Influence of Farm Management Factors Using Saline Water on Crop and Soil Productivity.

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Abstract: Water resources availability and soil salinity are the main limiting factors to crop production. Thus, farm factors have to be managing to achieve the best model which accomplished the main goals. So, the aims of the study was influencing between three factors, tillage systems "TS" [three treatments, (no-tillage "NT"- strip tillage "ST") the both of them called conservation tillage "CT" - conventional tillage "CV"]Leaching requirements "LR" [three treatments, 0% - 10% - 20%]and crop residue cover "CR" [three treatments, 0% - 50% - 100%] on some soil properties, crop productivity, farm water managements and tractor efficiency factors. Obviously, that conservation tillage "CT" and the combination of conservation tillage with 100% "CR" and 20% "LR" were most use efficiency with lowest cost under saline water at Ras-suder area.
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1. Introduction

The frequency of tillage, as well as the type of tillage implement used, can significantly affect the health and erodibility of agricultural soils. There are several definitions for conservation tillage **Morgan *et al.* (1979)**. For example **Allmaras and Dowdy (1985)** define it as a combination of cultural practices that result in the protection of soil resources while crops are grown. **James and Russell (1996)** mention that conservation tillage is defined as any tillage and planting system that keeps at least 30% of the soil surface covered by residue after planting and includes such practices as no-tillage, ridge tillage, strip tillage, mulch tillage and reduced tillage The Conservation Technology Information Center **(CTIC)** defines conservation tillage as any tillage and planting system that leaves at least 30 percent of the soil surface covered by residue after planting. **Gao *et al.* (1999, 2003)** reported that conservation tillage generally improvements soil moisture, water use efficiency, crop yield and economic status. **Reicosky and Allmaras (2003)** reported that tillage has long been an essential component of traditional agricultural systems. Broadly defined, tillage is mechanical manipulation of the soil and plant residues to prepare a seedbed for crop planting. The benefits of tillage are many: it loosens soil, enhances the release of nutrients from the soil for crop growth, kills weeds and regulates the circulation of water and air within the soil. Found also tillage has been found to adversely affect soil structure and cause excessive breakdown of aggregates, leading to soil erosion in higher rainfall areas. Intensive tillage can also have a negative impact on environmental quality by accelerating soil carbon loss and greenhouse gas emissions**.**

Miller and Dexter (1983) found that yield of sugar beet in no-tillage is equal to that of conventional tillage if there is sufficient control of weeds. **Blevins *et al.* (1983)**found that residue left on the soil surface after harvest and cultivation provides protection from the impact of rainfall and impedes the movement of soil particles by wind and water. The reduction in the decomposition rate of residue as a result of reduced tillage also increases soil organic matter content. The maintenance of soils structure that occurs in minimally tilled soils also helps decrease erosion potential and these soils also have a greater amount and diversity of soil fauna. **Wilhelm *et al.* (1986)** determined that the total available water in the soil profile accounted for 70% of the yield variation associated with residue treatment. The researchers noted that for each Mg/ha of residue removed there was a 0.1 Mg/ha reduction in grain yields. In addition, 81% of the yield variation was associated with the quantity of residue applied.

Karlen *et al.* (1994) had similar results in their experiment. They noted that grain yields were 8.1, 8.4, and 9.0 Mg/ha for removal, normal anddouble residue treatments, respectively. **Lascano *et al.* (1994)** found thatstrip tillage in cotton production showed that strip tillage compared to conventional tillage reduced water loss from the soil (evaporation) by 39%, saving 2.5 inches of water. **Salinas-Garcia *et al.* (1997)** reported that crop residue retention has been suggested to improve overall soil fertility and to support sustainable crop production. Crop residue retention under no tillage system reduce soil erosion, increase soil organic matter(SOM), and reduce requirement of labor and fuel under cereal grain and row crop culture. **Fang**

***et al.*(2003)** mention that the application of conservation tillage was shown to reduce production costs and increase farm income.

