

Proposed by: P. Hemasrichart
Revised by: A. Suchinai
K. Marlairotsiri, 2004

MAHA SARAOKHAM SERIES

Field Symbol: Msk

Distribution: Occupies moderate extent in Northeast plateau and small extent

Setting: The Maha Sarakham soils are formed from washed deposit from sandstone and occur on middle part of Peneplain. Relief is gently undulating which slopes range from 2 to 6 percent. Elevation ranges from 150 to 240 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Average annual precipitation varies from 1,100 to 1,400 mm. Mean air temperature varies from 26 to 28°C.

Drainage, Permeability and Runoff: Moderately well drained soils. Permeability is moderate. Runoff is rapid.

Vegetation and Land Use: Originally dry dipterocarp forest and mixed deciduous forest. Parts are cleared for upland crops such as kenaf, water melon, corn, cotton, beans, castor bean, cassava, etc. and settlement areas.

Characteristic Profile Features: The Maha Sarakham series is a member of the loamy, siliceous, subactive isohyperthermic Oxyaquic (Arenic) Haplustalfs. They are deep soils and are characterized by a very dark grayish brown or grayish brown loamy sand or sand A horizon overlying a light reddish brown or brown loamy sand E horizon which in turn overlies a brown, yellowish brown or light reddish brown sandy loam grading to sandy clay loam argillic B horizon. Common distinct strong brown with some common yellowish red mottles usually occur in the Bt horizon. Reaction is medium acid to mildly alkaline over very strongly acid acid to medium acid.

Typifying Pedon: Profile code no NE-N-31/47. (moist colors unless otherwise stated).

Location: Huai Aeng Irrigation Project, Amphoe Mueang Changwat Maha Sarakham.

Sheet Name: Changwat Maha Sarakham

Sheet No.:

Coordinate: 348826

Elevation: 155 m

Relief: nearly level

Slope: 1-2%

Physiography: middle part of peneplain

Parent material: washed deposit from sandstone

Drainage: moderate well drained

Permeability: moderate

Runoff: rapid

Ground water depth: >2.0 m

Flooding depth: -

Duration:-

Frequency: -

Annual rainfall:

Mean temp:

Climate type: Tropical Savannah

Natural vegetation and/or land use: cassava, mangoes, upland rice

Other:

Described by: P. Hemsrichart, et. al.

Date: 10 April 1981

Revised by:

Horizon	Depth (cm)	Description
Ap	0-23	Very dark grayish brown (10YR3/2) loamy fine sand; weak fine and medium subangular blocky structure; very friable, slightly sticky, slightly plastic; many very fine interstitial pores; common very fine and fine roots; medium acid (field pH 6.0); clear, smooth boundary.
AE	23-38	Dark brown (10YR3/3) and brown (7.5YR5/4) loamy fine sand; weak fine and medium subangular blocky structure; friable, nonsticky, nonplastic; many very fine interstitial pores; few very fine roots; slightly acid (field pH 6.5); gradual, smooth boundary.

E	38-70	Light reddish brown (5YR6/4) loamy fine sand; weak fine and medium subangular blocky structure breaking to single grains; very friable, nonsticky, nonplastic; many very fine interstitial pores; few very fine roots; mildly alkaline (field pH 7.5); clear, smooth boundary.
Bt1	70-95	Brown (7.5YR5/4) sandy loam; common fine distinct strong brown (7.5YR5/6) mottles; moderate medium and coarse subangular blocky structure; friable, sticky, plastic; patchy thin clay coating on ped faces and in pores; many very fine interstitial and common very fine tubular pores; mildly alkaline (field pH 7.5); gradual, smooth boundary.
Bt2	95-130	Yellowish brown (10YR5/4) sandy loam; common medium distinct yellowish red (5YR5/6) and common medium faint yellowish brown (10YR5/6) mottles; sand bleached of light reddish brown (5YR6/4); moderate medium and coarse subangular blocky structure; friable, sticky, plastic; patchy thin clay coating on ped faces and in pores; many very fine interstitial and common very fine tubular pores; few very fine roots; medium acid (field pH 6.0); gradual, smooth boundary.
Bt3	130-180	Light reddish brown (5YR6/3) sandy loam; many coarse distinct yellowish brown (10YR5/8) and common medium distinct strong brown (7.5YR5/6) mottles; common sand spots of light reddish brown (5YR6/4); moderate medium and coarse subangular blocky structure; friable, sticky, plastic; patchy thin clay coating on ped faces and in pores; many very fine interstitial and common very fine tubular pores; few very fine roots; few soft iron-manganese concretions; strongly acid (field pH 5.5); clear, smooth boundary.
Bt4	180-210	Light reddish brown (5YR6/3) sandy clay loam; common coarse distinct strong brown (7.5YR5/6) and common medium prominent yellowish red (5YR5/6) and red (10R4/8) mottles; moderate medium and coarse subangular blocky structure; firm, sticky, plastic; patchy thin clay coating on ped faces and in pores; few very fine roots; very strongly acid (field pH 5.0).

