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Characterization and Classification of Bamboo (*Dendrocalamus strictus* and *Bambusa bamboos*) Supporting Soils in Talakona Forest Area of Chittoor District in Andhra Pradesh

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ABSTRACT

Six representative pedons located in bamboo grown forest soils of Talakona forest area in Chittoor district of Andhra Pradesh are selected for their characterization and classification. The soils were distributed on uplands and plains and were developed from granite-gneiss parent material. The soils were shallow to deep in depth, reddish brown to brown in colour and texture varied from loam to clay in surface while sandy loam to clay in sub-surface. Structure varied from crumb to angular blocky in surface horizons whereas it varied from sub-angular blocky to angular blocky in sub-surface horizons. The soils are slightly acidic to neutral in reaction, non-saline, low in organic carbon, low in CEC (11.23 to 22.26 cmol (p+) kg^{-1}) and bulk density ranged from 1.19 to 1.32 Mg m^{-3}. The bamboo grown forest soils are low in nitrogen, medium in phosphorous and potassium and sufficient in available sulphur. DTPA extractable micronutrients in the bamboo grown forest soils were sufficient in available Zn, Cu, Mn and deficient in DTPA extractable Fe. Bamboo grown forest soils of Talakona forest area taxonomically grouped under: Typic Ustorthent, Lithic Ustorthent, Typic Haplustalfs,Typic Haplustepts and Typic Dystrustepts.

Key words : Available Macro and Micronutrients, Bamboo grown forest soils, Characterization, Classification

Bamboo is known as poor man's timber. There is a huge demand for bamboo from all quarters. A large chunk of rural population ekes out their livelihood by making articles of bamboo. Bamboo is found in good quantities in Napier RF of Tirupati range and is moderately available in Srikalahasthi and Puttur ranges. A little quantity is also found in Chittoor East and Bhakarapet ranges. The mixed forests of the division contain bamboo forests, occurring as moderate to dense and gregarious under-storey at places. Bamboos are mostly confined to hilltops, slopes, valleys, stream banks and moist localities (Subba Reddy, 2008). Like any vegetation, bamboo also exerts significant in put on soil physical, chemical and biological properties. Soil improvement with respect pH, exchangeable Ca, Mg and K was observed due to the growth of bamboo (Pant *et al.*, 1993). Though bamboo is grown in many forest areas of Chittoor district, till know no information is available regarding physical and physico-chemical properties ,nutrient status and taxonomy of bamboo grown forest soils of Talalkon forest area in Chittoor district of Andhra Pradesh. Keeping the above facts in view, the present investigation was taken up to study the physical and phsico-chemical properties, nutrient status and taxonomy of bamboo grown Talakona forest soils.

MATERIAL AND METHODS

The study area forms a part of southern agro-climatic zone with semi-arid monsoonic climate located in Chittoor district of Andhra Pradesh. The mean annual rainfall is 1221 mm. The mean annual soil temperature is 31.91ºC with a mean summer soil temperature of 32.07 ºC and mean winter soil temperature of 27.75 ºC. The soil moisture and temperature regime are ustic and iso-hyperthermic.

Six typical pedons in bamboo grown soils of Talakona forest area (13º 48' 49" N and 79º 11' 30" E to 13º 48' 43" N and 79º 10' 30" E) at an elevation of 640 m above MSL were selected having different types of bamboo and site characteristics in Chinthamanudhadi (P1), Makularevu-1 (P2), Malularevu-2 (P3), Chittaela Dhinni (P4), Vinikara Dhadi (P5) and Chinthlarevu (P6) of Chittoor district in Andhra Pradesh. The site and morphological characteristics were studied (Soil Survey Division Staff, 1995). Horizon wise soils samples were collected and were analysed for physical, physico-chemical, macronutrients and micronutrients by following standard procedures (Jackson, 1973). The soils were classified by adopting USDA soil taxonomy (Soil Survey Staff, 1998). The DTPA extractable micronutrient cations anlysed as per procedure outlined by Lindsay and Norvell (1978).

