

Proposed S. Charoenpong, 1970
Revised by :
P. Vijarnsorn and staffs, 1988
W. Sirichuaychoo, 2004

NONG KHLA SERIES

Field Symbol: **Nok**

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

Setting: Nong Khla soils derived from fine grain clastic rock namely mudstone, shale, phyllite or equivalent rocks and occurred on denudation surface. Relief is gently undulating to undulating. Elevation ranges from 30 to 80 m above sea level. Slope ranges from 2 to 12 percent. The climate is Tropical Rain Forest (Koppen 'Af') or Tropical Monsoon (Koppen 'Am'). Average annual precipitation is 3,000 mm. Average annual air temperature is from 26 °C to 28°C.

Drainage, Permeability and Surface Runoff: Drainage is well drained, permeability is estimated to be rapid and surface runoff is rapid, due to sloping.

Vegetation and Land Use: Some areas are still under Tropical Evergreen Forest, but many areas have been cleared for para rubber, oil palm and fruit trees plantation. Also, some area have been changed to the gravel pits which used for road subgrade material.

Characteristic Profile Features: Nong Khla series is a member of the clayey-skeletal, kaolinitic, isohyperthermic Typic Kandiodults (soil taxonomy, 2003). There are very shallow soils to ironstones and are characterized by dark reddish brown clay loam surface or A horizon overlying a dark red or red very gravelly clay kandic B horizon. Gravels composed of loose ironstones of various sizes (diameter between 2 to 7.5 cm) but rounded boulder of consolidated ironstones are also found in the soil profile at deeper depth. Weathering shales, phyllites or mudstones usually occur at approximately below 3 to 6 m of the soil surface.

Typifying Pedon: Nong Khla clay loam - para rubber plantation, Ban Suan, Amphoe Ao Luek, Changwat Krabi, 40 m above mean sea level, 3 to 5 percent slopes (sheet name Ban Kuan Hin, sheet number 4735 I).

Profile Code Number: S-64/23, described by Piboon Pramojanee, 14 December 1973 (moist colors unless otherwise stated).

Horizon Depth (cm)	Description
A 0-13	Dark brown to brown (7.5YR4/4) clay loam; moderate medium to coarse subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few fine to medium concretion of ironstone or shale; very strongly acid (field pH 5.0); clear smooth boundary.
BA 13-26/30	Yellowish red (5YR5/6-8) gravelly clay loam; friable, sticky and plastic; common patchy cutan in pores; many very fine to fine tubular pores; few fine and medium roots; gravels composed of ironstones or shale about 40% by volume of the soil matrix; very strongly acid (field pH 5.0); gradual wavy boundary.
Btc1 26/30-47/49	Red (2.5YR5/8) gravelly clay loam to clay; slightly firm, sticky and plastic; moderately thick cutan in pores; few fine tubular pores; few fine roots; gravels composed of ironstones or shale about 40-50% by volume of the soil matrix; very strongly acid (field pH 4.5); clear smooth boundary.
Btc2 47/49-100	Red (2.5YR5/8) gravelly clay; sticky, plastic; moderately thick cutan in pores; few fine tubular pores; few very fine roots; gravels composed of ironstones or shale about 40% by volume of the soil matrix; very strongly acid (field pH 4.5).

Type Location:

Name of village, Ban Nong Khla, Amphoe Tha Sae, Changwat Chumphon.

Range of Profile Features:

The surface or A horizon loam to clay or gravelly loam to gravelly clay, ranges between 5 to 15 cm in thickness and has 5YR or 2.5YR hues, values 3 or 4, and chromas 3 or 4. Very strongly acid to strongly acid, reaction values range from 4.5 to 5.5.

The kandic B horizon very gravelly clay, and has 2.5YR or 10R hues, values 3 to 5 and chromas 6 or 8. Very strongly acid to moderately acid, reaction values range from 5.0 to 6.0. The soil structure of the solum is difficult to define due to the presence of ironstones.

Similar Soil Series:

Khlong Chak series (Kc): clayey-skeletal, kaolinitic, isohyperthermic Typic Kandihumults, has a yellowish red argillic B horizon otherwise is the same.

Trang series (Tng): fine, kaolinitic, isohyperthermic Typic Kandihumults, almost the same except gravelly layers occur below 50 cm but within 1 meter of the soil surface.

Trat series (Td): fine, kaolinitic, isohyperthermic Typic Kandiodults.

Principal Associated Soils:

These include Trang, Khlong Chak and Trat series. All of these soils have ironstone layers at different depth due to the wavy topography of ironstone boundary. Also, Nong Khla series may found in association with Ao Luek series if there are limestone monadnocks occur on the area.

ANALYSIS RESULTS

(oven dry basis)

Profile code No.: S-64/23

Soil series: Nong Khla series (Nok)

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 ₄ OAc	
			USDA grading			Sand-fraction grading				Lab	Field	1:1	1:1				
			sand	silt	clay	vc	c	m	f	vf	result	estim ⁿ	water				KCl
Pe-332	0-13	A	54.0	24.5	21.5						scl	cl	5.2	4.4	0.0	3.0	88
Pe-333	13-26/30	BA	38.5	19.5	42.0						c	gcl	5.7	4.4	0.3	2.3	35
Pe-334	30-47/49	Btc1	14.0	8.0	78.0						c	gcl-c	5.7	4.4	0.0	2.0	21
Pe-335	49-100	Btc2	16.0	8.0	76.0						c	gc	6.1	4.6	0.6	1.9	29

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 conductivity (ECx10 ⁶) dS m ⁻¹	
				Ca	Mg	K	Na	SUM cations (B)	Extr. acidity (A)	SUM (B+A)	CEC NH ₄ OAc (C)	CEC 100g Clay	B/Cx100				(Bx100)/(B+A)
				0-13	1.8	2.25		0.40	0.40	0.20	0.20	1.20	9.50				10.70
13-26/30	1.8	1.22		0.14	0.16	0.06	0.20	0.56	8.20	8.76	3.6	8.6	16	6		0.05	
30-47/49	2.5	0.73		0.20	0.10	0.05	0.20	0.55	9.60	10.15	4.2	5.4	13	5		0.03	
49-100	2.9	0.37		0.20	0.15	0.05	0.20	0.60	8.50	9.10	4.3	5.7	14	7		0.03	

Surveyor: P. Pramojanee

Date: Dec. 14, 1973

Reported by: W. Sirichuaychoo

Date: Oct. 26, 1998