

# 5 Anthropogenic Soils of Africa

## Tunisia

### NARRATIVE PEDON DESCRIPTION

Pedon: Haouaria  
Soil Survey Number S86-FN-890-001  
Location: Tunisia  
1 km W of El Haouaria in NE corner of Cap Bon Area.  
Latitude: 37-04-00-S  
Physiography: in piedmonts  
Geomorphic Position:  
**Microrelief: terracettes 20 to 50 cm on upper third of component**  
Slope: 13% convex south facing  
Precipitation: 63 cm - Xeric Moisture Regime.  
Water Table Depth:  
Air Temperature: Ann: 18 Summ: 25 Win: 12  
Drainage: Well drained  
Stoniness: Class 0 Erosion or Deposition: Slight  
Particle Size Control Section: 6 to 56 cm  
Parent Material: alluvium from limestone-sandstone material  
Classification: Very-fine, montmorillonitic, thermic Calcic Rhodoxeralf  
Diagnostic Horizons: 0 to 6 cm Ochric, 6 to 91 cm Argillic, 91 to 127 cm Calcic  
Described By: P. Camp, R. Yeck, and Hammami Abdelkader  
Soil cracks range from 2 mm to 43 cm in depth; rock fragment percentages estimated.

NSSL Pedon Number: 86P0658  
Print Date: 08/20/02  
Longitude: 011-03-00-E  
Elevation: 64 m MSL  
Permeability: Slow  
Land Use: Cropland  
Runoff: Moderate  
Sample Date: 04/86

Ap -- 0 to 6 cm; yellowish red (5YR 4/6) dry clay and reddish brown (5YR 4/4) moist clay; strong very fine angular blocky structure; hard, very friable, very sticky, very plastic; many very fine roots between peds and few fine roots in cracks; many very fine interstitial and tubular pores; common patchy distinct organic coats on vertical and horizontal faces of peds and few patchy distinct organic coats in root channels and/or pores and few patchy distinct clay films on vertical and horizontal faces of peds; mildly alkaline (pH=7.6); 10 percent pebbles sandstone; abrupt smooth boundary. 86P3830

Bt1 -- 6 to 17 cm; yellowish red (5YR 4/6) interior and reddish brown (5YR 4/4) exterior dry clay and reddish brown (5YR 4/4) interior and red (2.5YR 4/6) exterior moist clay; strong very fine angular blocky structure parting to strong fine angular blocky; extremely hard, very friable, very sticky, very plastic; many very fine roots between peds and few fine roots in cracks; many very fine interstitial and tubular pores; many continuous prominent organic coats on vertical and horizontal faces of peds and common continuous prominent clay films on vertical and horizontal faces of peds; mildly alkaline (pH=7.6); 5 percent pebbles sandstone; gradual wavy boundary. Ped exterior and interior chroma possibly due to organic staining. 86P3831

Bt2 -- 17 to 40 cm; dark red (2.5YR 3/6) exterior dry clay and red (2.5YR 4/6) exterior moist clay; strong fine prismatic structure parting to strong medium prismatic; extremely hard, friable, very sticky, very plastic; few very fine roots in cracks; many very fine interstitial and tubular pores; few patchy distinct clay bridging on faces of peds and many patchy distinct clay films on vertical and horizontal faces of peds and few patchy distinct nonintersecting slickensides on vertical faces of peds; neutral (pH=7.2); 2 percent pebbles sandstone; gradual wavy boundary. 86P3832

Bt3 -- 40 to 70 cm; dark red (2.5YR 3/6) exterior dry clay and red (2.5YR 4/6) exterior moist clay; strong fine prismatic structure; extremely hard, friable, very sticky, very plastic; few very fine roots in cracks; common very fine interstitial and tubular pores; very few discontinuous distinct organic coats in root channels and/or pores and few discontinuous distinct nonintersecting slickensides on vertical faces of peds; moderately alkaline (pH=7.8); 5 percent pebbles sandstone; gradual wavy boundary. 86P3833

Bt4 -- 70 to 91 cm; red (2.5YR 4/6) exterior dry clay and dark red (2.5YR 3/6) exterior moist clay; strong fine angular blocky structure parting to strong medium angular blocky; extremely hard, friable, very sticky, very plastic; few very fine roots in cracks; few very fine interstitial and tubular pores; very few discontinuous distinct organic coats in root channels and/or pores and many discontinuous distinct clay films on vertical and horizontal faces of peds; moderately alkaline (pH=7.8); 10 percent pebbles sandstone, 5 percent cobbles sandstone, 1 percent stones sandstone; abrupt smooth boundary. 86P3834

2Ck -- 91 to 127 cm; 30% red (2.5YR 4/6) exterior and 70% yellowish red (5YR 5/8) exterior dry clay and dark red (2.5YR 3/6) interior and red (2.5YR 4/8) interior moist clay; moderate very fine subangular blocky structure; hard, very friable, very sticky, very plastic, ; few very fine roots between peds; common fine interstitial pores; very few patchy prominent manganese or iron-manganese coats on vertical and horizontal faces of peds and common patchy prominent lime or carbonate coats throughout and common patchy prominent lime or carbonate coats on faces of peds; common fine irregular soft masses of carbonate and few fine plate like soft masses of iron-manganese; violently effervescent continuous; strongly alkaline (pH=8.6); 10 percent pebbles sandstone, 5 percent cobbles sandstone. Variegated coloration. Noticeable increase in coarse sand and fine pebbles, 10%. 86P3835

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-001

(TUNISIA)

PRINT DATE 08/20/02

SAMPLED AS : HAOUARIA ; VERY FINE, MONTMORILLONITIC, THERMIC CALCIC RHODOXEROLF  
 REVISED TO : SND ; VERY-FINE, MIXED, THERMIC CALCIC RHODOXEROLF

SSL - PROJECT 86P 127, (CP86FN193) SMSS TUNISIA  
 - PEDON 86P 658, SAMPLES 86P 3830- 3835  
 - GENERAL METHODS 1B1a, 2A1, 2B

UNITED STATES DEPARTMENT OF AGRICULTURE  
 NATURAL RESOURCES CONSERVATION SERVICE  
 NATIONAL SOIL SURVEY CENTER  
 SOIL SURVEY LABORATORY  
 LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -)(- -CLAY- -)(- -SILT- -)(- - - - -SAND- - - - -)(-COARSE FRACTIONS(MM)-)(>2MM)																
			CLAY LT	SILT .002	SAND .05	FINE LT	CO3 LT	FINE .002	COARSE .02	VF .05	F .10	M .25	C .5	VC 1	2	5	20	1- PCT OF	WT
			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - PCT OF <2MM (3A1) - - - - ->										<- PCT OF <75MM(3B1)-> SOIL						
86P3830S	0- 6	AP	67.7	7.0	25.3	52.0		3.5	3.5	5.5	15.4	2.2	0.8	1.4	2	5	--	25	7
86P3831S	6- 17	BT1	68.8	6.7	24.5	57.9		2.9	3.8	5.6	15.4	2.0	0.6	0.9	1	4	1	24	6
86P3832S	17- 40	BT2	86.3	4.0	9.7	73.6		1.3	2.7	2.6	5.8	0.7	0.2	0.4	1	TR	--	8	1
86P3833S	40- 70	BT3	84.2	5.4	10.4	69.6		2.7	2.7	3.6	5.2	0.7	0.4	0.5	1	1	--	9	2
86P3834S	70- 91	BT4	71.0	7.0	22.0	57.7		2.5	4.5	5.5	13.4	1.3	0.7	1.1	1	4	3	23	18
86P3835S	91-127	2CK	29.0	22.4	48.6	19.7	2.6	11.7	10.7	8.1	16.0	7.6	8.5	8.4	11	27	1	64	43

DEPTH (CM)	ORGN TOTAL C N		EXTR TOTAL P S		(- - DITH-CIT - -)(RATIO/CLAY)(EXTRACTABLE)				(- BULK DENSITY - ) COLE (- - -WATER CONTENT - -)				WRD							
	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
0- 6	1.42	0.139						0.35	0.31											20.8
6- 17	1.37	0.132						0.34	0.32			1.37	1.70	0.072						31.6 22.1 0.13
17- 40	0.73							0.30	0.32			1.23	1.57	0.084						39.3 27.2 0.15
40- 70	0.65							0.30	0.32	68	36	1.29	1.63	0.080						38.9 27.3 0.15
70- 91	0.42							0.32	0.32			1.37	1.68	0.062						33.2 22.8 0.13
91-127	0.18							0.35	0.34	33	18	1.48	1.58	0.015						19.3 10.0 0.10

AVERAGES, DEPTH 6- 56: PCT CLAY 82 PCT .1-75MM 12

\*\*\* P R I M A R Y C H A R A C T E R I Z A T I O N D A T A \*\*\*

S86FN-890-001

PRINT DATE 08/20/02

SAMPLED AS : HAOUARIA ; VERY FINE, MONTMORILLONITIC, THERMIC CALCIC RHODOXERALF  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 658, SAMPLE 86P 3830- 3835

