J. Agric. Sci. Mansoura Univ., 31 (12): 7485 - 7496, 2006

GROWTH, YIELD AND YIELD COMPONENTS OF MAIZE (*Zea mays* L.) AS INFLUNCED BY NITROGEN FERTILIZATION LEVELS AND MECHANICAL WEED CONTROL TREATMENTS.

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ABSTRACT

Two field experiments were conducted at Shandaweel Research Station farm at Sohage during 2004 and 2005 seasons. This work aimed to find out the effect of nitrogen fertilizer levels (90, 120 and 150 kg/fed.) and some mechanical weed control treatments (hand hoeing at 15 and 30 DAS, hand hoeing at 15 and 45 DAS, hand hoeing at 30 and 45 DAS, hand hoeing at 15,30 and 45 DAS and un-weeded) on growth, yield and yield components of maize (single cross 10).Split-plot design in four replications was used in this study. The main plots were assigned to three nitrogen fertilizer levels, while the five weed control treatments were assigned in sub- plots.

Decreasing nitrogen rates reduced significantly dry weights of grassy weeds, dry weight of broad leaved weeds and dry weight of total weeds. Increasing nitrogen levels from 90 to 150 kg/fed. increased significantly all growth characters, yield components and grain yield of maize.

All mechanical weed control treatments reduced the dry weights of grassy and broad leaved weeds and total weeds compared with un-weeded. The most effective weed control treatment against maize weeds were hand hoeing thrice at 15,30 and 45 DAS which controlled 88.1% of total weeds. Also, all weed treatments surpassed the un-weeded in the all estimated maize characters. Hand hoeing thrice at 15,30 and 45 DAS was the superior treatment than other ones in growth characters, yield components and grain yield of maize.

Maize plants treated with hand hoeing thrice at 15,30 and 45 DAS and fertilized with 150 kg N/fed. gave the highest grain yield and yield components.

INTRODUCTION

Maize is one of the most important cereal crops in the world and Egypt. Maize grain is widely used for both human and animal feeding. Weed control and nitrogen fertilization are among the important factors affecting maize productivity. Nitrogen is the most limiting nutrient for cereal crops production. Improving maize growth (plant height, plant diameter, dry matter accumulation and LAI) due to increasing nitrogen supply was achieved by Okpara (2000), Tripathi and Hazra (2002),El-Nagar (2003), Okeleye and Oyekanmi (2003), and Berzsenyi and Lap (2005).Many investigators found that increasing nitrogen application increased grain yield and its components i.e. ear length, ear diameter, number of rows/ear, number of kernels/ear, 100-kernel weight and shelling percentage (Bader *et al* 1997, El-Sheikh, 1998, Griesh and Yakout 2001, El-Metwally *et al* 2001,El-Nagar 2002, Oraby *et al* 2003, Saleh *et al* 2003 and Abdel-Hameed 2005).

Weeds create a serious problem in maize fields. It can cause tremendous crop losses depending on the competitiveness of the crop, composition of the weed flora, and level of weed infestation (Akobundu *et al.*,

2000; Chikoye and Ekeleme, 2003). The use of physical and mechanical weed control means (such as hoeing, ridging and flaming) allows, if properly planned and managed, the control of weeds in row crops that is similar to that obtained by chemicals (Balsari *et al*,1993). Faisal (1989), Salama (1989), Tantawy *et al* (1993) and Khajanji *et al* (2005) mentioned that chemical and mechanical weed control treatments affected significantly ear length, number of rows/ear, 100-kernels weight, grain yield/fed and shelling percentage. Khajanji *et al* (2003a) and (2003b) and Shekhawat and Gautam (2002) found that weed control methods, i.e. atrazine and hand weeding twice at 25 and 50 DAS, proved superior to the weedy control with respect to growth characters and grain yield, also reduction the weed dry weight. Singh and Singh (2003) reported that higher plant height, number of leaves per plant, leaf area index, dry weight of plant and grain yield were observed under hand weeding at 25 and 45 DAS compared with the control. Sharara *et al* (2005) mentioned that hand hoeing twice treatment was the most effective treatment for controlling the weeds and increasing the maize productivity compared with control or other chemical treatments.