Type Location: The soils were first described at Amphoe Mueang Changwat Maha Sarakham

Range of Profile Features:

The A or Ap horizon varies in thickness from 20 to 40 cm and has 10YR or 7.5 YR hues values of 3 to 6 and chromas of 2 to 4. Structure is weak fine to medium blocky and/or single grains. Field pH value varies from 5.0 to 6.5.

The E horizon has 7.5YR or 10YR hues, values of 5 to 7 and chromas of 3 to 4. Structure and texture are as above. Field pH values vary from 5.5 to 6.5. The B horizon has 7.5 YR or 10YR hues. Values of 5 to 7 and chromas of 3 to 8. The structure is moderate medium and/or coarse blocky. Field pH values vary from 4.5 to 6.0.

Similar Soil Series:

Ban Phai series (Bpi): has yellower color chromas of 4 to 8 in the subsoils.

Nam Phong series (Ng); has textures between 0-100 cm from the soil surface of loamy sand and/or sand

Principal Associated Soils: These include Ban Phai, Nam Phong soils on the same physiographic position and Ubon soils on the lower one.

ANALYSIS RESULTS

Profile code no.:Ne-N31/47

(oven dry basis)

Soil series : Maha Sarakham (Msk)

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			
	0-23	Ap	85.5	12.0	2.5	0.0	1.1	5.2	47.0		ls	lfs	5.4	5.0		8.8	63
	23-38	AE	83.8	14.2	2.0	0.0	0.2	5.4	35.7		ls	lfs	5.6	5.1		3.8	19
	38-70	E	86.4	11.6	2.0	0.0	0.2	5.1	46.5		ls	lfs	6.6	5.9		4.0	14
	70-95	Bt1	72.2	12.5	15.3	0.0	0.0	5.6	37.4		sl	sl	6.0	4.8		3.8	29
	95-130	Bt2	67.7	15.5	16.8	0.0	0.3	4.2	37.9		sl	sl	5.4	4.0		7.9	55
	130-180	Bt3	71.6	12.1	16.3	0.0	0.0	4.5	37.1		sl	sl	5.1	3.6		4.4	130
	180-210	Bt4	64.8	13.2	22.0	0.0	0.2	4.5	34.3		scl	scl	4.6	3.6		8.5	165

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 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	0.4	0.54		1.80	0.30	0.10	0.20	2.40	2.10	4.50	2.90			
23-38	0.6	0.16		0.90	0.10	0.04	0.20	1.24	0.70	1.94	1.50	75.0	83	64			0.07	
38-70	0.4	0.00		0.60	0.10	0.04	0.20	0.94	0.50	1.44	0.90	45.0	100	65			0.02	
70-95	0.7	0.06		2.20	0.70	0.10	0.20	3.20	1.70	4.90	3.30	21.6	97	65			0.10	
95-130	0.7	0.05		1.80	1.00	0.10	0.30	3.20	1.80	5.00	3.80	22.6	84	64			0.06	
130-180	0.9	0.07		1.20	0.80	0.20	0.30	2.50	2.20	4.70	3.40	20.9	74	53			0.04	
180-210	1.3	0.09		1.00	1.10	0.30	0.30	2.70	3.70	6.40	4.70	21.4	57	42			0.05	