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
DEPTH	(- NH4OAC EXTRACTABLE BASES -)				ACID-	(- -CEC- -)			EXCH	SAR	BASE	CO3 AS	RES.	CASO4 AS	(- - -PH - - -)					
(CM)	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION	CACO3	OHMS	GYP SUM	SAT	CACL2	H2O			
	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM NH4OAC	<2MM	/CM	<2MM	<20MM	PASTE	.01M			
	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f	8C1f	
	<- - - - -MEQ / 100 G - - - - ->					<- - - - ->			PCT		<- -PCT- >	PCT		<- -PCT- >			1:2	1:1		
0- 6	19.3	6.5	0.9	2.0	28.7		28.7	23.6	3	2	100	100					7.1	6.8	7.4	
6- 17	13.8	6.1	0.9	1.6	22.4		22.4	23.2	4		100	97						6.3	7.0	
17- 40	14.3	8.0	1.2	1.4	24.9		24.9	26.1	5		100	95						6.2	6.9	
40- 70	14.1	7.8	1.2	1.4	24.5		24.5	25.6	4	3	100	96					6.7	6.3	6.9	
70- 91	15.0	6.7	1.2	1.1	24.0		24.0	22.7	4	3	100	100					6.8	6.5	7.1	
91-127		3.7	0.6	0.4				10.1	5	3	100	100	47	2200			7.8	7.7	8.3	

DEPTH	( - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - )															PRED.		
(CM)	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL ELEC.	ELEC.	
	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS
	<- - - - -MEQ / LITER - - - - ->															<- -PCT- >	/cm	/cm
0- 6	3.0	1.4	2.9	0.3	--	4.3	TR	1.9				0.5	--	--	71.5	TR	0.71	0.45
6- 17																		0.21
17- 40																		0.20
40- 70	0.8	0.4	2.4	0.1	--	0.3	TR	1.5				1.2	--	--	80.3	TR	0.41	0.25
70- 91	1.3	0.6	2.9	0.1	--	0.4	TR	2.2				1.6	0.1	--	72.0	TR	0.55	0.32
91-127	2.1	0.8	3.8	0.1	--	1.5	0.1	1.9				2.2	0.1	0.4	37.4	TR	0.70	0.31

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 2, 3,

ANALYSES: S= ALL ON SIEVED <2mm BASIS

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-001

PRINT DATE 08/20/02

SAMPLED AS : HAOUARIA ; VERY FINE, MONTMORILLONITIC, THERMIC CALCIC RHODOXEROLF  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 658, SAMPLE 86P 3830- 3835

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

CLAY MINERALOGY (<.002mm)														
SAMPLE	FRACT	ION	X-RAY	DSC	TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	RETN	PRETA
NUMBER	7A2i	7A6	7A4b	7C3	7D2	7D2	7D2	7D2	7D2	7D2	7D2	7D2	7D2	7D2
	peak size	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
86P3831	TCLY	KK 3	MI 2	GE 1	HE 1	KK27	Gitr	KK36	GI 3		12.0		3.1	
86P3832	TCLY	KK 3	MI 2	GE 1	HE 1	KK31	Gitr				10.9		3.2	
86P3833	TCLY	KK 3	MI 3	GE 1	HE 1	KK28	Gitr				11.3		3.4	
86P3834	TCLY	KK 3	MI 3	GE 1	HE 1	KK34	Gitr				11.7		2.9	
86P3835	TCLY	KK 3	MI 3	GE 1	CA 1	KK30	Gitr				11.0		2.7	

SAND - SILT MINERALOGY (2.0-0.002mm)														
SAMPLE	FRACT	ION	X-RAY	DTA	TGA	TOT RE	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT	GRAIN COUNT
NUMBER	7A2i	7A3b	7A4b	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a	7B1a
	Peak Size	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
86P3834	FS					100	QZ99	OP 1	RAtr					
86P3835	FS					68	QZ68	CB23	CA 8	FK 1	OPtr			

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm                      FS    Fine Sand, 0.1-0.25mm

MINERAL INTERPRETATION:

KK kaolinite                      MI mica                      GE goethite                      HE hematite                      GI gibbsite                      QZ quartz  
 OP opaques                      RA resist-aggre                      CA calcite                      CB carb-aggrega                      FK potas feldsp

RELATIVE PEAK SIZE:    5 Very Large    4 Large    3 Medium    2 Small    1 Very Small    6 No Peaks

NARRATIVE PEDON DESCRIPTION

Pedon: Djedeida	NSSL Pedon Number: 86P0662
Soil Survey Number S86-FN-890-005	Print Date: 08/20/02
Location: Tunisia	
Latitude: 36-55-24-N	Longitude: 009-56-28-E
Physiography: Playa or alluvial flat in intermountain basin	
<b>Microrelief: land leveled or smooth</b>	
Slope: 1% plane	Elevation: 13 m MSL
Precipitation: 45 cm - Xeric Moisture Regime.	
Water Table Depth:	Permeability: Slow
Air Temperature: Ann: 19 Summ: 26 Win: 12	
Drainage: Moderately well drained	Land Use: Rangeland grazed
Stoniness: Class 0 Erosion or Deposition: Slight	Runoff: Ponded
Particle Size Control Section: 25 to 100 cm	
Parent Material: alluvium from sedimentary material	
Classification: Fine, montmorillonitic, thermic Entic Chromixerert	
Diagnostic Horizons: 0 to 17 cm Ochric	
Described By: P. Camp, R. Yeck, H Abdelkader and M. Deroutch	Sample Date: 04/86
Observed 1 to 1.5 cm wide cracks to depths of 120 cm in drier area of pit. Slickensides oriented at 45 degrees from horizontal. Snail shell fragments throughout.	

A1 -- 0 to 3 cm; light brownish gray (2.5Y 6/2) interior dry silty clay loam and olive brown (2.5Y 4/4) interior moist silty clay loam; strong very fine platy structure; very hard, firm, very sticky, very plastic; many very fine roots throughout; few very fine interstitial pores; violently effervescent continuous; moderately alkaline (pH=8.2); abrupt smooth boundary. 86P3854

A2 -- 3 to 17 cm; light yellowish brown (2.5Y 6/4) interior dry silty clay and light olive brown (2.5Y 5/4) interior moist silty clay; strong coarse prismatic structure; very hard, firm, very sticky, very plastic; many very fine roots throughout and few fine roots throughout; few very fine interstitial and tubular pores; few medium plate like salt masses; violently effervescent continuous; moderately alkaline (pH=8.0); clear smooth boundary. 86P3855

Bz1 -- 17 to 33 cm; light olive brown (2.5Y 5/4) interior dry clay and olive brown (2.5Y 4/4) interior moist clay; strong coarse angular blocky structure; slightly hard, firm, very sticky, very plastic; common very fine roots between peds; many very fine interstitial and tubular pores; few patchy distinct organic coats on vertical and horizontal faces of peds and few patchy distinct nonintersecting slickensides and common patchy distinct clay films on vertical and horizontal faces of peds; many medium cylindrical salt masses; violently effervescent continuous; moderately alkaline (pH=8.0); clear wavy boundary. 86P3856

Bz2 -- 33 to 64 cm; light olive brown (2.5Y 5/4) interior dry clay and olive brown (2.5Y 4/4) interior moist clay; strong coarse angular blocky structure parting to strong coarse wedge; very hard, firm, very sticky, very plastic; few fine roots in cracks and few medium roots in cracks; common very fine interstitial and tubular pores; many continuous prominent intersecting slickensides and common continuous prominent clay films on vertical and horizontal faces of peds; few medium cylindrical salt masses; violently effervescent continuous; moderately alkaline (pH=8.0); gradual wavy boundary. 86P3857

Bz1 -- 64 to 91 cm; light olive brown (2.5Y 5/4) interior dry clay and olive brown (2.5Y 4/4) interior moist clay; strong coarse angular blocky structure; very hard, very friable, very sticky, very plastic; few very fine roots throughout; common very fine interstitial and tubular pores; few discontinuous distinct nonintersecting slickensides and common discontinuous distinct clay films on vertical and horizontal faces of peds; few medium cylindrical salt masses and few fine plate like gypsum crystals; violently effervescent continuous; moderately alkaline (pH=8.0); gradual wavy boundary. 86P3858

Bz2 -- 91 to 120 cm; light olive brown (2.5Y 5/4) interior dry clay and light olive brown (2.5Y 5/4) interior moist clay; strong coarse subangular blocky structure; very hard, very friable, very sticky, very plastic; few very fine roots throughout; common very fine interstitial and tubular pores; common medium cylindrical salt masses and few fine plate like gypsum crystals; violently effervescent continuous; moderately alkaline (pH=8.0). 86P3859



\*\*\* P R I M A R Y C H A R A C T E R I Z A T I O N D A T A \*\*\*

S86FN-890-005

PRINT DATE 08/20/02

SAMPLED AS : DJEJDEIDA ; FINE, MONTMORILLONITIC, THERMIC ENTIC CHROMOXERERT  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 662, SAMPLE 86P 3854- 3859