The present investigation aimed to evaluate efficiency of some mechanical weed control treatments under nitrogen application levels on weeds as well as growth, yield components and grain yield of maize crop.

MATERIALS AND METHODS

Two field experiments were conducted at Shandaweel Research Station farm at Sohage during 2004 and 2005 seasons. This work aimed to find out the effect of nitrogen fertilizer levels and some mechanical weed control treatments on growth, yield and yield components of maize (single cross 10). Split-plot design in four replications was used in this study. The main plots were assigned to three nitrogen fertilizer levels 90, 120 and 150 kg N/fed., while the five weed control treatments were assigned in sub- plots.

Weed control treatments:

T_1-Hand hoeing at 15 and 30 days after sowing (DAS), T_2-hand hoeing at 15 and 45 DAS, T_3-hand hoeing at 30 and 45 DAS, T_4-hand hoeing at 15,30 and 45 DAS and T_5-unweeded. Each sub- plot consisted of 5 rows of 4 m long and 70 cm apart. The area of each sub- plot was 14 m^2. Grains were hand sowing as the usual dry method of sowing on one side of ridges at space of 25 cm between hills at the 3rd of June in both seasons. The experimental soil was clay loam in texture with pH value of 7.8, organic mater content of 1.6%, total N 1.2%, available P and K of 7.5 and 160 ppm, respectively. The preceding crop was faba bean in both seasons. Mineral nitrogen was applied as urea (46.5% N) in two equal doses after 21and 30 days from planting. Phosphorus fertilizer was added as super phosphate (15.5% P_2O_5) at rate of 150 kg /fed before planting. Potassium was added at recommended rate of 24 kg K_2O/fed after thinning.

Data recorded:

Weed survey; weeds were hand pulled from one square meter chosen at random in each plot after 75 days from sowing. Weeds were identified and classified into two main groups (annual grasses and broad leaved weeds). Weeds of each group were air-dry for seven days then dried in oven at 70 C°

for 48 hours until a constant weight. Dry weight in (g/m^2)of each weed group were recorded for grassy weeds, broad leaved weeds and total dry weight of weeds. The dominant weed species counted in the experimental plots in both seasons are shown in Table 1.

Table 1: Scientific name, common name and family for weeds accompanied maize crop in the experimental site during 2004 and 2005 seasons, survey in Shandaweel Research Station

Weeds type	Scientific name	Common name	Family
Broad leaved	*Xanthium spinosum* L.	Ever lasting (cub weed)	Asteraceae
	Portulaca oleracea L.	Common puslane	Protulaceceae
	Euphorbia peplus L.	Leafy spurge	Euphorbiaceae
	Lotus corniculatus L.	Birds foot -trefoil	Leguminosae
	Corchorus olitorius L.	Malta jute	Tiliaceae
	Amaranthus hybridus L.	Pig weed	Amaranthaceae
Grassy	*Echinochola colonum* L.	Jungle rice	Poaceae

At 50,70 and 90 DAS, five maize plants were taken at random from each plot to determine growth characteristics as follow: Plant height (cm), number of leaves/plant, total dry weight/plant, leaf area index (LAI) and crop growth rate (CGR) calculated according to Watson (1952).

At harvest, a random sample of 10 maize plants was taken from each plot to determine ear length (cm), ear diameter (cm), number of rows per ear, number of kernels per ear, ear weight (g), kernel ear weight (g), shelling% and 100-kernel weight (g)). In addition, grain yield (ardab/fed) was estimated on plot basis.

Data were subjected to analysis of variance as described by Gomez and Gomez (1984). Least significant difference (LSD) test at 0.05 level was used to compare between means of treatments.