RESULTS AND DISCUSSION

Morphological characteristics

Morphological characteristics (Table 1) indicated that the soils on the plains were shallow to deep in depth ranging from 0.71 – 1.50 m (Pedon 1 and 2) and were yellowish red to brown in colour (5YR 4/6 to 10YR 4/3) whereas soils on uplands were shallow to deep in depth ranging from 0.30-1.20 m (pedon 3, 4, 5 and 6) and were reddish brown to dark yellowish brown in colour (5YR 4/4 to 10YR 3/4). The dark colour of pedon is mainly due to the complexation of humus with mineral matter and iron oxides. Occurrence of iron oxides in various hydrated forms might have resulted in dark colour to soils on uplands (Walia and Rao, 1996). The consistency varied from slightly hard to very hard (dry), friable to very firm (moist) and slightly sticky and slightly plastic to very sticky and very plastic. These variations in consistence correspond to clay content. Similar results are reported by Basava Raju *et al.,* (2005). Soils showed wide textural variation from loam to clay in surface and sandy loam to clay in sub-surface (plains and uplands). The soil matrix of none of the pedons showed any effervescence with dilute HCl.

Physical properties

The bulk density ranged from 1.17 to 1.33 Mg m^{-3} and showed increasing trend with depth. Lower bulk density of the surface soil could be attributed to higher organic matter content (Vara Prasad Rao *et al*., 2008). The particle density of the soils varied from 2.11 to 2.41(Table 2) and does not showed much variations in all the horizon in bamboo grown forest soils of Talakoana. Water holding capacity also showed increasing trend with depth in all the pedon except in pedon 2. Increase in water holding capacity of bamboo grown forest soils with depth might be due to increased in clay content with depth. Texture varied from loam to clay in surface and sandy loam to clay in sub-surface soils. These wide textural variations (sandy loan to clay) are result of parent material, topography, *in-situ* weathering and translocation of clay. Similar results were reported by Thangasamy *et al.,* (2005).

Physico-chemical properties

Bamboo grown forest soil of Talakona forest area are slightly acidic to neutral in reaction (5.7-7.5)The organic carbon content of surface soils varied from 2.4 to 3 g kg^{-1} and decreased with depth (Table 3). In general both surface and sub-surface soil samples are low in organic carbon. The lower organic carbon content in different horizon could be ascribed to prevalence of tropical condition where the degradation of organic matter occurs at a faster rate thereby leaving less organic carbon in the soils (Leelavathi *et al.,* 2009). The EC values ranged from 0.01 to 0.15 dSm^{-1} indicating non- saline nature. The CEC of the soils varied from 11.23 to 22.26 cmol (p+) kg^{-1}. The exchangeable complex is dominated by Ca followed by Mg, Na and K. The higher exchangeable Ca in the surface soil may be due to redistribution of Ca by weathering of mica and fixation of released potassium might have result in low exchangeable potassium status (Subbaiah, 1984). Uplands exhibited higher base saturation (39.58 to 86.55) as compared to plains (52.13 to 79.14 %). The order of dominance of cations on the exchange complex is Ca > Mg > Na > K.

Soil fertility status

Available macronutrients

Soil fertility exhibits the status of different soils with regard to the amount and availability of nutrients essential for plant growth. The available nitrogen in bamboo grown soils of Talakona forest area ranged from 63 to 278 kg ha^{-1} (Table 4). Low nitrogen status in the soils could be attributed to low amount of organic carbon in these soils (Prasuna Rani *et al*., 1992). The available phosphorus in bamboo grown forest soils varied from 13 to 21 kg ha^{-1}. The medium status phosphorous could be attributed to fixation of released phosphorous by clay minerals and oxides of Fe and Al (Vijay Kumar *et al.,* 1994). The available potassium status was found to be medium (114 to 220 kg ha^{-1}). Similar results were reported by Thangasamy *et al.,* (2005). However, the available sulphur was found to be above the critical limit (10 mg kg^{-1}) in the bamboo grown forest soils of Talakona forest area.