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -)				ACID- ITY	(- -CEC- -)		EXCH NA	SAR	BASE SATURATION	CO3 AS CACO3	RES. OHMS	CASO4 AS GYPSUM		(- - -PH - - -) SAT CACL2			H2O		
	5B5a	5B5a	5B5a	5B5a	SUM BASES	6H5a	CATS	OAC	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f	8C1f	
	<- - - - ->				MEQ / 100 G	<- - - - ->				PCT	<- -PCT- >		PCT	<- -PCT- >		1:2			1:1	
0- 3		11.7	7.6	1.6					24.8	15	10	100	100	27		TR		7.3	7.7	7.6
3- 17		11.9	13.9	1.4					23.8	28	18	100	100	27		TR		7.7	7.9	7.8
17- 33		14.0	24.7	1.3					26.3	38	26	100	100	26		TR		7.7	7.9	7.8
33- 64		14.2	24.5	1.2					25.8	41	29	100	100	25		TR		7.8	8.0	7.8
64- 91		14.4	26.8	1.0					23.9	46	28	100	100	28		1		7.7	8.0	7.9
91-120		14.0	28.8	0.9					23.8	47	30	100	100	28	100	1		7.8	8.0	7.9

DEPTH (CM)	( - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - )															)PRED.			
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL ELEC. SALTS EST.	ELEC. COND. 8A3a	ELEC. COND. 8I	
	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS	
	<- - - - - MEQ / LITER - - - - ->															<- -PCT- >		/cm	/cm
0- 3	30.5	19.7	52.4	0.8	--	2.5	0.8	84.7				15.4	--	--	73.8	0.5	8.67	4.51	
3- 17	28.2	19.1	85.3	0.6	--	1.1	1.0	103.1				25.4	--	--	83.9	0.7	10.98	5.91	
17- 33	50.9	40.2	177.4	0.7	--	0.7	2.2	199.5				67.9	--	--	83.3	1.3	19.13	11.44	
33- 64	32.9	32.6	165.8	0.5	--	0.8	2.2	192.2				34.6	--	--	83.7	1.2	17.69	9.86	
64- 91	49.2	43.9	193.9	0.5	--	0.8	2.2	216.0				67.9	--	--	81.4	1.5	22.50	12.64	
91-120	51.1	45.9	208.5	0.5	--	0.8	2.3	233.7				66.5	--	--	84.5	1.7	23.90	12.49	

ANALYSES: S= ALL ON SIEVED <2mm BASIS

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-005

PRINT DATE 08/20/02

SAMPLED AS : DJEDEIDA ; FINE, MONTMORILLONITIC, THERMIC ENTIC CHROMOXERERT  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 662, SAMPLE 86P 3854- 3859

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

CLAY MINERALOGY (<.002mm) < - - - - - >  
 SAMPLE FRACT < - - - - X-RAY - - - - -> - - - - THERMAL - - - -> - - - - ELEMENTAL - - - - -> - - - - EGME INTER  
 ION < - - - - -> - - - - DSC - -> - - - - TGA - -> - - - - SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O < - - - -> RETN PRETA  
 NUMBER < - - - - 7A2i - - - - -> - - - - 7A6 - -> - - - - 7A4b - -> - - - - -> - - - - 7C3 - - - - -> - - - -> 7D2 TION  
 < - - - -> - - - - peak size - - - - -> - - - - Percent - - - - -> - - - - Percent - - - - -> - - - -> - - - ->

86P3856 TCLY CA 3 KK 3 MI 2 MM 2 MT 2 KK34 KK33  
 86P3858 TCLY KK 3 CA 3 MI 2 MM 2 MT 2 KK41 GItr

SAND - SILT MINERALOGY (2.0-0.002mm) < - - - - - >  
 SAMPLE FRACT < - - - - X-RAY - - - - -> - - - - THERMAL - - - -> - - - - OPTICAL - - - - -> - - - -> INTER  
 ION < - - - - -> - - - - DTA - -> - - - - TGA - ->TOT RE< - - - - -> - - - - GRAIN COUNT - - - - -> - - - -> PRETA  
 NUMBER < - - - - 7A2i - - - - -> - - - - 7A3b - -> - - - - 7A4b - -> - - - - -> - - - - 7B1a - - - - -> - - - -> TION  
 < - - - -> - - - - Peak Size - - - - -> - - - - Percent - - - - -> - - - - Percent - - - - -> - - - -> - - - ->

86P3856 VFS 61 QZ54 CA27 FK 7 RA 5 AR 4 OP 2  
 86P3856 VFS MI 1 OWtr  
 86P3858 VFS 54 QZ47 CA38 FK 6 RA 5 AR 2 OP 2  
 86P3858 VFS GYtr

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

CA calcite KK kaolinite MI mica MM mont-mica MT montmorillon QZ quartz  
 FK potas feldsp RA resist-aggre AR wthr aggrega OP opaques OW oth-weath mn GY gypsum  
 GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

PEDON MINERALOGY

BASED ON SAND/SILT:  
 BASED ON CLAY:  
 FAMILY MINERALOGY:  
 COMMENTS:  
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NARRATIVE PEDON DESCRIPTION

Pedon: Msaadine	NSSL Pedon Number: 86P0663
Soil Survey Number S86-FN-890-006	Print Date: 08/20/02
Location: Tunisia	
Latitude: 36-45-00-N	Longitude: 009-40-00-E
Physiography: in level or undulating uplands	
<b>Microrelief: land leveled or smoothless than 20 cm on middle third of component</b>	
Slope: 2% undulating west facing	Elevation: 104 m MSL
Precipitation: 60 cm - Xeric Moisture Regime.	
Water Table Depth:	Permeability: Moderate
Air Temperature: Ann: 18 Summ: 25 Win: 11	
Drainage: Well drained	Land Use: Cropland
Stoniness: Class 0                      Erosion or Deposition: Slight	Runoff: Slow
Particle Size Control Section: 22 to 109 cm	
Parent Material: alluvium from sedimentary material	
Classification: Fine-loamy, mixed, thermic Petrocalcic Palexeroll	
Diagnostic Horizons: 0 to 22 cm Mollic, 22 to 48 cm Cambic, 90 to 109 cm Petrocalcic	
Described By: P. Camp, R. Yeck, H. Abdelkader, and M. Derouich	Sample Date: 04/86
Snail shell fragments in upper profile.	

Ap1 -- 0 to 9 cm; brown to dark brown (10YR 4/3) interior dry loam and dark brown (10YR 3/3) interior moist loam; strong coarse subangular blocky structure; slightly hard, very friable, sticky, plastic; many very fine roots throughout and many fine roots throughout; common very fine interstitial and tubular and common fine interstitial and tubular pores; strongly effervescent continuous; moderately alkaline (pH=7.8); clear smooth boundary. 86P3860

Ap2 -- 9 to 22 cm; brown to dark brown (10YR 4/3) interior dry clay loam and dark brown (10YR 3/3) interior moist clay loam; moderate coarse subangular blocky structure; slightly hard, very friable, sticky, plastic; common very fine roots throughout and common fine roots throughout; common fine interstitial and tubular and common medium interstitial and tubular pores; strongly effervescent continuous; moderately alkaline (pH=7.8); gradual wavy boundary. **Observed pottery shard at base of Ap2.** 86P3861

Btz -- 22 to 48 cm; brown to dark brown (10YR 4/3) interior dry clay loam and dark brown (10YR 3/3) interior moist clay loam; strong very coarse subangular blocky structure; hard, friable, sticky, plastic; common very fine roots throughout; many medium continuous tubular and many coarse continuous tubular pores; common discontinuous distinct clay bridging on vertical and horizontal faces of peds and many discontinuous distinct lime or carbonate coats in root channels and/or pores; many fine irregular soft masses of carbonate and many medium irregular soft masses of carbonate; violently effervescent continuous; moderately alkaline (pH=8.0); gradual wavy boundary. Some salt efflorescence on ped faces. 86P3862

2Ck -- 48 to 73 cm; 70% brown (7.5YR 5/4) interior and 30% pink (7.5YR 7/4) interior dry very gravelly clay loam and 70% brown to dark brown (7.5YR 4/4) interior and 30% reddish yellow (7.5YR 6/6) interior moist very gravelly clay loam; moderate fine subangular blocky structure; slightly hard, very friable, sticky, plastic; few very fine roots throughout; common fine interstitial and tubular and common medium interstitial and tubular pores; many very coarse rounded soft masses of carbonate and many coarse rounded soft masses of carbonate; violently effervescent continuous; moderately alkaline (pH=8.0); abrupt broken boundary. Pebble size rock fragments consist of fractured hardpan. 86P3863

2Ckm1 -- 73 to 90 cm; 90% very pale brown (10YR 8/3) interior and 10% light yellowish brown (10YR 6/4) interior dry and 90% yellow (10YR 8/6) interior and 10% dark yellowish brown (10YR 4/4) interior moist; , strongly cemented, , ; few very fine roots matted around stones; violently effervescent continuous; moderately alkaline (pH=8.0); abrupt smooth boundary. Fractured hardpan with finer material in joints. 86P3864

