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Studies on some Low Lying Areas of Heavy Textured Soils in Toshka Region

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SOME CLAYEY soils in Toshka region were studied in this investigation. They are characterized by wide cracks, gilgai and slickensides throughout the profile. It could be classified as Vertisols. They cover some low lying scattered areas ranged between 150-1500 feddans. The clay and silt contents varied between 40.0 and 47.1 % & 40.0 and 50.0 %, respectively. The ECe values amounted to 46.1 dS/m. These soils are difficult for management due to their shrink-swell properties, high soil consistency when dry, plastic and sticky when wet. Adding organic matter increases the moisture level and prolongs the number of days available for soil tillage, adding soil amendment to reduce the ESP, improving the internal drainage by preparing beds and furrows in contact with external drainage. Water requirements for removing excess soluble salts from the soil depth of 50 cm are about 1600 m^3/feddan, whereas, the gypsum requirements are about 11.0 ton/feddan. Most of these soils are classified as S_4 soil suitability for agriculture. It could be cultivated with trees especially date palms by excavating pits on the crest of beds and refilling it by loamy soil. Also, the graminaceous such as wheat, sugarcane and maize could be cultivated in these soils.

The south-valley region in Egypt is considered agriculturally a promising area, especially in Toshka. It is located in the southern part of the Western Desert between latitudes 22° 22' and 23° 26' north and longitudes 30° 30' and 32° 00' East. This area is arid, *i.e.*, hot rainless in summer with high evaporation and low relative humidity. The temperature ranges during summer season between 22°C and 45.7°C, while in winter it varies between 6.5°C and 25.2°C. The lithology of Toshka area includes Precambrian formation (igneous rocks), Mesozoic formation (Nubian sandstone) and Cenozoic formations (shale beds).

The soils in Toshka region vary widely in their physical and chemical properties. Their elevation lies between +130 to +200 a.s.i. Areas lower than +150 a.s.i. are submerged by flood water.

The objectives of this study are to identify the properties of the heavy textured soils in Toshka region and classify it, study their management, soil suitability and land evaluation.

Material and Methods

Eleven soil profiles were chosen from some areas which have clayey texture and low elevation, these areas ranged between 150 – 1500 feddans. Soil profiles were morphologically studied in the field according to Soil Survey Staff (1993) and sampled for laboratory analysis. Particle size distribution was determined according to Page (1982). Gypsum content was determined according to FAO (1970). Electrical conductivity and salts were determined in soil paste extract according to Page (1982). Organic matter was determined by Walkely and Black method (Jackson, 1967). The clay fraction was checked by x-ray diffraction (with monochromatic CUK radiation). The leaching requirements were determined according to Ramaznof (1988). The gypsum requirements were determined according to FAO (1970). The soils were classified according to Soil Survey Staff (1999). Land suitability was determined according to Sys *et al.* (1991).

Results and Discussion

Soil characteristics

As shown in both field and morphological description (Table 1) and the particle size distribution (Table 2), the texture of the studied soil profiles are heavy, *i.e.*, silty clay. Their clay contents ranged from 40 to 50 %. Moreover, the high consistency for these soils is related to the relatively high contents of silt, which ranged from 40 to 48 %.

This heavy soil texture is due to the depositional environment, developed on shale material during humid period of Pleistocene period which established the formation of montmorillonite clay minerals on lowest elevation parts in Toshka region, of about +150 to +155 contours.

All the studied soils have cracks at the surface of about 20 cm wide and extending down to more than 1.0 m in depth, as revealed by field description (Table 1).

Also, the morphological description, Table 1 shows a well-developed slickensides. The slickensides developed through the entire thickness of the studied soil profiles No. 1, 4, 5, 7, 9 and 10 and in the subsurface in the other soil profiles. They induced soil structure to become strong coarse angular blocky in most studied profiles.

Concerning the formation of gilgai, it was recognized in strong form in all studied soils of heavy textures as shown in the morphological description (Table 1).

