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Characteristics and Classification of Soils of Northern Telangana Zone of Andhra Pradesh

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Abstract:: *Twelve soils in Northern Telangana of Andhra Pradesh, were studied for their genesis and classification. The soils are very low to low in organic carbon; low in available N and P_2O_5; medium to high in available K_2O, and neutral to slightly alkaline in reaction. The available Zn, Cu, Fe and Mn in surface layer ranges from 0.70 to 2.89, 1.14 to 8.19, 22.7 to 98.5 and 22 to 202 ppm, respectively. The bulk density, CEC and clay at surface horizon ranges from 1.30 to 1.68 g cc^{-1}, 6.2 to 43.0 C mol (+) kg^{-1} and 17.4 to 54.1 per cent respectively. Five soils are found with ochric epipedon and qualify for Inceptisols, three with argillic horizons and qualify for Alfisols, three with deep and wide cracks and qualify for Vertisols, and one pedon with no profile development classified as Entisol.* (**Key words:** *Pedon; ochric epipedon; argillic horizon; Inceptisols; Alfisols; Vertisols; Entisols).*

Northern Telangana Zone comprising Karimnagar, Adilabad, Nizamabad and major parts of Warangal, Khammam and Medak districts spread over 63,350 sq. km (23%) area of Andhra Pradesh. It has great potentialities and hence it is imperative to understand their physicochemical properties and taxonomic classification.

MATERIAL AND METHODS

Geographic Settings: The Northern Telangana semiarid zone lies between 17° 42' and 19° 84' N Lat., and 77° 38' and 81° 16' E Long. at 160 to 620 m above MSL. It has granite-gneiss parent material and is drained by river Godavari, Manjira, Paler and Maner. The soil temperature regime is hyperthermic and moisture regime is Udic. The annual rainfall is 900 to 1150 mm, 86 per cent is received during June to September. The depth of ground water ranges from 5 to 15 m.

Twelve typical pedons were studied for soil site characteristics (Table 1) and morphology (Table 2). The physicochemical properties (Table 3)

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and available nutrients (Table 4) were estimated by standard procedures (Jackson 1967). Soils were classified (Table 5) according to Soil Taxonomy (Soil Survey Staff 1975).

RESULTS AND DISCUSSION

Morphology of Pedons: Jagtias clay loam (P_1) is very dark brown in colour, shallow, granular to subangular blocky structure, moderately well drained with good permeability, thickness of solum ranges from 11 to 19 cm.

Adilabad clay (P_2) is a very deep, very dark gray, imperfectly drained, angular blocky structure throughout the profile.

Mudhol clay (P_3) is very dark gray brown, deep, angular blocky structure with slicken sides.

Mudhol sandy loam (P_4) is dark brown in colour, well drained, clay loam with granular to angular blocky structure.

Aswaraopet sandy loam (P_5) is a deep red, well drained, with granular to sub angular blocky structure.

Madhira clay loam (P_6) is deep, imperfectly drained, clay texture upto three layers, hard pan causing impeded drainage, 4th horizon is sandy, granular to angular blocky structure in upper horizon and granular in the lower horizons.

Warangal sandy loam (P_7) is dark brown in colour, shallow and well drained with good permeability, subangular blocky structure, thickness of the solum ranges from 9 to 11 cm.

Karimnagar sandy loam (P_8) is yellowish red to reddish brown in colour, shallow with good drainage and permeability, granular to subangular blocky structure, thickness of the solum varies from 18 to 30cm Malyal sandy loam (P_9) is yellowish red to dark red in colour, good drainage and permeability, granular structure, thickness of solum varies from 14 to 43 cm.

Rudrur clay loam (P_{10}) is a deep, dark gray with impeded drainage, angular blocky structure throughout the profile, thickness of solum varies from 10-120 cm.

Rudrur sandy clay loam (P_{11}) is reddish brown in colour with good drainage, granular to subangular blocky structure, thickness of the solum ranges from 10 to 55 cm.