DTPA extractable micronutrients

The DTPA extractable Zn ranged from 0.80 to 1.60 mg kg^{-1} (Table 4), considering 0.6 mg kg^{-1} as critical level (Lindsay and Norvell, 1978), the soils are sufficient in Zn. This is due to variable intensity of the pedogenic process and more complexing with organic matter which resulted in chelation of Zn enhanced the availability of Zn (Verma *et al*., 2005).

The DTPA extractable Fe content varied from 0.46 to 2.78 mg kg^{-1} soil. According to critical limit of 4.5 mg kg^{-1} of Lindsay and Norvell (1978), the soils were deficient in available Fe. These findings were in accordance with the finding of Thangasamy *et al*., (2005)

All the pedon were found to be sufficient in available Cu (0.25 to2.50 mg kg^{-1}) as all the values

Table 1. Summary of the morphological characters of the pedons

Pedon No.& Horizon	Depth (m)	Colour		Texture	Structure			Consistence			Boundary		Roots	
		Dry	Moist		S	G	T	Dry	Moist	Wet	D	T	S	Q
Pedon 1	(CHINTHAMANUDHADI): **Typic Ustorthent**, Location: **13° 81' 90.4" N; 79° 18' 93.6" E**													
Ap	0.00-0.23	10 YR 4/3	10 YR 4/2	l	f	2	cr	h	fr	sp	c	s	m	f
A1	0.23-0.49	5 YR 4/6	5 YR 4/6	sl	m	3	sbk	vh	fr	sssp	d	w	c	f
A2	0.49-0.71	7.5 YR 4/6	7.5 YR 4/5	scl	c	3	sbk	vh	fi	sp	c	s	c	m
Cr	Weathered gneiss													
Pedon 2	(MAKKULAREVU-1) : **Typic Haplustalfs**, Location: **13° 82' 15.1" N; 79° 18' 67.4" E**													
Ap	0.00-0.20	7.5 YR 5/3	7.5 YR 5/2	scl	m	2	cr	h	fi	sp	c	s	f	m
E	0.20-0.37	7.5 YR 4/4	7.5 YR 4/3	scl	c	3	sbk	vh	fi	sp	c	s	c	f
Bt1	0.37-0.58	7.5 YR 5/4	7.5 YR 5/3	sc	c	3	abk	vh	vfi	sp	d	w	c	-
Bt2	0.58-0.76	7.5 YR 4/4	7.5 YR 4/4	c	c	3	abk	vh	vfi	vsvp	d	w	-	-
B2	0.76-1.05	7.5 YR 4/6	7.5 YR 4/5	scl	c	3	sbk	vh	fi	sp	d	w	-	-
BC	1.05-1.50+	7.5 YR 4/4	7.5 YR 4/3	sl	c	3	sbk	vh	fr	sssp	d	w	-	-
Pedon 3	(MAKKULAREVU-2): **Typic Haplustepts**, Location: **13° 82' 63" N; 79° 18' 75.2" E**													
Ap	0.00-0.28	10 YR 3/2	10 YR 3/2	sl	m	3	cr	sh	fr	sssp	c	s	f	m
Bw1	0.28-0.50	7.5 YR 4/4	7.5 YR 4/3	scl	m	3	sbk	h	fi	sp	c	s	f	m
Bw2	0.50-0.70	7.5 YR 5/4	7.5 YR 5/3	scl	m	3	sbk	h	fi	sp	d	w	f	m
Bw3	0.70-0.90	7.5 YR 5/4	7.5 YR 5/3	scl	m	2	sbk	h	fi	sp	d	w	-	-
Bw4	0.90-1.20+	7.5 YR 3/4	7.5 YR 3/4	scl	m	2	sbk	h	fi	sp	d	w	-	-
Pedon 4	(CHITTAELA DHINNI): **Typic Dystrustepts**, Location: **13° 81' 82.6" N; 79° 19' 11.1" E**													
Ap	0.00-0.17	10 YR 3/4	10 YR 3/3	scl	m	2	sbk	h	fi	sp	c	s	f	f
Bw1	0.17-0.39	5YR 4/4	5YR 4/3	scl	c	3	sbk	h	fi	sp	c	s	f	f
Bw2	0.39-0.60	5 YR 4/6	5 YR 4/5	scl	c	3	sbk	h	fi	sp	d	w	f	f
B1	0.60-0.81	5 YR 4/4	5 YR 4/3	sl	c	3	sbk	sh	fr	sssp	d	w	-	-
BC	0.81-1.00	5 YR 4/6	5 YR 4/5	sl	c	3	sbk	sh	fr	sssp	d	w	-	-

Table1. contd...

