Established by P. Vijarnsorn, 1969
Revised by :
P. Vijarnsorn and staffs,1988
W. Sirichuaychoo, 2004

BANG NARA SERIES **Field Symbol: Ba**

Distribution: Occupies large extent throughout in Peninsular Thailand and some areas in Southeast Coast of Thailand.

Setting: Bang Nara soils are formed from alluvium on alluvial plain (low terrace). Relief is level to nearly level. Slope is less than 2 percent. Elevation ranges from 20 to 30 m above mean sea level. The climate is Tropical Monsoon (Koppen `Am'). Average annual precipitation is from 1,500 to 3,000 mm. Average annual air temperature is from 26 ^{o}C to 28^{o}C.

Drainage, Permeability and Surface Runoff: Drainage is poorly drained, permeability is slow and surface runoff is slow. Flooding by impounded rainwater 10 to 30 cm for 4 to 5 months. The ground water level below 1.5 m during the dry season.

Vegetation and Land Use: The majority of this soils used for transplanted rice. When abandoned, reverts to grass and low secondary shrubs.

Characteristic Profile Features: The Bang Nara series is a member of the fine, kaolinitic, isohyperthermic Typic Paleaquults (Soil Taxonomy, 2003). They are very deep soils with clay texture of argillic B horizon, saturated with water in all layers from the soil surface to a depth more than 200 cm (Endosaturation). The surface or A horizon is clay loam texture with gray, light gray, light brownish gray or light brownish yellow colors overlying clay loamy (≥35 percent clay)or clay argillic B horizon with light gray, light brownish gray or gray colors. Brownish mottles occurred in the surface horizon and become yellowish brown and/or brownish yellow in subsoil. Strongly acid to slightly acid, reaction values range from 5.5 to 6.5 over very strongly acid to strongly acid, reaction values range from 5.0 to 5.5.

Typifying Pedon: Bang Nara clay loam - transplanted rice, from Ban Khu Ha Nai, Amphoe Rattaphum, Changwat Songkhla, less than 1 percent slope, 20 m above mean sea level, ground water table shallow than 1 meter, 10 to 30 cm flooding depth (sheet name Amphoe Hat Yai, sheet number 5023 II, coordinate 641791).

Profle Code Number: S-68/41, described by Udom Samrongkit, 7 July 1971(moist colors unless otherwise stated).

Horizon	Depth (cm)	Description
Apg	0-15	Gray to light gray (10YR6/1) loam; many fine and medium distinct yellowish brown (10YR5/6) and strong brown (7.5YR5/8) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine tubular and interstitial pores; few very fine and fine roots; moderately acid (field pH 6.0); clear smooth boundary.
BAg	15-24	Light gray (10YR7/2) clay loam; few fine faint brownish yellow (10YR6/6) and many fine prominent yellowish red (5YR5/6) mottles; weak fine and medium subangular blocky structure; slightly firm, slightly sticky and slightly plastic; common very fine and fine tubular and interstitial pores; very few very fine roots; strongly acid (field pH 5.5); gradual smooth boundary.
Btg1	24-55	Light gray (10YR7/2) clay loam; few fine prominent red (2.5R4/6) and many fine distinct strong brown (7.5YR5/8) mottles; moderate fine and medium subangular blocky structure; firm, sticky and slightly plastic; broken thin cutans; common very fine and few fine tubular and interstitial pores; very few very fine roots; strongly acid (field pH 5.5); gradual smooth boundary.
Btg2	55-85	Light gray (10YR7/2) clay; few fine prominent yellowish red (5YR5/8) and red (2.5YR4/8) mottles; weak fine and medium subangular blocky structure;

friable, very sticky and very plastic; broken thin to moderately thick cutans on peds; common very fine and fine tubular and fine interstitial pores; very few very fine roots; strongly acid (field pH 5.5); gradual smooth boundary.

Btg3 85-100+ Light gray (10YR7/2) clay loam; few fine distinct yellowish strong brown (7.5YR5/8), prominent red (2.5YR4/8) and common fine prominent yellowish red (5YR4/6) mottles; weak fine subangular blocky structure; friable, sticky and slightly plastic; broken thin cutans; common very fine and few fine tubular and few fine interstitial pores; very strongly acid to strongly acid (field pH 5.0-5.5).

Type Location:

Name of subdistrict, Tambon Bang Nara, Amphoe Muang, Changwat Narathiwat.