Zaheerabad sandy clay loam (P_{12})

TABLE 1. General information of studied pedons

Pedon	Soil name	Phsiographic position with (MSL m)	Location
P_1	Jagtial clay loam	Upper pediplain (259)	RARS, Jagtial, Dist. Karimnagar.About 18° 48' N latitude and 78° 56' E longitude
P_2	Adilabad clay	Plain land (244)	A.R.S., Adilabad, Dist. Adilabad About 19° 20' N latitude and 78° 80' E longitude.
P_3	Mudhol clay loam	Upper pediplain (355)	A.R.S., Mudhol, Dist. Adilabad About 18° 80' latitude and 77° 55' E longitude.
P_4	Mudhol sandy loam	Upper pediplain (355)	--do-
P_5	Aswaraopet sandy loam	Upper pediplain (168)	H.R.S., Aswaraopet, Dist. Khamman About 17° 14' N latitude and 81° 8' E longitude
P_6	Madhira clay loam	Plain land (189)	A.R.S., Madhira, Dist. Khammam About 16° 55' N latitude and 80° 22' E longitude.
P_7	Warangal sandy loam	Upper pediplain (269)	A.R.S., Warangal, Dist. Warangal About 17° 58' N latitude and 79° 28' E longitude.
P_8	Karimnagar sandy loam	Upper pediplain (259)	A.R.S., Karimnagar, Dist. Karimnagar About 18° 30' N latitude and 79° 15' E longitude.
P_9	Malyal sandy loam	Upper pediplain (269)	J.V.R.H.R.S., Malyal, Dist. Warangal About 17° N latitude and 80° E longitude.
P_{10}	Rudrur clay loam	Lower pediplain (404)	RS & RRS, Rudrur, Dist. Nizamabad About 18° 38' N latitude and 77° 55' E longitude.
P_{11}	Rudrur sandy clay loam	Lower pediplain (404)	--do--
P_{12}	Zaheerabad sandy clay loam	Upper pediplain (620)	Zaheerabad, Dist. Medak About 15° N latitude and 77° E longitude.

