

Proposed by W. Van der Kevie, 1971
Revised by:
1. C. Changprai, 1987
2. S. Udomsri, 2004

PAK THO SERIES

Field Symbol: Pth

Distribution: Occupies moderate extent in the southwestern or western part of the Central Plain.

Setting: Pak Tho soils are formed from alluvium and occur on low terrace or alluvial fan. Relief is flat to nearly flat with a micro-relief caused by the presence of abundant termite mounds. Slopes are about 0-2%. Elevation ranges from 8-20 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Mean annual precipitation ranges from 900 to 1,400 mm. Mean annual temperature is 27°C.

Drainage, Permeability and Surface Runoff: Somewhat poorly drained to poorly drained. Permeability and runoff are slow. These soils are flooded by impounded rainwater rainwater to depths of up to 30 cm for four or five months during the rainy season. Groundwater level falls below 2 m from the soil surface during the peak of the dry season.

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

Characteristic Profile Features: Pak Tho series is a member of the Fine, kaolinitic, isohyperthermic (Aeric) plinthic Paleaquults. They are deep, strongly to medium acid over very strongly acid soils. They are characterized by a grayish brown, light grayish brown or pinkish gray loam or clay loam A horizon, overlying a light brown loam, sandy loam or sandy clay loam subsurface. This in turn overlies a light gray or pinkish gray clay, weakly developed argillic B horizon. Frequent, hard iron/manganese nodules commonly occur at the top of the B horizon and become fewer with depth. These soils are mottled throughout with dominant strong brown, red mottles and plinthie in the B horizon.

Typifying Pedon: Profile code number is SW-52/3

Location: Amphoe Mueang Changwat Ratchaburi.

Sheet Name: Changwat Ratchaburi

Coordinate: 825995

Relief: level to nearly level

Physiography: alluvial plain

Parent material: riverine alluvium

Drainage: somewhat poorly drained

Runoff: slow

Flooding depth: - cm

Annual rainfall: 1,044.1 mm

Natural vegetation and/or land use: paddy field

Other:

Described by: Suthep and Kevie

Revised by: S. Udomsri

SheetNo.: 4936 II

Elevation: 8 m MSL.

Slope: 0-1%

Permeability: slow

Ground water depth: >1 m

Frequency: -

Climate type: Tropical Savannah

Date: 24 February, 1971

Horizon	Depth (cm)	Description
Apg1	0-15	Pinkish gray (7.5YR6/2) sandy clay loam; many medium distinct strong brown (7.5YR5/8) mottles; weak coarse subangular blocky structure; slightly firm, sticky, plastic; very few iron nodules; common medium and few very fine roots; moderately acid (field pH 6.0); clear, smooth boundary.
Apg2	15-26	Pinkish gray (7.5YR6/2) clay loam; many medium and fine distinct strong brown (7.5YR5/6) mottles; very weak coarse subangular blocky structure to massive; firm, sticky, plastic; pale colored sandy inclusions in places; few irregular iron nodules; few fine and very fine roots; moderately acid (field pH 6.0); clear, slightly wavy boundary.

ABg	26-35	Light brown (7.5YR6/4) clay loam; many medium distinct strong brown (7.5YR5/8) and common medium prominent red (10R4/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few small and large hard iron nodules; few very fine roots; very strongly acid (field pH 5.0); clear, slightly wavy boundary.
Btg1	35-43	Pinkish gray (5YR7/2) clay with sand fraction; many medium prominent red (2.5YR4/8) and common medium distinct reddish yellow (7.5YR6/8) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; patchy clay coatings on ped faces and in pores; many coarse iron nodules and few coarse manganese nodules (50-60% of soil mass); few very fine roots; very strongly acid (field pH 5.0); gradual, smooth boundary.
Btg2	43-100	Light gray (10YR7/2) clay with sand fraction; common fine and medium prominent red (10R4/8) mottles; moderate medium and coarse breaking to strong fine angular blocky structure; slightly firm, sticky, plastic; many pressure faces; patchy clay coatings on ped faces and in pores; few fine subrounded iron nodules; very few very fine roots; very strongly acid (field pH 4.5-5.0); gradual, smooth boundary.
Btg3	100-120	Light gray (10YR7/2) clay with sand fraction; common fine and medium prominent (2.5YR4/8) red and common fine distinct strong brown (7.5YR5/6) mottles; moderate medium and coarse subangular blocky breaking to strong fine angular blocky structure; slightly firm, sticky, plastic; patchy clay coatings on ped faces and in pores; few very fine subrounded iron nodules; very few very fine roots; very strongly acid (field pH 4.5).

