

WATTHANA SERIES

Field Symbol: Wa

Distribution: Occupies small to moderate extent in the Central Highland.

Setting: Wattana soils are formed from recent local alluvial fill derived from predominantly basic rocks and including basalt, limestone and andesite. They occur on valley flats and bottom land. Relief is level to nearly level. Slopes are 1% or less. Elevation ranges from 60 to 100 m above sea level. The climate is Tropical Savanna (Koppen 'Aw'). Annual precipitation ranges from 1,100 to 1,500 mm.

Drainage, Permeability and Runoff: Somewhat poorly drained. Permeability and runoff are slow. Surface flooding by impounded rainwater and occasionally by creeks occur for three to four months during the wet season to depths of up to 30 cm. The groundwater level falls to below 2 m during the peak of the dry season when deep wide cracks may be observed.

Vegetation and Land Use: Mainly used for transplanted rice with some maize being grown during the dry season.

Characteristic Profile Features: Watthana series is a member of the fine, smectitic, isohyperthermic Ustic Edoaquerts. They are very deep, neutral to mildly alkaline soils and are characterized by a thick, black to very dark grey silty clay or clay A horizon overlying a slightly paler silty clay or clay C horizon. Few to common, predominantly brown and brownish yellow mottles occur in the C horizon and along root channels and pores in the A horizon. Slickensides and pressure faces are characteristic of the C and lower A horizons. Cracks are at least 1 cm wide at 50 cm depth.

Typifying Pedon: Profile code no. is NC-47/40 (Type Location) (moist colours unless otherwise stated).

Location: About 300 m South of Ban Nong Chaeng, 100 m east of highway to Phetchabun, Ban Nong Chaeng, Amphoe Nong Phai Changwat Phetchabun.

Sheet Name: Amphoe Nong Phai

Sheet No.: 5240 IV

Coordinate: 157527

Elevation: 81 m (MSL)

Relief: nearly level

Slope: 1 %

Physiography: valley flats and bottom land

Parent material: recent local alluvium derived from basalt, limestone and andesite

Drainage: somewhat poorly drained

Permeability: slow

Runoff: slow

Ground water depth: >2 m

Flooding depth: 30 cm

Duration: -

Frequency: -

Annual rainfall: 1,124.7 mm

Mean temp.: 27.2 °C

Climate type: Tropical Savannah (Aw)

Natural vegetation or land use: transplanted rice

Other: deep cracks (50 cm deep, >5 cm width)

Described by: Tanit and Bos

Date: 11 December, 1968

Revised by: Phusit Wiwatwongwana

Date: 27 May, 2004

| Horizon | Depth (cm) | Description |
|---------|------------|--|
| Apg | 0-14 | Very dark gray (10YR3/1) dry, black (10YR2/1) moist, clay; strong brown mottles along roots channels; strong medium to coarse angular blocky structure; hard, firm, sticky, plastic; abundant very fine and fine roots; slightly acid (field pH 6.5); abrupt, smooth boundary. |
| Bssg1 | 14-48 | Very dark gray (10YR3/1) clay, many fine faint brown mottles; medium to coarse subangular blocky structure; friable, sticky, plastic; clear slickensides; common very fine and fine roots; slightly acid (field pH 6.5); clear, wavy boundary. |
| Bssg2 | 48-90 | Dark gray to gray (10YR4/1 to 5/1) clay; many fine faint brown mottles; weak fine to medium subangular blocky structure; very friable, sticky, plastic; many |

pressure faces and slickensides; few fine roots; slightly acid (field pH 6.5); gradual, wavy boundary.

Bssg3 90-180 Dark gray (10YR4/1) clay; few fine faint yellowish brown mottles; weak fine to medium subangular blocky structure; very friable, sticky, plastic; many pressure faces and slickensides; few pores; few fine rounded gravels; neutral (field pH 7.0).

Ck 180+ As above but with white secondary lime concretions.

Range of Profile Features:

The A horizon is from 30 to 50 cm thick, has 10YR hue, values of 2 or 3 and chromas of 1 or less. Structure is moderate, medium to coarse blocky and may be granular in the uppermost layer. Field pH values range from 6.5 to 8.0.

The subsoil, provisionally termed C horizon has 10YR hue, values of 3 or 4 and occasionally 5 in the deeper layers and chroma of 1. Structure is strong coarse prismatic, breaking to medium blocky. Field pH values range from 7.0 to 8.0.

Similar Soil Series:

Phimai series (Pm): occupies a lower position and floods deeply (1 m or more) during the wet season. Colours in the subsoil are predominantly gray, becoming light gray in deeper layers. Mottles are more distinct and cracks open for a shorter period.

Ban Mi series (Bm): has a similar profile but floods and remains moist for longer periods and derived from alluvium.

Buri Rum series (Br): has a similar profile, but occupies a higher position and residuum soils.

Principal Associated Soils:

These include Buri Ram and Chai Badan series soils formed on dissected lava flows adjacent to Watthana series soils.

ANALYSIS RESULTS (oven dry basis)

Profile code no.: NC-47/40
Soil series: Watthana (Wa)

| 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 ⁿ | water | | | | KCl |
| P-309 | 0-14 | Apg | 7.3 | 41.8 | 50.9 | | | | | | c | c | 6.1 | 5.2 | 2.7 | 21.6 | 160 |
| P-310 | 14-48 | Bssg1 | 6.3 | 36.3 | 57.4 | | | | | | c | c | 6.0 | 4.9 | 2.9 | 5.1 | 120 |
| P-311 | 48-90 | Bssg2 | 6.6 | 32.1 | 61.3 | | | | | | c | c | 6.2 | 4.8 | 2.8 | 7.0 | 140 |
| P-312 | 90-180 | Bssg3 | 8.0 | 37.8 | 54.2 | | | | | | c | c | 7.4 | 6.0 | 3.7 | 7.6 | 105 |

| 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 ₄ OAc (C) | CEC 100g Clay | B/Cx100 | | | |
| 0-14 | 1.2 | 1.70 | | 28.90 | 16.70 | 0.20 | 0.60 | 46.40 | 12.00 | 58.40 | 49.7 | 97.6 | 93 | 79 | | 0.04 |
| 14-48 | 1.1 | 0.89 | | 22.50 | 18.50 | 0.10 | 1.00 | 42.10 | 11.80 | 53.90 | 47.5 | 82.8 | 89 | 78 | | 0.03 |
| 48-90 | 0.1 | 0.49 | | 22.80 | 22.90 | 0.10 | 2.40 | 48.20 | 9.90 | 58.10 | 48.4 | 79.0 | 100 | 83 | | 0.02 |
| 90-180 | 0.8 | 0.41 | | 33.50 | 11.50 | 0.10 | 0.30 | 45.40 | 5.50 | 50.90 | 48.2 | 88.9 | 94 | 89 | | 0.05 |

Surveyor: Tanit and Bos

Date: 11 December, 1968