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MAXIMIZING OF UTILIZATION FROM SOME OF NEW FARMING SYSTEMS TO IMPROVE MAIZE PRODUCTIVITY UNDER RECLAIMED SOIL CONDITION IN EAST DELTA

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ABSTRACT: Two field trials were conducted at Kassasein experimental station, Ismailia Governorate, during 2001 and 2002 summer seasons, to study the response of maize plant "Giza 2" to tillage and no tillage systems, ridge width (60, 70 and 80 cm) and weed control i.e.; unweeded, hand hoeing and chemical treatment with "Staren" 20% EC (4-amino-3,5 dichloro-6 fluoro-2 pyridloxy acetic acid) at rate of 200 ml/fad. applied after one month of sowing with 200 liter water/fad. under new reclaimed soil in East Delta.

The important results of this study were as follows:

Tillage of seed bed enhanced growth of maize plants and significantly increased grain yield and its components, as well as reduced the growth of weeds. As for the distances between ridges it was noticed that, increasing the distance from 60 up to 80 cm significantly increased No. of days to 50% tasseling and silking, stem diameter, ear leaf area, ear height, ear length, ear diameter, No. of kernel/ear, kernel weight/ear, shilling %, 100-kernel weight and fresh and dry weight of both broad leaved-weed and total weeds. Plant height and grain yield/fad gave also the highest values in ridge width of 70 cm. Concerning the weed control treatments, hand hoeing gave the best grain yield and yield components followed by Staren at 200 ml/fad. and then check indicating that these weed control treatments were very effective and reduced the fresh and dry weight of weeds.

The interaction between tillage systems and width of the ridge had a significant effect on grain yield/fad. and most of its components and weeds fresh and dry weight, also the interaction

between tillage and weed control methods had marked effects on increasing of grain yield/fad. and decreasing of fresh and dry weight of weeds.

In general the results of this study revealed that tillage of soil increased grain yield with average (18.5 ardab/fad.), comparing to non tillage (14.12 ardab/fad.) also decrease width of the ridge to 70 cm markedly increase grain yield/fad (17.5 ard./fad.) comparing to lowest value of 80 cm between ridges (15.0 ard/fad.). Grain yield/fad. and the yield components recorded the higher value by mechanical weed control (19.25 ardab./fad.) comparing to unweeded control (12.47 ardab/fad.). Fresh and dry weight of weeds was at lower value by mechanical weed control followed by chemical weed control.

Finally the recommendation from this study revealed that tillage of the soil and planting maize plants at the distance of 70 cm between ridges and control the weed mechanically were the recommended treatments for raising maize productivity under the conditions of this investigation.

Key words: Maize productivity, farming systems, tillage and no tillage, ridge width, weed control, growth and yield of maize.

INTRODUCTION

Maize is consider as a very important crop for human and animal consumption it is one of the major cereal crops grown in Egypt. Many factors affect grain yield of maize such as genetic constitution, seeding environment, soil fertility, seed-bed preparation, ridge width, fertilization and weed control which participate the crop plants and compitate it on light nutrition and cause yield lost which may be reach 40%. Many investigators proved that the different cultivation methods have an effect on soil condition and both roots and growth of plant (Cannel and Elis, 1978). Using the developed plowing (conventional chisel plough + disking) instead of conventional method alone had no significant effects on the yield (Korayem *et al.*, 1985). While, using chisel plough followed with rotary plough which gave the lowest soil surface roughness and affect the physical mixing of the soil as well as indirectly affect on the seed bank gave the highest grain yield of wheat (Abo-Habaga *et al.*, 1989 and Daniel and Stephen, 1990). On the other hand, Principi and Mattana (1992), Selim and El-Sergany (1995) and Awad (1996) mentioned that the highest

grain yield of corn was obtained using conventional tillage system. Under tillage system fresh weight of grass weeds and dry weight of total weeds were reduced (El-Douby *et al.*, 2002). The highest grain yield of wheat was obtained by tilling soil with mold board or chisel plough (Gill *et al.*, 2000 and Haikel, 2001).

At low population, yield is limited by the number of maize plants while at high population, yield is limited by the number of barren plants and they showed that interrow spacing and competition for water as well as light and nutrients determine the optimum maize plant densities for each growth environment (Larson and Hanway, 1977). Increasing of planting density significantly increased maize grain yield per unit area, as well as, ear characters and components of yield decreased (Abdel-Gawad *et al.*, 1974, Ahmadi *et al.*, 1993, Ragheb *et al.*, 1993 and Soliman *et al.* (1995). The competition between maize plants for light, soil fertility and other environmental factors was markedly increased in case of planting maize at the highest population density levels (Abdul-Galil *et al.*, 1990, Hashemi-Dezfouli and Herbert, 1992 and Ali *et al.*, 1994). Plant height and ear height, barren plants% and grain maize yield/fad. were significantly increased by increasing plant population (Mosalem and Shady, 1996). The highest values of yield components were obtained with sowing maize at hill space of 30 cm (20000 plants/fad.), while, the highest values of plant height, ear height and grain yield/fad. were obtained at hill space of 20 cm (30000 plants/fad.) (Samira *et al.*, 1998 and Sayed *et al.*, 2003).