TABLE 2. Morphological characteristics of soils of Telangana

Horizon	Depth (cm)	Colour (moist)	Texture	Structure	Consistency			Cracks-width (cm)	Pores	Roots	Boundary
					Dry	Moist	Wet				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Pedon 1											
Ap	0-11	Very dark brown (10YR 2/2)	Scl	f1 gr-sbk	dl	mfr	WS & WP	1	few, fine	few, fine	CS
B1	11-30	Very dark brown (10YR 2/2)	C1	f2 abk	d1	mrf	WS & WP	--	few, fine	few, fine	CW
C	30 +	Very dark gray brown (10YR 2/2)	C1	f2 abk	dh	mfr	WS & WP	--	few, fine	--	CS
Pedon 2											
Ap	0-14	Very dark gray (10YR 3/1)	C	m3 abk	dh	mfr	WS & WP	1	few, fine	Plenty thick	CS
A1	14-47	Very dark gray brown (10YR 3/2)	C	m3 abk	dh	mfr	WVS & WVP	2-3	few, fine	few, fine	CS
A11	47-73	Very dark gray (10YR 3/2)	C	m3 abk	dh	mfr	WVS & WVP	2-3	few, fine	--	CS
A12	73-102	Very dark gray (10YR 3/1)	C	m3 abk	dh	mfr	WVS & WVP	2	few, fine	--	CS
A13	102-132	Very dark gray (10YR 3/1)	C	m3 abk	dh	mfr	WVS & WVP	0.2	few, fine	--	CS
A14	132-153	Dark brown (10YR 3/3)	C	m2 abk	dh	mfr	WVS & WVP	0.2	few, fine	--	CS
C	153 +	Dark brown (10YR 3/3)	C	m2 abk	dh	mfr	WS & WP	0.2	few, fine	--	CS
Pedon 3											
Ap	0-19	Very dark gray brown (10YR 3/2)	C	m2 abk	dh	mfr	WVS & WVP	1-2	few, fine	plenty fine	CS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
A1	19-51	Very dark gray brown (10YR 3/2)	C	m3 abk	dh	mfr	WVS & WVP	1	few, fine	--	CS
A2	51-105	Very dark gray brown (10YR 3/2)	C	m3 abk	dvh	mfr	WVS & WVP	1	few, fine	--	CW
C	105+	Calcareous murrum			-	-	-	-	-	-	-
Pedon 4											
Ap	0-22	Dark brown (7.5YR 4/2)	Cl	m2 gr-abk	dl	mfr WP	WS &	0.5	few, fine	plenty fine	CW
B1	22-133	Reddish brown (5YR 4/4)	sl	f1	dl	mfr	WNS & WNP	--	plenty fine	-	CW
C	113+	Calcareous murrum			-	-	-	-	-	-	-
Pedon 5											
Ap	0-15	Dark red (2.5YR 3/6)	sl	m2 gr	dl	mvfr	WNS & WNP	--	few, fine	plenty, fine	CW
B1	15-40	Dark red (2.5YR 3/6)	scl	m2 gr-abk	dl	mfm	WSS & WSP	--	few, fine	--	CW
B2	40-95	Red (2.5YR 4/8)	scl	m2 gr-sbk	ds	mvfm	WS & WP	--	few, fine	--	CW
Pedon 6											
Ap	0-26	Very dark gray brown (10YR 3/2)	C	m2 gr-abk	dh	mfr	WSS & WSP	1	few, fine	plenty, fine	CS
B1	26-89	Very dark gray brown (10YR 3/2)	C	m3 abk	dh	mfr	WVS & WVP	0.5	few, fine	--	CS
C ca	89-154	Dark gray brown (10YR 4/2)	C	massive	dh	mfr	WVS & WVP	--	--	--	CS
C	154+	Dark brown (10YR 3/3)	S	f1 gr	dh	mfr	WNS & WNP	--	--	--	CS
Pedon 7											
Ap	0-9	Dark brown (7.5YR 4/4)	Sl	f1 gr-sbk	dl	mfr	WSS & WNP	--	few fine	few thick	CS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
B11	9-20	Dark brown (10YR 4/3)	Sl	f1 sbk	dl	mfr	WSS & WNP	--	few, fine	--	CS
B12	20-31	Dark brown (10YR 4/3)	Sl	massive	dl	mfr	WSS & WNP	--	--	--	CS
C	31 +	Calcareous murrum			-	-	-	-	-	-	-
Pedon 8											
Ap	0-18	Reddish brown (5YR 4/6)	Sl	f1 gr-sbk	dl	mfr	WSS & WSP	--	few, fine	few, fine	CS
B11	18-65	Reddish brown (5YR 4/3)	Sl	f1 gr-sbk	dl	mfr	WSS & WSP	--	few, fine	few, fine	CS
B12	65 +	Yellowish red (5YR 4/6)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	--	CS
Pedon 9											
Ap	0-22	Dark reddish brown (5YR 3/4)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	few, fine	CS
B11	22-36	Dark reddish brown (5YR 3/4)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	few, fine	CS
B12	36-61	Dark red (2.5YR 3/6)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	--	CS
B13	61-79	Yellowish red (5YR 5/8)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	--	CS
B14	79 +	Reddish brown (5YR 4/4)	Sl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	--	CS
Pedon 10											
Ap	0-10	Dark gray (10YR 4/1)	C	m2 abk	dh	mfm	WS & WP	2	few, fine	few, fine	CS
C11	10-130	Dark gray (10YR 4/1)	C	m3 abk	dh	mfm	WS & WP	2-3	few, fine	few, fine	CS
C12	130 +	Gray brown (10YR 5/2)	C	m3 abk	dh	mfm	WS & WP	2	few, fine	--	CS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Pedon 11											
Ap	0-10	Reddish brown (5YR 4/3)	Scl	f1 gr	dl	mfr	WSS & WSP	--	few, fine	few, fine	CS
B1	10-60	Dark reddish brown (5YR 3/4)	Scl	f1 sbk	dh	mfr	WSS & WSP	--	few, fine	--	CS
B21	60-115	Reddish brown (5YR 4/4	Scl	m2 sbk	dh	mfr	WS & WP	--	few, fine	--	CS
B22	115+	Dark brown (10YR 4/3)	Scl	m2 sbk	dh	mfm	WS & WP	--	few, fine	--	CS
Pedon 12											
Ap	0-8	Dark reddish brown (2.5YR 3/4)	Scl	m1 gr-sbk	dsh	mfr	WS & WP	--	few, fine	few, fine	CS
B1	8-22	Dark red (2.5YR 3/6)	Scl	m2 gr-sbk	dh	mfm	WS & WP	--	few, fine	few, fine	CS
B2	22+	Dark red (2.5YR 3/6)	Scl	m2 gr-sbk	dh	mfm	WS & WP	--	few, fine	--	CS

Soil texture: S-Sand; Sl-Sandy loam; Scl-Sandy clay loam; Cl-clay loam; SC-Sandy clay; C-Clay

