Proposed by: F. R. Moormann, 1967
Revised by:
1. N. Chorphaka, 1987
2. P. Wiwatwongwana, 2004

LAM NARAI SERIES — Field Symbol: Ln

Distribution: Occupies moderate extent in the Central Highlands.

Setting: Lam Narai soils are formed from mixed predominantly basic rocks (basalt, limestone and andesite) and occur on undulating to rolling dissected lava flows and erosion surfaces. Slopes range from 3 to 6%. Elevation varies from 50 to 160 m above sea level. The climate is Tropical Savanna (Koppen 'Aw'). Mean annual precipitation ranges from 1,100 to 1,600 mm.

Drainage, Permeability and Runoff: Well drained. Permeability is estimated to be moderate and runoff is estimated to be medium. Ground water table is below 1.5 m.

Vegetation and Land Use: Natural forests are mixed deciduous or dry evergreen. These soils are mainly used for the cultivation of upland crops, e.g. corn, cotton, sorghum and beans.

Characteristic Profile Features: Lam Narai series is a member of the fine, smectitic, isohyperthermic Vertic Haplustolls. They are moderately deep soils to a layer of lime concretions that may occur between 50 and 80 cm below which weathered parent rocks are found. They are characterized by a dark brown or dark reddish brown clay loam or clay A horizon overlying a dark reddish brown, reddish brown or dusky red silty clay or clay weakly developed B horizon. Lime nodules are few in the surface and become many in the subsoil. The reaction is neutral to moderately alkaline.

Typifying Pedon: Profile code no. is C-3/26 (Type Location) (moist colors unless otherwise stated).

Location: Tambon Lam Narai, Amphoe Chai Badan Changwat Lop Buri
Sheet Name: Amphoe Chai Badan **Sheet No.:** 5239 III
Coordinate: - **Elevation:** 50 m (MSL)
Relief: gently undulating **Slope:** 2 %
Physiography: dissected lava flows and erosion surfaces
Parent material: material: resdiuum and colluvium derived from basalt, limestone, calcareous sandstone and andesite
Drainage: well drained **Permeability:** moderate
Runoff: moderate **Ground water depth:** >1.5 m
Flooding depth: - **Duration:** - **Frequency:** -
Annual rainfall: 1,211.9 mm **Mean temp.:** 25.6 ^{o}C **Climate type:** Tropical Savannah (Aw)
Natural vegetation or land use: maize
Described by: Vichit Thunduan **Date:** 28 November, 1980
Revised by: Phusit Wiwatwongwana **Date:** 23 May, 2004

Horizon	Depth (cm)	Description
Ap	0-29	Dark brown (7.5YR3/2) clay; moderate medium subangular blocky structure; slightly firm, sticky, plastic; few fine ($\Phi\pm$ 2 mm) lime concretions; common very fine and fine roots; moderately alkaline (field pH 8.0); clear, smooth boundary.
Bw1	29-49	Dark reddish brown (5YR3/4) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine ($\Phi\pm$ 2 mm) lime concretions; few very fine roots; moderately alkaline (field pH 8.0); gradual, wavy boundary.
Bw2	49-82	Reddish brown (5YR4/4) clay; moderate medium subangular blocky structure; slightly firm, sticky, plastic; shiny faces that may be patchy thin cutans or pressure faces; few fine ($\Phi\pm$ 2 mm) lime concretion and very few fine angular rock fragments; few very fine roots; moderately alkaline (field pH 8.0); abrupt, wavy boundary.

Ck	82-150+	Layer of weathered rock (basalt) contain more than 80% lime concretions and some basalt fragments ($\Phi \pm$ 2 mm); moderately alkaline (field pH 8.0).

Range of Profile Features:

The A horizon ranges from 10 to 30 cm in thickness and has hues of 7.5YR and 5YR, values of 2 to 3, chromas of 2 in 7.5YR hues and 2 to 3 in 5YR hues. The field pH values are 7 to 8.

The B horizon has hues of 5YR and 2.5YR, values are 3 to 5 and chromas of 2 to 6 in 5YR and 4 in 2.5YR. The field pH values are 8 or more.

Structure is granular in the uppermost layers and moderate medium blocky in the lower A horizon and weak to strong, fine to coarse blocky in the subsoil. These soils may crack and show some pressure faces.

Similar Soil Series:

Chatturat series (Ct): consistence hard to very hard when dry, parent material is calcareous siltstone or shale which is reddish purple in colour.

Principal Associated Soils:

Lam Narai series are associated with Chai Badan, Samo Thod and Buri Ram series on dissected lava flows and erosion surfaces.

Remarks:

Although clay coatings were originally recognized in the field, thin section studies failed to prove their existence, Consequently the B horizon is thought to be cambic and the soil is tentatively classed as Calciustepts.

ANALYSIS RESULTS (oven dry basis)

Profile code no.: C-3/26

Soil series: Lam Narai (Ln)

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			
Pb-1	0-29	Ap	12.0	36.0	52.0						c	c	7.8	6.6	8.1	24.0	254
Pb-2	29-49	Bw1	11.0	36.0	53.0						c	c	7.2	6.1	4.8	9.9	166
Pb-3	49-82	Bw2	13.0	29.0	58.0						c	c	7.3	6.0	4.5	10.8	181
Pb-4	82-150+	Ck	29.0	38.5	32.5						cl		8.0	6.7	50.0	38.0	88

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 conduct^{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)			
0-29	9.2	1.47		73.60	4.10	0.70	0.40	78.80	6.50	85.30	84.0	161.5	94	92			0.18
29-49	9.0	0.71		66.60	3.60	0.40	0.30	70.90	9.00	79.90	84.1	158.7	84	89			0.16
49-82	9.1	0.61		65.50	3.30	0.50	0.40	69.70	9.30	79.00	79.6	137.2	88	88			0.17
82-150+	5.4	0.32		50.50	1.40	0.25	0.30	52.45	1.90	54.35	38.0	116.9	100	97			0.13

Surveyor: Vichit Thunduan

Date: 28 November, 1980