As mentioned in the above discussion, the studied clayey soils have the following properties:

1. Clay contents of more than 0 %.
2. Wide cracks in the surface to a depth of more than 1.0 m and more than 20.0 cm width.
3. Well developed slickensides all-through some of the studied profiles and in the subsurface in the rest.
4. Strong gilgai formation.

TABLE 1. The morphological description for the studied soil profiles.

Profile No.	Horizon	Depth (cm)	Elevation	Texture	Structure	Consistency	Slickensides	Some surface features	Taxonomic unit
1	AC	0-20	155+	Silty clay	mcab	Very hard	Strong	Gilgai, cracks	Typic Gypsitorrerts
	C	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks, gypsum	
2	AC	0-45	153+	Silty clay	scab	Very hard	Moderate	Gilgai, cracks	Halic Haplotorrerts
	C_1	45-100		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
	C_2	100-150		Silty clay	mcab	Very hard	Strong	Gilgai, cracks	
3	AC	0-35	152+	Silty clay	scab	Very hard	Moderate	Gilgai, cracks	Typic Gypsitorrerts
	C_1	35-100		Silty clay	scab	Very hard	Strong	Common gypsum	
	C_2	100-120		Silty clay	scab	Very hard	Strong	Common gypsum	
	C_3	120-150		Silty clay	wfab	Very hard	–	–	
4	AC	0-20	154+	Silty clay	mcab	Very hard	Strong	Gilgai, cracks	Sodic Haplotorrerts
	C	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
5	ACy	0-20	151+	Silty clay	mcab	Very hard	Strong	Gilgai, cracks	Sodic Haplotorrerts
	Cy	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
6	ACy	0-20	153+	Silty clay	mcab	Very hard	Moderate	Gilgai, cracks	Sodic Haplotorrerts
	Cy	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
7	ACy	0-40	152+	Silty clay	scab	Very hard	Strong	Gilgai, cracks	Halic Haplotorrerts
	Cy	40-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
8	AC	0-20	155+	Silty clay	mcab	Very hard	Moderate	Gilgai, cracks	Sodic Haplotorrerts
	C	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
9	AC	0-20	154+	Silty clay	mcab	Very hard	Strong	Gilgai, cracks	Sodic Haplotorrerts
	C	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
10	AC	0-50	155+	Silty clay	scab	Very hard	Strong	Gilgai, cracks	Sodic Haplotorrerts
	C	50-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	
11	ACy	0-20	153+	Silty clay	mcab	Very hard	Moderate	Gilgai, cracks	Sodic Haplotorrerts
	C	20-150		Silty clay	scab	Very hard	Strong	Gilgai, cracks	

s= strong, m= moderate, w= weak, c= coarse, f= fine, ab= angular blocky.

TABLE 2. Particle size distribution and soil texture for studied soil samples.

Profile No.	C. Sand %	F. Sand %	Silt %	Clay %	Texture
1	3.0	12.4	43.1	41.5	Silty clay
	2.0	4.5	48.0	45.5	Silty clay
2	4.1	10.1	41.5	43.0	Silty clay
	1.7	6.3	45.5	46.5	Silty clay
	1.3	4.1	47.1	47.0	Silty clay
3	6.0	10.5	42.2	41.3	Silty clay
	1.8	7.7	45.4	45.1	Silty clay
	1.7	4.3	47.7	46.3	Silty clay
	2.2	2.7	48.0	47.1	Silty clay
4	3.0	16.0	41.0	40.0	Silty clay
	2.1	5.3	45.1	47.5	Silty clay
5	3.0	13.0	44.0	40.0	Silty clay
	3.0	5.3	45.2	46.5	Silty clay
6	2.7	7.3	48.0	42.0	Silty clay
	1.5	9.3	44.0	45.0	Silty clay
7	2.5	7.5	40.0	50.0	Silty clay
	0.5	3.5	45.0	51.0	Silty clay
8	4.5	5.5	45.0	45.0	Silty clay
	0.5	2.5	50.0	47.0	Silty clay
9	2.5	10.5	44.0	43.0	Silty clay
	1.5	4.5	47.0	47.0	Silty clay
10	1.5	11.5	40.0	47.0	Silty clay
	1.5	3.5	47.0	48.0	Silty clay
11	5.5	14.5	40.0	40.0	Silty clay
	1.5	5.5	45.0	47.0	Silty clay

Soil Survey Staff (1999) identified the soils which have clay content more than 30.0 %, cracks on soil surface of width more than 5 cm and up to 60 cm in depth and gilgai as Vertisols. The studied clayey soils in Toshka regions have all these aspects, therefore, they are considered as "Vertisols" order. Also, they are classified at the suborder as "Torrerts".