2Ckm2 -- 90 to 109 cm; white (10YR 8/2) interior dry and yellow (10YR 7/6) interior moist; , indurated, , ; violently effervescent continuous; strongly alkaline (pH=8.4); abrupt smooth boundary. No observed roots. 86P3865

3Ck --109 to 125 cm; very pale brown (10YR 8/3) interior dry and yellow (10YR 7/6) interior moist; soft, very friable; violently effervescent continuous; strongly alkaline (pH=8.6). No observed roots. 86P3866

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-006

(TUNISIA )

PRINT DATE 08/20/02

SAMPLED AS : MSAADINE ; FINE-LOAMY, MIXED, THERMIC PETROCALCIC PALEXEROLL  
 REVISED TO : SND ; FINE, MIXED, THERMIC PETROCALCIC PALEXEROLL

SSL - PROJECT 86P 127, (CP86FN193) SMSS TUNISIA  
 - PEDON 86P 663, SAMPLES 86P 3860- 3866  
 - GENERAL METHODS 1B1a, 2A1, 2B

UNITED STATES DEPARTMENT OF AGRICULTURE  
 NATURAL RESOURCES CONSERVATION SERVICE  
 NATIONAL SOIL SURVEY CENTER  
 SOIL SURVEY LABORATORY  
 LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -)(- -CLAY- -)(- -SILT- -)(- - - - -SAND- - - - -)(-COARSE FRACTIONS(MM)-)(>2MM)																
			CLAY LT	SILT .002	SAND .05	FINE LT	CO3 LT	FINE .002	COARSE .02	VF .05	F .10	M .25	C .5	VC 1	2	5	20	.1- PCT OF	WT
86P3860S	0- 9	AP1	42.7	32.6	24.7	11.6	2.4	19.2	13.4	12.4	7.1	3.1	1.3	0.8	1	2	2	17	5
86P3861S	9- 22	AP2	43.1	32.2	24.7	11.9	2.7	19.3	12.9	12.9	7.0	2.9	1.2	0.7	1	2	--	14	3
86P3862S	22- 48	BTZ	48.2	28.4	23.4	17.1	6.2	17.1	11.3	15.3	3.5	2.9	1.3	0.4	1	1	--	10	2
86P3863S	48- 73	2CK	36.9	28.7	34.4	14.4	12.3	18.7	10.0	9.9	9.1	5.8	5.3	4.3	TR	17	7	43	24
86P3864S	73- 90	2CKM1													--	--	--	--	--
86P3865S	90-109	2CKM2													--	--	--	--	--
86P3866S	109-125	3CK	30.9	40.5	28.6		14.9	34.7	5.9	6.2	10.6	6.8	2.9	2.1	4	2	--	27	6

DEPTH (CM)	ORGN TOTAL C N		EXTR TOTAL P S		(- - DITH-CIT - -)(RATIO/CLAY)(EXTRACTABLE)				(- BULK DENSITY - ) COLE (- - -WATER CONTENT - -)				WRD						
	6A1c PCT	6B3a <2MM	6S3 PPM	6R3a PERCENT	6C2b OF	6G7a <2MM	6D2a -->	8D1	8D1	4F1 PCT	4F <0.4MM	4A3a G/CC	4A1d	4A1h	4D1 CM/CM	4B4	4B1c	4B1c	4B2a
0- 9	2.01	0.186						0.68	0.40			1.24	1.42	0.045			27.7	17.1	0.13
9- 22	1.80	0.172						0.67	0.38			1.16	1.36	0.054			27.3	16.2	0.13
22- 48	0.98	0.084						0.52	0.36	44	23	1.25	1.46	0.053			28.5	17.2	0.14
48- 73	0.53							0.30	0.36			1.25	1.40	0.033			27.4	13.4	0.15
73- 90																			
90-109																			
109-125	0.13							0.26	0.28										8.8

AVERAGES, DEPTH 22- 48: PCT CLAY 42 PCT .1-75MM 10

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-006

PRINT DATE 08/20/02

SAMPLED AS : MSAADINE ; FINE-LOAMY, MIXED, THERMIC PETROCALCIC PALEXEROLL  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 663, SAMPLE 86P 3860- 3866

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(- NH4OAC EXTRACTABLE BASES -) ACID- (- -CEC- -) EXCH SAR BASE CARBONATE CASO4 AS (- - -PH - - -)																			
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION	AS	CACO3	GYP	SUM	SAT	CACL2	H2O		
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M			
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f	
	<- - - - -MEQ / 100 G - - - - -> PCT <- -PCT- > <- -PCT- > <- -PCT- >																			
0- 9		3.5	0.9	2.0					29.0	2	2	100	100	10			7.6	7.5	8.0	
9- 22		3.4	0.6	1.5					28.7	2	1	100	100	10			7.6	7.6	7.9	
22- 48		3.6	0.3	0.8					25.1	1	1	100	100	16			7.6	7.7	8.1	
48- 73		2.4	0.3	0.3					11.0	2	1	100	100	47			7.6	7.7	8.0	
73- 90														61						
90-109														79						
109-125		4.8	0.4	0.3					7.9	6		100	100	66				7.8	8.4	

	( - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - ) PRED.																		
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL	ELEC.	ELEC.	
DEPTH	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS	
(CM)	<- - - - -MEQ / LITER - - - - -> <- -PCT- > /cm /cm																		
0- 9	6.7	0.9	3.3	0.3	--	8.2	0.1	1.4				1.0	--	--	57.4	TR	1.02	0.49	
9- 22	6.6	0.8	2.2	0.1	--	6.1	0.1	1.1				1.1	0.3	0.5	55.9	TR	0.89	0.51	
22- 48	3.5	0.5	0.8	TR	--	2.7	TR	0.3				0.3	0.9	0.2	59.8	TR	0.47	0.32	
48- 73	7.3	1.4	1.1	TR	--	1.5	0.1	0.3				0.7	0.5	6.5	46.1	TR	1.10	0.42	
73- 90																			
90-109																			
109-125																			0.24

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 7,  
 ANALYSES: S= ALL ON SIEVED <2mm BASIS

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-006

PRINT DATE 08/20/02

SAMPLED AS : MSAADINE ; FINE-LOAMY, MIXED, THERMIC PETROCALCIC PALEXEROLL  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 663, SAMPLE 86P 3860- 3866

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	SAND - SILT MINERALOGY (2.0-0.002mm)																			
SAMPLE	FRACT < - - - - X-RAY - - -> - - - THERMAL - - - -> - - - - - OPTICAL - - - - ->										> INTER									
NUMBER	ION < - - - - 7A2i - - - -> - - - DTA - -> - - - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - ->										> PRETA									
	< - - - - 7A3b - - - -> - - - 7A4b - -> - - - - - 7B1a - - - - ->										> TION									
	< - -> - - - Peak Size - - -> - - - Percent - - - -> - - - - - Percent - - - - ->										> - - ->									
86P3862	VFS										75	QZ75	CA14	FK 6	AR 3	CB 1	MI 1			
86P3862	VFS											OPtr								
86P3863	VFS										54	QZ53	AR31	CA 7	FK 5	CB 2	RA 1			
86P3863	VFS											EPtr	BTtr	OWtr						

FRACTION INTERPRETATION:

VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

QZ quartz CA calcite FK potas feldsp AR wthr aggrega CB carb-aggrega MI mica  
 OP opaques RA resist-aggre EP epidote BT biotite OW oth-weath mn

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

PEDON MINERALOGY  
 BASED ON SAND/SILT:  
 BASED ON CLAY:  
 FAMILY MINERALOGY:  
 COMMENTS:

NARRATIVE PEDON DESCRIPTION

Pedon: Andoun  
 Soil Survey Number S86-FN-890-007  
 Location: Tunisia  
 Latitude: 36-45-00-N  
 Physiography: in level or undulating uplands  
**Microrelief: land leveled or smooth on middle third of component**  
 Slope: 10% undulating southeast facing  
 Precipitation: 65 cm - Xeric Moisture Regime.  
 Water Table Depth:  
 Air Temperature: Ann: 17 Summ: 26 Win: 9  
 Drainage: Moderately well drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 25 to 100 cm  
 Parent Material: alluvium from limestone material  
 Classification: Fine, montmorillonitic, thermic Entic Chromixerert  
 Diagnostic Horizons: 0 to 11 cm Ochric, 11 to 58 cm Cambic  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich  
 Snail shell fragments throughout. Observed less than one percent fine and medium rock fragments throughout. 5 mm thick surface layer of highly granulated clay.

