

Proposed by: W. Van der Kevie, 1968  
Revised by:  
1. C. Changprai, 1987  
2. S. Udomsri, 2004

**BANG NAM PRIAO SERIES**

**Field Symbol: Bp**

**Distribution:** Occupies moderate extent in the southern part of the Central Plain and small extent in Peninsular Thailand.

**Setting:** Bang Nam Prio soils are formed from marine sediments mixed with riverine alluvium under brackish water influence. They occur in former tidal flats or alluvium plain which grade down to marine deposits and now free of tidal flooding which have been in cultivation for some time.. Relief is flat. Slopes are about 0-1 %. Elevation ranges from 2-4 m above sea level. The climate are both Tropical Savanna (Köppen 'Aw') and Tropical Monsoon (Köppen 'Am'). Annual precipitation ranges from 1,000 mm to 3,000 mm. Mean annual temperature is 27 °C.

**Drainage, Permeability and Surface Runoff:** Poorly drained. Runoff and permeability are slow. Surface flooding to depths from 20-40 cm from river or rainwater and occurs for about five months during the rainy season. Sometimes this area flooded by irrigation. The groundwater level falls to about 120 cm during the peak of the dry season and the soil cracks.

**Vegetation and Land Use:** Mainly used for broadcast rice cultivation.

**Characteristic Profile Features:** Bang Nam Prio series is a member of the Very-fine, mixed, active, acid, isohyperthermic Vertic Endoaquepts. They are very deep, strongly acid clay soils and are characterized by a dark gray or very dark gray clay A horizon, overlying a grayish brown B horizon which in turn overlies a reduced greenish gray clay. Strong brown and brownish mottles or yellowish red or red in sometimes occur in B horizon. Few to moderate straw yellow (jarosite) mottles may occur as coatings on ped faces in the B horizon. Reaction is very strongly acid to medium acid in the A horizon, extremely acid to strongly acid in the B horizon and neutral to mildly alkaline in the C horizon.

**Typifying Pedon:** Profile code number is C-10/3

**Location:** Ban Khlong Sam Bung Yai, Khet Min Buri, Bangkok Metropolitan.

**Sheet Name:** Khet Nong Chok

**Sheet No.:** 5136 I

**Coordinate:** 935273

**Elevation:** 2 m (MSL)

**Relief:** level to nearly level

**Slope:** 0-1%

**Physiography:** former tidal flats or alluvium plain

**Parent material:** marine sediments mixed with riverine alluvium under brackish water influence

**Drainage:** poorly drained

**Permeability:** slow

**Runoff:** slow

**Ground water depth:** >2 m

**Flooding depth:-** cm

**Duration:** 5 month

**Frequency:** every year

**Annual rainfall:** 1,244.2 mm

**Mean temp:** 27.9 °C

**Climate type:** Tropical Savannah

**Natural vegetation and/or land use:** paddy field

**Other:**

**Described by:** Van der Kevie and Chalaeo Changprai

**Date:** 27 May, 1969

**Revised by:** S. Udomsri

| Horizon | Depth (cm) | Description   |
|---------|------------|---|
| Apg     | 0-23       | Mixed dark gray (10YR4/1) and very dark gray (10YR3/1) clay; common fine distinct strong brown (7.5YR5/8) mottles; moderate medium angular blocky structure: hard; common fine roots; moderately acid (field pH 6.0); clear, smooth boundary.                               |
| ABg     | 23-54      | Dark gray (10YR4/1) and very dark gray (10YR3/1) with large inclusions of very dark grayish brown (10YR3/2) clay; common fine distinct strong brown (7.5YR5/8) mottles; weak prismatic breaking to subangular blocky structure: very firm; common very fine roots; strongly |

|     |         |   |
|-----|---------|---|
|     |         | acid (field pH 5.5); clear, wavy boundary.  |
| Bg1 | 54-96   | Grayish brown (10YR5/2) clay; many medium and coarse distinct strong brown (7.5YR5/8), brownish yellow (10YR6/8) and common fine straw yellow mottles mainly on ped faces; weak prismatic breaking to subangular blocky structure; very firm; thick continuous humus clay coatings in vertical pores; some large black spots of A material; few very fine roots; few iron pipes; extremely acid (field pH 4.0); clear, wavy boundary. |
| Bg2 | 96-114  | Grayish brown (10YR5/2) clay; common medium prominent yellowish red (5YR4/6) and yellowish brown (10YR5/6) mottles, the latter in vertical pores; moderate medium prismatic structure: sticky, plastic; thick continuous clay coatings in vertical pores; some thin sand layers; very few very fine roots; slightly acid (field pH 6.5); clear, smooth boundary.  |
| BCg | 114-160 | Grayish brown (10YR5/2) clay; common coarse distinct slightly hard light olive brown (2.5YR5/4) mottles and dark reddish brown (5YR3/3) coatings in root channels; weak coarse subangular blocky structure: sticky, plastic; neutral (field pH 7.0); gradual, smooth boundary.  |
| Cg1 | 160-200 | Dark greenish gray (5GY4/1) clay; common medium faint grayish green (5G4/2), few reddish brown and common slightly hard dark reddish brown (5YR3/3) mottles in pores and on ped faces; weak medium prismatic breaking to medium angular blocky structure: sticky, plastic; thick hard iron coatings in medium pores; moderately alkaline (field pH 8.0).  |
| Cg2 | 200-280 | Dark greenish gray (5GY4/1); completely reduced clay.   |

**Type Location:** Name of Amphoe, Amphoe Bang Nam Prio, Changwat Chachoengsao

**Range of Profile Features:**

The A horizon is from 15 to 30 cm thick, has 10YR hue, values of 3 or 4 and chromas of 2 or 1. Structure is weak prismatic, blocky or massive breaking to moderate medium blocky. Field pH values range from 4.5 to 6.0.

