

Reference soil Kenya 66: Vertisol

Description

The profile is an intergrade towards a vertic cambisol. No tuff in situ appears! *Acacia drepanolobium* is a typical Vertisol shrub. Slides: 10,242 - 10,247.



Classification

WRB 2006:

calcic horizon Vertisol (Pellic)

15-64 cm vertic horizon

secondary carbonates

WRB 1998:

Pelli- calcic horizon Vertisol

FAO-UNESCO-ISRIC 1988: FAO-UNESCO 1974:

Orthi- Calcic Vertisol gilgai phase

0-15 cm ochric A horizon

15-64 cm cambic B horizon

slickensides

soft powdery lime

Pellic Vertisol

0-15 cm ochric A horizon

15-64 cm cambic B horizon

gilgai microrelief

slickensides

Site description

General information:

Names of person(s) who described the profile : Kuyper J & S Mwangi
General description of location of profile (e.g., town, province) : Kajiado District, 5km ENE of Kajiado

Physiography:

The altitude of the soil profile relative to mean sea level, specified in meters : 1750 m asl
Regional landform : plain
Topography of the surrounding country : undulating

Date	: November 1985	Physiographic Unit in the immediate surrounding of the site	: valley in gently undul. plain
Latitude / Longitude	: S -1.8305555° / E 36.8278°	The slope refers to the inclination of the land immediately surrounding the site. The measured or estimated slope angle is specified to the nearest per cent	: 3 %
		The physiographic position of the site where the profile is located	: lower slope
		Form of the slope surrounding the site	: concave
		Slope Aspect of the site	:

Parent material:

The main parent rock/ material over which the soil has been formed (1st entry)	: tuff
Mode of Accumulation or deposition of parent material (1st entry)	: fluvial
Texture of parent material (1st entry)	: clayey
Weathering status of solid rock (1st entry)	: highly
Resistance against weathering (solid rock) (1st entry)	: poor
Depth1 of lithological boundary	: 76 cm
The main parent rock/ material over which the soil has been formed (2nd entry)	: gneiss
Mode of Accumulation or deposition of parent material (2nd entry)	: residual material
Texture of parent material (2nd entry)	: mixed
Weathering status of solid rock (2nd entry)	: partially or moderately
Resistance against weathering (solid rock) (2nd entry)	: moderate
Soil Depth; depth to which roots can easily penetrate throughout the year	: 76 cm
Remarks on Parent Materials	: transported tuff on gneiss

Hydrology and drainage:

Depth of groundwater table	: cm
Groundwater Top	: cm
Groundwater Bottom	: cm
Kind of groundwater table	: no groundwater table observed
Top Stagnating Layer	: cm
Bottom Stagnating Layer	: cm
Runoff	: rapid
Flooding frequency	: irregular
Nature of floodwater	: fresh
Estimated permeability (class) of least permeable part of the profile	: slow
Drainage Class	: imperfect
To Drainage Class	:
Moisture conditions of the profile: dry from -to	: 0-80 cm
Moisture conditions of the profile: moist from -to	: cm
Wet From - To	: cm

Land use / vegetation:

Current land use at the site	: semi-natural grassland, grazed
Major crops	:
Main type of irrigation	:
Rotation scheme	:
Vegetation Type;The natural vegetation at the site	: medium tall grassland
Status of vegetation	:
Remarks on Land Use / Vegetation	: VEGETATION: Shrubbed grassland; Acacia drepanolobium is the typical shrub

Erosion and aggradation:

Soil erosion type (1st entry)	: sheet
Occurrence of soil aggradation	: present
Slope Stability	: stable

Surface characteristics:

Microrelief type: small-scale : gilgai
differences in relief in the
direct vicinity of the site

Microrelief Pattern : none

Microrelief Height : 15

Rockiness : none

Stoniness : very stony

Average size of stones : 1

Shape of stones (on average) : (sub-)rounded

Cracks : large cracks (width more than 1 cm, or depth more than 50 cm)

Slaking of aggregates by tillage, rainfall or frost : surface slaked; sorted sand/silt, some clay films

Evidence of salt : non-saline

Evidence of alkali : slightly alkaline

Nearest climate station:

Station : Kajiado DC office

Country : Kenya

WMO Code : 9999

Distance : 7 km WSW (very good)

Latitude / Longitude : S 1°50 / E 36°48

Climate data*:

dataType(Station)	: nrecord	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (mm)(Kajiado DC office)	: 42	43	42	67	119	62	12	4	3	7	21	65	59	504

*Data are considered representative for site

Profile description:

Ah 0-15 cm : very dark grey (2.5Y 3/0, moist) very dark grey (2.5Y 3/0, dry), slightly gravelly clay, strong medium and coarse angular blocky, very hard firm sticky plastic, many very fine pores and few fine pores, many very fine and few fine roots, very few medium gravel weathered quartz, moderately calcareous (2-10%), clear smooth boundary to,

Ai 15-48 cm : very dark grey (2.5Y 3/0, moist) very dark grey (2.5Y 3/0, dry), slightly gravelly clay, strong very coarse prismatic, very hard extremely firm sticky plastic, broken slickensides, many very fine pores and few fine pores, many very fine and few fine roots, few medium gravel weathered quartz, moderately calcareous (2-10%), diffuse smooth boundary to,

ACi 48-64 cm : very dark grey (2.5Y 3/0, moist) very dark grey (2.5Y 3/0, dry), gravelly clay, strong medium and coarse prismatic and strong coarse and very coarse prismatic, very hard extremely firm sticky plastic, continuous slickensides, many very fine pores and few fine pores, many very fine and few fine roots, moderately calcareous (2-10%), clear irregular boundary to,

2RC 64-76 cm : very dark grey (10YR 3/1, moist) (10YR4.5/ 2, dry), silty clay loam, massive, slightly sticky plastic, continuous slickensides, dominant weathered gneiss fragments, strongly calcareous (10-25%),

Physical

Particle size distribution:

Depth (cm)		Gravel (%)	Very Coarse Sand (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Very Fine Sand (%)	Total Sand (%)	Coarse Silt (%)	Fine Silt (%)	Total Silt (%)	Clay (%)
0-15	:	0	12.1	11.7	6.3	6.6	2.3	39	7.3	15.3	22.6	38.5
15-50	:	5	10.4	11.6	5.8	5.7	2.9	36.4	6.4	14.1	20.5	43.0
50-65	:	45	16.6	12.7	8.6	7.0	2.5	47.4	4.5	13.4	17.9	34.8

Other physical data

Depth (cm)	Bulk Density (kg/dm ³)	Spec. Surf. Area (m ² /g)	COLE (cm/cm)	Water Disp. Clay (%)	Clay (%)
0-15	:	-	-	-	38.5
15-50	:	-	-	24.5	43.0
50-65	:	-	-	20.0	34.8

Chemical characteristics:

Depth (cm)	pH H2O	pH KCl	EC 1 : 2.5 (mS/cm)	CaCO3 (%)	Org. C (%)	Org. N (%)	C / N	Exch. Acid (cmol/kg)	Exch. Al (cmol/kg)	Ca (cmol/kg)	Mg (cmol/kg)	K (cmol/kg)	Na (cmol/kg)	Sum Cations (cmol/kg)
0-15	: 6.8	5.4	0.12	2.0	1.23	0.13	9	-	-	34.0	6.3	0.4	0.8	41.5
15-50	: 7.8	6.2	0.13	2.0	0.70	0.07	10	-	-	39.2	4.9	0.2	1.7	46
50-65	: 8.7	7.2	0.25	7.6	0.70	0.06	12	-	-	53.6	3.5	0.2	2.4	59.7

Depth (cm)		CEC Soil (cmol/kg)	CEC Clay (cmol/kg)	CEC Org (cmol/kg)	ECEC (cmol/kg)	Base sat. (%)	Al sat. (%)	ESP (%)
0-15	:	42.7	104	4.3	-	97	-	2
15-50	:	46.8	107	2.5	-	98	-	4
50-65	:	47.7	143	2.5	-	125	-	5

Clay mineralogy:

Depth (cm)	Kaolinite	Mica / illite	Vermiculite	Chlorite	Smec	Halloysite	Mixed layer	Quar	Feldspar	Gibbsite	Goethite	Hematite
0-15	: weak	-	-	-	very strong	-	-	weak	weak	-	-	-
15-50	: -	-	-	-	-	-	-	-	-	-	-	-
50-65	: weak	-	-	-	very strong	-	-	weak	weak	-	-	-