Controlling the weeds is one of the most laborious expensive, so chemical weed control become a previous essential practice in maize cultivation. Tillage directly affect the seed bank by physical mixing of the soil, particles and herbicide application indirectly affect the seed bank by reducing the number of seed producing plants (Daniel and Stephen, 1990). Application of fluroxypyt herbicide at rate 0.2 and 0.3 L/fad.; atrazine at 0.750 g/fad. and bentzon at 0.5l/fad. were very effective for the control of broad leaved weed and gave excellent for controlling *Xanthium strumarium* and gave the highest length and diameter of ears in maize (Al-Marsafy *et al.*, 1992). Hand hoeing twice and atrazine herbicide were significantly effective on reducing fresh weight of weeds (Mekky, 1993 and Tantawy *et al.*, 1994).

Also, El-Bially (1995) reported that yield and grain yield components were affected by atrazine as application chemical and mechanical weed control treatments exceeded the unweeded in maize plant height, leaf area index, ear length and diameter and 100-kernels weight. Grain yield produced by atrazine was equal to the recorded by hand hoeing twice. Application of atrazine at 0.750 kg/fad. Fluroxypyt at 0.21/fad. and hand hoeing twice were effective for controlling broad leaved weeds and significantly increased ear length and diameter, number of kernels/row, shelling percentage, 100-kernels weight and grain yield in both seasons (Hassanein, 1996, Mosalem and Shady, 1996, Tantawy and Mekky, 1998, Haikel, 2001 and Mekky, 2001).

In addition, weed control treatments significantly decreased the biomass of weeds compared with the unweeded treatment in both seasons and reflected on increasing grain yield (El-Douby and Samia, 2002).

This work aimed to study the effect of no-tillage and tillage systems, ridge width and weed control on growth, yield and yield components of maize under reclaimed soil condition in East Delta.

MATERIALS AND METHODS

Two field experiments were conducted at Kassasein Agricultural Station East Delta Ismailia Governorate during 2001 and 2002 summer seasons, to study the effect of tillage and no tillage systems, ridge width and weed control treatments on maize yield (Giza 2 cv.), its components and associated weeds in newly reclaimed land. The experimental soil was sandy in texture having pH value of 8.7 and 0.7% organic matter content. The experimental design was split split plot with four replicates as follows:

i- In main plots: two tillage systems i.e. conventional tillage and no tillage.

ii- In sub-plots: three planting densities (i.e. 35000, 30000 and 25000 plants/fad.) were arranged randomly expressed as three ridge width 60, 70 and 80 cm.

iii- In sub-sub plots: including three weed control treatments, namely:

1- Unweeded control (plots left without herbicide or hoeing).

2- Mechanical weed control (hand-hoeing twice treatment at 30 and 60 days from sowing).

3- Chemical weed control with staren 20% EC (4-amino-3,5-dichloro-6-fluoro-2-pyridloxy acetic acid), with rate of 200 ml/fad. applied after one month of sowing.

The sub-sub plot was 21 m^2 ($\frac{1}{200}$ /fad.) (7 m x 3 m). One plant was left in each hill at 20 cm apart. Maize was sown on May 25th 2001 and May 26th 2002, and harvested on October 10th and October 25th in both seasons, respectively. The recommended agriculture practices according the location were done throw growing seasons.

Data recorded:

I- Weed survey:

The predominant broad-leaf weeds in the two seasons were *Xanthium strumarium*, *Portulaca oleracea*, *Corchorus olitorus* and *Euphorbia geniculata*.

Weeds were hand pulled from one square meter of each plot one month before harvest. Weeds were identified, then the fresh and dry weight in grams of broad-leaved weed as well as the total weed species were estimated.

II- Growth, yield and its attributes:

1- Days to 50% of tasseling and silking.

At maturity, samples of ten plants were randomly taken from each sub-subplot to estimate the following characters.

2- Plant height (cm).
3- Stem diameter (cm).
4- Ear leaf area (cm^2).
5- Ear length (cm).
6- Ear diameter (mm).
7- No. of kernels/ear.
8- Kernels weight/ear.
9- Shilling percentage %.
10- 100-kernel weight (g).

III- Grain yield/fad. : Maize plants in the four inner rows of each sub-sub plot were harvested at maturity, tied and left to dry, then it was threshed. Grain ratio was estimated in kg and calculated to ardab/fad.

The obtained data in this study were subjected to the statistical analysis according to Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Effect of soil tillage:

The data concerning the effect of soil tillage, distance between ridges and methods of weed control on days to 50% tasseling and silking, plant height, stem diameter, ear leaf area, ear height, ear length, ear diameter, number of kernels/ear, kernels weight/ear, shelling percentage, 100-kernel weight and grain yield/faddan as well as broad-leaved weeds and total weeds fresh

and dry weight are illustrate Tables (1, 2, 3 and 4). Data recorded showed significantly variations in number of days to 50% maize plants tasseling, silking, plant height, stem diameter, ear leaf area, ear height, ear length, ear diameter, kernels number/ear, kernels weight/ear, shelling percentage, 100-kernel weight, and grain yield/faddan as well as weeds fresh and dry weight due to non-tillage of seed bed soil.

Its clearly observed that tillage processing of maize seed bed enhanced the growth of maize plants and significantly increased number of days to 50% tasseling and selking, plant height, stem diameter, ear leaf area, ear height on the plant, ear length, ear diameter, number of kernels/ear, kernels weight/ear, shelling %, 100-kernels weight and grain yield/faddan, but significantly reduced growth of weeds.

These results may be due to that seed bed preparation and tillage processing enhance physical and chemical soil properties, soil aireation, soil solarization and puffering solution of soil, which may be encourage the growth and penetration of maize root system which also reflected in growth parameters of maize plants compared with no-tillage treatments. So, maize plants were stronger, taller and took more time to tasseling and silking (Table 1).

