

Proposed by: F.R. Moormann, 1963  
 Revised by:  
 1. C. Changprai, 1987  
 2. S. Udomsri, 2004

**BANG LEN SERIES**

**Field Symbol: BI**

**Distribution:** Occupies moderate extent in the Central Plain, mainly in Changwat Nakhon Pathom, Suphan Buri, Krungthep Maha Nakhon and Phra Nakhon Si Ayutthaya.

**Setting:** Bang Len 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 1-4 m above sea level. The climate is Tropical Savanna (Köppen 'Aw'). Annual precipitation ranges from 1,000 mm to 1,400 mm. Mean annual temperature is 27° C.

**Drainage, Permeability and Surface Runoff:** Poorly drained. Runoff and permeability are slow. Deep surface flooding by impounded rainwater or river occurs for about six months during the rainy season between 50-200 cm. 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:** The Bang Len series is a member of the Fine, smectitic, isohyperthermic Vertic Endoaquolls. They are deep, slightly acid to moderately alkaline soils and are characterized by a thick black A horizon overlying a paler coloured, predominantly yellowish brown mottled B horizon, which in turn overlies a reduced marine clay horizon which is low in sulphur. Gypsum crystals occur in the lower A and B horizon, slickensides and pressure faces founded in the B horizon.

**Typifying Pedon:** Profile code number is SW-53/34

**Location:** approx. 250 m west of road from Phra Prathon to Ban Bo at about km 11.5, Ban Khong Klang, Tambon Don Yay Hom, Amphoe Mueang Changwat Nakhon Pathom.

**Sheet Name:** Amphoe Ban Phaeo

**Sheet No.:** 5036 III

**Coordinate:** 166160

**Elevation:** 4 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:** 50-100 cm

**Duration:** 3-4 month

**Frequency:** every year

**Annual rainfall:** 1,112.8 mm

**Mean temp:** 28.2 °C

**Climate type:** Tropical Savannah

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

**Other:** crack width 1.5-2 cm at 15 cm depth

**Described by:** Pramote Hemsrichart

**Date:** 18 March, 1997

**Revised by:** S. Udomsri

Horizon	Depth (cm)	Description
Apg1	0-13	Very dark gray (10YR3/1) clay; common fine distinct strong brown (7.5YR5/6) mottles along roots; strong medium and coarse subangular blocky structure; extremely hard, firm, very sticky, very plastic; common fine and very fine roots; neutral (field pH 7.0); clear, smooth boundary.
Apg2	13-30/38	Black (10YR2/1) clay; few fine prominent light olive brown (2.5Y5/6) mottles; moderate medium and coarse prismatic breaking to medium and coarse subangular blocky structure; extremely hard, very firm, very sticky, very plastic; few fine and very fine roots; common slickensides and pressure faces; moderately alkaline (field pH 8.0); clear, wavy

		boundary.
Bssg1	30/38-64	Mixed very dark gray (10YR3/1) and grayish brown (10YR5/2) clay; many medium distinct light olive brown (2.5Y5/6) and few fine distinct yellowish brown (10YR5/8) mottles; weak coarse prismatic structure, firm, very sticky, very plastic; many gypsum crystals, many slickensides and pressure faces; moderately alkaline (field pH 8.0); gradual, smooth boundary.
Bssg2	64-116	Light brownish gray (10YR6/2) clay; many coarse distinct yellowish brown (10YR5/6-8) mottles; weak coarse prismatic structure; firm, very sticky, very plastic; many gypsum crystals, many slickensides and pressure faces, common soft Fe&Mn concretions, organic clay coated along crack faces; moderately alkaline (field pH8.0); gradual, smooth boundary.
Bg1	116-150	Light brownish gray (10YR6/2) clay loam; many medium distinct yellowish brown (10YR5/8) mottles; weak medium subangular blocky structure; firm, sticky, plastic; silt coated on crack faces, some iron pipes, common soft Fe&Mn concretions; moderately alkaline (field pH 8.0); clear, smooth boundary.
Bg2	150-180	Light brownish gray (10YR6/2) fine sandy clay loam to clay loam; many coarse distinct yellowish brown (10YR5/8) mottles; weak medium subangular blocky structure; firm, sticky, plastic; many shell fragments, common soft Fe&Mn concretions; moderately alkaline (field pH 8.0); clear, smooth boundary.
Cg	180-200	Greenish gray (5GY5/1); clay; some glauconite and mica.