Estimates from the Conservation Technology Information Center **(CTIC) (1998)** showed that by switching to conservation tillage can save as much as 225 labor hours and 1750 gallon of fuel per year on just 500 acres. Machinery would be used less, and that would mean an additional savings of an estimated $ 2500 in machinery wear. **Hernández and Macario (2000)** reported that Triticale grain is rich in some essential amino acids needed by humans. Its grain is also an important source of protein and energy that can be utilized in animal feeding and for human consumption in regions where protein sources in human diets are very scarce or too expensive to access by poor people. This is particularly true for sources of amino acids included in meat or milk proteins needed in children's diets for better mental growth and development.

Linden *et al.* (2000) compared tillage and residue management over several years and observed how precipitation influenced yields. In general, during dry years, treatments with residue yielded 22% more than those without. This can be attributed to how residue helps to maintain water in the soil profile. During a wet year, residues incorporated with tillage treatments (either chisel plow or moldboard plow) resulted in higher yields than no-residue tillage treatments. Perhaps these findings were due to the benefits of extra C and available moisture. The amount of residue returned can influence grain yields regardless of tillage**. Kumar *et al.* (2001)** reported that incorporation of crop residues is essential for sustaining soil productivity through replenishing SOM that not only akey indicator of soil quality, but it also supplies essential nutrients upon mineralization (N, P,and S) and improves soil physical, chemical, and biological properties. **Ji and Unger (2001)** reported increases in soil moisture storage by using straw mulch. **Liao *et al.* (2002)**demonstrated that conservation tillage increased soil moisture and water use efficiency of winter wheat. **Deng *et al.* (2006)** reported that mulching with crop residues improved water-use efficiency by 10-20% as a result of reduced soil evaporation and increased plant transpiration. In the case of winter wheat, straw mulching has been shown to increase water-use efficiency from 1.72 to 1.94 kg/m^3. Similarly, water-use efficiency of maize increased from 1.55 to 1.84 kg/m^3. **Zhang *et al.* (2009)** suggested that mulching was a promising soil management practice that can increase soil water storage especially in arid regions.

Lampurlanes and Cantero-Martınez (2003) found that tillage is often justified because without it compaction can lead to higher bulk density and increased penetration resistance, especially in the top few centimeters of soil. Many authors have found that semiarid no-tillage sites have greater bulk density and penetration resistance than reduced-tillage sites. **Al-Kaisi and Licht (2004)** reported that strip tillage is designed for row crops in which only a 9-12 inch wide strip is tilled and planted and the ground between rows is left undisturbed. The result showed that no difference in corn yield between strip tillage, no tillage, and conventional tillage in a corn-soybean rotation. **Su *et al.* (2004)** reported that no-tillage systems were effective in improving soil structure and increasing crop yield**. Asghar *et al.* (2006**) mention that crop residues are known to affect soil physicalproperties**,** availability of nutrients and soil biological activity**.**

He *et al.* (2007) compared conservation tillage with conventional tillage and found that conservation tillage can lead to the improvement of soil physical, chemical, and biological properties and play important roles in maintaining and improving soil quality. Tillage and residue management affect not only soil properties but also soil microbial community. Soil microorganisms play essential roles in agro ecosystem, and their changes will influence soilnutrient cycling**.**

Bauer and Conlon (1978) recommended no tillage and minimum tillage systems for seed bed preparing in saline soils because of its low cultivation depth, because by a deep tillage all washed salinities could be returned to soil surface. **Alizadeh and Koochaki (1991)** found that soil surface mulch is an effective method for decreasing evaporation from the soil and preventing salt accumulation.**Qiao *et al.* (2006)** reported that mulching of soil surface with different materials reduce evaporation losses and reduce salt build-up in the soil.**Egamberdiyeva *et al.* (2007)** mentioned that salinity is a major concern for irrigated agriculture in arid and semi-arid regions of the world by reducing soil productivity and limiting crop yield.

Therefore the main objective of this study was to choose the best tillage system and the best crop residue cover and the best percent of leaching requirements and study the impact of interaction between these treatments to achieve the highest Triticale yield and water use efficiency with lower costs at Ras-Sudr area.

2. Material and Methods

This study was carried out at RasSudr Experimental Station, South Sinai on sandy loam soil texture in the winter season 2011-2012 (from November 2011 to April 2012). Soil texture and some chemical properties of the soil and well irrigation water are given in ***Table (1).***

Table (1):Soil texture and some chemical properties of the soil and well irrigation water.