The B horizon has 10YR and 7.5YR hues, value of 5 to 6 and chromas of 2 or 1. Structure is moderate prismatic or blocky. Field pH values range from 4.0 to 6.0, if straw yellow mottles (jarosite) are not present the pH must be 5.5 or lower.

The C horizon is a reduced dark greenish gray clay and has field pH values which range from 7.0 to 8.0.

**Similar Soil Series:**

Bangkok series (Bk): has pH values about 7.0-8.0 throughout profile

Bangkhen series (Bn): has gypsum in B horizon and pH values about 5.5-6.5 throughout profile

Rangsit series (Rs): straw yellow mottles (jarosite) occur between 50-100 cm from the soil surface together with red mottles in the upper B horizon, also pH values are 4.5 or less in the B horizon.

Ayutthaya series (Ay): has an acid layer (jarosite) below 100 cm with pH values of 4.5 or less and the B horizon overlies a dark gray reduced clay which is high in sulphur.

Ongkharak series (Ok): has straw yellow mottles (jarosite) within 50 cm of the soil surface and pH values of 4.0 or less.

**Principal Associated Soils:** These include the nonacid Bangkok and Bang Khen series which occur adjacent to Bang Nam Prio series soils on the former tidal flats.

**ANALYSIS RESULTS**

**Profile code No. C-10/3**

**(oven dry basis)**

**Soil series : Bang Nam Prio (Bp)**

| 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   | 1:1 |                     |                               |  |
|         |            |         | sand   | silt | clay | vc                    | c | m | f | vf | result  | estim <sup>1</sup> | water | KCl |                     |                               |  |
| P-1112  | 0-23       | Apg     | 2.4  | 43.6 | 54.0 |                       |   |   |   |    | sic     | c                  | 4.2   | 3.7 | 1.3                 | 6.4                           | 338  |
| P-1113  | 23-54      | ABg     | 2.7  | 35.8 | 61.5 |                       |   |   |   |    | c       | c                  | 4.2   | 3.5 | 1.2                 | 2.9                           | 253  |
| P-1114  | 54-96      | Bssg1   | 13.7   | 26.8 | 59.5 |                       |   |   |   |    | c       | c                  | 4.0   | 3.6 | 1.3                 | 3.2                           | 238  |
| P-1115  | 96-114     | Bssg2   | 2.3  | 39.2 | 58.5 |                       |   |   |   |    | c       | c                  | 4.5   | 3.7 | 1.7                 | 2.8                           | 295  |
| P-1116  | 114-160    | BCg     | 1.1  | 33.9 | 65.0 |                       |   |   |   |    | c       | c                  | 5.2   | 4.5 | 1.4                 | 4.6                           | 410  |
| P-1117  | 160-200    | Cg1     | 7.2  | 43.3 | 49.5 |                       |   |   |   |    | sic     | c                  | 2.8   | 2.5 | 0.9                 | 12.2                          | 125  |
| P-1118  | 200-280    | Cg2     | 8.3  | 37.2 | 54.5 |                       |   |   |   |    | c       | c                  | 3.4   | 3.0 | 2.0                 | 44.2                          | 3  |

| Depth (cm) | Air dried to oven dried | C %  | N %  | Exchange capacity and cations (cmol <sub>(c)</sub> kg <sup>-1</sup> ) |       |      |      |                 |                   |           |                             |               |         | Base satur <sup>1</sup> (%) |       | ECEC cmol <sub>(c)</sub> kg <sup>-1</sup> (B+D) | Al KCl extr. cmol <sub>(c)</sub> kg <sup>-1</sup> (D) | Electrical conduct <sup>2</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)               |       |   |   |  |
|            |                         |      |      | 0-23  | 6.0   | 1.36 | 0.24 | 7.60            | 10.90             | 0.80      | 1.70                        | 21.00         | 22.10   | 43.10                       | 29.40 |   |   |  |
| 23-54      | 5.3                     | 0.51 | 0.13 | 5.30  | 10.10 | 0.60 | 1.70 | 17.70           | 18.00             | 35.70     | 25.50                       | 41.5          | 69      | 50                          |       |   | 0.07  |  |
| 54-96      | 6.0                     | 0.44 | 0.09 | 5.40  | 11.80 | 0.60 | 2.30 | 20.10           | 21.70             | 41.80     | 24.30                       | 40.8          | 83      | 48                          |       |   | 0.09  |  |
| 96-114     | 5.6                     | 0.38 | 0.07 | 6.50  | 14.30 | 0.70 | 2.70 | 24.20           | 14.60             | 38.80     | 29.50                       | 50.4          | 82      | 62                          |       |   | 0.07  |  |
| 114-160    | 6.3                     | 0.56 | 0.09 | 7.90  | 17.00 | 0.90 | 4.00 | 29.80           | 12.90             | 42.70     | 33.70                       | 51.8          | 88      | 70                          |       |   | 0.10  |  |
| 160-200    | 8.8                     | 0.88 | 0.13 | 9.60  | 22.40 | 0.30 | 4.80 | 37.10           | 23.20             | 60.30     | 30.60                       | 61.8          | 100     | 62                          |       |   | 0.12  |  |
| 200-280    | 8.9                     | 1.19 | 0.14 | 21.50   | 28.60 | 0.50 | 7.90 | 58.50           | 27.80             | 86.30     | 36.50                       | 67.0          | 100     | 68                          |       |   | 0.12  |  |