Also, enhancing growth of the roots throw soil tillaged and good seed-bed properties gave significantly higher ear leaf area, longer ears, thicker ears and higher number of kernels/ear compared with non-tillage seed-bed (Table 2).

On the other hand, kernels weight/ear, shelling percentage and 100-kernels weight (seed index) were significantly increased by tillage processing of seed-bed compared to non-tillage treatments (Table 3). Soil tillage consecuantly produced significantly higher grain yields/faddan by 30.05% and 31.91 than no-tillage treatment in both seasons respectively. These increments in the grain yields of both seasons were resulted due to the increments achieved in the yield components (Table 3).

The results in table 4 also, show significant reduction in the fresh and dry weight of broad leaved weeds as well as fresh and dry weight of total weeds by soil tillage compared with no-tillage system, which partially due to enhancing growth of maize plants causing more shading on the soil surface which may reduced the growth of weeds. These results are in agreements with those obtained by Cannel and Elis (1978),

Korayem *et al.* (1985), Abo Habaga (1989), Daniel and Stephen (1990), Principi and Mattana (1992), Selim and El-Sergany (1995) and Awad (1996) whose found that conventional tillage system significantly increased maize grain yield/faddan compared to no-tillage.

Effect of ridge width:

Data in tables 1, 2, 3 and 4, the results revealed that number of days to 50% tasseling and silking, stem diameter, ear leaf area, ear height, ear length, ear diameter, number of kernels/ear, kernels weight/ear, shilling percentage, 100-kernel weight, and weeds fresh and dry weight were significantly increased with increasing ridge width from 60 cm up to 80 cm except the height of plants and grain yield/fad. which took the opposite trend with decreasing plant population. These results may be expected that by lower planting density (25000 plant/fad. ridge width 80 cm), the soil surface area/plant was the heighest, enabled solar energy to reach the soil surface and consequently might be retard the effect of growth senescence of lower leaves of maize plants. So, that might be reflected on growth duration to 50% tasseling and silking, longer plants, thicker stems, higher ear, longer and thicker of ears as well as higher number of kernels/ear, kernels weight/ear, shilling percentage and 100-kernels weight comparing with higher density (35000 plant/fad. ridge width 60 cm) where the competition between plants was effective.

The highest grain yield/fad. increased consistently and markedly with decreasing ridge width of maize plant to 70 cm in the two seasons which due to the increase in number of plants, whereas, 80 cm ridge width record the lowest values in both seasons (Table 3). The increments in grain yields/fad. by 70 cm between ridges were 7.31% and 18.92% in the first season and 7.44% and 14.49, respectively in the second season over the ridge width 60 and 80 cm, respectively. The increment in grain yield of maize per faddan which associated with increasing plant density 30000 plants/fad. (ridge width 70 cm) may be also due to the best role of depressing weed biomasse under such densities to give higher grain weight and the more number of maize plants/fad. On the other hand, the broad-leafed and total weeds fresh and dry weight were significantly increased by increasing ridge width up to 80 cm, which may due to the same environmental conditions

encourage maize growth where, growth of weeds was negatively affected by higher maize plants density (ridge width 60 cm) due to reducing solar energy and light intercepted by maize plants. Similar results were obtained by Abdel Gawad *et al.* (1974), Ahmadi *et al.* (1993), Ragheb *et al.* (1993), Ali *et al.* (1994), Soliman *et al.* (1995), Mosalem and Shady (1996), Samira *et al.* (1998) and Sayed *et al.* (2003).

Effect of weed control:

Weed control is one of the important agricultural managements in crop production. In general the results concerning the effects of weed control treatments on growth and yields of maize and its components are presented in tables 1, 2, 3 and 4 which showed significant effects for both mechanical and chemical weeds control on all studied traits compared to control treatment. The results revealed that number of days to 50% tasseling and silking were significantly increased using mechanical weed control. Also by mechanical weed control maize plants were taller, thicker stems, higher value of leaf area, longer and thicker ears, higher number of kernels/ear compared with chemical weed control, also kernel weight/ear, shilling percentage, 100-kernel weight and the grain yield /faddan were the highest when using the mechanical management for weed control compared to both unweeding and chemical treatment. In addition to removing weed by mechanical weeding, there many benefits processing occurred at the same time, like soil surface aireation, conserving of soil moisture etc, which may be improved growth of maize plants. Grain yield/faddan was associated with the yield components which increased and were the highest by mechanical weed control and that was reflected to achieve higher grain yield/faddan. The lowest grain yield/faddan and yield components were observed by non-weeding, which was expected because weed plants may chare maize plants for nutrition elements and compete it during the different growth stages. But the results showed superiority of mechanical weed control than chemical control which produced higher maize grain yield/faddan also, yield components behaved the same trend of grain yield, which may be emphasized by reducing weeds growth and distribution in maize field. On the other side, the chemical weed control may had not the derived killing effects on all of weed species. So, the fresh and dry weight of broad-leaved weeds

were seriously reduced by chemical weed control compared to the other weed species. But the fresh and dry weight of total weeds were lower by mechanical treatment. Grain yield/faddan was reduced due to non-weeding in the two season with 37.18% with and 33.21% respectively compared to the mechanical weed control while, grain yield by mechanical weed control was higher 12.50% and 9.28% comparing with chemical weed control in the two season respectively. The same results were observed by several investigators Mekky (1993 and 2001), Tantawy *et al.* (1994), El-Bially (1995), Hassanein (1996), Mosalem and Shady (1996), Tantawy and Mekky (1998), Haikel (2001) and El-Douby and Samia (2002).