Soil structure: M-Medium; f-fine; 1-weak; 2-moderate; 3-strong; gr-granular; abk-angular blocky; sbk-subangular blocky

Soil consistence: dl-loose; ds-soft; dsh-slightly hard; dh-hard; dvh-very hard; mvfr-very friable; mfr-friable; mfm-firm; mvfm-very firm; WNS-non-sticky; WSS-slightly sticky; WS-sticky; WVS-very sticky; WNP-non-plastic; WSP-slightly plastic; WP-plastic; WVP-very plastic

Boundary: C-clear; d-diffuse; S-smooth; W-Wavy.

is shallow with well drained, dark red in colour, angular to sub-angular blocky structure, thickness of the solum ranges from 8 to 14 cm.

Physico-Chemical properties of soil: The soils are shallow to deep, imperfectly drained to well drained, sandy loam to clay loams. The clay content of soils varies from 17.4 of 54.1 per cent at surface layers. The variation in texture are due to variation in weathering as influenced by land scape position, soil environment and translocation of clay. Topography and high rainfall of the zone are respons-

TABLE 3. Physico-chemical properties of soils of Telangana

Horizon	Sand (%)	Silt (%)	Clay (%)	BD g cc^{-1}	CEC (cmol(+) kg^{-1})	pH	EC dS m^{-1}	OC (%)	$CaCO_3$ (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Pedon 1									
Ap	50.5	5.5	44.0	1.58	9.9	6.7	0.15	0.31	8.5
B1	73.1	4.6	22.3	1.44	8.6	6.6	0.09	0.29	10.0
C	75.6	3.2	21.2	1.27	8.4	7.9	0.33	0.38	4.5
Pedon 2									
Ap	45.9	14.6	39.5	1.39	37.3	7.9	0.03	0.33	4.5
A1	40.9	11.1	48.0	1.44	38.5	8.1	0.05	0.26	1.0
A11	26.4	14.8	58.8	1.36	39.9	8.3	0.05	0.35	20.5
A12	25.2	15.2	59.6	1.41	40.2	8.5	0.05	0.23	5.0
A13	26.6	20.9	58.5	1.40	40.1	8.8	0.06	0.32	10.0
A14	38.1	17.4	44.5	1.49	39.3	8.9	0.05	0.34	-
C	35.5	19.5	45.2	1.52	38.1	9.0	0.08	0.27	-
Pedon 3									
Ap	35.9	12.2	51.9	1.36	43.0	8.0	0.04	0.27	5.0
A1	26.9	16.2	56.9	1.37	40.2	8.0	0.02	0.06	7.0
A2	21.1	14.8	54.1	1.44	42.1	8.0	0.01	0.01	8.4
Pedon 4									
Ap	55.9	9.6	34.5	1.41	14.2	6.9	0.03	0.31	4.0
B1	33.4	17.1	49.5	1.39	15.7	7.4	0.06	0.31	-
C	58.4	12.1	29.5	1.60	15.3	7.7	0.04	0.13	-
Pedon 5									
Ap	41.1	4.8	54.1	1.64	16.2	6.7	0.01	0.11	-
B1	33.4	9:1	57.5	1.52	15.9	5.5	0.01	0.28	-
B2	29.7	5.6	64.7	1.39	17.1	4.9	0.01	0.36	-
Pedon 6									
Ap	36.1	9.8	54.1	1.38	12.2	8.1	0.02	0.20	2.5
B1	25.9	9.7	64.4	1.43	15.5	8.2	0.03	0.26	2.5
C ca	23.4	17.2	59.4	1.35	14.2	8.4	0.04	0.20	2.5
C	45.9	7.2	46.9	1.39	13.8	9.2	0.05	0.15	15.5
Pedon 7									
Ap	65.3	7.2	27.5	1.44	11.3	6.8	0.02	0.40	4.0
B11	60.3	7.2	32.5	1.44	11.9	6.9	0.15	0.22	5.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
B12	58.1	11.9	35.0	1.41	12.0	6.9	0.02	0.31	6.5
Pedon 8									
Ap	64.1	7.0	28.9	1.68	9.2	7.3	0.10	0.23	-
B11	66.1	6.9	27.0	1.46	9.0	7.1	0.11	0.22	-
B12	61.1	5.8	33.1	1.43	9.4	7.0	0.12	0.14	-
Pedon 9									
Ap	51.5	7.7	40.8	1.48	9.7	7.8	0.40	0.29	1.25
B11	46.5	8.7	44.8	1.34	9.9	7.7	0.50	0.27	1.25
B12	55.3	12.2	32.5	1.31	10.1	7.7	0.66	0.19	0.50
B13	57.2	11.9	30.9	1.39	9.3	7.7	0.91	0.21	0.75
B14	51.2	12.1	36.7	1.40	9.5	7.7	0.66	0.14	1.50
Pedon 10									
Ap	46.8	8.2	45.0	1.30	10.3	6.9	0.79	0.32	0.75
C11	38.2	9.8	52.0	1.30	35.1	7.8	2.38	0.26	4.20
C12	42.1	8.1	49.8	1.34	36.3	8.1	8.35	0.17	10.30
Pedon 11									
Ap	66.8	6.4	26.8	1.52	13.6	7.3	0.23	0.27	-
B1	56.7	15.5	27.8	1.38	13.9	7.6	0.31	0.24	-
B21	57.8	14.1	27.8	1.43	13.9	7.3	0.21	0.19	-
B22	56.7	55.5	27.8	1.30	13.4	7.7	0.35	0.14	0.50
Pedon 12									
Ap	74.2	8.4	17.4	1.59	8.2	6.4	0.08	0.45	-
B1	76.3	9.1	14.6	1.31	5.8	6.4	0.06	0.28	-
B2	78.2	7.9	13.9	1.38	6.1	6.9	0.07	0.13	-