RESULTS AND DISCUSSION

I-Effect of nitrogen levels:

a-Weeds:

The results listed in Table 2 reveal that nitrogen levels affected significantly dry weights of grassy weeds, broad leaved weeds and total weeds (g/m^2) in both seasons. The low nitrogen level (90 kg N/fed.) decreased significantly all above traits compared with the high nitrogen level (150 kg N/fed.). In the first season the high level of nitrogen increased significantly dry weights of grassy weeds, broad leaved weeds and total weeds (g/m^2) by 71, 57 and 64%, respectively compared with low level of nitrogen and by 67, 70 and 68% in the second season in this respective. Urea fertilizer stimulated the germination of weed seeds and increased vegetative growth of weed plant and consequently increased their accumulated increased the amounts of dry matter per plant.

Table 2: Effect of nitrogen fertilization levels and mechanical weed control treatments on dry weight of weeds (g/m^2) at 90 days from sowing in 2004 and 2005 seasons.

Treatments	Dry weight of weeds (g/m^2)					
	Grassy		Broad leaved		Total	
	2004	2005	2004	2005	2004	2005
Nitrogen levels (kg/fed)						
90	60.2	79.5	68.2	83.9	128.4	163.4
120	72.7	102.1	74.9	106.4	147.6	208.5
150	103.0	133.0	107.1	142.6	210.1	275.6
L.S.D. at 0.05%	7.5	3.2	14.1	7.7	19.3	6.9
Weed control						
T_1 (hand hoeing at 15 and 30 DAS)	39.2	44.3	42.3	52.1	81.4	96.3
T_2 (hand hoeing at 15 and 45 DAS)	49.7	58.2	44.0	59.1	93.7	117.3
T_3 (hand hoeing at 30 and 45 DAS)	43.4	64.9	42.4	69.5	85.8	134.3
T_4 (hand hoeing at 15, 30 and 45 DAS)	28.1	31.8	33.4	41.0	61.5	72.8
T_5 Un-weeded (control)	232.8	325.4	254.9	333.2	487.7	658.6
L.S.D. at 0.05%	*8.9*	*10.6*	*13.7*	*12.5*	*17.5*	*19.9*

b-Growth characters:

Data presented in Tables 3 and 4 show that high level of nitrogen (150 kg/fed) increased significantly plant height, stalk diameter, number of leaves /plant, LAI, dry weight /plant and crop growth rate (CGR) in all growth stages i.e. 50, 70 and 90 DAS and both seasons except for plant height at 50 DAS in the first and second seasons this affect is not significant. The significant response of growth characters to the higher rate of nitrogen could attributed to the important role of nitrogen in producing carbohydrates, enzymes and other compounds which play an important role in enhancing cell division and enlargement. Similar results were obtained by Okpara (2000), Tripathi and Hazra (2002),El-Nagar (2003), Okeleye and Oyekanmi (2003), and Berzsenyi and Lap (2005).

c-Yield and yield components:

Data presented in Table 5 shows that increasing nitrogen levels from 90 to 120 and 150 kg/fed. significantly increased ear length, ear diameter, number of rows /ear, number of kernels /ear, ear weight, kernel ear weight, shelling% and 100-kernel weight. Also, maize grain yield (ardab/fed.) increased significantly and consonantly with increasing nitrogen levels. This increase in the first season amounted to 25.17 and 8.53% compared with the low and medium levels of nitrogen, respectively and 29.58 and 7.58% in the second one. While, the medium level of nitrogen (120 kg/fed.) gave higher grain yield/fed. than the low levels of nitrogen (90 kg/fed) by 15.34 and 20.45% in the first and second seasons, respectively.These increases may be due to the fact of that nitrogen is generally deficient in Egyptian soils and therefore its addition enables the plants to absorb balanced nutrients, which promotes the synthesis of photosynthates and the accumulation of assimilates and a consequence growth and yield are enhanced. These findings are in harmony with those reported by Bader *et al* (1997), El-Sheikh, (1998), Griesh and Yakout (2001), El-Metwally *et al* (2001),El-Nagar (2002), Oraby *et al* (2003), Saleh *et al* (2003) and Abdel-Hameed (2005).