NSSL Pedon Number: 86P0664  
 Print Date: 08/20/02  
 Longitude: 009-10-00-E  
 Elevation: 282 m MSL  
 Permeability: Moderately slow  
 Land Use: Cropland  
 Runoff: Moderate  
 Sample Date: 04/86

Ap -- 0 to 11 cm; grayish brown (2.5Y 5/2) interior dry clay and dark grayish brown (2.5Y 4/2) interior moist clay; very hard, very friable, very sticky, very plastic; common very fine roots throughout; common very fine interstitial pores; strongly effervescent continuous; moderately alkaline (pH=8.0); clear wavy boundary. 86P3867

Bt1 -- 11 to 30 cm; dark grayish brown (2.5Y 4/2) interior dry clay and dark grayish brown (2.5Y 4/2) interior moist clay; moderate medium angular blocky structure; very hard, friable, very sticky, very plastic; many very fine roots throughout; common very fine interstitial and tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; violently effervescent continuous; moderately alkaline (pH=7.8); gradual wavy boundary. 86P3868

Bt2 -- 30 to 58 cm; dark grayish brown (2.5Y 4/2) interior dry clay and dark grayish brown (2.5Y 4/2) interior moist clay; strong medium angular blocky structure; very hard, very friable, very sticky, very plastic; many very fine roots throughout; many very fine discontinuous tubular pores; common discontinuous prominent organic coats and many discontinuous prominent clay films on vertical and horizontal faces of peds; violently effervescent continuous; moderately alkaline (pH=8.0); gradual wavy boundary. 86P3869

Btk1 -- 58 to 81 cm; 85% dark grayish brown (2.5Y 4/2) and 15% light olive brown (2.5Y 5/6) interior dry clay and 85% dark grayish brown (2.5Y 4/2) interior and 15% light olive brown (2.5Y 5/6) interior moist clay; strong fine angular blocky structure parting to strong fine wedge; very hard, very friable, very sticky, very plastic; many very fine roots in cracks and few fine roots in cracks; common fine discontinuous tubular pores; many continuous prominent intersecting slickensides and many continuous prominent clay films on vertical and horizontal faces of peds; common coarse irregular soft masses of carbonate; violently effervescent continuous; moderately alkaline (pH=8.0); clear wavy boundary. 86P3870

Btk2 -- 81 to 127 cm; 75% dark grayish brown (2.5Y 4/2) and 25% light olive brown (2.5Y 5/6) interior dry clay and 75% dark grayish brown (2.5Y 4/2) and 25% light olive brown (2.5Y 5/6) interior moist clay; strong medium angular blocky structure parting to strong medium wedge; very hard, very friable, very sticky, very plastic; few very fine roots in cracks and few fine roots in cracks; many very fine interstitial and tubular pores; common discontinuous prominent intersecting slickensides and many discontinuous prominent clay films on vertical and horizontal faces of peds; many coarse irregular soft masses of carbonate; violently effervescent continuous; moderately alkaline (pH=8.0). 86P3871





NARRATIVE PEDON DESCRIPTION

Pedon: Nefza  
 Soil Survey Number S86-FN-890-009  
 Location: Tunisia

NSSL Pedon Number: 86P0666  
 Print Date: 08/20/02

Latitude: 36-58-22-N

Longitude: 009-04-00-E

Physiography: in level or undulating uplands

Geomorphic Position: backslope sideslope

**Microrelief: land leveled or smooth on upper third of component**

Slope: 8% convex southwest facing

Elevation: 36 m MSL

Precipitation: 95 cm - Xeric Moisture Regime.

Water Table Depth:

Permeability: Slow

Air Temperature: Ann: 16 Summ: 25 Win: 8

Drainage: Well drained

Land Use: Cropland

Stoniness: Class 0

Erosion or Deposition: Slight

Runoff: Moderate

Particle Size Control Section: 25 to 100 cm

Parent Material: alluvium

Classification: Fine, montmorillonitic, thermic Entic Chromixeret

Diagnostic Horizons: 0 to 8 cm Ochric, 8 to 145 cm Cambic

Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich

Sample Date: 04/86

pH by cresol red indicates profile to be lower than indicator range. Mineralogy and parent material unknown for this area.

Ap -- 0 to 8 cm; yellowish brown (10YR 5/6) interior dry clay and yellowish brown (10YR 5/4) interior moist clay; moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; many very fine roots throughout; many very fine interstitial pores; many patchy distinct manganese or iron-manganese coats on vertical and horizontal faces of peds; clear smooth boundary. 86P3878

Bt1 -- 8 to 74 cm; brownish yellow (10YR 6/6) interior dry clay and yellowish brown (10YR 5/6) interior moist clay; moderate coarse wedge structure; very hard, friable, very sticky, very plastic; common very fine roots throughout; many very fine interstitial and tubular pores; many continuous distinct intersecting slickensides and many continuous distinct clay films on vertical and horizontal faces of peds and many continuous distinct manganese or iron-manganese coats on vertical and horizontal faces of peds; gradual wavy boundary. This horizon split for sampling at 41 cm. 86P3879

Bt2 -- 74 to 145 cm; yellowish brown (10YR 5/6) interior dry clay and brownish yellow (10YR 6/6) interior moist clay; strong coarse wedge structure; very hard, firm, very sticky, very plastic; few very fine roots in cracks; many very fine interstitial and tubular pores; many continuous prominent intersecting slickensides and many continuous prominent clay films on vertical and horizontal faces of peds and many continuous prominent manganese or iron-manganese coats on vertical and horizontal faces of peds. This horizon split for sampling at 110 cm. 86P3881

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-009

(TUNISIA)

PRINT DATE 08/20/02

SAMPLED AS : NEFZA ; FINE, MONTMORILLONITIC, THERMIC ENTIC CHROMOXERERT  
 REVISED TO : SND ; FINE, MIXED, THERMIC PALEXEROLLIIC CHROMOXERERT

SSL - PROJECT 86P 127, (CP86FN193) SMSS TUNISIA  
 - PEDON 86P 666, SAMPLES 86P 3878- 3882  
 - GENERAL METHODS 1B1a, 2A1, 2B

UNITED STATES DEPARTMENT OF AGRICULTURE  
 NATURAL RESOURCES CONSERVATION SERVICE  
 NATIONAL SOIL SURVEY CENTER  
 SOIL SURVEY LABORATORY  
 LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -)(- -CLAY- -)(- -SILT- -)(- - - - -SAND- - - - -)(-COARSE FRACTIONS(MM)-)(>2MM)																
			CLAY LT	SILT .002	SAND .05	FINE LT	CO3 LT	FINE .002	COARSE .02	VF .05	F .10	M .25	C .5	VC 1	2	5	20	.1- PCT OF	
			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - PCT OF <2MM (3A1) - - - - ->										<- PCT OF <75MM(3B1)-> SOIL						
86P3878S	0- 8	AP	44.5	24.3	31.2	25.2		13.5	10.8	11.7	11.9	4.1	1.7	1.8	2	1	--	22	3
86P3879S	8- 41	BT1	54.0	22.6	23.4	30.9		14.0	8.6	8.7	10.0	2.9	0.9	0.9	TR	--	--	15	TR
86P3880S	41- 74	BT1	46.1	22.9	31.0	25.9		13.1	9.8	12.0	14.4	3.3	0.8	0.5	1	--	--	20	1
86P3881S	74-110	BT2	41.8	24.6	33.6	22.7		13.2	11.4	16.2	14.1	2.9	0.3	0.1	TR	--	--	17	--
86P3882S	110-145	BT2	53.7	17.8	28.5	27.1		12.4	5.4	6.5	11.5	7.5	2.5	0.5	1	TR	--	23	1

DEPTH (CM)	ORGN TOTAL		EXTR TOTAL		(- - DITH-CIT - -)(RATIO/CLAY)				(ATTEBERG)				(- BULK DENSITY -)		COLE (- - -WATER CONTENT - -)				WRD			
	C	N	P	S	FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR		BAR	SOIL	
0- 8	0.77	0.102						0.50	0.33											14.6		
8- 41	0.35	0.087						0.46	0.35				1.47	1.84	0.078					27.3	18.8	0.13
41- 74	0.20							0.43	0.36												16.5	
74-110	0.11							0.43	0.36	46	30		1.66	1.90	0.046					20.9	15.1	0.10
110-145	0.10							0.46	0.36				1.53	1.88	0.071					26.5	19.3	0.11

AVERAGES, DEPTH 8- 68: PCT CLAY 50 PCT .1-75MM 17



NARRATIVE PEDON DESCRIPTION

Pedon: Satfoura  
 Soil Survey Number S86-FN-890-010  
 Location: Tunisia  
 Latitude: 36-34-00-N  
 Physiography: Broad plain in bolson  
**Microrelief: land leveled or smooth**  
 Slope: 2% convex south facing  
 Precipitation: 55 cm - Xeric Moisture Regime.  
 Water Table Depth:  
 Air Temperature: Ann: 18 Summ: 27 Win: 10  
 Drainage: Well drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 25 to 100 cm  
 Parent Material: alluvium from limestone-sandstone material  
 Classification: Fine, montmorillonitic, thermic Entic Chromixerert  
 Diagnostic Horizons: 0 to 27 cm Mollic, 27 to 174 cm Cambic  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich  
 Well developed bow structure in horizons 3, 4, and 5. Slickensides oriented at 30 degrees from horizontal. Observed few mixed pebbles throughout profile.