Interaction effects:

Table (5) showed significant interaction effects between tillage system and ridge width on the number of days to 50% silking, ear leaf area, ear length, 100-kernels weight, grain yield/fad. and weeds fresh weight. Also, there were significant interactions effects between tillage systems and weed control methods on the number of days to 50% silking, ear height and length and total weeds fresh weight (Table 6). In addition, number of days to 50% silking, number of kernels/ear, grain yield/fad. and fresh weight of weeds were significantly affected by the interaction between ridge spaces and weed control methods (Table 7). Data in (Tables 5, 6 and 7) showed that number of days to 50% selking was the highest when maize plants sown at 80 cm ridge with and soil tillage (Table 5) and were the highest when weeds were mechanically controlled by tillage system (Table 6) as well as when maize plants grown at 80 cm space and mechanically controlled (Table 7). Ear leaf area was the largest when maize plants grown under tillage soil system and 80 cm between ridges (Table 5). Ears of maize were the highest by mechanically weed control under both tillage systems in the two season (Table 6).

Maize ears were the longest when maize plant grown under ridge in spaces of 80 cm and mechanically weeded under the two tillage systems (Table 5 and 6). Number of grains/ear (Table 7) reached the highest values by mechanically control weeding under wider ridge spaces. The largest number of grains/ear was obtained at the wider space and mechanically weed control (498.2/ear) in the first season. Also, weight of 100 grain was the heavy at 80 cm space between

ridges under tillage system (Table 5). 100-grain weight of maize was the highest at the lowest planting density under the two tillage systems (Table 5). The highest grain yield per faddan of maize was obtained when maize grown in space of 70 cm between ridges under tillage system and mechanically weeded, while, the lowest value was obtained in widely ridges (80 cm) and both unweeded method and no tillage system in the two seasons (Tables 5 and 7). Weed fresh weight was found to be the highest when maize planted widely sown and let unweeded under no-tillage system (Tables 5, 6 and 7) while the lowest weight of weeds fresh weight was obtained when maize planted under tillage system with ridge width 70 cm and weeded mechanically. The highest grain yield/faddan of maize obtained may due to tilling the soil, using appropriate planting density and mechanically weeding, which all these managements enhanced plants growth and productivity of maize plants.

Table 1. The effect of tillage systems, ridge width and weed control on days to 50% tasselling and silking, plant height and stem diameter in the two seasons.

Characters / Treatments	Days to 50% tasselling		Days 50% silking		Plant height (cm)		Stem diameter (cm)	
	2001	2002	2001	2002	2001	2002	2001	2002
A. tillage systems:								
No. tillage	63.02	62.58	65.38	65.73	190.78	185.63	26.88	27.98
Tillage	64.31	63.96	67.03	67.12	232.08	227.76	30.01	28.47
F-test	*	*	**	*	**	**	**	NS
L.S.D. 0.05	0.76	0.95	0.35	0.69	8.81	5.69	1.07	-
0.01	-	-	0.81	-	20.3	13.14	2.47	-
B.Ridge width (cm):								
60 (35000)	63.28	62.73	65.18	65.26	198.99	198.84	26.42	27.13
70 (30000)	63.30	63.07	66.37	66.74	222.30	215.79	28.42	28.50
80 (25000)	64.46	64.00	67.07	67.29	213.00	205.46	30.49	29.05
F-test	NS	*	**	**	**	**	**	**
L.S.D. 0.05	-	0.70	0.30	0.48	3.38	7.10	0.49	0.72
0.01	-	-	0.43	0.78	4.92	10.29	0.73	1.05
C- Weed control:								
Unweeded	64.27	63.32	65.88	65.74	195.22	195.39	26.97	27.56
Mechanical	64.13	64.26	67.41	67.55	225.52	223.64	29.61	29.29
Chemical	62.66	62.22	65.32	65.99	213.56	201.10	28.76	27.82
F-test	NS	**	**	**	**	**	**	*
L.S.D. 0.05	-	0.54	0.23	0.30	3.01	6.06	0.28	0.91
0.01	-	0.72	0.32	0.41	4.08	8.3	0.37	-
Interaction:								
A x B	NS	NS	*	NS	**	*	**	*
A x C	NS	NS	*	**	**	NS	**	NS
B x C	NS	NS	**	*	NS	NS	**	NS

Table 2. The effect of tillage systems, ridge width and weed control on ear leaf area, ear height, ear length, ear diameter and No. of kernels/ear in the two seasons.

