

Proposed by: C. Changprai, 1966
Revised by: 1. P. Hemsrichart, 1988
 B. Boonsompopphan,
 2. K. Malairotsiri, 2004

THA UTHEN SERIES

Field Symbol: Tu

Distribution: Occupies small extent in Northeast Thailand.

Setting: Tha Uthen soils are formed from wash deposit of sandstone overlying siltstone and occur on the middle part of peneplain.. Relief is nearly level to gently undulating which slopes range from 1 to 4 percent. Elevation is from 130 to 170 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Average annual precipitation is from 1,500 to 2,200 mm. Mean annual air temperature varies from 26 to 28°C.

Drainage, Permeability and Runoff: Moderately well drained. Permeability is rapid over slow. Surface runoff is medium to rapid. Ground water table falls below 2 meters during the peak of the dry period.

Vegetation and Land Use: Mainly under mixed deciduous forest with some shifting cultivation.

Characteristic Profile Features: The Tha Uthen series is a member of coarse-loamy over clayey-skeletal siliceous over kaolinitic, subactive, noncemented, isohyperthermic, Oxyaquic Haplorthods. They are moderately deep soils which are characterized by a gray or grayish brown loamy sand A horizon overlying a brown or dark brown sandy loam upper spodic B horizon and light yellowish brown or brownish yellow sandy loam or sandy clay loam lower spodic B horizon which in turn overlies a light gray or very pale brown or whitish clay 2C horizon. Semi-consolidated ironstone layer occur at a depth between the spodic horizon and 2C horizon. This horizon is variable in depth and thickness, but mainly occur at depth between 50 cm and 80 cm from the surface. Reddish and yellowish mottles occur in the lower B and the C horizon. Reaction is medium to strongly acid throughout the profile.

Typifying Pedon: Profile code no. is NE-N-29/11, (moist colours unless otherwise stated).

Location: Ban Don Du, Amphoe Tha Uthen Changwat Nakhon Phanom.

Sheet Name: Amphoe Si Songkhram

Sheet No.: 5844 II

Coordinate: 418460

Elevation: 130-170 m

Relief: nearly level to gently undulating

Slope: 1%

Physiography: middle part of peneplain

Parent material: washed deposit

Drainage: moderately well drained

Permeability: rapid over slow

Runoff: medium to rapid

Ground water depth: >2 m

Flooding depth: -

Duration: -

Frequency: -

Annual rainfall: 2,163.3 mm

Mean temp: 25.9 °C

Climate type: Tropical Savannah

Natural vegetation and/or land use: mixed deciduous forest with some shifting cultivation

Other:

Described by: C. Changprai

Date: 19 Feb. 1969

Revised by:

Horizon	Depth (cm)	Description
A	0-16	Gray (5YR 5/1) loamy fine sand; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; common fine interstitial pores; common earth worms; common fine and few medium roots; strongly acid (field pH 5.5); clear, smooth boundary.
E	16-30/32	Grayish brown (10YR 5/2) loamy fine sand with light gray spots (10YR 7/2); weak fine and medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many fine interstitial pores; many earth worm casts; common fine roots; strongly acid (field pH 5.5); clear, slightly wavy boundary.

Bhs1	30/32-47/49	Dark brown (7.5YR 3/2) to reddish brown (5YR 4/4) sandy loam; massive; slightly hard, slightly firm, nonsticky, nonplastic; common fine tubular pores; many fine and few medium roots; medium acid (field pH 6.0); abrupt, wavy boundary.
Bhs2	47/49-54/58	Light yellowish brown to very pale brown (10YR 6-7/4) sandy loam; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many fine tubular pores; contain 2-5 percent ironstone gravels; many fine roots; medium acid (field pH 6.0); abrupt, wavy boundary.
B2C	54/58-90	Mixed, yellow (10YR 7/6), light yellowish brown (10YR 6/4) and red (2.5YR 4/6) clay with 90 percent ironstone gravels; many fine roots; medium acid (field pH 6.0); abrupt, wavy boundary.
2C	90-150	Mixed, white (10YR 7/1), very pale brown (10YR 7/4) and red (10YR 4/6) clay with 10-15 percent ironstone gravels; firm, sticky, plastic; strongly acid (field pH 5.5).

Type Location: The Tha Uthen series was named for Amphoe Tha Uthen in which soils of this series were first described at the same location as of typifying pedon mentioned above.

Range of Profile Feature:

The thickness of the A horizon varies from 15 to 30 cm and has 10YR, 7.5YR or 5YR hues, values of 5 to 6 and chromas of 2 or 1. Structure is weak fine to medium blocky and/or single grain. Field pH value is from 4.5 to 5.5.

The E horizon has 10YR or 7.5YR hues, values of 5 to 6 and chroma of 2 to 4. Structure and pH are similar as above.

The spodic B horizon has 10YR, 7.5YR or 5YR hues, values of 3 to 6 and chromas of 2 to 4. Structure is weak medium and/or coarse blocky and/or massive. Field pH values vary from 5.5 to 6.0. Below the spodic B horizon is a layer of extremely gravelly clay and has mixed color of 10YR or 7.5YR and 5YR or 2.5YR hues, values of 4 to 7 and chromas of 4 to 6. Structure is massive or weak coarse blocky. Field pH value is from 5.5 to 6.0.

The 2C horizon has 10YR hues, values of 7 to 8 and chromas of 1 to 4. Structure is weak coarse blocky. Field pH value is from 5.0 to 6.0.

Similar Soil Series:

Ban Thon series (Bh): has thicker and well developed spodic horizon and no ironstone layer.

Principal Associated Soils: These include Khorat and Ubon soils. The Khorat and Ubon soils occupy on higher position whereas Ubon occupy on the lower ones..

ANALYSIS RESULTS

Profile code no.:NE-S-29/11

(oven dry basis)

Soil series : Tha Uthen (Tu)

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-587	0-16	A	77.5	17.3	5.2						ls	ls	4.9	3.8		3.4	19
P-588	16-30/32	E	77.1	17.7	5.2						ls	ls	5.0	4.2		2.9	22
P-589	30/32-54/58	Bhs	75.4	19.0	5.6						sl	sl	5.5	4.6		41.5	46
P-590	54/58-90	B2C	61.8	16.3	21.9						scl	gc	5.2	4.2		5.8	34
P-591	90-150	2C	39.3	18.1	42.6						c	c	5.3	3.9		2.2	46

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol ₍₊₎ kg ⁻¹)								Base satur ¹ (%)		ECEC cmol ₍₊₎ kg ⁻¹ (B+D)	Al KCl extr. cmol ₍₊₎ kg ⁻¹ (D)	Electrical conduct ¹ (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)
0-16	0.1	0.43		0.30	0.01	0.04	0.10	0.45	1.00	1.45	1.40	26.9	32	31			0.01				
16-30/32	0.4	0.47		0.30	0.03	0.04	0.20	0.57	2.80	3.37	2.20	42.3	26	17			0.01				
30/32-54/58	2.4	1.44		0.20	0.01	0.10	0.10	0.41	16.50	16.91	7.00	125.0	6	2			0.02				
54/58-90	0.9	0.52		0.20	0.10	0.10	0.20	0.60	6.80	7.40	4.80	21.9	13	8			0.01				
90-150	0.8	0.05		0.30	0.01	0.10	0.20	0.61	9.50	10.11	8.00	18.8	6	6			0.00				