ible for accumulation of clay in the 'B' horizon in some of the pedons. Enrichment of clay in 'B' horizon may be due to clay migration and may be also due to advance stage of weathering under the prevailing climatic conditions (Sehgal 1986). The bulk density of pedons upper horizon ranged from 1.30 to 1.68 g cc^{-1}. The pH of surface soils ranged from 6.4 to 8.1, EC from 0.01 to 0.79 dSm^{-1} and CEC from 6.2 to 43.0 cmol kg^{-1} at surface layer. The organic carbon pH, EC and CEC of pedons do not follow a regular trend with depth. $CaCO_3$ ranged from 0 to 8.5 at surface horizon. The fertility status indicates that the soils are highly deficient in

Table 4. Available nutrients in soil of Telengana

Horizon	Major nutrients (kg ha^{-1})			Micronutrients (ppm)			
	N	P_2O_5	K_2O	Zn	Cu	Fe	Mn
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pedon 1							
Ap	94	6.5	291	1.01	1.14	45.0	172
B1	98	6.0	224	0.91	1.07	40.1	124
C	98	6.2	224	0.83	1.52	25.2	108
Pedon 2							
Ap	87	16.0	627	2.04	3.39	46.8	163
A1	80	14.1	313	1.98	3.16	40.1	158
A11	67	10.2	201	1.02	2.98	38.2	141
A12	60	9.1	358	1.53	1.48	36.2	151
A13	60	6.9	358	1.36	2.01	39.0	138
A14	71	6.0	403	0.93	1.02	31.2	98
C	39	4.0	381	0.87	1.01	26.1	82
Pedon 3							
Ap	102	16.4	403	2.15	2.85	46.4	175
A1	106	8.0	246	1.98	2.14	42.1	169
A2	109	5.1	179	1.43	1.63	28.0	133
Pedon 4							
Ap	110	8.5	403	1.15	2.47	23.9	25
B1	102	4.4	381	1.05	2.32	19.5	25
C	55	3.2	358	1.01	2.30	19.0	24
Pedon 5							
Ap	91	8.2	358	1.25	1.40	30.0	160
B1	123	5.1	246	1.21	1.36	24.1	149
B2	118	2.1	179	0.98	1.27	22.1	136
Pedon 6							
Ap	112	8.5	381	1.18	1.98	22.7	181
B1	90	5.8	381	1.06	1.87	21.2	169
C ca	59	4.0	314	0.98	1.40	18.1	150
C	57	3.0	201	0.89	1.32	17.1	139
Pedon 7							
Ap	116	6.0	224	1.07	1.56	39.0	126
B11	115	4.8	314	0.98	1.44	43.0	111
B12	125	3.2	246	0.87	1.32	31.0	98

