

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

## KHOK KHAIN SERIES

Field Symbol: Ko

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

**Setting:** Khok Khain soils are formed from old alluvium of granite and occur on granitic terrain. Elevation ranges from 20 to 40 m above mean sea level. Relief is level to nearly level. Slope is less than 2 percent. The climate is Tropical Monsoon (Koppen 'Am'). Average annual air temperature is from 26 °C to 28°C. Average annual precipitation is from 1,800 to 3,000 millimeters.

**Drainage, Permeability and Surface Runoff:** Drainage is poorly drained, permeability is estimated to be moderate and surface runoff is slow. Surface flooding from impounded rainwater up to 30 cm during the rainy season and ground water level seldom falls below 1.5 m.

**Vegetation and Land Use:** Mainly used for transplanted rice. Abandoned areas revert to grass and low secondary shrubs.

**Characteristic Profile Features:** Khok Khain is a member of the fine-loamy, kaolinitic, isohyperthermic Typic Kandiaquults (soil taxonomy). They are very deep soils and are characterized by a gray or light brownish gray sandy loam surface or A horizon overlying upper kandic B horizon is sandy loam or sandy clay loam is brownish gray and lower kandic B horizon sandy clay loam is light gray or gray. They are mottled throughout with the brownish colors. Coarse fraction is composed of angular quartz sand. Strongly acid to moderately acid, reaction values range from 4.5 to 6.0.

**Typifying Pedon:** Khok Khain sandy loam - transplanted rice, Moo Ban Gubear Madao, Amphoe Yingo, Changwat Narathiwat, less 2 percent slopes, 10 to 30 cm flooding depth, shallow than 1 meter ground water depth.

**Profile Code Number:** S-71/17, described by F. J. Dent, 18 April 1969 (moist colors unless otherwise stated).

Horizon Depth (cm)	Description
Apg 0-10	Light brownish gray (10YR6/2) sandy loam; few fine mottles along roots; moderate coarse subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine discontinuous random inped and exped, simple open tubular and interstitial pores; many fine and medium roots; very strongly acid (field pH 5.0); clear smooth boundary.
Bg 10-21	Light gray (10YR7/1) sandy loam; many fine distinct yellowish brown (10YR5/8) mottles; strong coarse subangular blocky structure; hard, very firm, slightly sticky and slightly plastic; few fine discontinuous random inped and exped, simple open tubular and interstitial pores; few fine roots; very strongly acid (field pH 5.0); gradual smooth boundary.
Btg1 21-57	Light gray (10YR7/1) sandy clay loam; many medium distinct yellowish brown (10YR5/6) mottles; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few patchy thin cutan inped and exped; many fine discontinuous random inped and exped, simple open tubular and interstitial pores; few fine roots; strongly acid (field pH 5.5); gradual smooth boundary.
Btg2 57-100	Light gray (10YR7/1) sandy clay loam; many medium distinct yellowish brown (10YR5/8) mottles; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few patchy thin cutan inped and exped; common fine interstitial and few fine tubular discontinuous random inped and exped, simple open pores; strongly acid (field pH 5.5); gradual smooth boundary.

**Type Location:**

Name of village, Ban Khok Khain, Amphoe Yi-ngo, Changwat Narathiwat.

**Range of Profile Features:**

The surface or A horizon sandy loam ranges from 10 to 20 cm in thickness and has 10YR hues, values 5 or 6 and chromas 3 or 4. The structure is moderate coarse blocky. Strongly acid to moderately acid, reaction values range from 5.0 to 6.0.

The kandic B horizon sandy clay loam (or sandy loam over sandy clay loam,  $\geq 35$  percent clay in control section) has 10YR hues, values 5 or 6 and chromas 3 or 4 over 10YR, 7.5YR and 2.5YR hues, values 6 to 7 and chromas 2 or less. Structure of moderate medium blocky. Strongly acid to moderately acid, reaction values range from 5.0 to 6.0.

Red mottles may occur in the deeper subsoil and few mica flakes may occur in the surface or throughout the profile.

**Similar Soil Series:**

Bang Nara series (Ba): fine, kaolinitic, isohyperthermic Typic Paleaquults.

Su-ngai Kolok series (Gk): fine, kaolinitic, isohyperthermic Typic Endoaquults, sandy texture subsoil.

**Principal Associated Soils:**

These include La Han, Thung Wa and Su-ngai Kolok series.

La Han series (Lh): coarse-loamy, siliceous, subactive, isohyperthermic Typic Paleudults, has grayer color in subsoil and well drained.

Thung Wa series (Tg): coarse-loamy, siliceous, subactive, isohyperthermic Typic Paleudults, well drained and occur on higher positions.

**ANALYSIS RESULTS**

Profile code No.: S-71/17

(oven dry basis)

Soil series: Khok Khian series (Ko)

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>						
P-862	0-10	Apg	51.2	34.8	14.0							l	sl	4.4	3.8	0.2	6.2	46
P-863	10-21	Bg	67.4	15.6	17.0							sl	sl	5.2	4.0	0.0	4.0	19
P-864	21-57	Btg1	66.1	8.4	25.5							scl	scl	5.0	3.9	0.2	4.4	22
P-865	57-100	Btg2	65.6	7.4	27.0							scl	scl	5.2	4.0	0.2	4.6	28

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 (B+D) cmol <sub>(+)</sub> kg <sup>-1</sup>	Al KCl extr. (ECx10 <sup>6</sup> ) cmol <sub>(+)</sub> kg <sup>-1</sup> (D)	Electrical conduct <sup>y</sup> (ECx10 <sup>6</sup> ) dS m <sup>-1</sup>
								SUM	Extr.	SUM	CEC	CEC	B/Cx100	(Bx100)				
				Ca	Mg	K	Na	cations (B)	acidity (A)	(B+A)	NH <sub>4</sub> OAc (C)	100g Clay		(B+A)				
0-10	0.1	1.13		0.60	0.30	0.10	0.20	1.20	4.30	5.50	4.7	33.6	26	22			0.04	
10-21	0.1	0.17		0.40	0.20	0.03	0.10	0.73	2.30	3.03	2.8	16.5	26	24			0.01	
21-57	0.2	0.11		0.40	0.20	0.03	0.20	0.83	3.30	4.13	3.8	14.9	22	20			0.01	
57-100	0.1	0.11		0.60	0.40	0.04	0.20	1.24	3.40	4.64	3.3	12.2	38	27			0.01	

Surveyor: F. J. Dent

Reported by: W. Sirichuaychoo

Date: April 18, 1969

Date: Nov. 7, 1998