Particle size distribution %				Texture class	$CaCO_3$ %	O.M %	pH		E.C	
Coarse sand	Fine sand	Silt	Clay				Soil	Water	Soil	Water
12.3	58.7	19.7	9.3	Sandy loam	46.1	0.43	7.76	7.89	10.7	4.8

A. Implement Specifications:

The specifications of the implement used in this study were combination machine with 180 cm working width. Consist of two units the first unit to tillage consist of seven shanks with chisel blade arranged in two rows and the second unit to planting which planting in rows as shown in ***Fig. (1).*** Tillage unit used only in treatments of strip tillage and conventional tillage where, all seven shanks in chisel tillage unit were used inconventional tillage treatment and made two passes (one pass of tillage without planting unit and the second pass used tillage unit with planting unit) but at strip tillage treatment used the all combination machine in one pass for tillage and planting,with a note that was used only the rear four shanksin chisel tillage unit.No-tillage treatment used only planting. The forward speed of tractor was 4.5 km/h and tillage depth for tillage treatments was 20 cm.

B. Experimental Procedure:

The following are the experimental details:

1. To fulfill the objective of this study, an experiment having an area of about 1.5 fed. was established as a split split plots design in three replicates, divided into three main plots involved three leaching requirements(0%, 10% and20%). Each main plot includes threesub-plots, which involved three crop cover residue (0%, 50% and 100%). Each sub-plot includes threesub-sub-plots, which involved three tillage systems (no-tillage, strip tillage and conventional tillage).

2. The Triticale seeds were planted in November, with a rate of 40 kg/fed by seeder and harvested in April, 2012.

3. At harvesting triticale crop, three randomized samples were taken by hand from each plot using a wooden square frame ($1m^2$) as a simpler to determine the triticale yield per fed. Finally, the Triticale crop was harvested and threshing by thresher.

C. Measurements:

1. Soil bulk density was measured using a core samples (Three replicates for each sample) according to **Black *et al.* (1965)** method.

2. The soil mean weight diameter (M.W.D) was determined according to **Van Bavel, (1949)** as follows:

$$M.W.D. = \sum_{i=1}^{i=n} \frac{X_i W_i}{W_T} \quad \ldots\ldots (1)$$

$$\text{where: } X_i = \frac{\varepsilon_{i-1}+\varepsilon_i}{2} \quad \ldots\ldots\ldots \quad \ldots(2)$$

where;

x_i: The mean weight diameter of each fractions,(mm).

w_i: The weight of the soil retained on i th sieve, (gm).

w_T: The total weight of the soil retained on the sieves, (gm).

ε_i : Sieve mesh.

i: Number of sieves.

3. Theoretical and actual field capacity and field efficiency were calculated by using equations mentioned by **kepner *et al.* (1978)**.

4. Soil penetration resistance measured by a Japanese cone index penetrometer **(SR-2, DIK-500)**

5. Draft force was measured by hydraulic dynamometer which, coupled between the two tractors with the attaching the machine to estimate its draught force. A considerable number of readings were taken at a time interval 10 seconds to obtain an accurate average of draught force. The hitch was always adjusted in order to keep the line of pull as horizontal as possible.

6. Fuel consumption per unit time was determined by measuring the volume of fuel consumed during operation time. It was calculated using the fuel meter equipment as shown in ***Fig. (2).***The length of line which marked by the marker tool on the paper sheet represents the fuel consumption. The fuel meter was calibrated prior and the volume of fuel was determined accurately.