Table 3: Effect of nitrogen fertilization levels and mechanical weed control treatments on plant height, stalk diameter and number of leaves/plant at 50, 70 and 90 days after sowing of maize.

Treatments	Plant height (cm)						Stalk diameter (cm)						Number of leaves /plant					
	50 DAS		70 DAS		90 DAS		50 DAS		70 DAS		90 DAS		50 DAS		70 DAS		90 DAS	
	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
Nitrogen levels																		
90 kg/fed	109.6	116.4	159.1	135.2	247.4	252.0	1.004	1.078	1.32	1.35	2.02	1.66	7.74	7.76	11.25	10.94	13.14	11.83
120 kg/fed	112.4	113.5	198.1	186.7	253.6	263.0	1.028	1.109	1.45	1.53	2.17	2.60	8.23	8.39	12.24	11.53	13.38	12.34
150 kg/fed	115.4	120.0	208.1	193.7	265.4	278.0	1.113	1.229	1.52	1.56	2.43	2.64	9.47	9.09	12.36	12.74	13.55	13.22
L.S.D at 0.05%	NS	NS	8.6	6.2	11.0	13.0	0.049	0.090	0.11	0.13	0.15	0.14	0.51	0.64	0.88	0.53	0.33	0.24
Weed control																		
T_1	114.7	126.2	184.8	175.3	259.5	269.0	1.119	1.2	1.43	1.58	2.23	2.44	8.67	8.88	12.26	12.40	13.88	13.15
T_2	102.9	119.9	182.7	165.3	251.7	261.0	0.954	1.056	1.40	1.41	2.11	2.35	8.28	7.83	11.67	11.35	13.26	12.04
T_3	103.6	119.4	186.9	172.4	254.4	266.0	0.968	1.083	1.37	1.43	2.16	2.31	8.18	7.28	11.88	11.33	13.32	11.72
T_4	130.4	135.4	213.4	189.3	271.2	281.0	1.319	1.392	1.70	1.73	2.55	2.63	10.19	10.91	13.17	13.01	14.19	13.76
T_5	99.1	97.3	174.4	157.0	240.6	244.0	0.879	0.953	1.26	1.30	1.97	1.79	7.07	7.15	10.77	10.59	12.13	11.65
L.S.D at 0.05%	7.3	5.9	13.1	10.9	9.3	10.0	0.125	0.100	0.11	0.12	0.11	0.13	0.73	0.72	0.75	0.57	0.45	0.33

T_1=Hand hoeing twice at 15 and 30 days after sowing (DAS), T_2= Hand hoeing twice at 15 and 45 days after sowing, T_3= Hand hoeing twice at 30 and 45 days after sowing, T_4= Hand hoeing thrice at 15, 30 and 45 days after sowing, T_5=Control (un-weeded)

Table 4: Effect of nitrogen fertilization levels and mechanical weed control treatments on leaf area index, dry weight/plant and crop growth rate at 50, 70 and 90 days after sowing of maize.