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pedon 8							
Ap	88	8.0	390	0.70	2.23	98.5	102
B11	69	7.3	289	0.83	2.11	87.1	98
B12	70	4.2	258	0.69	1.98	63.1	86
Pedon 9							
Ap	85	9.2	342	0.83	3.96	67.3	202
B11	79	8.4	359	0.79	3.55	61.2	187
B12	78	5.2	298	0.98	2.99	58.1	166
B13	60	4.3	281	0.79	3.11	43.2	143
B14	59	2.9	214	0.76	2.76	28.2	136
Pedon 10							
Ap	92	8.7	372	2.11	3.20	44.0	24
C11	87	6.2	289	1.98	3.02	43.0	22
C12	51	4.2	250	1.87	2.11	38.0	19
Pedon 11							
Ap	87	7.2	382	2.89	2.53	-59.0	22
B1	72	6.3	299	2.11	2.42	48.0	19
B21	69	4.1	259	1.17	1.98	42.0	18
B22	54	3.2	243	1.08	1.19	39.9	15
Pedon 12							
Ap	78	8.5	625	2.18	8.19	59.9	157
B1	69	7.8	582	2.03	7.12	48.1	148
B2	52	4.2	442	1.98	6.43	46.2	139

available nitrogen and P_2O_5, medium to high in available K_2O, and very low to low in organic carbon. The zinc, copper, iron and Manganese ranged from 0.70 to 2.89, 1.14 to 8.19, 22.7 to 98.5 and 22 to 202 ppm, respectively at the surface layers.

Soil classification:The pedons P_1, P_6, P_7, P_8 and P_9 qualify for Inceptisols due to few diagnostic features at order level and characterized by ochrepts. Owing to the presence of thin, light coloured surface horizons with little organic matter and further classified as Ustochrepts at great group level due to ustic soil moisture regimes. The pedons P_4, P_5 and P_{11} are characterized by argillic horizon

Table 5. Classification of soils of Telangana region

Pedon	Order	Suborder	Great group	Family	Series
1	Inceptisols	Ochrepts	Ustochrepts	Fine, loamy, mixed Udic Ustochrept	Jagtial
2	Vertisols	Usterts	Chromusterts	Very fine, montmorillonitic, Udic Chromusterts	Adilabad
3	Vertisols	Usterts	Chromusterts	Very fine, montmorillonitic, Udic Chromusterts	Mudhole
4	Alfisols	Ustalfs	Haplustalfs	Fine, loamy, mixed, Udic Haplustalfs	Mudhole
5	Alfisols	Ustalfs	Rhodustalfs	Fien, lomay, mixed, Udic Rhodustalfs	Aswaraopet
6	Inceptisols	Ochrepts	Ustochrepts	Fine, loamy, mixed, Udic Ustochrepts	Madhira
7	Inceptisols	Ochrepts	Ustochrepts	Fine, loamy, mixed, Udic Ustochrepts	Warangal
8	Inceptisols	Ochrepts	Ustochrepts	Fine, loamy, mixed, Udic Ustochrepts	Karimnagar
9	Inceptisols	Ochrepts	Ustochrepts	Fine, loamy, mixed, Udic Ustochrepts	Malyal
10	Vertisols	Usterts	Chromusterts	Very fine, montmorillonitic, Udic Chromusterts	Rudrur
11	Alfisols	Ustalfs	Paleustalfs	Fine, loamy, mixed, Udic Paleustalfs	Rudrur
12	Entisols	Orthent	Ustorthent	Fine, loamy, mixed, Udic Ustorthent	Zahirabad

* Temperature family hyperthermic is common upto 11 pedon. Pedon 12 has isohyperthermic family.

and are classified as Alfisols and these were further classified as Ustalfs due to more than 90 cumulative dry days. Pedon 4 belong to Haplustalfs.

They are well drained soils and absence of fragipan, duripan and other characteristics. Pedon 5, Rhodustalfs due to agrillic horizon colour redder than 5 YR and Pedon 11 as Paleustalfs due to presence of thick dense agrillic horizon. The pedons P_2, P_3 and P_{10} qualify for Vertisols due to high in dark swelling and shrinking clays, deep and wide cracks when soil dry and characterized by usterts due to cracks open more than 90 cumulative days in the year and chromusterts at great group level by high chroma of 1.5 or more in some horizon with in 20 cm. The pedon P_{12} is characterized by orthents due to shallow, clay loam texture over hard rock and therefore keyed out as Entisols which showed little profile development and further classified as Ustorthents at great group level due to Ustic soil moisture regimes.

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