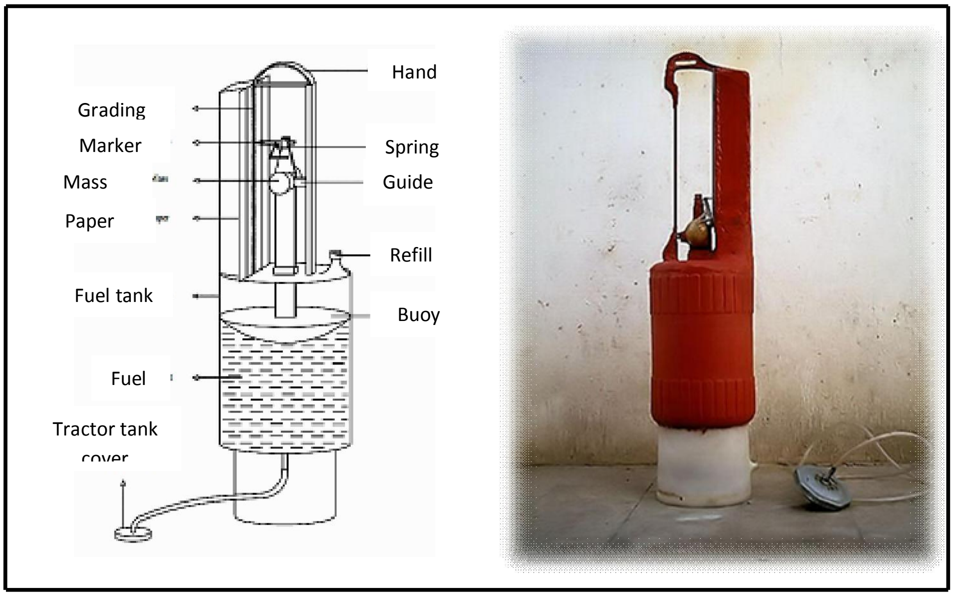

Fig. (2): Fuel meter for measuring fuel consumption.

7. Slip percentages were calculated using the standard method of measuring distances traveled with and without load for a certain number of wheel revolutions.

8. Total cost of performing a preparing operation calculated using an equation, developed by **EL-Awady (1978)** was used for determine the total hourly cost as follows:

$$C = \left(\frac{P}{h}\right)\cdot\left(\frac{1}{L}+\frac{1}{2}+t+r\right)+(1.2\cdot RFC\cdot f)+\left(\frac{m}{144}\right)+\left(\frac{P_1}{h_1}\right)\cdot\left(\frac{1}{L_1}+\frac{1}{2}+t+r_1\right) .(3)$$

where;

C: Hourly cost,(L.E./h).
p: Initial price of the tractor,(L.E).
h: Yearly working hours of tractor. (h/year).
L: Life expectancy of the tractor (year).
t: Annual taxes and overheads ratio, (%).
f: Fuel price, (L.E./L).
m: The monthly average wage,(L.E./month).
1.2: Factor accounting for lubrications.
r: Annual repairs and maintenance ratiofor tractor, (%).
P_1 :Initial price of the preparing implement, (L.E).
h_1 :Yearly working hours of preparing implement, (h/year).
r_1 :Annual repairs and maintenance ratiofor preparing implement, (%).
144: Operator monthly average working hours, (h).

9. Crop water requirement was calculated using the Reference Evapotranspiration (ET_o) and the Crop coefficients (K_C) by the following equation:-

$$ETc = ET_o * K_C \ldots\ldots \quad (4)$$

where;

ETc: Crop Evapotranspiration, (mm/day).
ETo: Reference Evapotranspiration, (mm/day).
Kc: Crop coefficients.

Table (2): Represent the Reference Evapotranspiration (ET_{ref}) according to (Center Laboratory for Agricultural Climate, CLAC.).

Month	Jan.	Feb.	Mar.	Apr.	May	June
ET_o(mm/day)	1.5	2	2.5	4	6	6
Month	July	Aug.	Sep.	Oct.	Nov.	Dec.
ET_o(mm/day)	7	6	4	3	2	2

Table (3): the average crop coefficients (Kc) for Triticale according to Andreas P. (2002).

Item	**Init.**	**Dev.**	**Mid.**	**Late.**	**Total.**
Days	20	50	60	30	**160**
K_C	0.3	1.15	1.15	0.25	**2.85**

Net irrigation requirement (IR_n) is derived from the field balance equation:

$$IR_n = ET_c - P_{eff} + LR \ldots\ldots \quad \ldots\ldots\ldots(5)$$

where;

IR_n: Net irrigation requirement, (mm/day).
ET_c: Crop evapotranspiration,(mm/day).
P_{eff}:Effective dependable rainfall, (mm/day).
LR: Leaching requirement, (mm).