Treatments	Leaf area index (LAI)						Dry weight /plant g						Crop growth rate (CGR) g/week			
	50 DAS		70 DAS		90 DAS		50 DAS		70 DAS		90 DAS		50-70 DAS		70-90 DAS	
	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
Nitrogen levels																
90 kg/fed	3.03	3.47	4.07	4.21	4.32	4.62	45.89	50.88	64.18	81.25	292.63	310.19	6.40	10.63	79.96	80.13
120 kg/fed	3.56	3.90	4.94	4.82	5.26	5.20	52.09	61.17	80.12	97.17	323.82	366.54	9.81	12.60	85.30	94.28
150 kg/fed	4.67	5.26	5.46	5.16	5.71	6.00	53.77	69.69	93.66	117.15	353.71	402.26	13.96	16.61	91.02	99.79
L.S.D at 0.05%	**0.38**	**0.38**	**0.43**	**0.24**	**0.42**	**0.49**	**3.23**	**4.97**	**12.33**	**7.96**	**6.75**	**10.04**	**2.50**	**2.58**	**3.40**	**3.32**
Weed control																
T_1	4.30	4.70	5.36	5.03	5.80	5.51	53.92	65.39	84.91	105.67	360.97	370.46	10.85	14.10	96.62	92.68
T_2	3.62	3.99	4.75	4.52	4.93	5.35	48.33	57.46	75.19	89.23	320.78	342.03	9.40	11.12	85.96	88.48
T_3	3.33	3.66	4.47	4.39	4.58	4.51	48.59	56.86	74.18	87.71	294.64	334.23	8.96	10.80	77.16	86.28
T_4	4.90	5.29	5.95	5.56	6.41	6.51	69.18	74.87	101.14	124.94	377.00	402.00	11.19	17.52	96.55	96.97
T_5	2.58	3.42	4.11	4.16	4.78	4.47	37.90	48.31	61.19	85.08	263.56	261.27	8.15	12.87	70.83	61.67
L.S.D at 0.05%	0.39	0.43	0.43	0.29	0.37	0.29	5.48	4.52	7.07	7.73	10.49	14.89	1.95	1.93	2.45	3.95

T_1=Hand hoeing twice at 15 and 30 days after sowing (DAS), T_2= Hand hoeing twice at 15 and 45 days after sowing, T_3= Hand hoeing twice at 30 and 45 days after sowing, T_4= Hand hoeing thrice at 15, 30 and 45 days after sowing, T_5=Control (un-weeded)

Table 5: Effect of nitrogen fertilization levels and mechanical weed control treatments on ear length, ear diameter, number of kernels/ear , 100-kernel weight, ear weight, kernels weight/ear, shelling % and grain yield of maize.

Treatments	Ear length (cm)		Ear diameter(cm)		Number of rows/ear		Number of kernels/ear		100-kernel weight (g)		Ear weight (g)		Kernels weight/ear(g)		Shelling %		Grain yield ardab/fed	
	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
Nitrogen levels																		
90 kg/fed	16.96	19.39	2.97	3.67	11.09	11.28	433	408	32.9	34.4	209.8	211.8	157.4	163.1	74.70	76.67	18.91	18.83
120 kg/fed	18.09	20.58	3.51	4.12	11.98	12.36	447	536	34.3	35.8	218.5	221.0	172.0	177.1	78.33	79.80	21.81	22.68
150 kg/fed	18.16	23.02	3.51	4.38	12.74	12.64	5.40	616	36.2	38.1	231.1	232.5	189.4	193.2	81.77	82.87	23.67	24.40
L.S.D at 0.05%	**0.48**	**0.42**	**0.28**	**0.14**	**0.42**	**0.26**	**7**	**15**	**1.0**	**0.9**	**3.0**	**3.1**	**7.6**	**7.9**	**3.02**	**2.97**	**1.08**	**1.41**
Weed control																		
T_1	18.22	22.82	3.34	4.31	12.60	12.39	489	529	37.4	38.5	236.3	238.8	187.5	193.4	79.33	81.00	24.75	25.84
T_2	17.81	20.77	3.15	4.05	11.71	11.80	477	487	35.7	36.3	216.9	219.4	167.8	174.7	77.00	79.22	20.96	22.44
T_3	17.03	19.30	3.76	3.92	11.32	11.69	467	513	32.2	34.6	204.9	207.1	162.1	163.8	78.94	79.00	18.31	20.11
T_4	18.69	24.83	3.86	4.62	13.07	13.19	532	620	38.9	39.6	253.9	255.4	209.3	213.7	82.33	83.56	27.42	27.58
T_5	16.92	17.27	2.93	3.38	10.98	11.38	402	451	28.4	31.4	186.8	188.0	137.9	143.2	73.72	76.11	15.86	13.86
L.S.D at 0.05%	0.90	0.86	0.25	0.19	0.38	0.48	7	14	1.1	1.2	5.7	5.6	7.6	7.8	2.12	2.12	1.09	0.96

