

Proposed by: F.R. Moormann et.al-1961  
Revised by: 1. P. Hemsrichart, 1988  
B. Boonsompophan,  
2. S. Sukchan,  
K. Malairodsiri, 2004

## PHON PHISAI SERIES

**Field Symbol: Pp**

**Distribution:** Occupies large extent in Northeast Thailand.especially central part of Phuphan Basin

**Setting:** Phon Phisai soils are formed from washed deposit over shale and/or siltstone and occur on middle part of peneplain. Relief is undulating which slopes range from 2 to 6 percent. Elevation is from 150 to 250 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Average annual precipitation is from 1,100 to 2,200 mm. Mean annual air temperature varies from 26 to 28°C.

**Drainage, Permeability and Runoff:** Moderately well drained. Permeability is moderate over slow. Runoff is medium to rapid. Ground water table falls below 3 meters during the peak of the dry period.

**Vegetation and Land Use:** Mainly in low open dipterocarp forest with some shrubs. Some shifting cultivation is carried out.

**Characteristic Profile Features:** Phon Phisai series is a member of the clayey skeletal, kaolinitic, isohyperthermic Typic (Oxyaquic Plinthic)Paleustults. They are shallow to ironstone nodule layer and are characterized by a very dark grayish brown sandy loam or loam (or gravelly) A horizon overlying a yellowish red or strong brown gravelly clay loam or clay argillic B horizon which in turn overlies a gray clay with mottled C horizon. The loose or semi-consolidated ironstone layer formed as a continuous phase, thicker than 20 cm up to 80 cm occurs within 50 cm depth from the surface. Reaction is slightly acid to medium acid over strong acid to very strongly acid.

**Typifying Pedon:** Profile code no. is NE-N-29/93 (moist colours unless otherwise stated).

**Location:** Ban Na Thom, Tambon Na Thom, Amphoe Ban Phaeng Changwat Nakhon Phanom.

**Sheet Name:** Amphoe Ban Phaeng

**Sheet No.:** 5844 IV

**Coordinate:** 109758

**Elevation:** 170 m

**Relief:** gently undulating

**Slope:** 2-3%

**Physiography:** middle part of peneplain

**Parent material:** washed deposit over shale and/or siltstone, sandstone

**Drainage:** moderately well drained

**Permeability:** moderate

**Runoff:** medium

**Ground water depth:** >1.60 m

**Flooding depth:** -

**Duration:** -

**Frequency:** -

**Annual rainfall:**

**Mean temp:**

**Climate type:** Tropical Savannah

**Natural vegetation and/or land use:** dipterocarp forest

**Other:**

**Described by:** P. Attanath, et. al.

**Date:** 23 December 1981

**Revised by:**

Horizon	Depth (cm)	Description
A	0-5	Dark grayish brown (10YR4/2) sandy loam; many fine and medium distinct strong brown (7.5YR4/6) mottles; moderate granular structure; friable, nonsticky, nonplastic; many fine roots; slightly acid (field pH 6.5); abrupt, smooth boundary.
BA	5-22	Pale brown (10YR6/3) loam; common fine and medium distinct strong brown (7.5YR5/6) mottles; friable, slightly sticky, slightly plastic; common fine and few medium roots; very strongly acid (field pH 5.0); gradual, smooth boundary.

Btcv	22-78	Very pale brown (10YR7/3) very gravelly clay; many coarse prominent red (2.5YR4/6) mottles; friable, sticky, plastic; continuous moderately thick clay coating on ped faces; few fine roots; gravels are hard ironstone nodules which make up about 50 percent of the horizon; very strongly acid (field pH 5.0); gradual, smooth boundary.
Btv	78-110	White (10YR8/1) slightly gravelly clay; many fine and medium prominent red (2.5YR4/8) mottles; firm, sticky, plastic; continuous moderately thick clay coating on ped faces; gravels are hard ironstone nodules which make up 5-10 percent of the horizon; very strongly acid (field pH 5.0); gradual, smooth boundary.
BCv	110-160	White (10YR8/1) clay; many medium and coarse prominent red (10R4/8) and few fine distinct yellowish red (5YR4/8) mottles; firm, sticky, plastic; very strongly acid (field pH 5.0).

**Type Location:** The Phon Phisai series was named for Amphoe Phon Phisai, Changwat Nong Khai in which soils of this series were first described at site of Land Settlement area.

**Range of Profile Feature:**

The thickness of the A horizon varies from 5 to 15 cm and has 10YR or 7.5YR hues, values of 3 to 6 and chromas of 2 to 4. Texture of loamy sand may occur. Structure is weak fine to medium blocky and/or granular. Field pH value is from 5.0 to 6.5.

The B horizon has mainly 5YR or 7.5YR hues; but redder hues may occur, values of 4 to 6 and chromas of 6 to 8. Structure in weak to moderate blocky. Field pH value is from 4.5 to 5.5.

The C horizon has 10YR or 7.5YR hues, values of 6 to 7 and chromas of 2 or less. Multicolored including common to medium plinthite mottles occur in this horizon. Field pH value varies from 4.5 to 5.5.

**Similar Soil Series:**

Chum Phon series (Cp): has udic moisture regime.

Pla Pak series (Ppk): is Plinthaquic Paleustults

**Principal Associated Soils:** These include Khorat, Satuek, Phen and Warin soils.

**ANALYSIS RESULTS**

**Profile code no.:NE-N29/93**

**(oven dry basis)**

**Soil series : Phon Phisai (Pp)**

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	1:1			
			sand	silt	clay	vc	c	m	f	vf	result	estim <sup>1</sup>	water	KCl				
5/6892	0-5	Ap	54.1	39.8	6.1	1.9	2.1	1.2	2.0	46.9	sl	sl	5.4	4.5		4.9	80	
5/6893	5-22	BA	44.3	40.7	15.0	5.9	4.0	1.5	1.8	30.7	l	l	5.2	3.9		1.3	96	
5/6894	22-78	Btcv	42.6	21.6	35.8	16.8	8.1	0.6	4.1	13.0	cl	vg.c	5.0	3.9		0.9	116	
5/6895	78-110	Btv	27.5	18.3	54.2	7.0	4.6	2.7	2.1	11.1	c	sg.c	5.3	3.6		1.0	103	
5/6896	110-160	BCv	20.9	34.6	44.5	3.4	3.2	2.2	3.1	9.0	c	c	4.8	3.6		1.0	74	

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol <sub>(+)</sub> kg <sup>-1</sup> )										Base satur <sup>1</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>1</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)				
															B/Cx100			
0-5	1.6	1.66		1.70	0.80	0.20	0.20	2.90	6.20	9.10	5.30	86.9	55	32			0.03	
5-22	3.1	0.81		0.90	0.80	0.20	0.20	2.10	6.50	8.60	5.60	37.3	38	24			0.10	
22-78	3.9	0.27		0.40	0.60	0.40	0.30	1.70	11.90	13.60	10.90	30.4	16	13			0.03	
78-110	4.2	0.19		0.30	0.70	0.30	0.30	1.60	13.60	15.20	20.60	23.2	13	11			0.04	
110-160	5.3	0.18		0.30	0.60	0.20	0.30	1.40	16.10	17.50	10.40	32.4	10	8			0.06	