The surface layer of the studied soil profiles are considered as A horizon, due to the developed pedogenic features, *i.e.*, soil structures, gilgai and slickensides. This agreed with Soil Survey Staff (1975) who described A horizon for some Torrerts soils.

Gypsum content of horizon A, profile No. 1 is 7.1 % and it is 10.3 % and 5.1 % at A and C1 of profile No. 3 (Table 3). Therefore, these horizons are considered 'gypsic' and these two profiles are classified as Typic Gypsitorrerts according to Soil Survey Staff (1999). Meanwhile, profile No. 2 and 7 could be classified as Halic Haplotorrerts, due to their surface horizon AC and ACy contained a soluble ions of 17.1 and 19.1 dS/m, respectively in soil extract of 1:1 (Table 3). On the other hand, the respect studied soil profiles could be classified as Sodic Haplotorrerts due to their containing of exchangeable sodium percent (ESP) of more than 15.0 (Table 3).

TABLE 3. Chemical analysis for the studied soil profiles.

Profile No.	Horizon	Depth (cm)	EC* (dS/m)	Soluble ions (meq/L)								SAR	ESP	Gypsum	OM %
				$CO_3^{=}$	HCO_3^-	Cl^-	$SO_4^{=}$	Ca^{++}	Mg^{++}	Na^+	K^+				
1	AC	0-20	9.3	–	2.0	101.0	132.0	102.0	56.1	105.3	1.0	14.0	10.1	7.1	0.5
	C	20-150	5.1	–	2.0	78.0	30.0	28.0	16.3	67.1	0.5	14.1	16.0	2.1	0.3
2	AC	0-45	17.1	–	2.5	578.0	25.0	75.0	30.5	451.3	1.3	67.3	49.7	3.5	0.7
	C_1	45-100	9.3	–	2.0	250.0	32.0	61.0	17.8	201.1	1.0	30.1	31.6	2.5	0.5
	C_2	100-150	8.1	–	2.5	192.0	18.0	25.0	13.1	173.1	0.5	37.3	36.1	1.5	–
3	AC	0-35	13.7	–	2.0	478.0	111.0	270.0	83.3	230.1	1.1	25.1	8.1	10.3	0.6
	C_1	35-100	8.1	–	2.5	184.0	14.0	61.0	41.1	135.8	0.5	19.1	11.1	5.1	0.4
	C_2	100-120	6.5	–	2.5	172.0	32.0	32.0	77.3	91.3	0.3	12.0	14.1	3.5	0.3
	C_3	120-150	6.3	–	2.5	160.0	14.0	28.0	30.1	110.3	0.3	21.0	24.9	1.0	–
4	AC	0-20	9.1	–	2.5	296.0	51.0	77.0	55.3	217.1	0.5	27.3	27.5	–	0.3
	C	20-150	8.1	–	2.5	226.0	25.0	55.0	27.3	180.3	0.5	27.8	27.8	–	0.2
5	ACy	0-20	4.1	–	2.0	61.0	31.0	30.7	22.0	40.3	1.0	8.1	8.5	1.3	0.3
	Cy	20-150	6.5	–	2.2	90.3	48.2	40.1	20.0	70.1	0.8	14.8	13.8	2.1	0.1
6	ACy	0-20	1.5	–	3.0	20.1	11.9	8.0	4.3	21.7	1.1	8.7	9.0	–	0.3
	Cy	20-150	5.1	–	2.5	75.1	47.4	25.0	10.0	80.3	0.7	19.5	21.7	–	–
7	ACy	0-40	19.1	–	2.0	310.5	148.5	59.5	83.1	317.1	1.3	39.6	41.5	3.1	0.5
	Cy	40-150	9.1	–	2.0	110.1	71.2	30.0	40.8	111.2	1.1	18.1	19.7	1.7	0.1
8	AC	0-20	4.5	–	2.5	93.3	17.2	10.7	10.0	91.3	1.0	30.3	33.1	–	0.4
	C	20-150	4.1	–	2.5	91.1	20.8	13.7	10.0	90.3	0.5	27.3	29.5	–	0.1
9	AC	0-20	6.1	–	2.5	110.3	34.2	33.0	20.0	93.1	0.5	17.9	19.1	1.5	0.3
	C	20-150	9.3	–	2.0	151.3	50.7	33.1	19.2	151.7	1.3	29.7	33.3	0.5	0.1
10	AC	0-50	5.1	–	2.5	110.7	21.8	30.0	14.0	91.3	1.7	19.3	21.5	1.3	0.5
	C	50-150	3.5	–	2.5	91.2	21.8	23.0	10.3	81.7	0.7	21.0	23.3	0.3	0.1
11	ACy	0-20	7.1	–	2.0	133.1	29.9	16.3	35.0	113.7	1.5	23.1	25.7	–	0.5
	C	20-150	6.3	–	2.0	120.3	28.7	10.0	33.9	97.1	0.7	21.0	23.5	–	0.1

