

Proposed by S. Charoenpong, 1974  
Revised by :  
P. Vijarnsorn and staffs, 1988  
W. Sirichuaychoo, 2004

## KHOK KLOI SERIES

Field Symbol: Koi

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

**Setting:** Khok Kloi soils derived from granite or equivalent rocks (gneissic granite or granitic gneiss) and occurred on granitic terrains. Relief is undulating to hilly with slopes ranging from 5 to 35 percent. Elevation is approximately from 20 to 60 m above mean sea level. The climate is Tropical Monsoon (Koppen 'Am') or Tropical Rain Forest (Koppen 'Af'). Average annual precipitation is above 2,000 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 moderate to rapid and surface runoff is rapid to medium depending upon slope and surface protection. Ground water level falls very deep, usually below 3 m throughout the year.

**Vegetation and Land Use:** Originally, under Tropical Evergreen Forest, now many areas have been cleared for para rubber, oil palm and fruit trees growing.

**Characteristic Profile Features:** The Khok Kloi series is a member of the fine, kaolinitic, isohyperthermic Typic Kandiodults (soil taxonomy, 2003). They are very deep soils and are characterized by a very dark brown or brown sandy loam surface or A horizon overlying a yellowish brown grading to yellowish red medium to gravelly sandy clay loam over sandy clay kandic B horizon. Gravelly horizons usually occur below 50 cm but within 1 meter from the soil surface and consist mainly of quartz grains. Very strongly acid to strongly acid, reaction values range from 5.0 to 5.5 in surface soil and very strongly acid, reaction values range from 4.5 to 5.0 in subsoil.

**Typifying Pedon:** Khok Kloi sandy loam – para rubber plantation, from Ban Farang, Tambon Khok Kloi, Amphoe Takua Thung, Changwat Phangnga, 35 m above mean sea level, 7 to 8 percent slopes (sheet name Ban Khok Kloi, sheet number 4635 I).

**Profile Code Number:** S-60/26, described by Anan Pittayarak, 9 January 1974 (moist colors unless otherwise stated).

Horizon Depth (cm)	Description
Ap 0-13	Brown to dark brown (7.5YR4/4) medium sandy loam; weak medium and coarse granular structure; friable, slightly sticky and nonplastic; many very fine and fine interstitial and common fine tubular pores; slightly acid (field pH 6.5); clear smooth boundary.
Bw 13-26	Yellowish red (5YR4/8) coarse sandy loam; weak medium and coarse subangular structure; friable, slightly sticky and nonplastic; common fine interstitial and tubular pores; plentiful fine and few medium roots; moderately acid (field pH 6.0); clear smooth boundary.
Bt1 26-51	Yellowish red (5YR4/8) coarse sandy clay; moderate medium and coarse subangular structure; friable, slightly sticky and slightly plastic; common thin clay film on ped faces; common fine interstitial and few fine tubular pores; plentiful fine and few medium roots; moderately acid (field pH 6.0); gradual smooth boundary.
Bt2 51-100	Red (2.5YR5/8) gravelly sandy clay; moderate fine and medium subangular structure; friable, slightly sticky, slightly plastic; common thin clay film on ped faces; common fine interstitial pores, few fine and medium tubular pores; moderately acid (field pH 6.0).
Bt3 100-140	Red (2.5YR5/8) gravelly sandy clay.
Bt4 140-170	Red (2.5YR5/8) very gravelly sandy clay.

**Type Location:**

Name of village and subdistrict, Ban Khok Kloi, Amphoe Takua Thung, Changwat Phangnga.

**Range of Profile Features:**

The surface or A horizon sandy loam or sandy clay loam, is 10 to 15 cm in thickness and has 10YR or 7.5YR hues, values 2 to 4, and chromas 3 or 4. Structure is moderate fine and medium subangular blocky. Strongly acid to moderately acid, reaction values range from 5.0 to 6.0.

The kandic B horizon has 10YR or 7.5YR hues, values 5 or 6 and chromas 6 or 8 which gradually grading to 5YR hues, values 4 or 5 and chromas 6 or 8. The reddish colors are commonly present within 80 cm of the soil surface. Texture usually grades from medium to coarse sandy clay loam or sandy clay to gravelly sandy clay or clay with discernible sand fractions. Sand grains increase in size with depth. Gravels are composed mostly of angular and subangular quartz grains. Very strongly acid to strongly acid, reaction values range from 4.5 to 5.5. Mottles of yellowish and reddish many occur in weathering zone of parent rock which found below 1.5 m of the soil surface.

**Similar Soil Series:**

Thai Mueang series (Tim): fine, kaolinitic, isohyperthermic Typic Kandiodults, brownish colors.

Khuan Kalong series (Kkl): fine-loamy, kaolinitic, isohyperthermic Typic Kandiodults, brownish colors.

**Principal Associated Soils:**

These include Phuket, Thai Mueang and Phangnga series. They also occur as parts of Slope Complex.

Phuket series (Pk): fine, kaolinitic, isohyperthermic Typic Kandiodults, no gravelly or slightly gravelly subsoil.

Phangnga series (Pga): fine, kaolinitic, isohyperthermic Typic Kandiodults, brown color and no gravelly or slightly gravelly subsoil.

ANALYSIS RESULTS

Profile code No.: S-60/26

(oven dry basis)

Soil series: Khok Kloi series (Koi)

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	Field	1:1 water	1:1 KCl			
			sand	silt	clay	vc	c	m	f	vf	result	estim <sup>n</sup>				
Pe-170	0-13	Ap	83.0	10.0	7.0					sl	m.sl	5.9	5.2	0.0	2.3	62
Pe-171	13-26	Bw	73.5	10.0	16.5					sl	co.sl	5.4	4.5	0.3	2.3	50
Pe-172	26-51	BT1	52.0	8.5	39.5					sc	co.sc	5.6	4.4	0.0	2.6	76
Pe-173	51-100	BT2	33.0	12.5	54.5					c	gsc	5.8	4.3	0.0	2.3	96

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)	CEC NH <sub>4</sub> OAc (C)	CEC 100g Clay	B/Cx100	(Bx100)/(B+A)				
				0-13	0.4	1.09		1.00	0.80	0.10	0.20	2.10	3.20	5.30	2.6			
13-26	1.0	0.89		0.20	0.20	0.10	0.10	0.60	5.10	5.70	2.8	17.0	21	11			0.06	
26-51	0.9	0.66		0.20	0.20	0.20	0.10	0.70	6.60	7.30	4.2	10.6	17	10			0.03	
51-100	2.0	0.55		0.30	0.20	0.20	0.20	0.90	8.20	9.10	4.4	8.1	20	10			0.03	

Surveyor: A. Pitayarak

Reported by: W. Sirichuaychoo

Date: Jan. 9, 1984

Date: Nov. 3, 1998