Pedon No.& Horizon	Depth (m)	Colour		Texture	Structure			Consistence			Boundary		Roots	
		Dry	Moist		S	G	T	Dry	Moist	Wet	D	T	S	Q
Pedon 5	(VINIKARA DHADI): **Lithic Ustorthent**; Location: **13° 81' 856.0" N; 79° 19' 29.8" E**													
Ap	0.00-0.15	10 YR 3/2	10 YR 3/1	c	m	2	abk	vh	vfi	vsvp	c	s	f	f
A1	0.15-0.30	10 YR 3/1	10 YR 3/1	c	f	0	abk	vh	vfi	vsvp	d	w	f	c
R	Granite-gneiss													
Pedon 6	(CHINTHLAREVU): **Typic Dystrustepts**; Location: **13° 82' 60.1" N; 79° 17' 11.3" E**													
A	0.00-0.16	7.5 YR5/4	7.5 YR5/3	scl	m	2	sbk	h	fi	sp	c	s	f	f
Bw1	0.16-0.32	7.5 YR 3/4	7.5 YR 3/3	sl	c	3	sbk	sh	vfi	sssp	d	w	f	-
Bw2	0.32-0.48	7.5 YR 3/2	7.5 YR 3/2	sl	c	3	sbk	sh	vfi	sssp	d	w	-	-
BC	0.48-0.67	7.5 YR 3/2	7.5 YR 3/1	sl	c	3	sbk	sh	vfi	sssp	d	w	-	-
Cr	Granite containing plagioclase feldspars with pegmatite veins													

Texture : c – clay, cl – clay loam, l – loam, s – sand, sl – sandy loam, scl – sandy clay loam, sc – sandy clay, ls – loamy sand
Structure : Size (S) – vf – very fine, f – fine, m – medium, c – coarse; Grade (G) – O – structureless, l – weak, 2 – moderate, 3 – strong; Type (T) cr – crumb, sg – single grain, abk – angular blocky, sbk – sub-angular blocky.
Consistence :
Dry : s – soft, l – loose, sh – slightly hard, h – hard, vh – very hard
Moist : l – loose, fr – friable, fi – firm, vfi – very firm
Wet : so – non-sticky, ss – slightly sticky, s – sticky, vs – very sticky; po – non-plastic, ps – slightly plastic, p – plastic, vp – very plastic
Cutans : Ty – type – t – Argillan, Th – Thickness, tn – thin, th – thick, Quantity (Q), p – patchy, c – continuous
Pores : Size (S) f – fine, m- medium, c- coarse; Q – Quantity, f – few, c – common, m - many
Roots : Size (S) f – fine, m- medium, c- coarse; Q – Quantity, f – few, c – common, m - many
Effervescence : es – strong effervescence, ev – violent effervescence
Boundary : D – Distinctness, c – clear, g – gradual, d – diffuse, T – Topography; s – smooth; w – wavy

Table 2. Physical characteristics of the soils.