Gross irrigation requirements account for losses of water incurred during conveyance and application to the field.

$$IR_g = IR_n/E_a \ldots\ldots\ldots\ldots\ldots\ldots \quad \ldots\ldots\ldots(6)$$

where;

IR_g: Gross irrigation requirements, (mm/day).
IR_n: Net irrigation requirement,(mm/day).
E_a:Overall irrigation efficiency, (%).
(Pressure piped network surface methods= (65 – 75%) **(Phocaides, 2000)**

Table (4):Total water applied with leaching Requirement (LR).

Crops	Irrigation system	Total water applied without leaching requirements	Total water applied with leaching Requirement (LR)		
			0% from total water applied	10% from total water applied	20% from total water applied
		m^3/fed.	m^3/fed.		
Triticale	Modern Surface Irrigation	2604	2604	2870	3200

10. Total cost per unit area was determined as follows:

$$T_{ca} = C/A_{fc} \qquad \ldots\ldots (5)$$

where;
Tca: Total cost of unit area, (L.E./fed).
A_{fc} : Actual field capacity, (Fed/h).
C : Hourly cost,(L.E./h).

11. Specific cost of production was determined as follows:

$$SCP = Tca / Y \qquad \ldots.(6)$$

where;
SEC: Specific cost of production, (L.E/Mg).
Tca: Total cost per unit area, (L.E/fed).
Y: Crop yield, (Mg/fed).

12. Field water-use efficiency was determined as defined by **Jensen (1983)** as follows:

$$E_t = Y / WR \qquad \ldots\ldots\ldots (7)$$

where:
E_t : Water - use efficiency, (kg/m^3).
Y : Total crop yield, (kg/fed).
WR : Total amount of irrigation water used per unit area, (m^3/fed).

3.Results and Discussion

1- Effect of different tillage systems on power requirements and soil physical properties.

The impact of different tillage systems on power requirements and soil physical properties are given in ***Fig. (3).*** The results indicated that minimum values of draft force, fuel consumption and tractor wheel slippage obtained with no-tillage which were 6.4 kN, 8.3 L/h and 2.3% respectively, compared with 28.6 kN, 31.8 L/h and 24.2% at conventional tillage the decreasing percentage for no-tillage compared with conventional tillage were 77%, 73% and 90% respectively. The results showed that actual field capacity, field efficiency, soil bulk density, soil penetration resistance and soil mean weight diameter were high at no-tillage 1.54 fed/h, 81 %, 1.71 g/cm^3, 840 kPa and 8.6 mm respectively, compared with 0.55fed/h, 58%, 1.17 g/cm3, 310 kPa and 3.1 mmat conventional tillage the increasing percentage for no-tillage compared with conventional tillage were 180%, 40%,46%, 177% and 170% respectively.

2- Effect of different tillage systems, crop residue cover and leaching requirements on Triticale grain yield, specific cost of production and water use efficiency.

The effect of different tillage systems,crop residue cover and leaching requirements on Triticale grain yield, specific cost of production and water use efficiency are presented in ***Table (5).*** The results showed that conventional tillage achieved the maximum value of Triticale grain yield followed by strip tillage and no-tillage 2 t/fed, 1.9 t/fed and 1.6 t/fed respectively. Triticale grain yield increased with increasing percentage of leashing requirements at all systems of tillage as example, 1.9 t/fed, 2.5 t/fed and 2.9 t/fed at 0%, 10% and 20% leashing requirements respectively (at strip tillage and 0% crop residue cover). Triticale grain yield increased with increasing percentage of crop residue cover at all systems of tillage as example, 1.9 t/fed, 2.5 t/fed and 2.7 t/fed at 0%, 50% and 100% crop residue cover respectively (at strip tillage and 0% leashing requirements). The results showed that conventional tillage achieved the maximum value of specific cost of production followed by strip tillage and no-tillage 75 L.E/t, 25 L.E/t and 18.7 L.E/t respectively. Specific cost of production decreased with increasing percentage of leashing requirements at all tillage systems as example, 25 L.E/t, 19 L.E/t and 16 L.E/t at 0%, 10% and 20% leashing requirements respectively (at strip tillage and 0% crop residue cover). Specific cost of production decreased with increasing percentage of crop residue cover at all tillage systems as example, 25 L.E/t, 19 L.E/t and 17.7 L.E/t at 0%, 50% and 100% crop residue cover respectively (at strip tillage and 0% leashing requirements). The results showed that conventional tillage achieved the maximum value of water use efficiency followed by strip tillage and no-tillage 0.77 kg/m^3, 0.73 kg/m^3 and 0.61 kg/m^3 respectively. Water use efficiency increased with increasing percentage of leashing requirements at all systems of tillage as example, 0.96 kg/m^3, 0.98 kg/m^3 and 1 kg/m^3 at 0%, 10% and 20% leashing requirements respectively (at strip tillage and 0% crop residue cover). Water use efficiency increased with increasing percentage of crop residue cover at all systems of tillage as example, 0.73 kg/m^3, 0.96 kg/m^3 and 1 kg/m^3 at 0%, 50% and 100% crop residue cover respectively (at strip tillage and 0% leashing requirements).

