

Proposed by C. Pinthip, 1970  
Revised by :  
P. Vijarnsorn and staffs, 1988  
W. Sirichuaychoo, 2004

## PATHIO SERIES

Field Symbol: Pt<sub>u</sub>

**Distribution:** Small extent in Peninsular Thailand and some areas in Southeast Coast of Thailand.

**Setting:** Pathio soils derived from fine grain clastic rocks namely shale, phyllite or equivalent rocks and occurred on denudation surface. Relief is gently undulating to undulating. Slope ranges from 2 to 12 percent. The climate is Tropical Monsoon (Koppen 'Am'). Annual precipitation is from 1,800 to 3,000 mm. Average annual temperature is from 26 °C to 28 °C.

**Drainage, Permeability and Surface Runoff:** Drainage is well drained, permeability is estimated to be moderate and surface runoff is medium. The ground water level is below 2 m for most of the year.

**Vegetation and Land Use:** Originally, Tropical Evergreen Forest. Parts are cleared for para rubber, oil palm or fruit trees. Abandoned areas revert to low secondary shrubs and grass (*Imperata cylindrica*).

**Characteristic Profile Features:** The Pathio series is a member of the fine, kaolinitic, isohyperthermic Typic Kandiodults (soil taxonomy, 2003). They are very deep soils and are characterized by a dark brown or dark reddish brown sandy loam surface or A horizon overlying a red sandy clay loam grading to sandy clay or clay kandic B horizon. Very strongly acid to moderately acid, reaction values range from 5.0 to 6.0.

**Typifying Pedon:** Pathio sandy loam - fruit trees and low shrubs with *Imperata cylindrica* undergrowth, from Moo Ban Khao Lang, Amphoe Lang Suan, Changwat Chumphon, 1 to 2 percent slopes.

**Profile Code Number:** S-58/21, described by Pisoot Vijarnsorn, 13 February 1970 (moist colors unless otherwise stated).

| Horizon | Depth (cm)          | Description  |
|---------|---------------------|--|
| A       | 0-5                 | Dark reddish brown (5YR3/4) sandy loam; weak fine granular structure; soft, slightly sticky and nonplastic; few fine interstitial and tubular pores; common fine and medium roots; common fine animal holes; moderately acid (field pH 6.0); clear wavy boundary.            |
| AB      | 5-20                | Dark red (2.5YR3/6) fine sandy clay loam; weak fine granular structure; very friable, slightly sticky and slightly plastic; common fine interstitial and tubular pores; common fine animal holes; common fine roots; moderately acid (field pH 6.0); clear smooth, boundary. |
| Bt1     | 20-34               | Red (2.5YR4/6) very fine sandy clay; weak fine to medium subangular blocky structure; friable, sticky and plastic; patchy thin cutan along ped faces; many fine interstitial and tubular pores; common fine roots; moderately acid (field pH 6.0); clear smooth, boundary.   |
| Bt2     | 34-100 <sup>+</sup> | Red (2.5YR4/6) very fine sandy clay; weak fine to medium subangular blocky structure; friable, sticky and plastic; distinct cutan along ped faces and animal holes; common fine interstitial and tubular pores; common fine roots; moderately acid (field pH 6.0).           |

### Type Location:

Name of district, Amphoe Pathio, Changwat Chumphon.

### Range of Profile Features:

The surface or A horizon sandy loam, is from 5 to 10 cm in thickness and has 10YR, 7.5YR or 5YR hues, values 3 to 4 and chromas 2 to 4. The structure is weak fine granular. Texture of

sandy clay loam may occur. Moderately acid to slightly acid, reaction values range from 6.0 to 6.5.

The lower A or upper B horizon has values of 4 to 5 and chromas 6 to 8 in 5YR hue. Texture may be sandy loam or sandy clay loam. Moderately acid to slightly acid, reaction values range from 6.0 to 6.5.

The argillic B horizon clay or sandy clay, has 2.5YR or 10R hues, values 2 to 4 and chromas 6 to 8. Structure is weak and moderate fine to medium blocky. Very strongly acid to strongly acid, reaction values range from 5.0 to 5.5.

**Similar Soil Series:**

Ao Luek series (Ak): very-fine, kaolinitic, isohyperthermic Rhodic Kandiodox, dark red colors (2.5YR or 10R, values  $\leq 3$  and chroma 2 to 6.

**Principal Associated Soils:**

These include Khlong Thom, Fang Daeng and Sadao series.