T_1=Hand hoeing twice at 15 and 30 days after sowing (DAS), T_2= Hand hoeing twice at 15 and 45 days after sowing, T_3= Hand hoeing twice at 30 and 45 days after sowing, T_4= Hand hoeing thrice at 15, 30 and 45 days after sowing, T_5=Control (un-weeded)

II-Effect of weed control treatments on:

a-Weeds:

Results given in Table 2 showed that all mechanical weed control treatments reduced significantly the dry weights of grassy, broad leaved and total weeds. Hand hoeing thrice at 15, 30 and 45 DAS was the potent weed control treatment and reduced the dry weights of grassy, broad leaved and total weeds by 87.9, 86.9 and 87.4% in the first season and by 90.2, 87.7 and 88.9% in the second season, respectively compared with un-weeded (control). Such treatment continuously eliminated weeds grown along most of the growing season of maize plant and consequently gave the highest reduction in dry weight of maize weeds. These results were in consistence with those obtained by Khajanji *et al* (2003a and 2003b), Shekhawat and Gautam (2002) and Sharara *et al* (2005).

b- Growth characters:

Data in Tables 3 and 4 indicate that mechanical weed control treatments had significant effect on plant height, stalk diameter, number of leaves /plant, LAI, total dry weight /plant and crop growth rate in all growth stages and both seasons. All mechanical weed control increased significantly all growth parameters compared with control (un-weeded). Hand hoeing thrice at 15, 30 and 45 DAS gave the best of all growth characters. These results are in agreement with those obtained by Shekhawat and Gautam (2002) and Singh and Singh (2003).

c-Yield and yield components:

The organized data in Table 5 elucidate the effect of weed control treatments on the yield and yield components of maize. It is clear that ear length, ear diameter, number of rows /ear, number of kernels /ear, ear weight, kernel ear weight, shelling%, 100-kernel weight and grain yield were significantly affected by weed control treatments. The greatest values of all above traits were obtained by hand hoeing thrice at 15, 30 and 45 DAS. This treatment increased significantly grain yield (ardab/fed) in the first season by 72.9, 49.7, 30.8 and 10.8% compared with un-weeded, hand hoeing twice at 30 and 45 DAS, hand hoeing twice at 15and 45 DAS and hand hoeing twice at 15 and 30 DAS, respectively and by 98.9, 37.1, 22.9 and 6.7% in the second season at above respective. This finding is almost expected, since three hoeings treatment exerted the highest reduction in dry weight of maize weeds (Table 2) and minimized the weed application strength against crop plant and afforded to them more utilization of available environmental resources to maximize grain yield and its attributes. Similar results were obtained by Faisal (1989), Salama (1989), Tantawy *et al* (1993) and Khajanji *et al* (2005).

II- Interaction effects:

Data presented in Table 6 indicate that the highest controlling for total weeds was obtained by the hand hoeing at 15, 30 and 45 DAS and nitrogen fertilizer at 90 kg/fed. (46.2 and 55.2 g/m^2 in the first and second seasons, respectively).

Table 6:Effect of interaction between nitrogen fertilization levels and mechanical weed control treatments on dry weight of weeds, number of kernel/ear, ear weight, kernel weight/ear, shelling% and grain yield of maize.