According to the statistical analysis from recorded data in ***Table (6),*** the obtained results revealed that there were significant differences between the mean numbers of tillage systems, covering percent and leaching requirements treatments on the three study variables Triticale grain yield, water use efficiency and specific cost of production. However; at leaching and cover's treatments the significant differences between means number for cost variable sorting start from 31.7, 26.33 and 22.55L.E/t for leaching treatments (0-10-20%) and from 32, 25.6 and 23 L.E/t for cover treatments (0-50-100%) respectively. In the contrary, a significant influence on Triticale grain yield and water use efficiency recorded at third treatment for all three factors leaching, cover and tillage which are 20%, 100% and CT respectively because all of them increase a positive behavior of water movement on soil texture which helping crop to utilization from irrigation water.

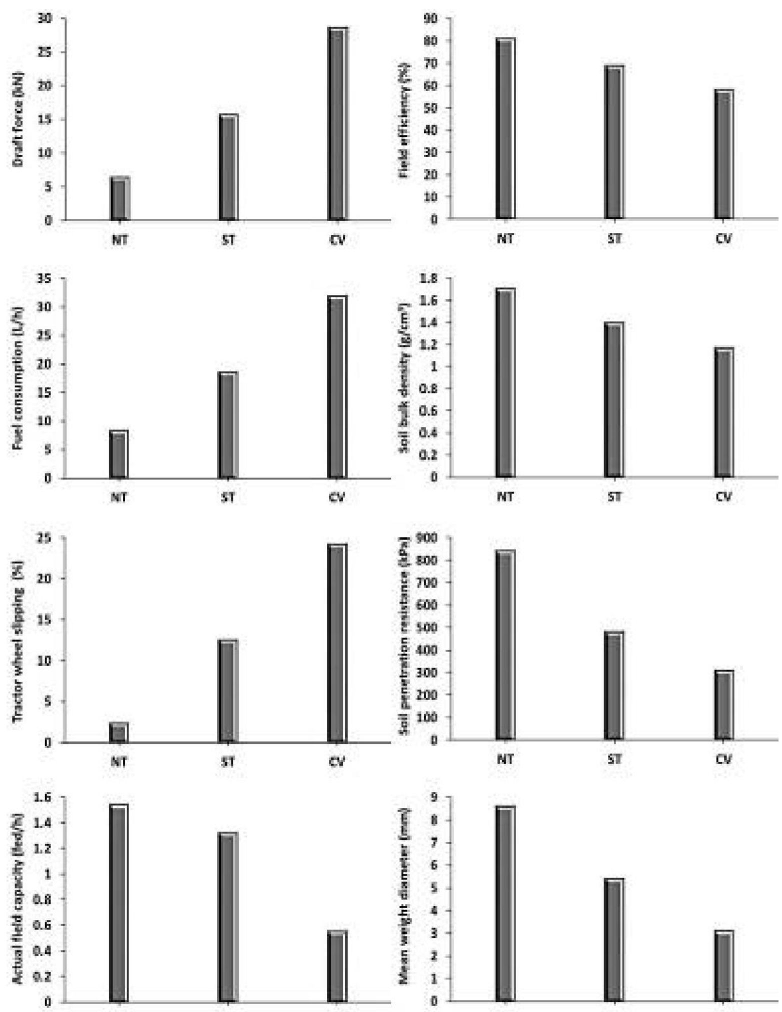

Fig.(3): Draft force, fuel consumption, tractor slippage, actual field capacity, field efficiency, soil bulk density and soil mean weight diameter at different tillage types.