**Type Location:** Name of Amphoe, Amphoe Bang Len Changwat Nakhon Pathom.

**Range of Profile Features:**

The A horizon is from 20 cm to 40 cm , thick, has black (10YR2/1) or very dark gray (10YR3/1) matrix colours and textures of clay or silty clay. Structure is weak to moderate, coarse blocky and may be weak granular in the uppermost layer. Field pH ranges from 6.0 to 6.5

The upper B horizon has hues of 7.5YR or 10YR values of 3 to 4 and chromas of 2 or less. Structure is weak to moderate blocky, prismatic or massive, breaking to blocky . Field pH values range from 5.0 to 6.5.

The lower B horizon has hues of 10YR, 2.5Y or 5Y, values of 4 to 5 and chromas of 2 or less. Structure is weak to moderate blocky, prismatic or massive, breaking to blocky. Thin, fine sand and silt layers may occur in the lower B horizon. Soft, iron-manganese nodules also occur in the B horizon. Field pH values range from 6.0 to 8.0 increasing with depth.

The C horizon consists of reduced mudclay which may contain lenses of fine sand or silt and shell fragments. Field pH values continue to increase with depth.

**Similar Soil Series:**

Bangkok series (Bk): has a lighter coloured A horizon and without gypsum.

Bang Khen series (Bn): has lower pH values and dominant red mottles in the B horizon.

**Principal Associated Soils:** Bang Len soils are found in association with soils on the former tidal flats, these include Ayutthaya, Sena, Bangkok, and Bang Khen series soils.

**ANALYSIS RESULTS**

**Profile code No. : SW-53/34**

**(oven dry basis)**

**Soil series : Bang Len (B1)**

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				
4011011	0-13	Apg1	5.0	37.3	57.7	0.3	0.1	0.5	1.5	2.6	c	c	6.3	5.4		3.3	195	
4011102	13-30/38	Apg2	4.6	37.6	57.8	0.2	0.2	0.3	1.7	2.2	c	c	7.0	6.2		40.8	195	
4011103	30/38-64	Bssg1	18.9	32.9	48.2	1.1	7.4	7.1	3.1	0.2	c	c	7.3	6.8		7.2	156	
4011104	64-116	Bssg2	18.6	49.9	31.5	1.0	4.4	5.2	3.8	4.2	sicl	c	7.2	6.5		11.8	195	
4011105	116-150	Bg1	27.8	38.5	33.7	0.2	0.1	2.7	16.5	8.3	cl	cl	7.2	6.4		7.1	195	
4011106	150-180	Bg2	48.6	22.5	28.9	0.2	0.6	1.5	34.3	12.0	scl	fscl	7.8	7.3		-	156	

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)			
0-13	4.6	1.69		25.10	10.10	0.50	2.80	38.50	5.10	43.60	34.10	59.1	100	88	38.50			
13-30/38	4.7	0.66		25.20	10.90	0.50	3.50	40.10	1.90	42.00	31.60	54.7	100	95	40.10			
30/38-64	6.3	0.22		82.70	8.30	0.40	3.70	95.10	1.00	96.10	20.00	41.5	100	99	95.10			
64-116	5.9	0.13		71.50	8.30	0.50	4.20	84.50	0.60	85.10	20.20	64.1	100	99	84.50			
116-150	3.0	0.09		9.20	7.80	0.50	4.40	21.90	1.10	23.00	15.50	46.0	100	95	21.90			
150-180	2.4	0.11		16.20	6.80	0.40	4.50	27.90	0.20	28.10	25.80	89.3	100	99	27.90			