

Proposed by: W. Van der Kevie, 1964
Revised by:
1. C. Changprai, 1987
2. S. Udomsri, 2004

KHOK KRATHIAM SERIES

Field Symbol: Kk

Distribution: Occupies small extent in the northern part of the Central Plain with limestone nearby.

Setting: Khok Krathiam soils are formed from alluvium which high in montmorillonitic clays. They occur on alluvial plain or along the boundary between terraces and the recent alluvial plain which have limestone nearby. Relief is nearly flat with slopes of less than 2 %. Elevation ranges from 2-5 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Annual precipitation ranges from 1,000 mm to 1,400 mm. Mean annual temperature is 27° C.

Drainage and Permeability and Surface Runoff: Poorly drained. Runoff and permeability are slow. These soils are flooded by river water or rain to depths of 1 m or more for five or six months during the rainy season. Sometimes this area flooded by irrigation. However, these soils also dry out deeply with groundwater level falling below 2 m during the peak of the dry season when deep wide cracks usually occur.

Vegetation and Land Use: Mainly used for broadcast rice cultivation.

Characteristic Profile Features: Khok Krathiam series is a member of the Very-fine, smectitic, isohyperthermic Ustic Endoaquerts. They are deep, medium to slightly acid over mildly to moderately alkaline soils. They are characterized by a thick black, grading to very dark gray or dark gray clay A horizon, overlying a gray or light gray clay B horizon. These soils are mottled throughout with strong brown and yellowish red coatings along root channels and cracks in the upper A horizon, and yellowish brown, light olive brown and olive yellow mottles in the B horizons. Slickensides and pressure faces occur from shallow depth and cracks at least 1 cm wide at 50 cm depth open during the dry season. Manganese, iron/manganese, and secondary lime nodules are commonly found in the deeper subsoil below approximately 80 cm from the soil surface.

Typifying Pedon: Profile code number is Code C-3/18

Location: Ban Kong Thong, Tambon Don Thong, Amphoe Nong Don Changwat Saraburi.

Sheet Name: Amphoe Tha Ruea

Sheet No.: 5138 III

Coordinate: 156854

Elevation: 2 m (MSL)

Relief: level to nearly level

Slope: 0-1%

Physiography: alluvium plain

Parent material: alluvium

Drainage: poorly drained

Permeability: slow

Runoff: slow

Ground water depth: >2 m

Flooding depth: 100 cm

Duration: several month

Frequency: every year

Annual rainfall: 1,211.9 mm

Mean temp: 28.1 °C

Climate type: Tropical Savannah

Natural vegetation and/or land use: paddy field

Other: deep wide (1.5-2 cm) cracks up to 1 m depth

Described by: Cowie, Kevie, Thamrong and Chalaeo

Date: 15 April, 1969

Revised by: S. Udomsri

Horizon	Depth (cm)	Description
Apg1	0-2	Black (10YR2/1) clay; many very fine strong brown mottles along root channels; strong coarse granular; loose hard aggregates; many fine and very fine roots; slightly acid (field pH 6.5); abrupt, wavy boundary.
Apg2	2-15	Black (10YR2/1) clay; many prominent strong brown (7.5YR5/6) and yellowish red (5YR5/6) mottles, fine along root channels and medium along ped faces; moderate coarse angular blocky structure; many fine and common medium sized slickensides and common pressure faces;