Characters / Treatments	Ear leaf area (cm^2)		Ear height (cm)		Ear length (cm)		Ear diameter (cm)		No. of kernel/ear	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
A. tillage systems:										
No. tillage	664.26	672.04	128.69	128.55	19.95	20.35	3.80	3.84	422.50	403.61
tillage	675.53	681.22	144.78	144.82	21.20	21.52	4.16	4.27	453.04	460.93
F-test	*	*	**	**	**	**	*	*	**	*
L.S.D. 0.05	5.43	6.4	2.24	5.35	0.41	0.27	0.22	0.21	10.7	25.84
0.01	-	-	5.16	12.34	0.95	0.63	-	-	27.02	-
B.Ridge width (cm):										
60 (35000)	656.71	665.89	136.06	137.72	19.40	20.06	3.84	3.88	415.53	410.07
70 (30000)	667.44	677.39	136.50	137.28	20.46	20.74	3.98	4.07	436.93	429.38
80 (25000)	685.53	686.61	137.45	135.06	21.83	22.01	4.12	4.24	460.83	457.36
F-test	**	*	**	**	**	**	**	**	**	**
L.S.D. 0.05	5.10	8.76	0.35	0.30	0.31	0.19	0.05	0.10	8.84	8.95
0.01	7.70	-	0.51	0.48	0.45	0.28	0.10	0.15	12.86	13.02
C-Weed control:										
Unweeded	660.41	669.78	132.59	132.95	19.85	20.10	3.78	3.88	406.18	407.71
Mechanical	681.17	682.22	141.60	142.61	21.43	21.83	4.19	4.23	469.59	457.31
Chemical	668.11	677.89	136.02	134.50	20.44	20.88	3.96	4.06	437.52	431.79
F-test	**	**	**	**	**	**	**	**	**	**
L.S.D. 0.05	4.04	5.06	0.81	1.64	0.22	0.25	0.09	0.09	7.08	11.33
0.01	5.77	7.01	1.10	2.23	0.30	0.34	0.12	0.13	9.42	14.04
Interaction:										
A x B	*	NS	NS	NS	*	**	NS	NS	NS	NS
A x C	NS	NS	**	**	NS	*	NS	NS	NS	NS
B x C	NS	NS	NS	NS	NS	NS	NS	NS	*	NS

Table 3. The effect of tillage systems, ridge width and weed control on kernels weight/ear, shilling %, 100-grain weight and grain yield/fad. in the two seasons.

Characters / Treatments	Kernels weight/ear		Shilling %		100-grain weight (g)		Grain yield (ardab/fad.)	
	2001	2002	2001	2002	2001	2002	2001	2002
A. tillage systems:								
No. tillage	208.23	209.56	73.40	72.98	30.43	30.30	14.14	14.10
tillage	226.36	223.56	76.00	74.49	32.80	32.60	18.39	18.60
F-test	**	**	*	**	**	*	**	*
L.S.D 0.05	7.3	4.51	1.34	0.58	0.11	0.13	0.62	0.71
0.01	16.83	10.4	-	1.35	0.25	-	0.70	0.90
B.Ridge width (cm):								
60 (35000)	206.68	209.22	73.14	71.96	30.14	30.32	16.40	16.27
70 (30000)	218.90	215.83	74.48	73.65	31.84	31.69	17.60	17.48
80 (25000)	226.30	224.61	76.47	75.59	32.85	32.35	14.8	15.27
F-test	**	**	**	**	**	**	**	**
L.S.D. 0.05	4.24	4.12	0.89	0.81	0.17	0.14	0.36	0.26
0.01	6.17	5.96	1.29	1.18	0.25	0.37	0.52	0.32
C- Weed control:								
Unweeded	196.48	190.72	73.66	72.56	31.13	30.24	12.25	12.69
Mechanical	236.33	242.33	75.72	75.19	32.28	32.76	19.50	19.00
Chemical	219.07	216.61	74.72	73.44	31.42	31.37	17.03	17.37
F-test	**	**	**	**	**	**	**	**
L.S.D. 0.05	4.07	2.90	0.83	0.84	0.16	0.58	0.13	0.18
0.01	5.52	3.92	1.13	1.14	0.22	0.78	0.17	0.24
Interaction:								
A x B	NS	NS	NS	NS	**	NS	*	*
A x C	NS	NS	NS	NS	NS	NS	NS	NS
B x C	NS	NS	NS	NS	NS	NS	*	*

Table 4. The effect of tillage systems, ridge width and weed control on fresh and dry weight of broad-leaved weeds and fresh and dry weight of total weeds in the two seasons.

Characters / Treatments	Broad-leaved weed (gm)		Total weeds (gm)		Broad-leaved weed (gm)		Total weeds (gm)	
	Fresh	Dry	Fresh	Dry	Fresh	Dry	Fresh	Dry
	2001				2002			
A. tillage systems:								
No. tillage	427.5	90.5	2509.0	490.0	394.7	98.9	2416.3	410.0
tillage	120.6	19.2	555.0	122.0	110.0	22.0	557.0	184.7
F-test	**	**	**	**	**	**	**	**
L.S.D. 0.05	4.0	2.0	35	17	6.9	3.5	49	8.2
0.01	6.0	3.0	80	12	10.5	4.2	114	9.5
B.Ridge width (cm):								
60 (35000)	281.3	55.1	1404.0	280.8	265.5	59.3	1590.0	318.0
70 (30000)	200.7	49.5	1161.0	234.0	185.0	55. 6	1160.0	232.0
80 (25000)	340.4	60.1	2031.0	404.7	332.5	66.5	1710.0	342.0
F-test	**	**	**	**	**	**	**	**
L.S.D. 0.05	5.0	1.2	48.0	5.0	4.1	3.2	34.0	5.3
0.01	6.0	1.8	70.0	9.0	5.3	4.1	49.0	0.5
C- Weed control:								
Unweeded	760.1	150.0	2601.0	522.9	687.0	166.6	2188.0	506.0
Mechanical	47.0	10.0	650.6.0	136.6	50.5	9.9	839.0	104.8
Chemical	15.0	4.1	1345.0	260.0	19.5	4.9	1433.0	286.6
F-test	**	**	**	**	**	**	**	**
L.S.D. 0.05	3.5	1.0	34.0	3.5	3.2	9.1	33.0	3.4
0.01	4.0	1.4	70.0	7.0	3.8	1.2	45.0	4.2
Interaction:								
A x B	*	*	*	*	*	*	*	*
A x C	NS	NS	**	NS	NS	*	**	NS
B x C	NS	NS	**	NS	NS	NS	**	NS

Table 5. The interaction effects between tillage systems and ridge width on No. of days to 50% selking, ear leaf area, ear length, 100-kernels weight, grain yield ardabs/fad. and fresh weight of weeds.

