

Proposed by: W. Van der Kevie, 1969
Revised by:
1. C. Changprai, 1987
2. S. Udomsri, 2004

CHACHOENGSAO SERIES

Field Symbol: Cc

Distribution: Occupies moderate extent in the southeastern part of the Central Plain.

Setting: Chachoengsao 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 between 30-40 cm for four to five months from river or rainwater 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: Chachoengsao series is a member of the Fine (Very-fine), mixed, nonacid, semiactive, isohyperthermic Vertic Endoaquepts. They are very deep, medium acid to neutral soils. They are characterized by a dark coloured A horizon overlying a paler coloured B horizon containing red mottles in the upper layers and brownish yellow and yellowish brown mottles in the lower layers. The B horizon overlies a reduced greenish gray marine clay which is low in sulphur. Pressure faces and slickensides are characteristic for the B horizon.

Typifying Pedon: Profile code number is No.6

Location: 50 m east of highway No. 121, Ban Khlong Lat Khwang, Amphoe Ban Pho Changwat Chachoengsao.

Sheet Name: Changwat Chachoengsao

No.: 5236 III

Coordinate:-

Elevation: 3 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: 20-40 cm

Duration: 4-5 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: S. Panichapong & P. Vijarnsorn

Date: 22 January, 1981

Revised by: S. Udomsri

Horizon	Depth (cm)	Description
Apg	0-22	Dark gray to very dark gray (10YR3-4/1) clay; many fine prominent yellowish red (5YR5/8) mottles along root channels; weak coarse blocky to massive; firm, very sticky, very plastic; many fine roots; strongly acid (field pH 5.5); clear, smooth boundary.
Bg	22-42	Dark gray (10YR4/1) clay; many fine distinct strong brown (7.5YR5/8) and few fine prominent yellowish red (5YR5/8) mottles; massive; very sticky, very plastic; common fine roots; patchy organic matter coatings along cracks; strongly acid (field pH 5.5); gradual, smooth boundary.

Bssg	42-70	Grayish brown to brown (10-7.5YR5/2) clay; many medium distinct strong brown (7.5YR5/8), yellowish red (5YR5/8) and few fine prominent red (10R4/8) mottles; massive; very sticky, very plastic; few fine roots; patchy organic matter coatings along cracks, root channels and animal holes; distinct slickensides; neutral (field pH 7.0); clear, irregular boundary.
BCg	70-125	Grayish brown (10YR5/2) clay; many medium distinct strong brown (7.5YR5/8) and prominent yellowish red (5YR5/8) mottles, few spots of jarosite (10YR8/8); massive; very sticky, very plastic; few decay large roots (in places); patchy organic matter coatings along decayed root channels; neutral (field pH 7.0); abrupt, irregular boundary.
Cg1	125-165	Gray to dark gray (5Y4-5/1) half ripe clay; few decayed roots in places; moderately alkaline field pH 8.0).
Cg2	165-265	Dark greenish gray (5GY4/1) unripe silty clay loam; few decayed roots (in places); common fine shell fragments; moderately alkaline (field pH 8.0).

Remark: From the depth of 125 to 265 cm, soils were taken by auger.

Pedon No. 6 from *Characteristics of Some Acid Sulphate Soils in Thailand*. in the tour guide for 2nd Symposium on Acid Sulphate Soils in Thailand, 18-24 January, 1981, Bangkok, Thailand, Soil Survey Division, Department of Land Development, Bangkok, Thailand.

Type Location: Name of Changwat, Changwat Chachoengsao.

Range of Profile Features:

The A horizon is from 20 to 40 cm thick, has 10YR hue, values of 3 or less and chromas of 1 or 2 with clay or silty clay textures. Structure is weak coarse blocky and field pH values range from 4.5 to 5.5.

The B horizon has hues of 10YR, 2.5Y or 5Y, values of 5 or 6 and chromas of 1 or 2. Structure is prismatic breaking to moderate blocky. Field pH values range from 5.0 to 8.0, increasing with depth. Few pale yellow jarosite mottles may occur in the lower B horizon.

The C horizon is a reduced dark gray and greenish gray, soft clay. Shell fragments may occur very deep in the profile and field pH is usually 8.0.

Similar Soil Series:

Maha Phot series (Ma): has a similar profile, but contain jarosite mottles in the profile which occur at some depth below 100 cm from the soil surface.

Ayutthaya series (Ay): has a similar profile, but contains gypsum in the lower A and upper B horizon and contain jarosite mottles in the profile which occur at some depth below 100 cm from the soil surface.

Bang Khen series (Bn): has a similar profile, but contains gypsum in the lower A and upper B horizons.

Bangkok series (Bk): has pH values about 7.0-8.0 throughout profile and without red mottles.

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

ANALYSIS RESULTS

Profile code No. 6

(oven dry basis)

Soil series : Chachoengsao (Cc)

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			
33794	0-22	Apg	0.6	35.5	63.9						c	c	4.7	4.8	-	2.0	554
33795	22-42	Bg	1.3	28.2	70.5						c	c	4.6	4.7	-	2.0	562
33796	42-70	Bssg	2.7	39.9	57.4						c	c	4.8	4.9	-	2.0	534
33797	70-125	BCg	6.5	45.4	48.1						c	c	5.3	5.4	-	6.0	507
33798	125-165	Cg1	6.6	46.5	46.9						c	c	6.0	6.0	-	31.0	608
33799	165-265	Cg2	6.2	57.6	36.2						c	c	6.5	6.5	1.2	88.0	671

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol _(c) kg ⁻¹)										Base satur ¹ (%)		ECEC cmol _(c) kg ⁻¹ (B+D)	AI KCl extr. cmol _(c) 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)				
				0-22	1.10	0.10	4.73	18.90	1.42	8.00	33.05	12.94	45.99	23.48	36.7			
22-42	0.33	0.08	4.36	18.70	1.44	4.00	28.50	12.77	41.27	19.60	27.8	100	69			5.63		
42-70	0.20	0.06	4.39	18.22	1.37	10.00	33.98	10.42	44.40	18.13	31.6	100	77			7.92		
70-125	0.18	0.04	4.39	19.18	1.30	8.00	32.87	8.40	41.27	18.67	38.8	100	80			10.56		
125-165	1.86	0.08	5.89	24.82	1.56	14.00	46.27	7.73	54.00	19.87	42.4	100	86			18.48		
165-265	2.47	0.08	18.19	28.37	1.72	20.00	68.28	8.74	77.02	19.11	52.8	100	89			22.88		