Proposed by:
P. Hemsrichartti and N. Chorphaka, 1979
Revised by:
1. N. Chorphaka, 1987
2. A. Potichan, 2004

KAMPHAENG PHET SERIES Field Symbol: Kp

Distribution: Occupies large extent in the north of Thailand

Setting: Kamphaeng Phet soil are formed from alluvium and occur on river levees and alluvial fans. Relief is nearly level to gently undulating. Slope range from 1 to 3 percent. Elevation is approximately from 30 to 65 m above sea level. The climate is Tropical Savannah (Aw). Average annual precipitation range from 980 to 1,350 mm. Mean annual air temperature is 26.9 ^{o}C.

Drainage, Permeability and Runoff: Moderately well drained. Permeability is estimated to be moderate. Surface runoff is slow. Ground water level is below 1 m throughout the year. Flooding commonly occur as a flash from the stream or river.

Vegetation and Land Use: Mostly used for fruit trees and/or are put to upland crops such as beans, corns, sugar canes etc.

Characteristic Profile Features: Kamphaeng Phet series is a member of fine-silty, mixed, active, isohyperthermic Oxyaquic (Ultic) Haplustalfs. They are very deep soils characterized by a brown or dark brown loam or silt loam A horizon, overlying a brown, dark brown or dark yellowish brown silty clay loam or silt loam argillic B horizon. These inturn overly lighter texture horizon which commonly occurs below 100 cm but within 1.5 m of the soil surface. Reaction is moderately acid to neutral in the surface horizon and strongly acid to slightly acid in the subsoil. Fine mica flakes occur in all horizons, but not enough for micaceous family.

Typifying Pedon: Profile code no. is NC-44/43 (moist colors unless otherwise stated).

Location: About 0.5 km south of Ban Khlong Toei, Ban Khlong Toei, Tambon Bung Kok, Amphoe Bang Rakam, Changwat Phitsanulok.

Sheet Name: Amphoe Sam Ngam **Sheet No.:** 5042 III
Coordinate: 102476 **Elevation:** 42 m (MSL)
Relief: gently undulating **Slope:** 2-3 %
Physiography: old levee
Parent material: alluvium
Drainage: moderately well drained **Permeability:** moderate
Runoff: slow **Ground water depth:** >2 m
Flooding depth: 50 - 100cm **Duration:** few days **Frequency:** almost every year
Annual rainfall: 1,351.9 mm **Mean temp.:** 27.5 ^{o}C **Climate type:** Tropical Savannah (Aw)
Natural vegetation or land use: Mango, Pamello, Kapok, Jack fruit, Teak, Corn, Mung bean
Described by: N. Chorphaka and P. Hemsrichartti **Date:** Feb. 26 1977
Revised by: Aniruth Potichan **Date:** 24 May, 2004

Horizon	Depth (cm)	Description
Ap	0-17	Very dark grayish brown to dark brown (10YR3/2-3) loam; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral (field pH 7.0); clear, smooth boundary.
Bw	17-35	Dark brown to brown (10YR4/3) loam; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; slightly acid (field pH 6.5); gradual and smooth boundary.

Bt1	35-73	Dark brown to brown (7.5YR4/4) and few dark brown (7.5YR3/2) loam; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; broken moderately thick cutans on ped faces and in pores; few very fine roots; strongly acid (field pH 5.5); gradual and smooth boundary.
Bt2	73-143	Dark brown to brown (7.5YR4/4) and yellowish brown (10YR5/4) silt loam; few spots of light brownish gray (10YR6/2); moderate medium and coarse subangular blocky structure; firm, slightly sticky and slightly plastic; continuous moderately thick cutans on ped faces and in pores; few very fine and fine roots; few black spots of manganese and iron oxide nodules, common termite holes; strongly acid (field pH5.5); gradual and smooth boundary.
CB	143-180	Yellowish brown (10YR5/8) loamy fine sand; weak fine and medium subangular blocky structure breaking to single grains; very friable, nonsticky, nonplastic; patchy thin cutans on ped faces; few very fine roots; neutral (field pH 7.0).
C	180+	Yellowish brown (10YR5/8) sandy.

Remark: many very fine mica flakes throughout profile.

Type location:

Kamphaeng Phet series was named for Changwat Kamphaeng Phet where this soil is first studied and classified.

Range of Profile Features:

The A horizon is from 15 to 20 cm thick and has 10YR or 7.5YR hues, value of 3 to 4 and chromas of 2 to 4. Texture of fine sandy loam may occur. Structure is weak to moderate medium subangular blocky. Field pH is from 6.0 to 7.0.

The argillic B horizon has 10YR or 7.5YR hues, value of 3 to 5 and chroma of 3 to 4. Texture of clay loam or loam may occur. Structure is moderate to strong medium and coarse subangular blocky. Field pH ranges from 5.5 to 6.5. At some depth between 100 to 150 cm of the soil surface texture become much lighter varying from sandy loam to sand. It may be a BC, CB or C horizon. The soil color is commonly 10YR or 7.5YR hues, value of 4 to 5 and chroma of 4 to 8. Structure is weak subangular blocky to structureless. Field pH varies from 6.0 to 7.0.

Similar Soil Series:

Kamphaeng Saen series (Ks): has a similar profile, but higher pH values throughout, with soft powdery lime and high base saturation more than 75% in argillic B.

Taphan Hin series (Tph): has a similar profile but redder in color (5YR hue).

Rueso series (Ro): has more developed argillic B horizon down deeper than 150 cm of the soil surface and is under udic soil moisture regime.

Principal Associated Soils:

These include Chiang Mai, Sai Ngam series on same position and Mae Sai series on lower position adjacent to the levee.

ANALYSIS RESULTS

(oven dry basis)

Profile code no.: (PN-7) NC-44/43

Soil series: Kamphaeng Phet (Kp)

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_4OAc
			USDA grading			Sand-fraction grading					Lab	Field	1:1	1:1			
			sand	silt	clay	vc	c	m	f	vf	result	estim^{n}	water	KCl			
DN 3360	0-17	Ap	51.8	38.5	9.7						l	l	6.4	5.2		13.9	138
DN 3361	17-35	Bw	49.8	38.2	12.0						l	l	6.4	4.9		4.2	227
DN 3362	35-73	Bt1	43.9	38.3	17.8						l	l	5.4	3.7		6.1	100
DN 3363	73-143	Bt2	45.2	34.3	20.5						l	sil	5.5	3.7		3.7	51
DN 3364	143-180	BC	80.5	13.5	6.0						ls	lfs	6.0	4.3		1.6	36

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 condut^{y} ($ECx10^{6}$) dS m^{-1}
				Ca	Mg	K	Na	SUM cations (B)	Extr. acidity (A)	SUM (B+A)	CEC NH_4OAc (C)	CEC 100g Clay	B/Cx100	(Bx100)/ (B+A)			
0-17	1.0	0.89		4.10	1.70	0.40	0.50	6.70	3.10	9.80	6.5	67.0	100	68			0.07
17-35	1.2	0.39		2.20	1.90	0.60	0.40	5.10	3.30	8.40	5.5	45.8	93	61			0.08
35-73	2.0	0.33		1.90	2.30	0.30	0.20	4.70	5.90	10.60	6.6	37.1	71	44			0.05
73-143	2.6	0.24		3.50	2.00	0.20	0.50	6.20	5.80	12.00	8.8	42.9	70	52			0.08
143-180	0.9	0.10		2.70	1.10	0.10	0.50	4.40	2.10	6.50	4.4	73.3	100	68			0.06

Surveyor: N. Chorphaka and P. Hemsrichartti

Date: Feb. 26 1977