Source of analyzing procedures:

Laboratory	Attribute	Description	Proc. ref
ISRIC	Base sat.	Calculation; Sum of Exchangeable Cations (Na, K, Ca, Mg) / CEC soil	labmanual
ISRIC	C / N	Calculation; Organic Carbon / Organic Nitrogen	labmanual
ISRIC	Ca	Exchangeable bases with 1 M ammonium acetate at pH 7; Ca by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC	CaCO ₃ eq.	Carbonates are dissolved with dilute HCl. Residual acid is titrated. Carbonates expressed as CaCO ₃	7
ISRIC	CEC Clay	Calculation; ((CEC soil - CEC org.m.) / clay %)*100	9-6.3

ISRIC	CEC Org	CEC organic matter; expert estimate for charge per unit C	9-6.3
ISRIC	CEC Soil	CEC; with index cation in buffered solution pH7	9-4 and 9-5.3.3
ISRIC	Clay; < 0.002 mm	Fraction by Pipette analysis; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	EC 1 : 2.5	Electro Conductivity of a soil / water (1:2.5) suspension	4-1.4 and 13-4
ISRIC	ESP	Calculation; (Exchangeable Na / CEC soil) * 100	9-6.3
ISRIC	Feldspar	Feldspar; relative abundance scale 0 - 7	16-1
ISRIC	Gravel	Fraction from field sample, after drying, crushing, sieving	1-1
ISRIC	K	Exchangeable bases with 1 M ammonium acetate at pH 7; K by flame atomic emission spectrometry	9-6.1
ISRIC	Kaolinite	Kaolinite; relative abundance scale 0 - 7	16-1
ISRIC	Mg	Exchangeable bases with 1 M ammonium acetate at pH 7; Mg by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC	Na	Exchangeable bases with 1 M ammonium acetate at pH 7; Na by flame atomic emission spectrometry	9-4 and 9-5.3
ISRIC	Organic Carbon	Wet combustion of organic matter by potassium dichromate and sulphuric acid at about 125 degrees Celcius. Residual dichromate is back titrated against ferrous sulphate. To compensate for incomplete destruction an empirical correction factor of 1.3 is applied	5
ISRIC	Organic Nitrogen	Organic Matter is digested in sulphuric acid (and hydrogen peroxide) with selenium as catalyst. Nitrogen is converted to ammonium sulphate. The solution is made alkaline and ammonia is distilled off. The evolved ammonia is trapped in boric acid and titrated with standardized acid solution	6
ISRIC	pH H ₂ O	pH electrode; in supernatant suspension	4
ISRIC	pH KCl	In supernatant suspension; potentiometrically	4-1
ISRIC	Quartz	Quartz; relative abundance scale 0 - 7	16-1
ISRIC	Sand; 0.10 - 0.05 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 0.25 - 0.10 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 0.5 - 0.25 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 1.0 - 0.5 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 2.0 - 0.05 mm	Total sand fractions by sieving; after removal CaCO ₃ and organic matter	3-5
ISRIC	Sand; 2.0 - 1.0 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Silt; 0.02 - 0.002 mm	Fraction by Pipette analysis ; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Silt; 0.05 - 0.002 mm	Calculation; Sum fractions Silt 0.05 - 0.02 mm	3-4.7
ISRIC	Silt; 0.05 - 0.02 mm	Fraction by Pipette analysis ; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Smectite	Smectite; relative abundance scale 0 - 7	16-1
ISRIC	Sum cations	Sum of Exchangeable Cations (Ca, Mg, Na, K) with 1 M ammonium acetate at pH 7	9-
ISRIC	Water Dispersable Clay	Fraction by Pipette analysis; without any pretreatment	3-8

*ref: no labmanual available, link to presumable used analytical method

Other classification

USDA-NRCS (1999) : Leptic Haplustert

USDA-SCS (1975) : Leptic Pellustert clayey isothermic

Please report suggestions for improvement to the [webmaster](#)

[Data usage and citation](#) // [Disclaimer](#)