Khlong Thom series (Km): fine-loamy, kaolinitic, isohyperthermic Typic Kandiodults.

Fang Daeng series (Fd): fine-loamy, kaolinitic, isohyperthermic Rhodic Kandiodults.

Sadao series (Sd): coarse-loamy, kaolinitic, isohyperthermic Typic Kandiodults.

**ANALYSIS RESULTS**  
(oven dry basis)

Profile code No.: S-58/21

Soil series: Pathio series (Ptu)

| Lab No. | Depth (cm) | Horizon | Particle size distribution analysis (% by weight) |      |      |                       |   |   |   |    | Texture |                    | pH        |         | CaCO <sub>3</sub> % | P, mg kg <sup>-1</sup> Bray 2 | K, mg kg <sup>-1</sup> NH <sub>4</sub> OAc |
|---------|------------|---------|---|------|------|-----------------------|---|---|---|----|---------|--------------------|-----------|---------|---------------------|-------------------------------|--|
|         |            |         | USDA grading                                      |      |      | Sand-fraction grading |   |   |   |    | Lab     | Field              | 1:1 water | 1:1 KCl |                     |                               |  |
|         |            |         | sand  | silt | clay | vc                    | c | m | f | vf | result  | estim <sup>n</sup> |           |         |                     |                               |  |
| Pd-679  | 0-5        | A       | 60.0  | 31.0 | 9.0  |                       |   |   |   |    | sl      | sl                 | 6.4       | 6.0     | 1.1                 | 11.3                          | 241  |
| Pd-680  | 5-20       | AB      | 58.0  | 28.0 | 14.0 |                       |   |   |   |    | sl      | scl                | 5.0       | 4.4     | 0.0                 | 3.1                           | 104  |
| Pd-681  | 20-34      | Bt1     | 47.0  | 20.0 | 33.0 |                       |   |   |   |    | scl     | sc                 | 4.9       | 3.9     | 0.3                 | 3.7                           | 63   |
| Pd-682  | 34-100+    | Bt2     | 30.0  | 18.0 | 52.0 |                       |   |   |   |    | c       | sc                 | 4.9       | 3.7     | 0.6                 | 3.1                           | 30   |

| Depth (cm) | Air dried to oven dried | C %  | N % | Exchange capacity and cations (cmol <sub>(+)</sub> kg <sup>-1</sup> ) |      |      |      |                 |                   |           |                             |               |         | Base satur <sup>n</sup> (%) |  | ECEC cmol <sub>(+)</sub> kg <sup>-1</sup> (B+D) | Al KCl extr. cmol <sub>(+)</sub> kg <sup>-1</sup> (D) | Electrical conduct <sup>y</sup> (ECx10 <sup>6</sup> ) dS m <sup>-1</sup> |
|------------|-------------------------|------|-----|---|------|------|------|-----------------|-------------------|-----------|-----------------------------|---------------|---------|-----------------------------|--|---|---|--|
|            |                         |      |     | Ca Mg K Na  |      |      |      | SUM cations (B) | Extr. acidity (A) | SUM (B+A) | CEC NH <sub>4</sub> OAc (C) | CEC 100g Clay | B/Cx100 | (Bx100)/(B+A)               |  |   |   |  |
|            |                         |      |     |   |      |      |      |                 |                   |           |                             |               |         |                             |  |   |   |  |
| 0-5        | 2.9                     | 4.40 |     | 19.50   | 2.60 | 0.30 | 0.20 | 22.60           | 7.80              | 30.40     | 22.1                        | 245.6         | 100     | 74                          |  |   | 0.30  |  |
| 5-20       | 0.9                     | 0.69 |     | 1.80  | 0.50 | 0.20 | 0.20 | 2.70            | 5.70              | 8.40      | 4.9                         | 35.0          | 55      | 32                          |  |   | 0.11  |  |
| 20-34      | 1.2                     | 0.39 |     | 1.80  | 0.60 | 0.10 | 0.10 | 2.60            | 8.60              | 11.20     | 5.7                         | 17.3          | 46      | 23                          |  |   | 0.03  |  |
| 34-100+    | 1.9                     | 0.19 |     | 0.90  | 0.40 | 0.10 | 0.10 | 1.50            | 9.00              | 10.50     | 7.7                         | 14.8          | 19      | 14                          |  |   | 0.02  |  |

Surveyor: P. Vijarnsorn

Reported by: W. Sirichuaychoo

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