EC* = In soil extract 1: 1, SAR= sodium adsorption ration, ESP= exchangeable sodium percent, O.M.= organic matter.

Clay mineralogy

X-ray identification for the clay fraction of the studied soils show that it is dominated with smectite clay minerals (montmorillonite). By comparing diffraction patterns of air-dried, ethylene glycol solvated and heating at 550 °C. The glycol-treated preparation gives very strong 001 reflection at about 17 A°, which in the air dried condition, shifts to about 15 A° (Fig. 1). With the treatment at heating of 550°C, the peak of smectite collapses to 10 A°, which confirms the majority of smectites in the studied soils. Also, the X-ray diffractions for the studied soil samples indicate that kaolinite minerals constitute the minority (Fig.1). Whereas, the peak at 7.1 A° and 3.55 indicate the orders of 001 and 002 of kaolinite clay minerals.

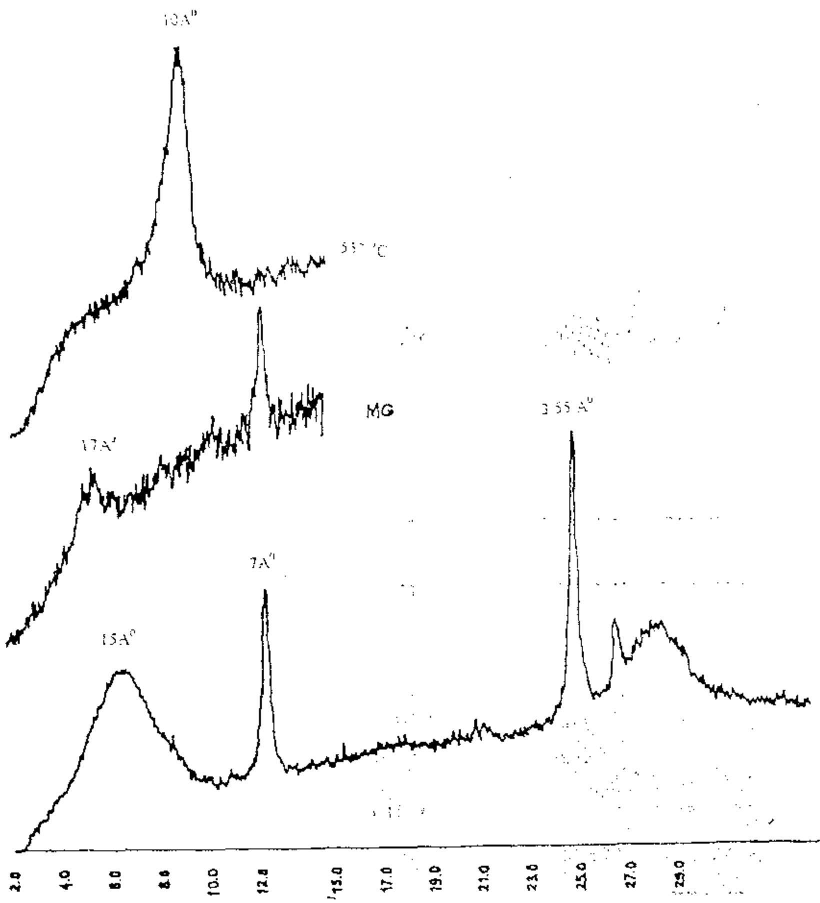

Fig. 1. X ray diffractions of clay fraction for the studied soil profiles No 3.

The identification of X-ray diffraction for the studied Toshka soils confirms that the high shrink-swell and high soil consistency property due to the presence of domination of smectite clay minerals (montmorillonite) in the clay fraction which had been formed in the humid period of Pleistocene, developing Vertisols, which also confirm their high soil fertility. The domination of smectite clay minerals caused both gilgai, cracks on soil surface and slickensides features due to shrink-swell processes.

Organic matter

The content of soil organic matter has a marked effect on soil consistency in Vertisols (Ahmed, 1989). In particular, the organic matter affects the amount of water needed to impart plastic properties. These soils have very low contents of organic matter less than 0.7 % (Table 3). The increasing of organic matter level in Vertisols raises the moisture content of the plastic limit with important practical consequences, which enable the farmer to manage the soil at a higher moisture content without destroying the soil structure. Therefore, the increasing number of management days when cultivations without structure degradation are possible by increasing the soil contents of organic matter. Thus, it is recommended to add organic matter to Toshka Vertisols to enable tillage and other cultivation operations.