Ridge width (cm) / Tillage systems	2001			2002		
	60	70	80	60	70	80
	No. of days to 50% selking					
No-tillage	64.12	65.82	66.19			
Tillage	66.23	66.92	67.94			
L.S.D. 0.05		0.42				
	Ear leaf area (cm^2)					
No-tillage	654.63	662.89	675.24			
Tillage	658.79	671.99	695.82			
L.S.D. 0.05		7.198				
	Ear length (cm)					
No-tillage	18.99	19.69	21.17	19.66	20.32	21.1
Tillage	19.87	21.23	22.49	20.47	21.16	22.94
L.S.D. 0.05		0.22			0.26	
0.01		0.33			0.38	
	100-kerenls weight (gm)					
No-tillage	28.70	30.80	31.78			
Tillage	31.59	32.90	33.92			
L.S.D. 0.05		0.22				
0.01		0.35				
	Grain yield ardabs/fad.					
No-tillage	13.90	14.27	13.54	14.00	14.40	13.00
Tillage	18.83	19.83	17.72	18.90	19.89	17.78
L.S.D. 0.05		0.31			0.36	
	Fresh weight of weeds (gm)					
No-tillage	1603.00	1500.00	1770.00	1647.00	1441.82	1794.00
Tillage	1506.00	1200.00	1620.00	1379.64	1156.82	1500.64
L.S.D. 0.05		70.00			48.00	

Table 6. The interaction effects between tillage systems and weed control on No. of days to 50% silking, ear height and length and fresh weight of weeds.

Weed control / Tillage systems	2001			2002		
	Unweeded	Mech.	Chem.	Unweeded	Mech.	Chem.
			No. of days to 50% silking			
No-tillage	64.2	66.66	65.3	64.3	67.3	65.58
Tillage	65.6	68.14	67.34	65.14	68.82	67.40
L.S.D. 0.05		0.33			0.42	
0.01		-			0.57	
			Ear height (cm)			
No-tillage	126.84	131.10	128.20	125.67	132.66	127.33
Tillage	138.30	152.10	143.90	140.23	152.56	141.67
L.S.D. 0.05		1.14			2.33	
0.01		1.53			3.15	
			Ear length (cm)			
No-tillage				19.69	21.00	20.32
Tillage				20.51	22.62	21.43
L.S.D. 0.05					0.36	
			Fresh weight of weeds (gm)			
No-tillage	2239.00	1323.00	1400.00	2285.00	1307.00	1314.00
Tillage	1853.67	1084.67	1291.67	1797.00	1117.00	1234.00
L.S.D. 0.05		78.00			77.00	
0.01		66.00			65.00	

Table 7. The interaction effects between ridge width and weed control on No. of day to 50% silking, No. of grains/ear, grain yield ardabs/fad. and fresh weight of weeds.

Weed control / Ridge width	2001			2002		
	Unweeded	Mech.	Chem.	Unweeded	Mech.	Chem.
			No. of day to 50% silking			
60	64.98	66.55	64.00	64.8	65.08	64.85
70	66.03	67.22	65.85	65.72	68.37	66.13
80	66.63	68.44	66.10	66.68	69.2	66.98
L.S.D. 0.05		0.32			0.40	
0.01		0.49			-	
			No. of grains/ear			
60	377.10	447.97	421.55			
70	413.18	462.60	435.00			
80	428.30	498.20	456.00			
L.S.D. 0.05		9.70				
			Grain yield ardabs/fad.			
60	12.66	19.42	16.30	13.89	18.64	17.58
70	14.74	20.90	18.6	15.64	22.98	20.80
80	11.23	17.90	14.64	14.15	17.88	16.78
L.S.D. 0.05		0.28			0.31	
0.01		0.37			0.41	
			Fresh weight of weeds (gm)			
60	2174.0	1225.0	1314.0	2113.3	1119.1	1200.1
70	1718.0	1069.0	1262.0	1780.0	1080.0	1153.1
80	2214.0	1382.0	1430.0	2183.3	1333.3	1480.0
L.S.D. 0.05		61.0			58.0	
0.01		81.0			79.0	

REFERENCES

Abdel-Gawad, A.M., N.A. Nour El-Din and A.M. Badr (1974). Yielding capacity of maize as affected by some agricultural practices. Agric. Sci., Moshtohor, 2: 2-13.

Abdul-Galil, A.A., S.A. Ghanem, O.A. Zeiton and N.M. Moselhy (1990). Effect of planting density and foliar N fertilization on yield of maize proc, 4th Conf. Agron. Cairo 1-16 Sept. Vol. 1: 405-417.

Abo-Habaga, M. (1989). Effect of different seed-bed preparation systems on soil natural compoetion and crop yield. Egyptian-Grman Conf. Agr. Mech, 4-6 Oct., Mansoura Univ. Egypt, 71-80.