Type Location: Name of Amphoe, Amphoe Pak Tho Changwat Ratchaburi..

Range of Profile Features:

The A or Ap horizon is from 10 to 20 cm, thick, has 10YR and 7.5YR hues, values of 5 or 6 and chroma of 2. Structure is weak coarse blocky and field pH values range from 5.5 to 6.0.

The subsurface (E or AB) horizon has 10YR, 7.5YR or 5YR hues, values of 5 or 6 and chroma of 4 in 7.5YR and 10 YR and 3 in 5YR , and has its upper boundary within 50 cm of the soil surface. Structure is weak or moderate, medium blocky and field pH values range from 5.0 to 5.5.

The B horizon has 7.5YR and 5YR hues in the upper part with values of 6 or 7 and chromas of 2 or less. The lower B has 7.5YR or 10YR hues, values of 6 or 7 and chroma of 2. Structure is moderate medium or coarse, breaking to strong fine blocky and field pH values range from 4.5 to 5.0. Cutans, either /or pressure faces and clay coatings occur in the B horizon. Manganese nodules may occur about 5-15 % in the lower part of this horizon.

Similar soil Series:

Doem Bang series (Db): has higher pH values throughout and base saturation more than 35%.

Khao Yoi series (Kyo): has higher pH values throughout and base saturation more than 35% and a member of fine-loamy family.

Chiang Rai series (Cr): has higher values and lower chromas throughout.

Principal Associated Soils: These include Khao Yoi series occupying similar positions on the low terrace.

ANALYSIS RESULTS
(oven dry basis)

Profile code No.: Sw-52/3
Soil series : Pak Tho (Pth)

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				
Pb 418	0-15	Apg1	44.0	41.0	15.0							l	scl	5.3	4.3	0.8	3.6	53
Pb 419	15-26	Apg2	46.0	36.5	17.5							l	cl	5.5	4.3	0.3	3.6	38
Pb 420	26-35	Abg	58.0	27.5	14.5							sl	cl	5.3	3.8	-	2.8	73
Pb 421	35-43	Btg1	19.0	36.5	44.5							c	c+s	5.1	3.5	-	4.2	88
Pb 422	43-100	Btg2	20.5	34.5	45.0							c	c+s	5.2	3.4	-	2.7	79
Pb 423	100-120	Btg3	21.5	25.5	53.0							c	c+s	5.0	3.5	-	3.3	111

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	1.7	0.52		1.30	0.50	0.10	0.30	2.20	2.40	4.60	3.70	24.7	59	48			0.03		
15-26	0.4	0.46		1.30	0.70	0.10	0.20	2.30	2.90	5.20	5.20	29.7	44	44			0.01		
26-35	1.4	0.29		0.30	0.70	0.20	0.40	1.60	9.50	11.10	11.20	77.2	14	14			0.01		
35-43	2.8	0.24		0.20	1.90	0.20	0.40	2.70	14.80	17.50	16.90	38.0	16	15			0.01		
43-100	2.1	0.24		0.20	2.70	0.20	0.30	3.40	11.80	15.20	14.50	32.2	23	22			0.01		
100-120	2.1	0.22		0.40	3.40	0.30	0.40	4.50	11.00	15.50	14.50	27.4	31	29			0.02		