Exchangeable sodium

Exchangeable sodium percentage (ESP) is another factor affecting soil consistency in Vertisols due to its natural clay system. High ESP values resulted in decreased hydraulic conductivity and lower structural stability in Vertisols, (Agassi *et al.*, 1985). Therefore, the high consistency for the studied Vertisols in Toshka is related to their high content of exchangeable sodium percentage which is more than 15 % and reached to 49.7 % and 41.5 % at A horizon of soil profile No. 2 and 7, respectively, (Table 3). Therefore, it is recommended to lower the high values of ESP in the studied soils by adding gypsum to replace the sodium by calcium cation and increase the structural stability of soil aggregates, in turn the hydraulic conductivity, and internal drainage.

Leaching requirements

The chemical analysis for the studied soils (Table 3) showed that all the studied soils contained a high soluble salts except the surface horizon of soil profile No. 6 whereas its ECe value was 3.5 dS/m. The electrical conductivity (ECe) values varied between 3.5 and 46.1 dS/m for the surface horizons (Table 3), and considered to be classified as strongly saline soils according to Soil Survey Staff (1993) except soil profile No. 6.

Therefore, these soluble salts need to be leached out side the soil or a depth of 50 cm from the soil surface.

The leaching water requirements for removing the salts out of the studied soils varied between 700 to 2400 m^3/fed. and the average is 1600 m^3/fed. (Table 4).

Which is relatively considered as low water quantity according to the following equation of Ramaznof (1988) for determining leaching requirements:

TABLE 4. Leaching requirements and gypsum requirements for the studied soils.

Profile No.	Leaching requirements m^3/feddan	Gypsum requirement ton/feddan
1	1400	3.0
2	2400	21.0
3	2000	17.0
4	1800	19.0
5	1300	not needed
6	700	not needed
7	2200	20.0
8	1100	19.0
9	1600	11.0
10	1400	13.0
11	1600	11.0
Average	1600	11.5

$$N = 10000\, D \log (S0/S1)$$

Where

N = leaching requirements in m^3/hectar.

D = the depth of leached soil layer which is 50 cm in the studied soils.

S0 = the salt % to be leached.

S1 = the salt % need to be reached.

a factor varied according to soil texture (1.2 for the studied soil).

