

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

**AYUTTHAYA SERIES**

**Field Symbol: Ay**

**Distribution:** Occupies large extent in the central part of the Central Plain; mainly in Changwat Phra Nakhon Si Ayutthaya, Suphan Buri, Pathum Thani and Nakhon Pathom.

**Setting:** Ayutthaya soils are formed from riverine alluvium mixed with marine sediments 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 80 cm to 2 m from river water or rain occurs for about five 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 Ayutthaya series is a member of the Very fine, mixed, active, acid, isohyperthermic, Vertic Endoaquepts. They are very deep strongly acid soils and are characterized by a gray or thick dark A horizon overlying a pale, brown or gray with mottles of red, strong brown or yellow mottled B horizon which contains jarosite mottles at some depth between 100 cm and 150 cm from the surface, overlying a reduced C horizon, with a high sulphur content. 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 C-6/10

**Location:** Amphoe Phak Hai Changwat Phra Nakhon Si Ayutthaya.

**Sheet Name:** Amphoe Phak Hai

**Sheet No.:** 5037 I

**Coordinate:** 516982

**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:** 100 cm

**Duration:** 6 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:**

**Described by:** Banchong and Maitri

**Date:** 11 May, 1970

**Revised by:** S. Udomsri

Horizon	Depth(cm)	Description
Apg	0-21	Dark gray (10YR4/1) heavy clay; many fine distinct strong brown (7.5YR5/8) and prominent yellowish red (5YR5/8) mottles in root channels and ped faces; moderate medium subangular blocky structure; firm; few pressure faces; common very fine roots; moderately acid (field pH 6.0); clear, smooth boundary.
Bssg1	21-45/50	Very dark gray (10YR3/1) heavy clay; many fine prominent red (2.5YR4/8) and distinct dark brown (7.5YR4/4) mottles; moderate medium subangular blocky structure breaking to fine block; firm, sticky,

		plastic; common slickensides; few very fine roots; strongly acid (field pH 5.5); clear, wavy boundary.
Bssg2	45/50-90	Light brownish gray (10YR6/2) heavy clay; many fine distinct yellowish brown (10YR5/8), brownish yellow (10YR6/8), many fine and medium prominent red (2.5YR4/8) and large spot of very dark gray (10YR3/1); moderate fine subangular blocky structure; few slickensides; many pressure faces; few very fine roots; patchy with many fine gypsum crystals; very strongly acid (field pH 5.0).
Bg	90-145	Light brownish gray (10YR6/2) heavy clay; many fine distinct brownish yellow (10YR6/8), many fine and medium prominent weak red (7.5R4/4) and red (10R5/8) mottles; gypsum crystals more than 10% by volume; very strongly acid (field pH 4.5).
Bjg	145-200	Grayish brown (10YR5/2) nearly ripe clay; many medium distinct reddish yellow (7.5YR6/8), prominent weak red (7.5R4/4), common medium distinct pale yellow (2.5Y7/4) mottles; common gypsum; very strongly acid (field pH 4.5).
BCg	200-230	Grayish brown (10YR5/2) nearly ripe clay; common medium and coarse distinct brownish yellow (10YR6/8), pale yellow (2.5Y7/4) mottles; strongly acid (field pH 5.5).
Cg1	230-250	Dark gray (5Y4/1) half ripe clay; moderately acid (field pH 6.0).
Cg2	250-300	Dark gray (5Y4/1) to dark greenish gray (5G4/1) half ripe clay; moderately alkaline (field pH 8.0).

**Type Location:** Name of Changwat, Changwat Phra Nakhon Si Ayutthaya

**Range of Profile Features:**

The A horizon is from 15 cm to 40 cm thick, has 10YR hue, values 4 through 1 and a chromas of 1 or 2 with clay or silty clay textures. Structure is weak medium to coarse blocky, with weak granular in the uppermost layer. Field pH values range from 4.5 to 7.0

The B horizon has hues of 10YR or 7.5YR, values of 4 to 6 and chromas of 2 or 1. Structure is weak prismatic breaking to moderate or strong, fine blocky. Mottling colour is variable, but predominantly red in the upper B and brownish yellow and pale yellow (jarosite) in the lower part, between 100-150 cm, the latter appearing as coatings on pores, root channels and ped faces. Slickensides and pressure faces founded in the B horizon. Field pH values range from 4.0 to 5.0 and usually decrease with depth.

