

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

BANG KHEN SERIES

Field Symbol: Bn

Distribution: Occupies moderate extent in the Central Plain, mainly in Changwat Nakhon Pathom, Nonthaburi and Krungthep Maha Nakhon.

Setting: Bangk Khen 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 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 to depths of up to 50 cm by river or rainwater for three to four months during the rainy season. Sometimes this area flooded by irrigation. The groundwater level falls to about 150 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 Khen series is a member of the Fine, mixed, active, acid, isohyperthermic Vertic Endoaquepts. They are very deep, slightly to moderately acid soils and are characterized by a dark coloured A horizon overlying a paler coloured B horizon with dominant red mottles in the lower layers. The B horizon overlies a reduced marine clay which is low in sulphur. Gypsum crystals occur in the lower A and upper B horizons. slickensides and pressure faces founded in the B horizon.

Typifying Pedon: Profile code number is SW-53/35

Location: 750 m right of road from the irrigation road (Ban Don Samsip to Ban Nong Plong), Ban Don Samsip, Tambon Bang Pla, Amphoe Bang Len Changwat Nakhon Pathom.

Sheet Name: Changwat Nakhon Pathom

Sheet No.: 5036 IV

Coordinate: 271418

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: 30-40 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

Described by: Satira Udomsri

Date: 23 April, 1998

Revised by: S. Udomsri

Horizon	Depth (cm)	Description
A _{pg}	0-20	Mixed gray (10YR5/1), dark gray (2.5YN4/0) clay; many fine and medium distinct yellowish brown (10YR5/6) mottles; strong medium and coarse angular blocky structure partly to massive; very friable, very sticky, very plastic; many very fine and common fine roots; slightly acid (field pH 6.5); clear, smooth boundary.
B _{Ag}	20-32/36	Gray (10YR5/1) clay; common fine distinct brownish yellow (10YR6/8) and few fine prominent weak red (10R4/4) mottles; strong medium and coarse subangular blocky structure partly to massive; friable, very sticky, very plastic; common very fine and fine roots; slightly acid (field pH 6.5); clear, wavy boundary.

Bssg1	32/36-60	Gray (10YR6/1) clay; few fine distinct brownish yellow (10YR6/8) and common fine prominent weak red (10R4/4) mottles; strong fine and medium subangular blocky structure partly to massive; friable, very sticky, very plastic; common very fine and few fine roots; many slickensides and pressure faces, some organic clay coatings along cracks and on ped faces; slightly acid (field pH 6.5); clear, smooth boundary.
Bssg2	60-82	Light brownish gray (10YR6/2); clay; many fine and medium distinct strong brown (7.5YR5/8) and common fine prominent red (10R4/6) mottles; strong fine and medium subangular blocky structure partly to massive; friable, very sticky, very plastic; few very fine roots; many slickensides and pressure faces, some organic clay coatings along cracks and on ped faces, common fine gypsum crystals; slightly acid (field pH 6.5); clear, smooth boundary.
Bg1	82-110/115	Light gray (10YR7/1) clay; common fine and medium distinct yellowish brown (10YR5/6) mottles; strong fine and medium subangular blocky structure partly to massive; friable, very sticky, very plastic; common pressure faces, some organic clay coatings along cracks and on ped faces, many fine gypsum crystals, common soft Fe&Mn concretions; slightly acid (field pH 6.5); clear, wavy boundary.
Bg2	110/115-153	Light gray (10YR7/1) clay; many fine and medium prominent strong brown (7.5YR4/6), common fine distinct yellow (10YR7/8) and prominent red (10R4/6) mottles; strong medium and coarse angular blocky structure partly to massive; friable, very sticky, very plastic; common pressure faces, common soft Fe&Mn concretions; slightly acid (field pH 6.5); clear, smooth boundary.
Bg3	153-200 ⁺	Light gray (10YR7/1) clay; many medium prominent strong brown (7.5YR4/6), common fine distinct yellow (10YR7/8) mottles; strong medium and coarse angular blocky structure partly to massive; very sticky, very plastic; common pressure faces, many soft Fe&Mn concretions, some iron pipes; neutral (field pH 7.0).