Pedon No. & Horizon	Depth (m)	Sand (%)	Silt (%)	Clay (%)	Textural class	Bulk density (Mg m^{-3})	Particle density (Mg m^{-3})	Water holding capacity(%)
Pedon 1	**Typic Ustorthent**							
Ap	0.00-0.23	50.24	30.50	19.26	l	1.20	2.50	47.99
A1	0.23-0.49	65.31	17.00	17.69	sl	1.20	2.41	47.78
A2	0.49-0.71	67.35	7.65	25.00	scl	1.26	2.41	49.11
Cr	Weathered gneiss							
Pedon 2	**Typic Haplustalfs**							
Ap	0.00-0.20	69.00	6.46	24.54	cl	1.17	2.15	42.55
E	0.20-0.37	61.85	12.91	25.24	scl	1.19	2.26	37.86
Bt1	0.37-0.58	48.37	1.60	50.03	sc	1.18	2.28	31.36
Bt2	0.58-0.76	42.03	6.97	51.00	c	1.20	2.29	33.91
B2	0.76-1.05	55.02	22.98	22.00	scl	1.21	2.30	34.56
BC	1.05-1.50+	70.90	11.56	17.54	sl	1.22	2.31	35.64
Pedon 3	**Typic Haplustepts**							
Ap	0.00-0.28	62.50	17.50	20.00	sl	1.28	2.21	36.24
Bw1	0.28-0.50	65.00	13.00	22.00	scl	1.29	2.29	37.56
Bw2	0.50-0.70	67.25	7.57	25.18	scl	1.30	2.30	42.56
Bw3	0.70-0.90	63.54	3.46	33.00	scl	1.31	2.32	44.79
Bw4	0.90-1.20+	58.55	20.64	20.81	scl	1.32	2.35	46.56
Pedon 4	**Typic Dystrustepts**							
Ap	0.00-0.17	53.12	14.92	31.96	scl	1.21	2.30	42.50
Bw1	0.17-0.39	50.12	15.00	34.88	scl	1.29	2.27	42.38
Bw2	0.39-0.60	54.00	17.00	29.00	scl	1.30	2.11	42.52
B1	0.60-0.81	68.82	20.00	11.18	sl	1.32	2.36	41.11
Bc	0.81-1.00	70.00	22.00	8.00	sl	1.33	2.27	40.11
Pedon 5	**Lithic Ustorthent**							
Ap	0.00-0.15	42.55	2.13	55.32	c	1.19	2.24	46.24
A1	0.15-0.30	35.17	19.21	45.62	c	1.20	2.36	62.44
R	Granite-gneiss							
Pedon 6	**Typic Dystrustepts**							
A	0.00-0.16	67.79	8.05	24.16	scl	1.25	2.27	37.87
Bw1	0.16-0.32	69.53	12.19	18.28	sl	1.26	2.13	40.33
Bw2	0.32-0.48	57.39	15.04	27.57	scl	1.28	2.30	36.81
BC	0.48-0.67	64.47	22.84	12.69	sl	1.29	2.35	39.02
Cr	Granite containing plagioclase feldspars with pegmatite veins							

were well above the critical limit of 0.20 mg kg^{-1}. Similarly available Mn varied from 7.04 to 15.22 mg kg^{-1} soil and found to above critical level of 1 mg kg^{-1} soil. The higher content of available Mn and Cu in surface soils was attributed to their chelation with organic compounds leading to increase in their availability.

Classification of Soils

Based on morphological, physical and physico-chemical characteristics the bamboo grown forest soils of Talakona forest area are classified by adopting USDA Soil Taxonomy (Soil Survey Staff, 1998). Pedons 3, 4 and 6 showed cambic (Bw) diagnostic horizons, hence they are classified under Inceptisols at order level and Ustept at sub-order level due to prevalence of ustic soil moisture regime. Absence of duripan, calcic horizon and base saturation more than 60% allowed the pedon 3 to be placed in Haplustepts at great group level. Pedons 4 and 6 recorded the base saturation lower than 60%, hence the two pedons are classified under Dystrustepts. Finally, pedon 3 had no vertic properties and lithic contact with in 50 cm from

Table 3. Physico-chemical properties of soils.