Ahmadi, M., W.J. Weibold, J.E. Beuertein, D.J. Eckert and J. Schoper (1993). Agronomic practices that affect corn kernel characteristics. Agron. J., 85: 615-619.

Ali, A.A., G,M.A. Mohgoub and A.M. Awad (1994). Response of white-maize hybrid (S.C. 10) to nitrogen at different plant density distributions. J. Agric. Sci. Mansoura Univ., 19 (11): 3597-3605.

Al-Marsafy, H.T., A.S.O. Khohosy, A.H. Awad and A.A. Ali (1992). Performance of some pre and post emergence herbicides in the control of xanthium strumarium and other annual weeds in maize (Zea mays I). J. Agric. Sci. Mansoura Univ., 17 (8): 2576-2581.

Awad, R. (1996). Effect of mechanical systems of seed-bed on some physical properities: M.Sc. Thesis , Fac. Agr. Mansoura Univ., 1-76.

Cannell, R.Q. and F.B. Ellis (1978). "Simplified cultivation effect on soil conditions and crop yield". Lectombe Laboratory, Letcomble Regis-Wantage, Oxon, Oxt, 29: 55-59.

Daniel, A.B. and D.M. Stephen (1990): Weed seed population response to tillage and herbicide use in three irrigated cropping sequences. Weed Sci., 38: 511-517.

El-Bially, M.E. (1995). Efficiency of atrazine with other herbicide used alone in sequence or as tank mix in maize. Annals Agric. Sci. Ain Shams Univ. Cairo 40 (21.709-721-1995).

El-Douby, K.A. and Samia G.A. Mohamed (2002). Effect of tillage, phosphorus fertilization and weed control on faba bean and estimation the contributions of yield component statistically. Egypt. J. Agric. Res., 80 (1): 253-273.

Gill, S.M., M.S. Akhtar and Z. Saeed (2000). Soil water and bulk density as affected by tillage and fertilizer in rainfed wheat production system. Pakistan J. Biol. Sci., 3 (8): 1223-1226.

Gomez, K.A. and A.A. Gomez (1984). Statistical procedures for the agricultural research. Jhon Willey and Sons Inc., New York.

Haikel, A.M. (2001). Effect of preceding crops, seed-bed preparation and weed control methods on wheat productivity in newly reclaimed calcareous soils under Gun irrigation system. J. Agric. Sci., Mansoura Univ., 26 (9): 5177-5192.

Hashemi-Dezfouli, A. and S.J. Herbert (1992). Intensifying plant density response of corn with artificial shade. Agron. J., 84: 551-567.

Hassanein, A.M.A. (1996): Studies on the biological activity of some new low rate herbicides M.S. Thesis. Fac. of Agric. Minia Univ., Egypt, pp. 119.

Korayem, A.Y.; M.A. Shaibon and E.R. El-Ashry (1985). Development of the locally chisel plow. Misr J. Agric. Eng., 2 (4): 33-50.

Larson, W.F. and J.J. Hanway (1977). Corn production in G.F. Sprague (ed.) corn and corn improvement. Agron. J., 18: 625-669.

Mekky, M.S. (1993). Effect of some agricultural practices on growth, yield and its components of corn (Zea maus L.) M.S. Thesis Fac. of Agric. El-Minia Univ., Egypt, pp. 159.

Mekky, M.S. (2001). Control of broadleaf weeds in maize (Zea Mays L.) Minia J. of Agric. Res. of develop. Vol. (21) No. 3, pp. 387-399.

Mosalem, M.E. and M.F. Shady (1996). Effect of plant population and chemical weed control on maize (Zea mays L.) production. Proc. 7th Conf. Agron., Mansoura, 9-10 Sept. 41-58.

Principi, M.A. and R.R. Mattana (1992). Design and experimentation of tillage and sowing systems for corn. Argentinian Conference on Agricultural Engineering Proceeding of a Conference Heid in Villa Maria; Argentina, 53-54.

Ragheb, M.N.A., A.A. Beddeer and A. Sh. A. Gouda (1993). Effect of row spacing and plant population density on grain yield of some yield of some maize hybrids. Zagazig J. Agric. Res., 20 (2): 581-594.

Samira M.A. Hussein, M.A. Jaikel and M.A. El-Masry (1998).

Effect of some preceding crops, hill spaces and nitrogen fertilization on yield attributes and grain yield of maize under reclaimed sandy soil conditions in East delta. Proc. 8th Conf. Agron, Suez Canal Univ., Ismailia, Egypt, 28-29.

Sayed A. Saleh, Salah E.A. Toamia and Abdel-Hafiez A. Zohry (2003). Effect of agricultural management practices and Bio-N-Fertilizers on maize Growth and yield. Egypt. J. Agric. Res., 81 (3).

Selim, M.S.M. and P.Z. El-Sergany (1995). Response of till and no-till maize to nitrogen fertilizer after different winter crops. Zagazig J. Agric. Res., 22 (2): 287-299.

Soliman, F.H., A. Sh. Gouda, M.N. Ragheb and Samia M. Amer (1995). Response of maize (Zea mays L) hybrids to plant population density under different environmental conditions. Zagazig J. Agric. Res., 22 (3): 663-676.

Tantawy, A.A.; G.G.D. Salamh and M.S. Mekky (1994). The effect of plant population, plant distribution and weed control treatment on yield and its components of corn (Zea Maiz L.) Minia J. QAgric. Res. Rev. 16 (1): 173-187.

