Proposed by: F. R. Moormann et al.,
Revised by
1. N. Chorphaka, 1987
2. A. Potichan, 2004

**LI SERIES** **Field Symbol: Li**

**Distribution:** Occupies small to moderate extent in North and Central Highlands of Thailand.

**Setting:** Li soils are formed from residuum and colluvium from shale, phyllite and other equivalent rocks. They occur on undulating to hilly topography. The range of slopes is from 4 to 35 percent. Elevation is from 180 m up to 400 m above sea level. The climate is Tropical Savanna (Koppen 'Aw'). Average annual precipitation is from 1,100 to 1,500 mm. Mean annual air temperature is around 27 $^{o}$C.

**Drainage, Permeability and Runoff:** Well drained. Permeability is moderate and surface runoff is medium to rapid. Ground water table is very deep and never reached during the course of survey.

**Vegetation and Land Use:** Mainly are Mixed Deciduous and Dry Evergreen forests. Parts are cleared for upland crops and fruit trees such as corn, peanut, mungbean, citrus plantation etc.

**Characteristic Profile Features:** Li series is a member of the clayey-skeletal, mixed, semiactive, isohyperthermic, shallow Ultic Haplustalfs. They are shallow soils to parent rock and characterized by a dark reddish brown or dark brown loam or silt loam A horizon overlying a yellowish red or red very gravelly clay loam, clay or silty clay argillic B horizon which in turn overlies weathering parent rock fragments. The C or Cr horizon occurs at some depth within 50 cm of the surface (paralithic contact). Reaction is moderately acid to neutral over strongly acid to slightly acid.

**Typifying Pedon:** Profile code no. is N-39/65 (moist colors unless otherwise states).

**Location:** Ban Pha Mu, Tambon Rong Kwang, Amphoe Rong, Kwang Changwat Phrae.
**Sheet Name:** Amphoe Rong Kwang **Sheet No.:** 5045 I
**Coordinate:** 420300 **Elevation:** 250 m (MSL)
**Relief:** rolling **Slope:** 12 %
**Physiography:** dissected erosion surface
**Parent material:** residuum and colluvium derived from shale, phyllite and other equivalent rocks
**Drainage:** well drained **Permeability:** moderate
**Runoff:** rapid **Ground water depth:** >2 m
**Flooding depth:** - **Duration:** - **Frequency:** -
**Annual rainfall:** 1,095.5 mm **Mean temp.:** 26.2 $^{o}$C **Climate type:** Tropical Savannah (Aw)
**Natural vegetation or land use:** upland crops such as corn, bean
**Described by:** P. Hemsrichart, N. Chorphaka and C. Jongpakdee **Date:** 19 April, 1979
**Revised by:** Aniruth Potichan **Date:** 24 May, 2004

| Horizon | Depth (cm) | Description |
|---|---|---|
| Ap | 0-11 | Dark brown (7.5YR3/2) silty clay; moderate fine and medium granular structure; hard, friable, sticky and plastic; few fine fragments of shale; neutral (field pH 7.0); clear and smooth boundary. |
| BA | 11-27 | Brown to dark brown (7.5YR4/2-4) slightly gravelly silty clay; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine, fine and medium roots; some fragments of weathered shale about 10% by volume; medium acid (field pH 6.0); gradual and smooth boundary. |
| Bt | 27-36/57 | Reddish brown (5YR4/3) very gravelly silty clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; patchy thin cutans on ped faces and in pores; few very fine roots; about 50% of fragments are shale weathered; medium acid (field pH 6.0); clear and wavy boundary. |
| Cr | 36/57+ | Layer of weathered shale. |

**Type Location:**

Li series was named for Amphoe Li, Changwat Lamphun, in which soils of this series were first described.

**Range of Profile Features:**

The thickness of an A horizon varies from 5 to 15 cm and has 5YR or 7.5YR hues, values of 3 or 4 and chromas of 2 to 4. This horizon may contain parent rock fragments, if it is, the gravelly is used as an adjective for the textural class. Structure is weak to moderate blocky and/or granular at the uppermost. Field pH value is from 5.5 to 7.5.

The argillic B horizon has 5YR or 2.5YR hues, values of 4 or 5 and chromas 3 to 8. In places, dark red color may occur in this horizon. Structure is weak to moderate blocky. Coarse fraction consists of shale, phyllite and quartz gravels. Field pH value varies from 5.0 to 6.5.

The C or Cr horizon occurs at some depth within 50 cm of the surface. This horizon consists of parent rock fragments. Mottling may occur in the weathering zone.

Li soils may contain quartz gravels or fragments in the profile due to the quartz formed as vein imbedding in the parent rocks mentioned above.

**Similar Soil Series:**

Muak Lek series (Ml): has the subsoil color in 10YR or 7.5YR hues and is in clayey-skeletal particle size class.

Chiang Khan series (Ch): coarse fractions consist of iron-coated rock fragments (shale and equivalent rocks) or so called “pseudo- laterite”.

**Principal Associated Soils:**

These include Ban Chong, Muak Lek, Wang Hai and Wang Saphung and Chiang Khan series.

ANALYSIS RESULTS (oven dry basis)

Profile code no.: N-39/65

Soil series: Li (Li)

| 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 | | | |
| 2-9896 | 0-11 | Ap | 9.2 | 50.0 | 40.8 | 2.2 | 2.2 | 2.0 | 1.2 | 1.6 | sic | sic | 5.9 | 5.4 | | 11.2 | 121 |
| 2-9897 | 11-27 | BA | 11.4 | 48.0 | 40.6 | 5.3 | 3.1 | 1.2 | 0.5 | 1.3 | sic | sgsic | 5.8 | 4.6 | | 2.0 | 65 |
| 2-9898 | 27-36/57 | Bt | 9.8 | 41.2 | 49.0 | 1.6 | 3.0 | 1.9 | 1.2 | 2.1 | sic | vgsic | 5.4 | 4.4 | | 2.0 | 61 |

| 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$^{y}$ (ECx$10^{6}$) 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) | | | |
| 0-11 | 4.4 | 3.81 | | 19.10 | 5.40 | 0.30 | 0.20 | 25.00 | 9.70 | 34.70 | 29.3 | 71.8 | 85 | 72 | | | 0.37 |
| 11-27 | 3.4 | 2.01 | | 9.90 | 4.00 | 0.10 | 0.20 | 14.20 | 13.00 | 27.20 | 22.0 | 54.2 | 65 | 52 | | | 0.19 |
| 27-36/57 | 3.6 | 1.18 | | 8.30 | 4.70 | 0.10 | 0.30 | 13.40 | 11.40 | 24.80 | 18.6 | 38.0 | 72 | 54 | | | 0.17 |

Surveyor: P. Hemsrichart, N. Chorphaka and C. Jongpakdee

Date: 19 April, 1979