Pedon No. & Horizon	Depth (m)	pH (1:2.5) H_2O	EC (dSm^{-1})	Organic carbon(g kg^{-1})	CEC [cmol (p^+) kg^{-1}]	Exchangeable bases [cmol(p^+) kg^{-1}]				Base saturation (%)
						Ca^{+2}	Mg^{+2}	Na^+	K^+	
Pedon 1	**Typic Ustorthent**									
Ap	0.00-0.23	6.0	0.05	2.8	17.39	7.6	3.5	0.49	0.10	67.22
A1	0.23-0.49	6.1	0.01	2.9	16.96	6.3	4.2	0.66	0.07	66.21
A2	0.49-0.71	6.8	0.07	2.2	16.85	6.2	4.6	0.43	0.11	67.29
Cr	Weathered gneiss									
Pedon 2	**Typic Haplustalfs**									
Ap	0.00-0.20	5.9	0.09	2.9	20.12	5.9	4.1	0.30	0.15	52.13
E	0.20-0.37	5.7	0.03	2.7	19.12	6.8	4.3	0.40	0.11	60.72
Bt1	0.37-0.58	5.9	0.02	2.6	17.39	9.0	2.3	0.60	0.24	69.81
Bt2	0.58-0.76	6.9	0.03	2.8	18.69	9.0	2.3	0.65	0.25	75.97
B2	0.76-1.05	7.3	0.03	2.1	17.00	8.0	4.2	0.39	0.13	74.82
BC	1.05-1.50+	7.4	0.04	2.0	16.45	8.1	4.3	0.50	0.12	79.14
Pedon 3	**Typic Haplustepts**									
Ap	0.00-0.28	6.9	0.15	3.0	20.35	8.2	4.2	0.31	0.15	63.19
Bw1	0.28-0.50	6.8	0.09	3.2	17.78	8.0	4.0	0.26	0.16	69.85
Bw2	0.50-0.70	6.9	0.04	3.1	18.00	8.1	4.4	0.61	0.40	75.05
Bw3	0.70-0.90	7.0	0.02	2.1	17.13	8.2	4.1	0.71	0.55	77.69
Bw4	0.90-1.20+	6.6	0.02	1.5	16.20	7.8	3.2	0.61	0.54	75.00
Pedon 4	**Typic Dystrustepts**									
Ap	0.00-0.17	6.4	0.07	2.4	16.54	7.6	1.9	0.57	0.25	62.39
Bw1	0.17-0.39	6.0	0.06	1.9	20.21	7.8	2.2	0.50	0.24	53.14
Bw2	0.39-0.60	6.1	0.05	1.5	22.26	6.4	3.3	0.68	0.23	47.66
B1	0.60-0.81	6.1	0.03	1.2	20.14	6.8	3.0	0.67	0.22	53.07
Bc	0.81-1.00	7.5	0.01	1.1	17.39	7.0	1.5	0.70	0.21	54.11
Pedon 5	**Lithic Ustorthent**									
Ap	0.00-0.15	6.2	0.01	2.8	15.54	7.2	1.0	0.55	0.20	57.59
A1	0.15-0.30	6.0	0.05	2.0	11.23	7.0	2.0	0.50	0.22	86.55
R	Granite-gneiss									
Pedon 6	**Typic Dystrustepts**									
A	0.00-0.16	6.1	0.02	2.5	16.41	6.7	2.1	0.45	0.20	57.86
Bw1	0.16-0.32	6.4	0.02	2.4	14.82	7.8	3.1	0.55	0.22	78.74
Bw2	0.32-0.48	6.4	0.02	2.3	13.28	5.1	2.0	0.56	0.23	59.41
BC	0.48-0.67	7.0	0.04	1.5	13.01	3.2	1.0	0.54	0.24	39.58
Cr	Granite containing plagioclase feldspars with pegmatite veins									

surface hence, pedon 3 was logically classified as Typic Haplustepts. Pedons 4 and 6 did not show lithic contact, andic properties, pumice like fragments, aquic moisture, irregular decrease in organic carbon, oxic horizons and umbric or mollic epipedons, hence pedons 4 and 6 are classified under Typic Dystrustepts

Pedon 2 showed argillic (Bt) sub-surface diagnostic horizon as evidenced by the fact that the illuvial horizon contained 1.2 times more clay than the eluvial horizon and also base saturation more than 35% throughout the profile, hence pedon 2 is classified under Alfisols .However, this pedon was classified as ustalf at sub-order level due to the presence of ustic soil moisture regime. As pedon 2 did not have duripan, plinthite, kandic, natric or petrocalcic horizons and the argillic horizon did not exhibit a hue of 2.5 YR, hence pedon 2 was logically classified as Haplustalf at great group level. Finally, pedon 2 did not show any intergradation or extragradation, hence it is classified as Typic Haplustalfs.

