7	0.08	14.8	588.34	46.89	374.40	6.4	0.89	4.0	0.40	28.05	41.67
Murvinakombe	5.2-6.2 (5.8)	0.01-0.08 (0.05)	12.3-22.2 (15.66)	412.8-515.1 (487.3)	26.03-30.96 (28.5)	318.2-383.8 (349.41)	3.1-5.4 (4.33)	0.62-0.69 (0.65)	2-3.6 (3.06)	0.34-0.41 (0.37)	20.46-28.2 (26.17)	29.96-35.6 (32.66)
Shidle	5.6-6.0 (5.8)	0.01-0.02 (0.01)	13.9-18.6 (16.5)	378.4-505.7 (442.04)	18.5-30.09 (23.99)	299.5-411.8 (358.02)	3.2-5.2 (4.0)	0.41-1.02 (0.61)	2-2.7 (2.4)	0.32-0.44 (0.38)	18.6-30.2 (25.81)	25.3-34.56 (31.19)
Mense	5.9	0.02	12.3	423.12	17.86	355.68	2.4	0.67	3.2	0.38	28.71	29.28
Doddahonne	4.7-5.0 (4.8)	0.02-0.04 (0.03)	9.5-12.6 (11.05)	326.8-433.4 (380.12)	18.4-32.7 (25.55)	327.6-374.4 (351)	2.6-3.2 (2.9)	0.62-1.04 (0.83)	2-2.4 (2.2)	0.35-0.40 (0.37)	17.4-23.43 (20.41)	30.0-32.01 (31.02)
Henur	4.3-6.2 (5.3)	0.02-0.07 (0.045)	12.9-19.5 (16.55)	443.8-370.8 (569.3)	20.24-32.7 (26.24)	346.3-449.3 (414.2)	3.4-4.2 (4.0)	0.25-0.8 (0.51)	2.1-3.3 (2.72)	0.37-0.48 (0.44)	18.79-34.43 (27.39)	22.3-36.13 (27.48)
Mandegodu	5.5-5.6 (5.55)	0.04-0.05 (0.045)	17.7-18.9 (18.3)	608.9-650.2 (629.52)	16.21-19.05 (17.63)	290.2-421.2 (355.68)	2.6-2.8 (2.70)	0.36-0.65 (0.50)	2-2.8 (2.4)	0.31-0.45 (0.38)	15.45-18.14 (16.92)	32.98-38.2 (35.58)
Belandur	4.1	0.02	17.4	598.56	21.48	486.72	2.7	0.62	1.7	0.52	19.12	28.97
Nemmar	5.2	0.01	15.6	536.64	19.52	290.16	3.5	0.83	2.8	0.31	25.79	28.84
Haggudi	5.4	0.01	15.9	546.96	28.95	299.52	2.6	0.91	2.4	0.32	24.37	25.56
Bagod	5.8	0.02	13.2	454.08	41.99	336.96	2.9	0.38	1.8	0.36	21.17	25.69
Thorehalli	6.0	0.01	13.2	454.08	19.63	318.24	2.1	0.43	1.9	0.34	19.20	24.84
Benkikudduge	5.8	0.01	9.0	309.6	21.21	308.88	3.3	0.32	1.6	0.33	17.36	31.97
Thekkur	5.8	0.02	9.6	330.24	19.05	271.44	3.3	0.41	1.7	0.29	25.30	22.50
Handigodu	6.5	0.02	12.3	423.12	25.83	411.84	4.2	0.53	2.3	0.44	19.80	37.72
Doddamane	5.5	0.02	8.4	288.96	27.20	327.6	3.2	0.69	2.4	0.35	28.76	23.08
Bandlapur	5.1-5.6 (5.4)	0.01-0.02 (0.015)	12.9-17.4 (15.15)	443.8-598.6 (321.16)	12.18-19.92 (16.05)	196.6-299.52 (248.04)	1.4-2.5 (1.92)	0.43-0.61 (0.52)	2-2.9 (2.45)	0.21-0.32 (0.26)	20.46-29.80 (25.13)	16.4-26.5 (21.45)
Kanagod	5.7-6.1 (6.0)	0.04-0.14 (0.09)	11.1-13.5 (12.3)	381.8-484.4 (423.12)	15.2-17.9 (16.53)	308.9-419.3 (404.1)	4.4-6.3 (5.35)	0.55-0.81 (0.65)	2.4-3.1 (2.75)	0.33-0.48 (0.4)	23.16-33.40 (28.28)	23.8-45.03 (34.4)
Kuppanamakki	5.8-6.1 (6.0)	0.04-0.09 (0.06)	8.6-16.2 (13.4)	295.8-557.3 (460.96)	10.8-53.9 (28.78)	271.4-468 (358.02)	2.4-5.4 (4.05)	0.43-0.61 (0.52)	1.6-4.2 (3.03)	0.29-0.5 (0.38)	28.32-33.37 (30.67)	16.3-31.79 (26.03)
Valabe	5.8	0.03	17.7	608.88	32.70	336.96	3.5	0.49	1.9	0.36	22.45	27.83
Komballi	5.3-5.9 (5.6)	0.01-0.14 (0.05)	7.5-16.6 (13.2)	258.5-71.04 (454.76)	11.2-19.1 (15.09)	43.4-458.64 (320.11)	1.9-6.6 (3.93)	0.31-1.03 (0.62)	0.8-4.6 (2.67)	0.26-0.49 (0.37)	20.52-32.4 (25.98)	12.7-48.97 (29.78)
Kawli Estate	5.3-5.8 (5.6)	0.1-0.03 (0.06)	15.6-17.1 (16.35)	536.6-588.2 (562.44)	28.5-42.0 (35.26)	205.9-402.5 (304.2)	2.7-3.5 (3.1)	0.64-0.89 (0.76)	1.7-2.3 (2)	0.22-0.43 (0.32)	21.12-29.49 (25.30)	17.8-33.7 (25.77)
Kalaspura	4.3-5.6 (5.0)	0.03-0.06 (0.045)	9-10.5 (9.75)	309.6-361.2 (335.4)	12.3-23.4 (17.80)	252.7-271.4 (262.08)	2.9-5.7 (4.3)	0.51-0.65 (0.58)	1.3-3.4 (2.35)	0.27-0.29 (0.28)	26.18-35 (30.59)	19.0-28.68 (23.85)
Honne	5.8	0.04	14.8	165.12	16.50	196.56	1.2	0.3	0.8	0.21	23.17	10.83
Gudde Thota	5.6-6.1 (5.8)	0.03-0.04 (0.035)	12.3-16.5 (14.4)	423.1-567.6 (495.36)	19.05-23.8 (21.42)	336.9-439.9 (388.44)	2.9-4.6 (3.76)	0.96-1.1 (1.03)	1.6-2.9 (2.25)	0.36-0.47 (0.41)	25.5-27.8 (26.6)	23.8-31.87 (27.83)