Gypsum requirements

The quantities of gypsum requirements for the studied soil profiles varied between 3.0 and 21.0 ton/feddan with an average of 11.5 ton/feddan (Table 4). The lowest value (3.0 ton/feddan) is for soil profile No. 1 due to its low value of exchangeable sodium percentage and the relatively high contents of gypsum in soil (gypsum = 7.1 %) (Table 3). On the other hand, the highest gypsum requirement for the studied soil profiles No 2, 4, 7 and 8, whereas, their values are 21, 19, 20 and 19 ton/feddan, respectively (Table 4). This is due to the high values of exchangeable sodium percentage and the low contents of gypsum in soils (Table 3).

Internal drainage

The studied soils of Toshka Vertisols have a poor internal drainage due to their semectite clay systems and high swelling process. These soils need a long period to be dry. The too much water adsorbed could be detrimental to crop production due to poor drainage.

The surface drainage can be improved in Toshka heavy textural soils by preparing systems of beds and furrows. The cultivation should be on the surface of the beds to permit the water to drain to the furrows which will provide drainage for the seed zone and result in higher yields (El-Swaify *et al.*, 1985).

Evaluation for Toshka Vertisols soils

The parametric evaluation system of Sys *et al.* (1991) was used in this study to provide a method that permits evaluation for agricultural proposes based on physio-chemical characteristics of the soil profile.

The studied Toshka Vertisols soils could be grouped into classes S4 of suitability degree according to Sys *et al.* (1991) and suitability subclass/tsd (Table 5).

TABLE 5. Rating of the studied soil suitability parameters.

Prof. No.	Texture (t)	Depth (b)	$CaCO_3$ (c)	Gypsum (y)	Salinity/ Alkalinity (s)	Drainage (d)	Slope (g)	Suitability index (Ci)	Suitability subclass
1	85	100	100	100	56	70	95	37	S4tsd
2	85	100	100	100	40	70	95	25	S4tsd
3	85	100	100	90	50	70	95	29	S4tsd
4	85	100	100	90	60	70	95	31	S4tsd
5	89	100	100	100	75	70	95	41	S4tsd
6	85	100	100	90	77	70	95	40	S4tsd
7	85	100	100	100	40	70	100	23	S4tsd
8	85	100	100	90	65	70	95	33	S4tsd
9	85	100	100	100	60	70	95	33.9	S4tsd
10	85	100	100	100	65	70	95	27	S4tsd
11	85	100	100	90	69	70	95	39	S4tsd

Therefore, the studied clayey soils in Toshka region are almost suitable due to the following limitation factors:

1. Their heavy soil texture (t) which is harmful for seed germination and destroy the plant roots. Also, it affects the period of tillage and management.
2. Their relatively high contents of soluble salts and exchangeable (s).
3. Their status of poor drainage (d) related to soil heavy texture, which affect plant growth and soil management.

Therefore, the limiting factors for the usage of the studied soils for cultivation are the high contents of the soluble salts, the heavy texture and poor drainage.

Management of Vertisols in Toshka

Vertisols are characterized by their high consistency. They are hard when dry, sticky and plastic when wet. The period of favourable conditions for tillage and preparation for agriculture is short. Factors affecting cohesion and adhesion forces include clay mineralogy, *i.e.*, high smectite content, organic matter and exchangeable cations.

Land use

The Toshka Vertisol soils have a high fertility due to their high clay contents (Table 2), and high cation exchange capacity. Considering the problems of soil management , *i.e.*, the period that tillage can be done in is very short, the high shrink-swell process and very poor internal drainage, these soils are not suited for tree crops. But these problems can be overcome by using highly cambered beds on which a single rows of trees is planted at the crest of the beds. This arrangement provides the maximum drainage possible. Obviously, the drains between the beds discharge into bigger drains at right angles and the inturn discharges into the main drainage system.

In these heavy textured soils, special consideration should be given to preparing the planting hole for tree crops. A large hole should be excavated and filled with another more friable soil mixed with compost and fertilizers to enable the young plants to grow. The best tree crops suitable to grow in these heavy soils are the palms and oil due to their vigour and great proliferation of the roots, and the fact that individual roots are never very thick which can penetrate in this high consistency soil and can grow in the arid climate of Toshka region.

