

Proposed by S. Charoenpong. 1964  
Revised by:  
P. Vijarnsorn and staffs, 1988  
W. Sirichuaychoo, 2004

**KHLONG CHAK SERIES**

**Field Symbol: Kc**

**Distribution:** Occupies moderate to large extent in Southeast Coast of Thailand and in Peninsular Thailand.

**Setting:** Khlong Chak soils are formed from fine grain clastic rocks namely shale, phyllite or equivalent rocks and occurred on denudation surface. Relief is gently undulating to rolling. Slope ranges from 2 to 20 percent. Elevation ranges from 20 to 50 m. above mean sea level. The climate is Tropical Monsoon (Koppen 'Am'). Average annual precipitation is from 2,000 to 6,000 mm. Average annual air temperature is from 26 °C to 27°C.

**Drainage, Permeability and Surface Runoff:** Drainage is well drained, permeability is rapid and surface runoff is rapid. Ground water level falls below 5 m throughout the year.

**Vegetation and Land Use:** Tropical Evergreen Forest. Parts have been cleared and planted in para rubber, oil palm and fruit trees.

**Characteristic Profile Features:** The Khlong Chak series is a member of the clayey-skeletal, kaolinitic, isohyperthermic Typic Kandihumults (soil taxonomy, 2003). They are shallow soils to very gravelly of rock fragments and ironstones and are characterized by a dark brown, dark reddish brown or dark grayish brown clay loam surface or A horizon overlying a yellowish red very gravelly clay loam or clay kandic B horizon. Coarse fraction consists of angular and subangular shale and phyllite fragments and ironstones. Reaction is a moderately acid to slightly acid, reaction values range from 6.0 to 6.5 at the surface layer and strongly acid to moderately acid, reaction values range from 5.5 to 6.0 in the subsoil.

**Typifying pedon:** Khlong Chak clay loam – para rubber, Ban Hin Lap, Tambon Khlong Hin, Amphoe Ao Luek Changwat Krabi, 2 to 3 percent slopes (sheet name Ban Mak, sheet number 47251).

**Profile Code Number:** S-64/60, described by Kampon Busayamanon and staffs, 16 May 1979 (moist colors unless otherwise stated).

Horizon	Depth (cm)	Description
Ap	0-9	Very dark grayish brown (10YR3/2) clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; slightly acid (field pH 6.5); abrupt smooth boundary.
Bt	9-26	Strong brown (7.5YR5/8) slightly gravelly clay loam; weak fine subangular blocky structure; friable, sticky and slightly plastic; patchy thin cutan on ped faces, in pores and along root channels; common fine roots; slightly acid (field pH 6.5); gradual smooth boundary.
Btc1	26-45	Yellowish red (5YR5/6) gravelly clay; moderate medium subangular blocky structure; friable, sticky and plastic; continuous thick cutan on ped faces and in pores; gravels composed of ironstones about 40% by volume of the soil matrix; slightly acid (field pH 6.5); gradual smooth boundary.
Btc2	45-125	Yellowish red (5YR5/8) very gravelly clay; friable, sticky and plastic; broken thick cutan on ped faces and in pores; gravels composed of ironstones about 60% by volume of the soil matrix; strongly acid (field pH 5.5).

**Type Location:**

Name of river, Khlong Chak stream, Amphoe Klaeng, Changwat Rayong.

### Range of Profile Features:

The surface or A horizon clay loam varies from 10 to 30 cm in thickness, has 10YR, 7.5YR or 5YR hues, values 3 or 4 and chromas 2 to 4. Texture of silty clay loam or gravelly clay loam may occur. Structures is moderate medium and/or fine blocky with some granular. Strongly acid to neutral, reaction values range from 5.5 to 7.0.

The kandic B horizon very gravelly clay, has 5YR hues, values 4 or 5 and chromas 6 to 8. The color of 7.5YR hues may occur at the upper B horizon and the color of 2.5YR hues may occur in the lower part of the B horizon. Structure is moderate blocky. Very strongly acid to strongly acid, reaction values range from 4.5 to 5.5.

Khlong Chak soils contain very gravel of pseudo-laterite within 50 cm from the soil surface. Normally in Agriculture area, high leaching and low organic carbon content (Typic Kandiodults).

### Similar Soil Series:

Trat series (Td): fine, kaolinitic, isohyperthermic Typic Kandiodults, has ironstones between 50 to 100 cm from the soil surface (ironstones  $\geq$  35 percent).

Nong Khla series (Nok): clayey-skeletal, kaolinitic, isohyperthermic Typic Kandihumults, has redder color in the subsoil of kandic B horizon (2.5YR or 10R hue).

### Principal Associated Soils:

These include Trat, Nong Khla series and Slope Complex.

#### ANALYSIS RESULTS

(oven dry basis)

Profile code No.: S-64/60

Soil series: Khlong Chhak series (Kc)

Lab No.	Depth (cm)	Horizon	Particle size distribution analysis (% by weight)									Texture		pH		CaCO <sub>3</sub> %	P, mg kg <sup>-1</sup> Bray 2	K, mg kg <sup>-1</sup> NH <sub>4</sub> OAc
			USDA grading			Sand-fraction grading						Lab result	Field estim <sup>n</sup>	1:1 water	1:1 KCl			
			sand	silt	clay	vc	c	m	f	vf								
2-12966	0-9	A	42.9	21.0	36.1	3.8	3.6	9.0	14.3	12.2	cl	cl	6.0	5.4		116.0	292	
2-12967	9-26	Bt	30.2	18.6	51.2	1.0	0.9	6.3	11.8	10.2	c	cl	5.6	4.6		19.3	104	
2-12968	26-45	Btc1	19.6	4.8	75.6	1.2	0.9	3.1	7.1	7.3	c	slig.cl	5.4	4.6		3.0	53	
2-12969	45-125	Btc2	22.3	11.1	66.6	2.9	1.2	5.2	8.4	4.6	c	vgc	4.9	4.2		2.3	33	

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol <sub>(+)</sub> kg <sup>-1</sup> )										Base satur <sup>n</sup> (%)		ECEC cmol <sub>(+)</sub> kg <sup>-1</sup> (B+D)	Al KCl extr. cmol <sub>(+)</sub> kg <sup>-1</sup> (D)	Electrical conduct <sup>y</sup> (ECx10 <sup>6</sup> ) dS m <sup>-1</sup>	
				Ca Mg K Na				SUM cations (B)		Extr. acidity (A)		SUM (B+A) NH <sub>4</sub> OAc (C)		CEC 100g Clay	B/Cx100				(Bx100)/(B+A)
				Ca	Mg	K	Na	cations	acid	SUM	CEC	CEC	CEC						
0-9	2.5	3.80		12.20	2.10	0.80	0.20	15.30	10.50	25.80	18.4	51.0	83	59			0.54		
9-26	1.8	0.84		3.90	0.60	0.20	0.20	4.90	5.70	10.60	6.6	12.9	74	46			0.24		
26-45	1.9	0.78		2.50	0.30	0.10	0.30	3.20	7.50	10.70	5.4	7.1	59	30			0.06		
45-125	2.3	0.54		1.50	0.30	0.10	0.30	2.20	5.70	7.90	4.8	7.2	46	28			0.04		

Surveyor: K. Busayamanont & staff

Date: May 16, 1979

Reported by: W. Sirichuaychoo

Date: Oct. 26, 1998