NSSL Pedon Number: 86P0667  
 Print Date: 08/20/02  
 Longitude: 008-42-00-E  
 Elevation: 187 m MSL  
 Permeability: Moderately slow  
 Land Use: Cropland  
 Runoff: Very slow  
 Sample Date: 04/86

Ap1 -- 0 to 7 cm; dark brown (10YR 3/3) interior dry clay loam and very dark grayish brown (10YR 3/2) interior moist clay loam; moderate medium subangular blocky structure; very hard, very friable, very sticky, very plastic; many very fine roots throughout; many very fine interstitial pores; mildly alkaline (pH=7.4); clear wavy boundary. 86P3883

Ap2 -- 7 to 27 cm; dark brown (10YR 3/3) interior moist clay; very hard, friable, very sticky, very plastic; many very fine roots throughout and few fine roots throughout; many very fine interstitial and tubular and many fine interstitial and tubular pores; mildly alkaline (pH=7.4); clear wavy boundary. 86P3884

Bt1 -- 27 to 49 cm; very dark grayish brown (10YR 3/2) interior moist clay; strong coarse angular blocky structure; very hard, firm, very sticky, very plastic; common very fine roots throughout and few fine roots in cracks; many very fine tubular pores; many discontinuous prominent pressure faces and many discontinuous prominent clay films on vertical and horizontal faces of peds; mildly alkaline (pH=7.6); abrupt smooth boundary. 86P3885

Bt2 -- 49 to 70 cm; very dark grayish brown (10YR 3/2) interior moist clay; strong coarse prismatic structure; very hard, firm, very sticky, very plastic; common very fine roots in cracks; many very fine tubular pores; common discontinuous prominent nonintersecting slickensides and many discontinuous prominent clay films on vertical and horizontal faces of peds; few fine rounded soft masses of carbonate; moderately alkaline (pH=7.8); clear smooth boundary. 86P3886

Bt3 -- 70 to 108 cm; very dark grayish brown (10YR 3/2) interior moist clay; strong coarse wedge structure; very hard, friable, very sticky, very plastic; common very fine roots in cracks; common very fine tubular pores; many continuous prominent intersecting slickensides and many continuous prominent clay films on vertical and horizontal faces of peds; few fine rounded soft masses of carbonate; strongly effervescent continuous; moderately alkaline (pH=8.2); clear smooth boundary. 86P3887

Bt4 --108 to 174 cm; very dark grayish brown (10YR 3/2) interior moist clay; strong medium wedge structure; very hard, friable, very sticky, very plastic; few very fine roots in cracks; common very fine tubular pores; many continuous prominent intersecting slickensides; common fine rounded soft masses of carbonate and common medium rounded carbonate nodules; violently effervescent continuous; strongly alkaline (pH=8.4); gradual wavy boundary. 86P3888

2C/Btk --174 to 200 cm; 60% brown to dark brown (10YR 4/3) and 40% brownish yellow (10YR 6/6) moist clay; slightly hard, very friable, very sticky, plastic; common fine interstitial and tubular pores; many medium rounded soft masses of carbonate and many coarse rounded carbonate nodules; strongly alkaline (pH=8.6). No roots observed. 86P3889



\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-010

PRINT DATE 08/20/02

SAMPLED AS : SATFOURA ; FINE, MONTMORILLONITIC, THERMIC ENTIC CHROMOXERERT  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 667, SAMPLE 86P 3883- 3889

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-	
DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -)				ACID-SUM	(- -CEC- -)				EXCH NA	SAR	BASE SATURATION	CO3 AS RES. CACO3	OHMS	CASO4 AS GYPSUM	(- - -PH - - -)		SAT	CACL2	H2O	
	5B5a	5B5a	5B5a	5B5a	BASES	6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f	8C1f	8C1f	
	<- - - - -MEQ / 100 G - - - - ->					<- - - - ->				PCT	<- -PCT- >	PCT	<- -PCT- >		<- -PCT- >			1:2	1:1		
0- 7	22.7	3.7	0.4	1.0	27.8		27.8	25.9	1	1	100	100						7.0	6.7	7.1	
7- 27	24.5	3.9	0.5	0.8	29.7		29.7	27.7	2		100	100							6.7	7.2	
27- 49		5.1	0.5	0.8				33.4	1	1	100	100	1					7.2	7.0	7.4	
49- 70		5.8	0.6	0.8				32.5	2	1	100	100	2					7.5	7.4	7.9	
70-108		6.4	0.8	0.7				30.8	2	2	100	100	7	2100				7.6	7.6	8.2	
108-174		6.8	1.1	0.7				29.0	3	2	100	100	12					7.7	7.6	8.1	
174-200		4.2	0.8	0.4				13.8	4	3	100	100	28					7.8	7.7	8.1	

DEPTH (CM)	( - - - - - WATER EXTRACTED FROM SATURATED PASTE - - - - - )																PRED.		
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL ELEC. SALTS	ELEC. COND. EST.	ELEC. COND. 8A3a	COND. 8I
	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS	MMHOS
	<- - - - - MEQ / LITER - - - - ->																<- -PCT- >	/cm	/cm
0- 7	3.5	0.8	1.7	0.2	--	3.5	0.1	0.9				0.5	0.4	0.1	52.4	TR	0.59		0.28
7- 27																			0.23
27- 49	4.7	1.0	1.5	0.1	--	2.6	0.2	1.3				2.6	--	--	65.8	TR	0.70		0.34
49- 70	2.6	0.7	1.7	0.1	--	2.8	0.1	1.4				0.4	0.1	TR	65.2	TR	0.51		0.33
70-108	1.7	0.4	1.8	TR	--	2.5	0.1	0.8				0.4	0.2	--	66.0	TR	0.40		0.27
108-174	2.3	0.6	3.0	0.1	--	2.4	0.1	1.6				1.3	0.1	0.1	69.0	TR	0.63		0.34
174-200	4.4	1.1	4.4	TR	--	1.3	0.1	4.3				3.4	--	0.1	51.8	TR	1.03		0.42

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 2,  
 ANALYSES: S= ALL ON SIEVED <2mm BASIS

NARRATIVE PEDON DESCRIPTION

Pedon: Tozeur  
 Soil Survey Number S86-FN-890-012  
 Location: Tunisia  
 Latitude: 33-45-06-N  
 Slope:  
 Precipitation: 18 cm - Aridic Moisture Regime.  
 Water Table Depth:  
 Air Temperature: Ann: 22 Summ: 32 Win: 11  
 Drainage: Somewhat poorly drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 25 to 100 cm  
 Parent Material: eolian sand from limestone-sandstone material  
 Classification: Fine-loamy, mixed, hyperthermic **Anthropic Camborthid**  
 Diagnostic Horizons: 0 to 17 cm Anthropic, 17 to 67 cm Cambic  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich  
 Notes: **Pottery shards, shards, charcoal, sandstone and limestone fragments throughout.** Parent material appears to be of sand dune origin. Observed in upper 3 horizons as soil dries. Site located in desert oasis that is irrigated.

NSSL Pedon Number: 86P0669  
 Print Date: 08/20/02  
 Longitude: 008-12-02-E  
 Elevation: 25 m MSL  
 Permeability: Moderate  
 Land Use: Cropland  
 Runoff: None

Ap -- 0 to 17 cm; dark grayish brown (10YR 4/2) interior moist loam; , very friable, sticky, plastic; many fine roots throughout and many coarse roots throughout; common fine interstitial pores; violently effervescent continuous; strongly alkaline (pH=8.4); clear smooth boundary. 86P3895  
 Bw1 -- 17 to 37 cm; dark grayish brown (10YR 4/2) interior moist loam; weak fine subangular blocky structure; , friable, sticky, plastic; many medium roots throughout and many coarse roots throughout; many fine interstitial and many very fine interstitial pores; violently effervescent continuous; moderately alkaline (pH=8.2); clear smooth boundary. 86P3896  
 Bw2 -- 37 to 67 cm; dark grayish brown (10YR 4/2) interior moist loam; weak medium subangular blocky structure; , very friable, sticky, plastic; many coarse roots throughout and few medium roots throughout; common fine interstitial pores; violently effervescent continuous; moderately alkaline (pH=8.2); gradual wavy boundary. 86P3897  
 Bz1 -- 67 to 84 cm; dark grayish brown (10YR 4/2) interior moist loam; , friable, sticky, plastic; many coarse roots throughout and few medium roots throughout; common fine interstitial pores; few medium rounded halite crystals; violently effervescent continuous; moderately alkaline (pH=8.2); gradual wavy boundary. Concentrations appear to be salt-type unknown. 86P3898  
 Bz2 -- 84 to 117 cm; grayish brown (10YR 5/2) interior moist fine sandy loam; , very friable, slightly sticky, slightly plastic; common coarse roots throughout; many fine interstitial pores; many medium rounded halite crystals; violently effervescent continuous; moderately alkaline (pH=8.0). Concentrations appear to be salt-type unknown. 86P3899

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-012

(TUNISIA)

PRINT DATE 08/20/02

SAMPLED AS : TOZEUR ; FINE-LOAMY, MIXED, HYPERTHERMIC ANTHROPIC CAMBORTHID  
 REVISED TO : SND ; COARSE-LOAMY, MIXED, HYPERTHERMIC TYPIC CAMBORTHID