Nitrogen levels	Weed control	Dry weight of grassy weeds		Dry weight of broad leaved weeds		Dry weight of total weeds		Number of kernels/ear		Ear weight (g)		Kernels weight/ear(g)		Shelling %		Grain yield ardab/fed	
		2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
90 kg/fed	T_1	30.0	32.9	37.1	39.3	67.0	72.1	454	388	229.7	232.7	176.7	183.7	77.00	79.00	22.20	21.18
	T_2	38.6	44.4	40.1	44.5	78.6	88.9	444	372	205.3	201.3	148.6	149.1	72.38	74.00	18.60	19.55
	T_3	34.4	46.0	37.4	54.0	71.7	100.0	436	386	199.3	201.3	150.4	155.9	75.33	77.33	16.78	16.43
	T_4	18.9	24.0	27.3	31.2	46.2	55.2	453	546	239.3	241.3	189.5	194.7	79.17	80.67	23.78	23.95
	T_5	179.0	250.2	199.3	250.6	378.3	500.8	377	349	175.3	182.3	124.0	131.9	70.73	72.33	13.18	13.05
120 kg/fed	T_1	37.4	45.2	42.2	49.5	79.6	94.6	472	536	239.3	240.3	193.1	198.7	80.67	82.67	23.78	27.50
	T_2	52.1	60.2	43.2	54.6	95.3	114.8	451	508	213.0	217.0	161.3	167.1	75.73	77.00	22.90	22.88
	T_3	42.6	69.2	42.2	65.7	84.8	134.9	439	566	202.5	205.0	157.4	161.4	77.67	78.67	19.75	20.35
	T_4	25.9	30.8	33.3	42.2	59.3	73.0	491	630	251.5	255.0	211.2	215.1	84.00	84.33	27.35	27.88
	T_5	205.4	305.3	312.9	320.1	419.3	625.4	380	443	184.2	187.7	136.9	143.2	74.33	76.33	15.25	12.78
150 kg/fed	T_1	50.1	54.8	47.6	67.5	97.7	122.2	540	663	239.8	243.3	192.7	197.9	80.33	81.33	28.27	28.85
	T_2	58.4	69.8	48.8	78.3	107.1	148.2	536	583	230.5	240.0	195.0	208	84.60	86.67	21.40	24.90
	T_3	53.3	79.4	47.7	88.7	101.0	168.1	525	588	213.0	215.0	178.6	174.2	83.83	81.00	18.40	23.58
	T_4	39.4	40.6	39.7	49.5	79.1	90.1	651	686	264.0	270.0	223.0	231.4	84.47	85.67	29.13	30.90
	T_5	314.1	420.6	351.5	426.0	665.6	849.6	447	562	201.0	194.0	152.8	154.6	76.02	79.67	19.15	13.78
L.S.D at 0.05%		*15.5*	*18.3*	*23.8*	*21.7*	*30.4*	*34.5*	*12*	*28*	*9.9*	*9.7*	*13.1*	*13.4*	*3.70*	*3.70*	*1.74*	*1.54*

T_1=Hand hoeing twice at 15 and 30 days after sowing (DAS), T_2= Hand hoeing twice at 15 and 45 days after sowing, T_3= Hand hoeing twice at 30 and 45 days after sowing, T_4= Hand hoeing thrice at 15, 30 and 45 days after sowing, T_5=Control (un-weeded)

Concerning the effect of the interaction on maize yield and its components, data in Table 6 show that low level of nitrogen (90 kg/fed.) and un-weeded gave the lowest maize grain yield (13.18 and 13.05 ardab/fed in the first and second seasons, respectively). Maize treated with high rate of nitrogen (150 kg/fed.) with hand hoeing thrice at 15, 30 and 45 DAS gave the highest grain yield (29.13 and 30.90 ardab/fed in the first and second seasons, respectively). All treatments gave grain yield higher than the un-weeded and fertilization by low rate of nitrogen. The highest number of kernel /ear, ear weight and kernel ear weight were obtained from nitrogen fertilizer at 150 kg/fed. and hand hoeing thrice at 15, 30 and 45 DAS. While, the highest shelling% (84.60 and 86.67% in the first and second seasons, respectively) was obtained from nitrogen fertilizer at 150 kg/fed. and hand hoeing twice at 15 and 45 DAS (Table 6).

REFERENCES

Abdel- Hameed, I. M. (2005). Effect of sources and levels of nitrogen fertilizer on productivity of maize. Proc. 11th Conf. Agron. Dept., Fac. Agric., Assiut Univ.1:171-187.