Table (5): Triticale grain yield, specific cost of productionand water use efficiency at different tillage systems (TS), crop residue cover (CR) and leaching requirements (LR).

Leashing requirements (LR)	Crop residue cover (CR)	Tillage system (TS)	Triticale grain yield (t/fed)	Water use efficiency (kg/m^3)	Specific cost of production (L.E/t)
0%	0%	NT	1.6^{j}	0.61^{m}	19^{ef}
		ST	1.9^{ij}	0.73^{l}	25^{e}
		CV	2.0^{hij}	0.77^{kl}	75^{a}
	50%	NT	2.1^{ghij}	0.80^{jk}	14^{ef}
		ST	2.5^{efghi}	0.96^{efg}	19^{ef}
		CV	2.7^{efgh}	1.00^{e}	55^{b}
	100%	NT	2.4^{fghi}	0.92^{efg}	13^{ef}
		ST	2.7^{efgh}	1.00^{e}	18^{ef}
		CV	3.1^{bcdef}	1.15^{bc}	48^{bc}
10%	0%	NT	1.8^{ij}	0.63^{m}	17^{ef}
		ST	2.5^{efghi}	0.87^{hi}	19^{ef}
		CV	2.7^{efgh}	0.94^{efg}	55^{b}
	50%	NT	2.4^{fghi}	0.83^{ij}	13^{ef}
		ST	2.8^{defg}	0.98^{ef}	17^{ef}
		CV	3.2^{bcde}	1.10^{cd}	47^{bc}
	100%	NT	2.7^{efgh}	0.94^{efg}	11^{f}
		ST	3.1^{bcdef}	1.08^{d}	15^{ef}
		CV	3.5^{abcd}	1.20^{b}	43^{cd}
20%	0%	NT	2.1^{ghij}	0.66^{m}	14^{ef}
		ST	2.9^{cdef}	0.90^{gh}	17^{ef}
		CV	3.2^{bcde}	1.00^{e}	47^{bc}
	50%	NT	2.7^{efgh}	0.84^{ij}	11^{f}
		ST	3.2^{bcde}	1.00^{e}	15^{ef}
		CV	3.7^{ab}	1.15^{bc}	40^{cd}
	100%	NT	3.2^{bcde}	1.00^{e}	9^{f}
		ST	3.6^{abc}	1.13^{cd}	13^{ef}
		CV	4.0^{a}	1.25^{a}	37^{d}
Mean variables followed by the same letter are not significantly different at 0.05 level.					

Triticale grain yield	Water use efficiency	Specific cost of production
L.S.D at significance level 0.05 for interaction between three treatments (LR X CR X TS)		
0.43	0.049	6.9

Table (6):L.S.D at significance level (0.05) for mean values of Triticalegrain yield (T.G.Y), water use efficiency (W.U.E) and specific cost of production (S.C.P) at different levels of tillage systems (TS), crop residue cover (CR) and leaching requirements (LR).

Items	LR			CR			TS		
							CT		CV
Mean of:	0%	10%	20%	0%	50%	100%	NT	ST	
T.G.Y (t/fed.)	2.33^{c}	2.74^{b}	3.17^{a}	2.3^{c}	2.81^{b}	3.14^{a}	2.33^{c}	2.8^{b}	3.12^{a}
$LSD_{0.05}$	0.04653			0.1347			0.1435		
W.U.E(kg/m^3)	0.88^{c}	0.94^{b}	0.99^{a}	0.79^{c}	0.96^{b}	1.07^{a}	0.799^{c}	0.96^{b}	1.06^{a}
$LSD_{0.05}$	0.02499			0.04045			0.01827		
S.C.P(LE/ t)	31.7^{a}	26.33^{b}	22.55^{c}	32^{a}	25.6^{b}	23^{c}	13.44^{c}	17.48^{b}	49.6^{a}
$LSD_{0.05}$	0.7024			1.5744			2.3001		

3- Comparison between conservation tillage and conventional tillage in Triticale grain yield and water use efficiency.