Tantawy, A.A. and M.S. Mekky (1998). The effect of plant population and weed control treatments on yield, yield components and chemical contents of some maize varieties (Zea mays L.) Proc. 8th Conf. Agron. Suez Canal Univ. Ismailia Egypt 28-28, 190-200.

تعظيم أستخدام بعض النظم المزرعية لتحسين انتاجية الذرة الشامية تحت ظروف الأراضى المستصحلة بشرق الدلتا.

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لوحظ فى الأراضى حديثة الأستصلاح بشرق الدلتا كثرة الحشائش الحولية المعمرة مما يقلل من انتاجية المحاصيل الحقلية وتهدف هذه الدراسة إلى استخدام بعض النظم الزراعية مثل الخدمة المزرعية لإعداد مرقد جيد للبذرة والوصول إلى أنسب عرض للخط الذى يقلل من أنتشار الحشائش وأيضاً الوصول إلى أنسب طريقة من طرق مقاومة الحشائش لمعظمة أنتاجية محصول الذرة فى تلك الأراضى بشرق الدلتا.

ولتحقيق ذلك أقيمت تجربتان حقليتان بالمزرعة التجريبية بمحطة البحوث بالقصاصين بمحافظة الاسماعيلية خلال عامى ٢٠٠١-٢٠٠٢ لدراسة أستجابة نباتات الذرة صنف جيزة ٢. للخدمة المزرعية (خدمة وبدون خدمة) وثلاث معاملات لعرض الخط (٦٠، ٧٠، ٨٠سم) ومقاومة الحشائش (بدون مقاومة ومقاومة يدوية ومقاومة كيميائية بأستخدام مبيد الحشائش ستارين ٢٠% بمعدل ٢٠٠ملى للفدان بعد شهر من الزراعة).

تتلخص أهم النتائج المتحصل عليها:

- أدت عمليات خدمة الأرض إلى تحسين نمو نباتات الذرة وزيادة المحصول ومكوناته بينما أدت إلى تقليل نمو الحشائش.
- أدى زيادة عرض الخط من ٦٠ إلى ٨٠سم إلى زيادة معنوية فى عدد الأيام للوصول إلى ٥٠% من ظهور النورة المؤنثة والمذكرة، سمك الساق، مساحة ورقة الكوز، أرتفاع وطول وعرض الكوز، عدد الحبوب فى الكوز، وزن حبوب الكوز، نسبة التقشير، وزن المائة حبة، والوزن الغض والجاف للحشائش عريضة الأوراق وأيضاً الكلية بينما تم الحصول على أعلى قيمة لطول النبات ومحصول الذرة للفدان عند عرض الخط ٧٠سم.
- أدت طريقة مقاومة الحشائش يدويا وميكيانيكيا إلى الحصول إلى أعلى القيم من محصول الذرة للفدان الذى كان متمشياً مع الزيادة الملحوظة فى مكونات المحصول بينما تم الحصول على أقل قيمة من المعاملة بدون مقاومة الحشائش فى المحصول ومكوناته أيضاً أستعمال المقاومة اليدوية للحشائش أعطت أقل قيمة للوزن الغض والجاف للحشائش يليها المقاومة الكيميائية حيث أن المقاومة الكيميائية أثرت تأثير ملحوظ على الحشائش عريضة الأوراق فقط ولكنها لا تستطيع القضاء على كل الحشائش فى هذه المنطقة.

- أدى التفاعل بين نظام خدمة الأرض المعتاد وعرض الخط إلى تأثير معنوى على محصول الذرة للفدان ومعظم مكونات المحصول وأيضاً الوزن الغض والجاف للحشائش – أيضاً التفاعل بين نظام خدمة الأرض وطرق مقاومة الحشائش إلى زيادة محلوظة فى محصول الذرة للفدان ونقص فى الوزن الغض والجاف للحشائش.
- أظهرت النتائج السابقة إلى أن أعلى قيمة امحصول الذرة للفدان كمتوسط (١٨,٥ أردب للفدان) تم الحصول عليها من أستخدام الخدمة المزرعية وأعداد مرقد جيد للزراعة مقارنة بدون خدمة التى أعطت (١٤,١٢ أردب للفدان) أيضاً تم الحصول على أعلى قيمة للمحصول عند عرض خط ٧٠سم كمتوسط (١٧,٥ إردب للفدان) بينما أقل قيمة للمحصول للفدان تم الحصول عليها عند عرض خط ٨٠سم (١٥ أردب للفدان)، أما بالنسبة لطرق مقاومة الحشائش تم الحصول على أعلى قيمة للمحصول للفدان نتيجة للزيادة الملحوظة فى مكونات المحصول تحت الدراسة من أستخدام طريقة المقاومة اليدوية كمتوسط (١٩,٢٥ أردب للفدان) بينما تم الحصول على أقل قيمة من المعاملة كنترول التى لا تقاوم الحشائش فيها كمتوسط (١٢,٤٧ أردب للفدان) وكان ذلك ايضاً نتيجة لنقص الوزن الغض والجاف للحشائش باستخدام طريقة مقاومة الحشائش اليدوية يتبعها طريقة المقاومة الكيميائية.

لذلك توصى الدراسة باستخدام نظم الخدمة المزرعية مع زراعة نباتات الذرة الشامية على خطوط بعرض ٧٠سم بين الخطوط مع مقاومة الحشائش بالطريقة اليدوية للوصول إلى أعلى أنتاجية لمحصول الذرة الشامية تحت ظروف الأراضى المستصلحة بشرق الدلتا.