The C horizon consists of half ripe, very soft clay and has hues of 10YR to 5Y or 5GY, with values of 4 or 5 and chromas of 2 or less. Field pH values increase with depth.

**Similar Soil Series:**

Maha Phot series (Ma): has a similar profile, but without gypsum crystals.

Bang Khen series (Bn): has similar features in the upper meter of the solum, however, pH values are higher throughout and the reduced C horizon has a low sulphur content.

Rangsit series (Rs): has jarosite mottles between 50-100 cm. Gypsum crystals are not found in the solum and pH values are lower.

Ongkharak series (Ok): has jarosite mottles which occurs within 50 cm of the soil surface. Gypsum crystals are not found in the solum.

Sena series (se): has jarosite mottles between 50-100 cm.

Bang Len series (Bl): has a thick black A horizon and with out jarosite mottles and red mottles.

**Principal Associated Soils:** These include Sena, Bang Khen and Bang Len series. Sena series soils are consequently more acid from shallow depth. Bang Len series soils are found in close vicinity to the creeks in the old tidal flats, and Bang Khen series occur in the same area of Ayutthaya soil series

**ANALYSIS RESULTS**  
(oven dry basis)

Profile code No. : C-6/10  
Soil series : Ayutthaya (Ay)

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			
Pa 514	0-21	Apg	3.0	30.0	67.0						c	c	5.0	4.6	1.2	5.5	223
Pa 515	21-45/50	Bssg1	4.5	26.0	69.5						c	c	4.7	4.0	1.0	2.2	113
Pa 516	45/50-90	Bssg2	4.0	33.5	62.5						c	c	4.3	3.6	1.3	3.5	94
Pa 517	90-145	Bg	17.5	17.0	65.5						c	c	4.2	3.7	0.5	2.6	140
Pa 518	145-200	Bj	4.0	31.0	65.0						c	c	4.3	4.1	0.6	2.5	185
Pa 519	200-230	BCg	1.5	31.0	67.5						c	c	4.4	4.2	0.6	9.0	217
Pa 520	230-250	Cg1	1.5	35.0	63.5						c	c	3.7	3.3	0.6	27.6	250
Pa 521	250-320	Cg2	1.5	33.5	65.0						c	c	4.6	4.3	1.3	22.5	392

Depth (cm)	Air dried to oven dried	C %	N %	Exchange capacity and cations (cmol <sub>(+)</sub> kg <sup>-1</sup> )										Base satur <sup>1</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>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)			
0-21	5.0	1.62	0.20	15.80	0.40	0.50	1.10	17.80	15.40	33.20	36.60	54.6	49	54			0.22	
21-45/50	4.8	0.41	0.10	12.80	0.60	0.20	2.30	15.90	17.50	33.40	35.70	51.4	45	48			0.46	
45/50-90	5.4	0.20	0.03	22.20	0.80	0.20	3.90	27.10	21.40	48.50	28.50	45.6	95	56			0.70	
90-145	8.0	0.11	0.04	14.35	0.90	0.30	4.40	19.95	16.50	36.45	26.00	39.7	77	55			1.80	
145-200	6.1	0.16	0.04	9.60	1.10	0.40	4.10	15.20	17.90	33.10	31.00	47.7	49	46			0.60	
200-230	5.7	0.31	0.06	9.90	1.20	0.40	4.50	16.00	16.80	32.80	30.80	45.6	52	49			0.90	
230-250	6.1	1.27	0.09	10.00	1.40	0.50	5.10	17.00	21.10	38.10	33.50	52.8	51	45			1.70	
250-320	6.0	1.30	0.10	11.30	1.70	0.70	6.30	20.00	16.20	36.20	35.30	54.3	57	55			1.25	