		few very fine tubular pores; few snail shell fragments; some small pieces of brick; common very fine and few fine roots; neutral (field pH 7.0); gradual, smooth boundary.
Bssg1	15-40	Very dark gray (10YR3/1) clay; many medium distinct dark yellowish brown (10YR4/4) mottles and some inclusions of the Ap horizon; moderate coarse angular blocky breaking to fine angular blocky structure; friable; many medium slickensides and many pressure faces; common fine and few coarse roots; moderately alkaline (field pH 8.0); gradual, wavy boundary.
Bssg2	40-105	Dark gray (10YR4/1) clay; with few black inclusions of the Ap horizon and many medium distinct light olive brown (2.5Y5/4) mottles (60% of soil mass) and few fine prominent yellowish red (5YR5/6) mottles along root channels; moderate to weak medium angular blocky structure; slightly firm; common big slickensides and common pressure faces; few fine roots; mildly alkaline (field pH 7.5); gradual, slightly wavy boundary.
Bssg3	105-200	Gray (5Y6/1) clay; many medium distinct light olive brown (2.5Y5/4 60% of soil mass) and few fine prominent yellowish brown (10YR5/6) mottles; moderate to weak medium angular blocky structure; slightly firm, slightly plastic and very sticky; common slickensides and pressure faces; common very fine roots; few coarse lime nodules; few hard black manganese nodules.
Bssg4	200-280	Gray (10YR6/1) clay; common medium distinct light olive brown (2.5Y5/4) and few fine distinct yellowish brown (10YR5/6) mottles; slightly firm, very plastic and very sticky; common slickensides and pressure faces; very few lime nodules and very few manganese nodules.
BCg	280-400	Light gray (5Y7/1) clay; many fine and medium prominent yellowish brown (10YR5/6) mottles (50% of soil mass); many lime nodules which can be crushed by fingers (30% of soil mass) some coarse black manganese nodules.

Type Location: Name of village, Ban Khok Krathiam, Amphoe Mueang Changwat Lop Buri.

Range of Profile Features:

The A horizon is from 20 to 40 cm thick, has 10YR hue, values of 2 and 3 and chromas of 2 or 1 structure is strong, coarse granular at the surface and moderate. Field pH values range from 5.5 to 6.5.

The B horizon has 10YR or 5Y hues, values of 4 to 5 in the upper and 5 to 7 in the lower and chroma of 1 throughout. Structure is strong to moderate, medium blocky and field pH values range from 7.0 to 8.0.

Similar Soil Series:

Sing Buri series (sin) : has predominantly dark gray colours, floods for longer periods, somewhat lower pH values and does not dry long enough for deep cracking to occur.

Ban Mi series (Bm) : has dominant dark gray colours in the A horizon and upper B horizon

Chong Khae series (Ck) : contain dominant fine red mottles throughout.

Principal Associated Soils: These include Ban Mi series occupying somewhat higher positions on the semi-recent terrace, and Sing Buri series which occur on low lying parts of the alluvial plain.

ANALYSIS RESULTS

Profile code No. C-3/18

(oven dry basis)

Soil series : Khok Krathiam (Kk)

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 ¹	water	KCl				
P-784	0-15	Apg1-2	3.7	12.3	84.0							c	c	5.9	5.0	2.7	13.6	123
P-785	15-40	Bssg1	2.3	11.7	86.0							c	c	6.6	5.5	2.3	25.8	105
P-786	40-105	Bssg2	2.0	2.5	95.5							c	c	6.5	5.5	1.8	10.3	111
P-787	105-200	Bssg3	3.2	5.3	91.5							c	c	7.5	6.7	3.1	3.4	81
P-788	200-280	Bssg4	4.5	8.0	87.5							c	c	7.6	6.6	2.9	2.8	40
P-789	280-400	BCg	11.3	23.2	65.5							c	c	7.9	10.0	16.3	8.0	52

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol _(c) kg ⁻¹)										Base satur ¹ (%)		ECEC cmol _(c) kg ⁻¹ (B+D)	Al KCl extr. cmol _(c) kg ⁻¹ (D)	Electrical conduct ² (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)			
0-15	9.8	1.65		40.20	4.40	0.40	0.70	45.70	14.90	60.60	56.40	67.1	81	75			0.08	
15-40	9.0	0.77		42.00	4.10	0.30	1.00	47.40	10.30	57.70	54.30	63.1	87	82			0.08	
40-105	9.6	0.52		40.70	2.80	0.30	1.50	45.30	8.60	53.90	50.90	53.3	89	84			0.16	
105-200	9.5	0.06		50.60	2.50	0.20	2.00	55.30	5.00	60.30	51.90	56.7	100	92			0.19	
200-280	9.7	0.07		51.80	2.60	0.10	2.50	57.00	4.90	61.90	54.90	62.7	100	92			0.16	
280-400	9.8	0.02		54.70	1.80	0.10	2.20	58.80	2.10	60.90	37.90	57.9	100	97			0.19	