SSL - PROJECT 86P 127, (CP86FN193) SMSS TUNISIA  
 - PEDON 86P 669, SAMPLES 86P 3895- 3899  
 - GENERAL METHODS 1B1a, 2A1, 2B

UNITED STATES DEPARTMENT OF AGRICULTURE  
 NATURAL RESOURCES CONSERVATION SERVICE  
 NATIONAL SOIL SURVEY CENTER  
 SOIL SURVEY LABORATORY  
 LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -)(- -CLAY- -)(- -SILT- -)(- - - - -SAND- - - - -)(-COARSE FRACTIONS(MM)-)(>2MM)																	
			CLAY LT	SILT .002	SAND .05	FINE LT	CO3 LT	FINE .002	COARSE .02	VF .05	F .10	M .25	C .5	VC 1	2	5	20	1- PCT OF	WT	
			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE	
			< - - - - - PCT OF <2MM (3A1) - - - - ->										< - - - - - PCT OF <75MM(3B1)->							SOIL
86P3895S	0- 17	AP	17.1	14.5	68.4	9.7	0.9	5.8	8.7	44.7	13.2	6.6	2.7	1.2	1	1	--	25	2	
86P3896S	17- 37	BW1	17.3	15.9	66.8	10.9	2.9	6.6	9.3	44.2	13.8	6.2	2.2	0.4	--	TR	TR	23	TR	
86P3897S	37- 67	BW2	14.0	11.5	74.5	8.9	2.0	4.3	7.2	40.8	19.7	10.0	3.4	0.6	1	1	--	35	2	
86P3898S	67- 84	BZ1	14.4	11.4	74.2	8.2	3.8	5.0	6.4	41.7	18.5	10.0	3.3	0.7	3	1	--	35	4	
86P3899S	84-117	BZ2	11.3	9.2	79.5		2.5	4.5	4.7	40.5	22.7	11.8	3.8	0.7	1	TR	TR	40	1	

DEPTH (CM)	ORGN TOTAL		EXTR TOTAL		(- - DITH-CIT - -)(RATIO/CLAY)				(ATTERBERG )				(- BULK DENSITY -)		COLE (- - -WATER CONTENT - -)				WRD	
	C	N	P	S	FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM	-->			PCT	<0.4MM	<- - G/CC	- - ->	CM/CM	<- - -PCT OF	<2MM	- ->	CM/CM		
0- 17	1.46	0.114						0.66	0.47			1.48	1.52	0.009				16.6	8.1	0.13
17- 37	1.17	0.088						0.64	0.53			1.50	1.57	0.015				14.7	9.2	0.08
37- 67	0.65							0.54	0.51			1.39	1.49	0.023				17.9	7.2	0.15
67- 84	0.49							0.42	0.47	27	4	1.27	1.37	0.025				19.9	6.8	0.16
84-117	0.31							0.38	0.35			1.29	1.37	0.020				17.6	3.9	0.18

AVERAGES, DEPTH 25-100: PCT CLAY 11 PCT .1-75MM 34



NARRATIVE PEDON DESCRIPTION

Pedon: El Hania  
 Soil Survey Number S86-FN-890-013  
 Location: Tunisia  
 Latitude: 35-05-00-N  
 Physiography: Low sand ridge in intermountain basin  
**Microrelief: land leveled or smooth**  
 Slope: 2% undulating east facing  
 Precipitation: 23 cm - Aridic Moisture Regime.  
 Permeability: Rapid  
 Summ: 27 Win: 9  
 Drainage: Well drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 25 to 100 cm  
 Parent Material: alluvium from limestone-sandstone material  
 Classification: Coarse-loamy, mixed, thermic Typic Calciorthid  
 Diagnostic Horizons: 0 to 15 cm Ochric, 15 to 65 cm Cambic, 65 to 145 cm Calcic  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich  
 Textures will vary with removal of CO3 clay. Very few rock fragments and snail shell fragments throughout.

NSSL Pedon Number: 86P0670  
 Print Date: 08/20/02  
 Longitude: 009-40-00-E  
 Elevation: 217 m MSL  
 Air Temperature: Ann: 18  
 Land Use: Cropland  
 Runoff: None  
 Sample Date: 04/86

Ap -- 0 to 15 cm; reddish yellow (7.5YR 6/6) interior dry sand and yellowish brown (10YR 5/8) interior moist sand; loose, nonsticky, nonplastic; few very fine roots throughout; violently effervescent discontinuous; moderately alkaline (pH=8.2); gradual wavy boundary. Few 5-10 mm thick lighter colored discontinuous coarse sand lenses. 86P3900

Bw1 -- 15 to 33 cm; strong brown (7.5YR 5/6) interior dry loamy sand and yellowish brown (10YR 5/8) interior moist loamy sand; soft, very friable, nonsticky, nonplastic; many very fine roots throughout and few fine roots throughout; violently effervescent discontinuous; moderately alkaline (pH=8.2); gradual wavy boundary. 86P3901

Bw2 -- 33 to 65 cm; reddish yellow (7.5YR 6/6) interior dry sandy loam and yellowish brown (10YR 5/8) interior moist sandy loam; slightly hard, very friable, slightly sticky, nonplastic; common very fine roots throughout and common fine roots throughout; common fine interstitial pores; violently effervescent discontinuous; strongly alkaline (pH=8.4); gradual wavy boundary. 86P3902

Bk1 -- 65 to 86 cm; 95% reddish yellow (7.5YR 6/6) and 05% pinkish white (7.5YR 8/2) dry sandy clay loam and 95% yellowish brown (10YR 5/8) and 05% reddish yellow (7.5YR 7/6) moist sandy clay loam; hard, very friable, sticky, plastic; few very fine roots throughout and few fine roots throughout; many very fine interstitial and tubular and many fine interstitial and tubular pores; common medium rounded soft masses of carbonate and few medium rounded carbonate concretions; violently effervescent discontinuous; strongly alkaline (pH=8.4); gradual wavy boundary. 86P3903

Bk2 -- 86 to 120 cm; 75% reddish yellow (7.5YR 7/6) and 25% pinkish white (7.5YR 8/2) dry sandy clay loam and 75% reddish yellow (7.5YR 6/6) and 25% reddish yellow (7.5YR 7/6) moist sandy clay loam; hard, very friable, sticky, plastic; few very fine roots throughout and few fine roots throughout; few fine interstitial pores; common medium rounded soft masses of carbonate and common medium rounded carbonate concretions; violently effervescent discontinuous; strongly alkaline (pH=8.6); gradual wavy boundary. 86P3904

Bk3 --120 to 145 cm; 75% reddish yellow (7.5YR 7/6) and 25% pinkish white (7.5YR 8/2) dry sandy clay loam and 75% reddish yellow (7.5YR 6/6) and 25% reddish yellow (7.5YR 7/6) moist sandy clay loam; hard, very friable, sticky, plastic; few fine roots throughout; common fine interstitial pores; common medium rounded soft masses of carbonate and common medium rounded carbonate concretions; violently effervescent discontinuous; strongly alkaline (pH=8.6). 86P3905





NARRATIVE PEDON DESCRIPTION

Pedon: Chaal  
 Soil Survey Number S86-FN-890-014  
 Location: Tunisia  
 Latitude: 34-30-40-N  
 Physiography: Flood plain in river valley  
**smooth**  
 Slope: 1% undulating east facing  
 Precipitation: 20 cm - Aridic Moisture Regime.  
 Permeability: Moderately rapid  
 Summ: 26 Win: 11  
 Drainage: Well drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 25 to 100 cm  
 Parent Material: alluvium from limestone-sandstone material  
 Classification: Coarse-loamy, mixed (calcareous), thermic Typic  
 Diagnostic Horizons: 0 to 9 cm Ochric  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derdouich Sample Date: 04/86  
 Some major horizon breaks were based on color changes not reflected in description. Surface textures range from loamy sand to sand within a radius of 10 m. Snail shell fragments throughout.