management practices like organic matter application, temperature variations etc. Mohapatra *et al.* (1975) and Madiratta *et al.* (1985) also made similar findings. The available nitrogen content varied from 165 (low) to 743.04 kg ha⁻¹ (high). Relatively Koppa soils had lower average available nitrogen, phosphorus and potassium than Sringeri. Majority of the soil samples from Koppa taluk were medium status (82 %) for available nitrogen. The Sringeri taluk also had higher proportions of medium rating (62 %) followed by high (26 %) status. Hence, the nutrient indices for both taluks remained medium. The data on available phosphorus indicate low (7.38 kg ha⁻¹) to medium (53.91 kg ha⁻¹) status (Gajanan *et al.*, 1995). Here 76 per cent of Koppa soils had lower P status as against 50 per cent of Sringeri soils hence both soils had lower indices. Available potassium ranged from 43.36 to 486.72 kg ha⁻¹ and 64 per cent of Koppa samples were medium status as against 52 per cent of Sringeri samples were high status. The two taluks studied had high index value (>2) with high fertility rating. Time to time management of gardens with organic sources and other fertilizers might be the reason for the variations.

In conclusion, the study revealed that surface soils of traditional areca nut gardens are sandy loam to sandy clay loam in texture, acidic (slight to moderate) in nature with low salt accumulation and cation exchange capacity. Majority of soils were medium in available nitrogen and phosphorus while available potassium status was high.

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