GAGHWA SERIES

Established Series UKT, KBJ, JFD 3 November, 1969

The Gaghwa series are members of the fine, mixed, mesic family of Typic Haplohumults [Leptic Umbric Cutanic Alisols (Alumic Humic Hyperdystric Siltic) classified by WRB]. These soils have dark brown sandy loam Ap horizons, dark grayish brown silt loam BAt horizons, brown silty clay loam Bt1 horizons, and dark yellowish brown silty clay Bt2 horizons. They are developed on mountain colluvial slopes derived from acidic crystalline or similar materials.

Typifying Pedon: Gaghwa sandy loam-corn (Colors are for moist soil).

Slope: 7-15%
Elevation: 513 m above m.s.l.
Soil moisture regime: Udic
Soil temperature regime: Mesic
Parent material: Colluvium from granite and granite-gneiss
Diagnostic features: An umbric epipedon from a depth of 0 to 19 cm and an argillic horizon from a depth of 19 to 84 cm (An umbric horizon from a depth of 0 to 19 cm and an argic horizon from a depth of 19 to 84 cm by WRB).

Described by: Song, K. C., S. J. Jung, and D. C. Noh, 17 May, 2005.



Morphological properties of typifying pedon.

Ap - 0 to 19 cm. Dark brown (10YR 3/3) sandy loam; structureless, massive; friable, slightly sticky and slightly plastic; common fine to medium roots; common fine to medium pores; soil dressing; clear smooth boundary.

BAt - 19 to 34 cm. Dark grayish brown (10YR 4/2) silt loam; moderate granular structure; firm, sticky and plastic; few fine roots; common fine to medium pores; clear smooth boundary.

Bt1 - 34 to 54 cm. Brown (10YR 4/3) silty clay loam; moderate subangular blocky structure; firm, sticky and plastic; thin patch clay cutans; common fine roots; common fine pores; clear smooth boundary.

Bt2 - 54 to 84 cm. Dark yellowish brown (10YR 4/4) silty clay; moderate angular blocky structure; firm, very sticky and very plastic; thin continuous clay cutans; few fine roots; common fine to medium pores; few macro worm pores; about 20% bouldary stones; clear wavy boundary.

R - More than 84 cm. Granite bedrock.

The typifying pedon has an umbric epipedon from a depth of 0 to 19 cm and an argillic horizon from a depth of 19 to 84 cm. It has a base saturation (by sum of cations) of less than 35% at 125 cm below the upper boundary of the argillic horizon. That can be classified as Ultisol. It has 0.9% or more organic carbon in the upper 15 cm of the argillic horizon and keys out as Humult. Also it meets the requirements of Typic Haplohumult.

The typifying pedon has more than 35% clay at the particle-size control section and has mesic soil temperature regime. Therefore it can be classified as fine, mixed, mesic family of Typic Haplohumult.

Type Location: About 400 meters west of the Mumyeong Bridge, Sinri 4 Ri, Daehwa Myeon, Pyeongchang Gun, Gangwon Do (128° 26' 56.9", 37° 32' 14.1").

Range in Characteristics: These soils have umbric epipedons and argillic horizons. Solum thickness ranges 50 to 100 cm. Depth to hard rock is less than 100 cm. Reaction is very strongly acid. Base saturation is less than 35 percent. Ap horizons are dark brown loam to clay loam. Bt horizons are brown, dark yellowish brown, or yellowish red clay loam, silty clay loam, or silty clay.

<u>Competing Series and Their Differentiae</u>: These are the Jeongeub, Unbong, Ungyo, and Mangsil series. The Jeongeub soils have 10 to 35% gravels in the profiles. The Unbong and Ungyo soils have fine loamy texture class. The Mangsil soils occur at high elevations in mountainous regions with moderately weathered andesite materials and have fine loamy texture class.

Setting: The Gaghwa soils occur on sloping to moderately steep, dissected, colluvial slopes. Dominant slopes are between 7 and 15 percent and the range is from 2 to 60 percent.

Principal Associated Soils: The Anryong, Jangwon, Wonji, Chilgog, and Geumgog soils are associated. The Anryong, Jangwon, and Wonji soils are associated in similar positions. The Chilgog and Geumgog soils are associated in lower positions.

Drainage and Permeability: Well drained. Runoff is medium to rapid. Permeability is moderately slow or slow.

Use and Vegetation: Most of these soils are used for upland crops such as barley, sesame, radish

and soybean. About one-third grows pine forest, scrub and wild grass.

Distribution and Extent: The Gaghwa soils occur on mountain colluvial slopes and fan terraces in granite, granite gneiss and areas of similar materials throughout the country. These soils have large extent though individual areas may be relatively small.