Also, graminaceous crop such as creals (wheat, maize), sugar cane and pasture grasses can grow well on these soils. Their roots are vigorous and extensive that the plant can better, without damage caused by soil cracking (Ahmed, 1989).

Conclusions

The studied clayey textured soils in Toshka region are classified as Vertisols according to Soil Survey Staff (1999). The following recommendations are suitable for soil management:

1- Tillage operation must be carried out during the suitable period in which soil is not too moist nor too dry in order not to face structure degradation or soil compaction. Adding composed organic matter to the soil would improve moisture content without destroying its structure.

2- Excess soluble salts need to be leached out in a depth of 50 cm from soil surface, followed by adding gypsum requirements.

3- Adding soil amendments to reduce the ESP values of Toshka Vertisols is necessary to increase soil aggregates and lower soil consistency. The gypsum requirements for the studied soils varied between 3.0 to 20.0 tons/feddan.

4- Improving the internal and external drainage by preparing system of beds and furrows and cultivation on the crest of the beds where excess water drains in the furrows.

5- After leaching the salts out and adding the gypsum requirements, all these studied soils will be classified as class S_2 for soil suitability according to Sys *et al.* (1991), and then would be suitable for cultivation by many crops therefore, these soils are considered as promising area for future agricultural development.

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دراسات لبعض الأراضى منخفضة المنسوب، ثقيلة القوام فى منطقة توشكا

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تمت دراسة بعض الأراضى الثقيلة القوام فى منطقة توشكا حيث تتميز هذه الأراضى باحتوائها على تشققات واسعة على السطح كما أن السطح متموج تموجا خفيفا مكونا لظاهرة الـ gilgai ويوجد slickensides بعمق القطاع مما يشير إلى إنها تتبع رتبة أراضى Vertisols. وتشغل هذه الأراضى مساحات تتراوح من ١٥٠ – ١٥٠٠ فدان. تفرض هذه الأراضى بحكم تكوينها مشاكل فى خدمتها وإدارتها بسبب خواص التمدد والانكماش الشديدين والصلابة العالية عند الجفاف واللزوجة والبلاستيكية عند الابتلال. واقترحت بعض التوصيات اللازمة للتغلب على مشاكل خدمة هذه الأراضى تتمثل فى إضافة المادة العضوية لزيادة محتواها من المادة العضوية وبالتالي لرفع الحد الأعلى لنسبة الرطوبة المصاحبة لخاصية اللزوجة مما يؤدى إلى زيادة الفترة التى يمكن خلالها إجراء عمليات الحرث بسهولة. هذا بالإضافة إلى محسن تربة لخفض نسبة الصوديوم المتبادل وغسيل الأملاح، ويوصى كذلك بالزراعة على خطوط حيث تصرف المياه فى الأخاديد أو الجراية بين الخطوط التى تعمل كمصرف داخلي والتى تتصل بدورها بمصرف خارجي وبالتالي يتحسن الصرف لهذه الأراضى. يمكن زراعة هذه الأراضى بنخيل البلح نظرا لجذوره الرفيعة والقوية التى تستطيع أن تتغلغل فى منطقة تحت التربة على أن تحفر الجور التى تزرع بها الشتلات على ظهر الخط أو المصطبة وتملأ بتربة طميية مخلوطة بالسماد وكذلك يمكن زراعة العشبيات مثل القمح والذرة وقصب السكر بهذه الأراضى.

ونظرا لاحتواء هذه الأراضى على نسبة عالية من الأملاح الذائبة، فان الاحتياجات الغسيلية للتخلص من الأملاح إلى عمق ٥٠ سم من سطح الأرض تقدر بحوالى ١٦٠٠ م٣ للفدان فى المتوسط وصلاحية هذه الأراضى للزراعة تقع فى الدرجة الرابعة S_4 تبعا لطريقة Sys ولكن بعد غسيل الأملاح وإضافة الجبس الزراعى والتى تقدر بحوالى ١١ طن للفدان فإنها تقع بين الدرجتين الثانية والثالثة. وحينئذ تصلح لزراعة عدد كبير من المحاصيل.