Type Location: Name of Amphoe, Amphoe Bang Khen Changwat Krung Thep Maha Nakhon (Bangkok)

Range of Profile Features:

The A horizon is from 15 cm to 30 cm thick, has 10YR hue, values of 4 or less and chromas of 2 or 1 with clay or silty clay textures. Structure is moderate blocky and field pH values range from 5.5 to 7.0.

The upper B horizon has hue of 10YR, values of 4 to 6 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 5 to 7 and chromas of 2 or less. Structure is weak to moderate blocky, prismatic or massive, breaking to blocky. Field pH values range from 6.5 to 8.0

The C horizon consists of a soft reduced dark greenish gray clay. Field pH values range from 7.0 to 8.0, increasing with depth.

Similar Soil Series:

Bangkok series (Bk): has higher pH values and without red mottles and gypsum.

Ayutthaya series (Ay): has an acid jarosite layer below 100 cm of the surface with pH values of 4.5 or less in the B horizon

Chachoengsao series (Cc): has a similar profile, but higher pH values and without gypsum.

Bang Len series (Bl): has dark coloured thickner, higher pH values and without red mottles.

Principal Associated Soils: Bang Khen soils are found in association with Bangkok and Bang Len series soils on the former tidal flats.

ANALYSIS RESULTS

Profile code No. : SW-53/35

(oven dry basis)

Soil series : Bang Khen (Bn)

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 ¹	water	KCl			
416418	0-20	Apg	0.8	33.8	65.4	-	-	-	-	0.8	c	c	5.0	4.6		37.4	195
416419	20-32/36	BAG	0.5	32.2	67.3	-	-	-	-	0.5	c	c	5.1	4.5		2.1	195
416420	32/36-60	Bssg1	0.7	34.9	64.4	-	-	-	-	0.7	c	c	5.0	4.4		1.2	195
416421	60-82	Bssg2	1.3	40.6	58.1	-	-	-	-	1.3	sic	c	5.1	4.4		1.0	156
416422	82-110/115	Bwg1	5.6	49.2	45.2	0.5	1.2	2.4	1.1	0.4	sic	c	4.9	4.3		1.7	156
416423	10/115-15	Bwg2	1.4	33.9	64.7	-	-	-	-	1.4	c	c	4.9	4.3		2.3	234
416424	153-200	Bwg3	2.3	41.6	56.1	-	0.2	0.3	0.8	1.0	sic	c	5.8	5.2		7.8	273

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol ₍₊₎ kg ⁻¹)										Base satur ¹ (%)		ECEC cmol ₍₊₎ kg ⁻¹ (B+D)	Al KCl extr. cmol ₍₊₎ kg ⁻¹ (D)	Electrical conduct ² (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	(Bx100)/(B+A)				
				0-20	3.9	2.46	0.21	15.30	9.40	0.50	4.10	29.30	10.40	39.70	29.40			
20-32/36	3.7	0.51	0.06	10.40	8.90	0.50	3.20	23.00	9.60	32.60	26.90	40.0	86	71	23.10	0.06		
32/36-60	3.2	0.36	0.05	9.20	9.50	0.50	3.90	23.10	8.20	31.30	24.30	37.7	95	74	23.20	0.07		
60-82	3.7	0.03	0.04	64.90	9.90	0.40	4.60	79.80	6.50	86.30	24.20	41.7	100	92	79.90	0.05		
82-110/115	3.6	0.06	0.02	72.10	8.80	0.40	5.90	87.20	5.00	92.20	20.00	44.2	100	95	87.30	0.06		
10/115-15	4.4	0.14	0.03	15.50	7.20	0.60	8.20	31.50	5.40	36.90	24.40	37.7	100	85	31.60	0.06		
153-200	3.6	0.17	0.03	6.90	11.80	0.70	7.30	26.70	3.40	30.10	22.30	39.8	100	89	26.70	0.00		