Table 4. Available nutrient status of the soils .

Pedon No. & Horizon	Depth (m)	Available macronutrients (kg ha^{-1})				Available micronutrients (mg kg^{-1})			
		N	P	K	S	Zn	Cu	Fe	Mn
Pedon 1	**Typic Ustorthent**								
Ap	0.00-0.23	278	20	211	28	1.50	2.20	2.00	14.30
A1	0.23-0.49	251	19	142	29	1.54	1.98	1.69	14.10
A2	0.49-0.71	188	17	114	21	1.50	1.94	1.24	14.20
Cr	Weathered gneiss								
Pedon 2	**Typic Haplustalfs**								
Ap	0.00-0.20	251	18	220	22	1.38	1.94	2.78	15.10
E	0.20-0.37	188	17	157	21	1.30	2.50	0.50	14.50
Bt1	0.37-0.58	251	17	200	21	1.22	2.30	0.46	7.06
Bt2	0.58-0.76	125	16	184	20	1.28	2.00	1.06	7.07
B2	0.76-1.05	125	15	144	20	1.26	1.44	1.04	7.05
BC	1.05-1.50+	125	14	144	20	1.26	1.42	0.59	7.06
Pedon 3	**Typic Haplustepts**								
Ap	0.00-0.28	188	21	186	28	1.48	1.24	2.16	7.04
Bw1	0.28-0.50	125	20	162	27	1.40	0.80	1.31	12.00
Bw2	0.50-0.70	125	18	162	27	0.95	0.72	1.50	12.16
Bw3	0.70-0.90	63	15	151	26	0.80	0.70	1.20	12.45
Bw4	0.90-1.20+	63	14	155	25	0.80	0.70	1.50	12.05
Pedon 4	**Typic Dystrustepts**								
Ap	0.00-0.17	251	19	210	29	1.60	2.25	1.80	12.00
Bw1	0.17-0.39	181	18	205	28	1.24	1.50	1.41	15.00
Bw2	0.39-0.60	125	18	195	24	1.20	1.76	1.38	13.00
B1	0.60-0.81	63	17	188	26	1.00	1.70	1.35	12.00
Bc	0.81-1.00	125	15	178	25	0.90	1.62	1.20	12.01
Pedon 5	**Lithic Ustorthent**								
Ap	0.00-0.15	188	14	200	30	1.25	1.36	2.06	15.22
A1	0.15-0.30	125	13	174	29	1.25	1.36	2.00	15.00
R	Granite-gneiss								
Pedon 6	**Typic Dystrustepts**								
A	0.00-0.16	125	17	190	30	0.98	0.60	2.23	14.22
Bw1	0.16-0.32	188	16	182	28	0.92	0.25	2.15	14.01
Bw2	0.32-0.48	188	15	150	27	0.86	0.40	2.09	13.05
BC	0.48-0.67	63	13	153	25	0.86	0.50	1.05	13.04
Cr	Granite containing plagioclase feldspars with pegmatite veins								

Pedons 1 and 5 which do not have any diagnostic horizon are classified as Entisols. Both the pedon showed regular decrease in organic carbon with depth, hence classified under orthents. Pedons 1 and 5 have *ustic* soil moisture regime and classified under Ustorthents. Pedon 5 showed lithic contact within 50 cm from the soil surface and classified as Lithic Ustorthent whereas pedon 1 did not show any intergradation and extragradation, hence grouped under Typic Ustorthents.

In conclusion the bamboo (***Dendrocalamus strictus & Bambusa bamboos***) grown forest soils of Talakona forest area are low in available nitrogen, medium in available phosphorus and potassium, sufficient available sulphur and sufficient in DTPA extractable Zn, Cu and Mn and deficient in available Fe. Further, bamboo grown forest soils were classified taxonomically into Typic Ustorthent, Lithic Ustorthent, Typic Haplustalfs,Typic Haplustepts and Typic Dystrustepts.

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