Series Established: Gwangju City, 1967. Revised, Pyeongchang Gun, Gangwon Do, 2005.

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			(Total)	(0	Clay)	(\$	(Silt)			() Sand				
		С	lay	Silt	Sand	Fine	Coarse	Fine	Coarse	VF	F	М	С	VC		
Depth (cm)	Horiz	on I	T	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1		
()		.0	002	05	- 2	.0002	.002	02	05	10	25	50) - 1	- 2		
							Pct (of < 2n	nm (3A1))						
0-19	А	1	5.1	26.7	58.2			18.8	8.0	6.5	12.6	12.3	15.4	10.6		
19-34	BA	t 2	9.7	58.6	11.7			46.7	11.9	2.2	2.4	2.5	3.7	1.3		
34-54	Bt1	3	4.7	58.4	6.9			46.2	12.2	0.7	0.4	1.7	2.1	1.1		
54-84	Bt2	3	4.6	61.4	5.0			50.1	11.3	0.9	0.9	1.1	1.6	0.5		
84-	R															
	Coarse Fractions(mm)					>2mm Orgn			Extr	Total (Dith -C			th -Cit)		
Denth	Weight					Wt C			Р	S		Ext	ractabl	e		
(cm)	2-5	5-20	20 20-75 .1-75			ct of					F	e	Al	Mn		
					V	Vhole	6A1c	6B3a	683	6R3a	1 6C	2b	6G7a	6D2a		
	Pct	of < 7	75mm	(3B1)		Soil	Pct <	2mm	g/kg		Pct	of <	2mm			
0-19							1.13									
19-34							2.15									
34-54							1.46									
54-84							0.62									
84-																
	Ratio	/Clay	y Atterberg		(Bulk I	Density)	CO	LE	(- Wat	Water Content)	WRD		
	CEC	1500	L	imits	Fie	eld 3	33 Ove	n Who	ole Fie	ld 1	0	33	1500	Whole		
Depth (cm)		kPa	LL	PI	Mc	oist k	Pa Dry	y So	il Mo	ist kl	Pa l	кРа	kPa	Soil		
(•)	8D1	8D1	4P1	4P	9 4A	.3a 4A	A1d 4A1	h 4D	01 4B	4 4E	81c 4	B1c	4B2a	4C1		
	-			10.1		,		,			0 10			1		

Laboratory data sheets of typifying pedon.

	Ratio/Clay		Atter	berg	(Bulk Density)			COLE	(-	Water (-)	WRD	
Depth (cm)	CEC	1500	Limits		Field	33	Oven	Whole	Field	10	33	1500	Whole
		kPa	LL	PI	Moist	kPa	Dry	Soil	Moist	kPa	kPa	kPa	Soil
	8D1	8D1	4P1	4P	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
		Pct <0.4mm				g/cc				Pct of	<2mm		cm/cm
0-19	0.74				1.34				17.5				
19-34	0.67				1.37				28.5				
34-54	0.49				10.9				37.1				
54-84	0.48				1.37				30.5				
84-													

	(N	H4OAc	Extract	able Ba	ses)	Acid-	Extr	(Al		
Depth (cm)	Ca	Mg	Κ	Na	Sum	ity	Al	Sum	NH4-	Bases	Sat
	5B5a	5B5a	5B5a	5B5a	Bases			Cats	OAc	+ Al	
	6N2e	6O2d	6Q2b	6P2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1
					m	eq / 100g	Pct				
0-19	2.1	0.5	0.5	0	3.1	13.5	2.2	16.6	11.2	5.3	41.5
19-34	0.7	0.2	0.	0	1.4	22.0	5.3	23.4	20.0	6.7	79.1
34-54	0.6	0.2	0.4	0	1.2	20.0	5.3	21.2	17.0	6.5	81.5
54-84	1.7	0.6	0.6	0	3.0	16.5	3.4	19.5	16.0	6.4	53.1
84-											

	(Base Sat)		CO3 as	Res	Cond	(t	он	·)	Acid	Oxalat	e Extra	ction
	Sum	NH4-	CaCO3			NaF	KCl	CaCl2	H2O	Opt	Al	Fe	Si
Depth		OAc	<2mm					.01M		Den			
(cm)	5C3	5C1	6E1g	8E1	8I	8C1d		8C1f	8C1f	8J	6G12	6C9a	6V2
	Pct			ohms/ cm	dS/m		1: 1	1: 2	1: 1		- Pct	of <2	mm -
0-19	18.8	28.0					3.4	4.1	4.6				
19-34	6.0	7.0					3.4	3.8	4.4				
34-54	5.7	7.1					3.7	4.2	4.6				
54-84	15.4	18.6					3.7	4.5	4.9				
84-													