Results showed that conventional tillage achieved the highest values of Triticale grain yield and water use efficiency compared to conservation tillage, whether no-tillage or strip tillage however, the system of conservation tillage should be covering of the soil by residues of plant not least about 30% and the system of conventional tillage does not use the covering so that when compared the conventional tillage (without crop residue cover and leaching requirements) with conservation tillage (with crop residue cover and without leaching requirements) as shown in **Fig. (5)** it is clear that both of Triticale grain yield and water use efficiency increased with conservation tillage system compared to conventional tillage therefore, we found that using conservation tillage with a good coverage of crop residue achieved the highest Triticale grain yield and water use efficiency at the lowest values for costs.

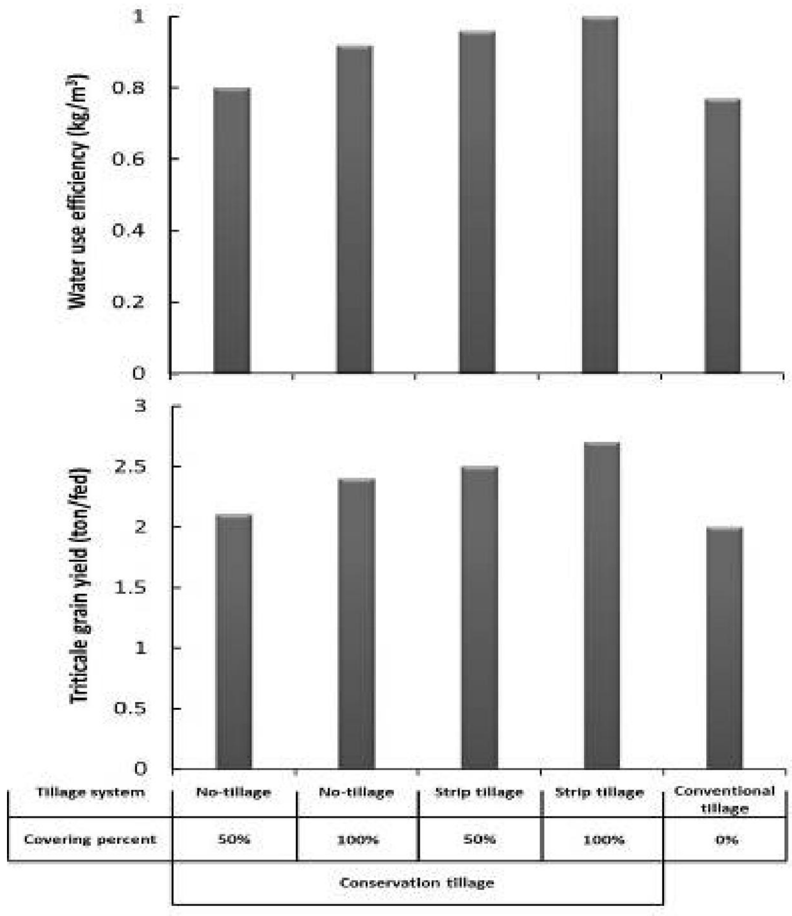

Fig.(5): Comparison between conservation tillage and conventional tillage in Triticale grain yield and water use efficiency at 0% leaching requirements.

Conclusion

Our results suggest that different tillage systems, residue management and leaching requirements have an effect on saline soil productivity.Tillage systems, residue management, leaching requirements, and theirinteractions influenced on power requirements, soil physical properties, soil productivity, water use efficiency and soil preparation cost as the previous results were showed.Itis clear from this study that the conservation tillage achieved the pest result compared with conventionaltillage especially when combination it with suitable percentage of crop residuecover and leaching requirements. Therefore, this study,clearly that in the saline soil of RasSudr area, a croppingsystem that includes no tillage, strip tillage, cropresidue cover and leacdhing requirements can have positive effects compared withcommon farming practices.

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