NSSL Pedon Number: 86P0671  
 Print Date: 08/20/02

Longitude: 010-15-50-E  
**Microrelief: land leveled or**

Elevation: 90 m MSL

Air Temperature: Ann: 18

Land Use: Cropland  
 Runoff: Very slow

Ap -- 0 to 9 cm; reddish yellow (7.5YR 6/6) interior dry sandy loam and strong brown (7.5YR 5/6) interior moist sandy loam; soft, very friable, slightly sticky, nonplastic; few very fine roots throughout and few fine roots throughout; violently effervescent continuous; moderately alkaline (pH=8.0); abrupt smooth boundary. 86P3906

C -- 9 to 23 cm; reddish yellow (7.5YR 6/6) interior dry clay loam and strong brown (7.5YR 5/6) interior moist clay loam; slightly hard, very friable, very sticky, very plastic; common very fine roots throughout and few fine roots throughout; violently effervescent continuous; moderately alkaline (pH=8.2); clear smooth boundary. 86P3907

2C -- 23 to 82 cm; reddish yellow (7.5YR 6/6) interior dry loam and strong brown (7.5YR 5/6) interior moist loam; weak medium subangular blocky structure; slightly hard, very friable, sticky, plastic; few very fine roots throughout and few fine roots throughout; many fine interstitial and tubular pores; common medium cylindrical insects casts; violently effervescent continuous; moderately alkaline (pH=8.2); clear smooth boundary. Few 2-5 mm randomly distributed platy clay or silty clay surface fragments. 86P3908

3C -- 82 to 112 cm; reddish yellow (7.5YR 6/6) interior dry sandy loam and strong brown (7.5YR 5/6) interior moist sandy loam; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; common fine interstitial pores; few medium rounded halite crystals; violently effervescent continuous; strongly alkaline (pH=8.4); clear smooth boundary. Few 2-5 mm randomly distributed platy clay or silty clay surface fragments. Few areas oriented in discontinuous lenses. 86P3909

4C --112 to 142 cm; reddish yellow (7.5YR 6/6) interior dry fine sandy loam and strong brown (7.5YR 5/6) interior moist fine sandy loam; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; many fine interstitial pores; few medium rounded halite crystals; violently effervescent continuous; strongly alkaline (pH=8.6); clear smooth boundary. Many less than 2 mm randomly distributed platy clay or silty clay surface fragments. 86P3910

5C --142 to 180 cm; strong brown (7.5YR 5/6) interior dry sandy loam and strong brown (7.5YR 5/6) interior moist sandy loam; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots throughout and few medium roots throughout; common fine interstitial pores; few medium rounded halite crystals; violently effervescent continuous; strongly alkaline (pH=8.6); clear smooth boundary. Many 1-5 mm randomly distributed clay or silty clay surface fragments. 86P3911

6C --180 to 229 cm; strong brown (7.5YR 5/6) interior dry loamy sand and strong brown (7.5YR 5/6) interior moist loamy sand; slightly hard, very friable, nonsticky, nonplastic; few very fine roots throughout; few very fine interstitial pores; few medium rounded soft masses of carbonate; strongly alkaline (pH=8.6). Few less than 2 mm randomly distributed platy clay or silty clay surface fragments. 86P3912



\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S86FN-890-014

PRINT DATE 08/20/02

SAMPLED AS : CHAAL ; COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC TYPIC TORRIFLUVENT  
 USDA-NRCS-NSSC-SOIL SURVEY LABORATORY ; PEDON 86P 671, SAMPLE 86P 3906- 3912

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(- NH4OAC EXTRACTABLE BASES -) ACID- (- -CEC- -) EXCH SAR BASE CO3 AS RES. CASO4 AS (- - -PH - - -)																			
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION	CACO3	OHMS	GYP	SUM	SAT	CACL2	H2O		
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM NH4OAC	<2MM	/CM	<2MM	<20MM	PASTE	.01M			
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f	8C1f	
	<- - - - -MEQ / 100 G - - - - -> PCT <- -PCT- > PCT <- -PCT- >																			
0- 9		2.5	0.2	0.5					10.9	1	100	100	12						7.8	8.3
9- 23		1.5	0.1	0.4					7.2	1	100	100	8						7.8	8.4
23- 82		2.3	0.2	0.3					12.2	1	1	100	100	11				7.8	7.8	8.3
82-112		1.9	0.1	0.2					6.0	2	1	100	100	6	3300			8.0	7.8	8.2
112-142		1.6	0.1	0.2					5.2	3		100	100	7					7.8	8.3
142-180		2.0	0.3	0.3					7.6	4		100	100	6					7.8	8.3
180-229		1.4	0.2	0.2					5.1	4		100	100	2					7.8	8.4

	( - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - ) PRED.																			
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL	ELEC.	ELEC.		
																SALTS	COND.	COND.		
DEPTH	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	8A3a	8I		
(CM)	<- - - - -MEQ / LITER - - - - -> <- -PCT- > /cm /cm																			
0- 9																				0.21
9- 23																				0.17
23- 82	4.2	0.9	1.1	0.1	--	2.3	0.1	1.3				2.4	--	--	37.1	TR	0.63			0.26
82-112	5.0	1.1	1.4	0.1	--	1.8	0.1	1.7				3.1	--	0.5	31.1	TR	0.77			0.25
112-142																				0.21
142-180																				0.23
180-229																				0.22

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 1, 2, 5, 6, 7,

ANALYSES: S= ALL ON SIEVED <2mm BASIS

NARRATIVE PEDON DESCRIPTION

Pedon: Chott Mariem  
 Soil Survey Number S86-FN-890-015  
 Location: Tunisia  
 Latitude: 35-55-06-N  
 Physiography: in coastal plains  
**Microrelief: terracettes closed depressions**  
 Slope: 1% plane east facing  
 Precipitation: 35 cm - Xeric Moisture Regime.  
 Permeability: Moderate  
 Summ: 26 Win: 12  
 Drainage: Well drained  
 Stoniness: Class 0 Erosion or Deposition: Slight  
 Particle Size Control Section: 46 to 79 cm  
 Parent Material: marine from mixed material  
 Classification: Fine-loamy, mixed, thermic Calcic  
 Diagnostic Horizons: 0 to 35 cm Mollic, 46 to 79 cm Argillic, 79 to 150 cm Calcic  
 Described By: P. Camp, R. Yeck, H. Abdelkader and M. Derouich Sample Date: 04/86  
 Surface has been leveled. Observed concentration of red sandstone and white limestone fragments about 10 cm in diameter at boundary of horizon 2 and 3.

NSSL Pedon Number: 86P0672  
 Print Date: 08/20/02

Longitude: 010-31-10-E

Elevation: 18 m MSL

Air Temperature: Ann: 19

Land Use: Cropland irrigated  
 Runoff: None

Ap1 -- 0 to 13 cm; dark yellowish brown (10YR 4/4) interior dry loam and dark yellowish brown (10YR 3/4) interior moist loam; moderate medium subangular blocky structure; hard, very friable, sticky, plastic; many very fine roots throughout and common fine roots throughout; many very fine interstitial pores; slightly effervescent continuous; moderately alkaline (pH=8.0); abrupt smooth boundary. 86P3913

Ap2 -- 13 to 35 cm; dark yellowish brown (10YR 4/4) interior dry loam and dark yellowish brown (10YR 3/4) interior moist loam; moderate medium subangular blocky structure; slightly hard, very friable, sticky, plastic; many very fine roots throughout and common fine roots throughout; many medium vesicular and common fine interstitial pores; few fine rounded carbonate nodules; strongly effervescent continuous; moderately alkaline (pH=8.0); abrupt wavy boundary. Rock fragment with carbonate pendant vertically oriented at 28 cm and small piece of plastic. Large amount of biological activity with some insect casts. 86P3914

2B -- 35 to 46 cm; dark yellowish brown (10YR 4/4) interior dry loam and dark yellowish brown (10YR 3/4) interior moist loam; moderate medium subangular blocky structure; very hard, very friable, sticky, very plastic; common fine roots throughout and few medium roots throughout; common very fine interstitial pores; few discontinuous distinct clay films on faces of peds; few fine rounded carbonate nodules; moderately alkaline (pH=7.8); abrupt wavy boundary. Typically non-effervescent, but some small areas are strongly effervescent. Less biological activity than above. 86P3915

2Bt -- 46 to 67 cm; dark yellowish brown (10YR 4/4) interior dry clay loam and dark yellowish brown (10YR 3/4) interior moist clay loam; strong coarse prismatic structure; very hard, very friable, very sticky, very plastic; few fine roots throughout and few medium roots throughout; many very fine tubular and many fine tubular pores; many continuous prominent clay films on faces of peds and few continuous prominent black stains on faces of peds; few medium rounded soft masses of lime; violently effervescent continuous; strongly alkaline (pH=8.4); gradual wavy boundary. 86P3916

2B/Ct -- 67 to 79 cm; 60% dark yellowish brown (10YR 4/4) and 40% strong brown (7.5YR 5/6) dry clay loam and 60% dark yellowish brown (10YR 3/4) and 40% brown (7.5YR 5/4) moist clay loam; strong coarse prismatic structure; very hard, very friable, very sticky, very plastic; few fine roots throughout and few medium roots throughout; many very fine tubular and many fine tubular pores; common continuous prominent clay films on faces of peds; common medium rounded carbonate nodules; violently effervescent continuous; strongly alkaline (pH=8.4); gradual wavy boundary. Common irregular filaments of CaCO<sub>3</sub>. 86P3917

3Btk -- 79 to 150 cm; 75% strong brown (7.5YR 5/6) and 25% pink (7.5YR 8/4) dry clay loam and 75% strong brown (7.5YR 5/8) and 25% reddish yellow (7.5YR 8/6) moist clay loam; very hard, very friable, very sticky, very plastic; few very fine roots throughout and few fine roots throughout; few fine tubular pores; many medium rounded carbonate nodules; violently effervescent continuous; strongly alkaline (pH=8.6). Many irregular filaments of CaCO<sub>3</sub>. 86P3918