Range of Profile Features:

The surface or A horizon clay loam or loam, ranges from 10 to 20 cm in thickness and has colors 10YR or 7.5YR hues, values 5 to 6 and chromas 1 to 3. The structure is moderate medium and coarse blocky. Texture of clay or silty texture may occur. Very strongly acid to slightly acid, reaction values range from 5.0 to 6.5.

The subsurface of argillic B horizon clay, has 10YR or 7.5YR hues, values 5 or 6 and chromas 2 or less, but may range to 2.5Y or 5Y hues. The structure is moderate medium and coarse blocky. Clay loam, silty clay loam or silty clay (sandy clay texture is occasionally found) more than 35 percent clay. Very strongly acid to moderately acid, reaction values range from 5.0 to 6.0.

Similar Soil Series:

Klaeng series (Kl): very-fine, kaolinitic, isohyperthermic Typic Plinthaquults, has red mottles of plinthite $\geq$ 50 percent by volume within 150 cm or continuous phase from the soil surface.

Phatthalung series (Ptl): fine, kaolinitic, isohyperthermic Plinthic Paleaquults, has red mottles of plinthite 5 to less than 50 percent by volume within 150 cm from the soil surface.

Tha Sala series (Tsl): fine, kaolinitic, isohyperthermic Typic Endoaquults, lighter texture subsoil within 150 cm from the soil surface.

Principal Associated Soils:

These include Klaeng, Phatthalung, Sai Buri and Rueso series. Sai Buri and Rueso soils occur on the higher parts of the old natural levees and have better drainage. Klaeng and Phatthalung soils are listed as similar soil series.

Sai Buri series: fine-silty, kaolinitic, isohyperthermic Aquic Kandiudults.

Rueso series: fine-silty, mixed, semiactive, isohyperthermic Typic Palehumults.

ANALYSIS RESULTS

(oven dry basis)

Profile code No.: S-68/41

Soil series: Bang Nara series (Ba)

Lab No.	Depth (cm)	Horizon	Particle size distribution analysis (% by weight)								Texture		pH		$CaCO_3$ %	P, mg kg^{-1} Bray 2	K, mg kg^{-1} NH_4OAc
			USDA grading			Sand-fraction grading					Lab	Field	1:1	1:1			
			sand	silt	clay	vc	c	m	f	vf	result	estim[n]	water	KCl			
Pb-998	0-15	Apg	33.0	42.0	25.0						l	l	4.6	3.9		4.2	62
Pb-999	15-24	BA g	40.0	27.5	32.5						cl	cl	5.2	3.9		2.3	35
Pb-1000	24-55	Btg1	33.0	29.0	38.0						cl	cl	5.0	3.8		1.7	38
Pb-1001	55-85	Btg2	34.5	25.5	40.0						cl-c	c	5.1	3.7		1.7	41
Pb-1002	85-100+	Btg3	44.0	24.0	32.0						cl	cl	5.2	3.7		1.9	50

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations ($cmol_{(+)}$ kg^{-1})									Base satur[n] (%)		ECEC $cmol_{(+)}$ kg^{-1} (B+D)	Al KCl extr. $cmol_{(+)}$ kg^{-1} (D)	Electrical conduct[y] ($ECx10^6$) dS m^{-1}
				Ca	Mg	K	Na	SUM cations (B)	Extr. acidity (A)	SUM (B+A)	CEC NH_4OAc (C)	CEC 100g Clay	B/Cx100	(Bx100)/ (B+A)			
0-15	0.8	1.06		1.30	0.30	0.10	0.30	2.00	5.20	7.20	5.5	22.0	36	28			0.04
15-24	0.9	0.32		1.20	0.30	0.10	0.30	1.90	4.50	6.40	5.5	16.9	35	30			0.01
24-55	0.8	0.20		0.30	0.10	0.10	0.30	0.80	5.90	6.70	5.7	15.0	14	12			0.01
55-85	1.4	0.05		0.50	0.30	0.10	0.30	1.20	7.60	8.80	7.1	17.8	17	14			0.02
85-100+	0.6	0.02		0.60	0.60	0.10	0.30	1.60	5.40	7.00	6.1	19.1	26	23			0.03

Surveyor: U. Samrongkit

Date: July 7, 1971

Reported by: W. Sirichuaychoo

Date: Nov. 7, 1998