Akobundu, I.O.; U.E. Udensi and D. Chikoye (2000). Velvet bean (*Mucuma* spp.) suppresses *Imperata cylindrica* (L.) Raeuch. and increases maize yield. Int. J. Pest Manage. 46, 103-108.

Bader, A.M; G.Y. Hammam; F.T. El-Sheikh and N.K. El-Gezawy (1997). Effect of nitrogen fertilization and Arispon (foliar spray) on some maize varieties grown on a clay soil in Kalubia Governorate. Proc.1st Ann. Sympo., Plant Nutrition, and Fertilization. The National Res. Center, Cairo, 1-2 Sept.

Balsari, P; G. Airoldi and A. Ferrero (1993). Evalution of the mechanical weed control in maize and soybean. Proc. of 8th Symposium European Weed Res. Society, Braunschweig, Germany, 341-348.

Berzsenyi, Z. and D.Q. Lap (2005). Effect of sowing date, nitrogen fertilization and plant density on the dynamics of dry matter accumulation and yield formation of maize (*Zea mays* L.) hybrids. Cereal Res. Communications; 33(1): 85-88.

Chikoye, D. and F. Ekeleme (2003). Cover crops for cogongrass [*Imperata cylindrica* (L.) Raeuch.] management and effects on subsequent maize yield. Weed Sci. 51, 792-797.

El- Metwally, I. M.: S. A. Ahmed and A. Saad El- Din (2001). Nitrogen fertilizer levels and some weed control treatments effects on maize and its associated weeds .J. Agric. Sci. Mansoura Univ., 23(5): 1855-1864.

El-Nagar, G.R. (2002). Effect of nitrogen fertilizer and foliar application with micronutrients on white and yellow maize. Assiut J. Agric. Sci., 33(3): 85-102.

El-Nagar, G.R. (2003). Integrating mineral and bio-fixed nitrogen fertilization in maize production under different irrigation regimes. Assiut J. Agric. Sci., 34(5): 53-76.

El-Sheikh, F.T.Z. (1998). Effect of plant population densities on nitrogen use efficiency of some maize varieties. Ann. Agric. Sci., Moshtohor, 36(1): 143-162.

Faisal, R.I.I. (1989). Effect of weed control on maize. Ph.D. Fac. Agric. Al-Azhar Univ., Egypt.

Gomez, K.A. and A.A. Gomez (1984). Statistical Procedures for Agricultural Research. John Willey and Sons. Inc, New York, U.S.A.

Griesh, M.H. and G.M. Yakout (2001). Effect of plant population density and nitrogen fertilization on yield and yield components of some white and yellow maize hybrids under drip irrigation system in sandy soil. Plant nutrition:-food security and sustainability of agroecosystems through basic and applied research Fourteenth International Plant Nutrition Colloquium, Hannover, Germany; 810-811.

Khajanji, S.N.; J.R. Patel and R.C. Gautam (2005). Growth and yield attributes and yield of maize as influenced by tillage and weed control methods. Environment and Ecology; 23(Spl-1): 144-146.

Khajanji, S.N.; R.C. Gautam and J.R. Patel (2003a). Residual effect of tillage and weed control practices applied to rainy season maize on winter wheat. J. of Maharashtra Agric. Univ.; 27(3): 279-282.

Khajanji, S.N.; R.C. Gautam and J.R. Patel (2003b). Effect of tillage and weed control methods on growth and yield of maize. J. of Maharashtra Agric. Univ.; 27(3): 277-279.

Okeleye, K.A. and A.A. Oyekanmi (2003). Influence of tillage systems and nitrogen fertilizer levels on growth and yield of maize (*Zea mays* L.) hybrids. Moor J. Agric. Res.; 4(1): 26-36.

Okpara, D.A. (2000). Growth and yield of maize and vegetable cowpea as influenced by intercropping and nitrogen fertilizer in the lowland humid tropics. J. of Sustainable Agric. and the Environ.; 2(2): 188-194.

Oraby, F. T.: A. A. Sarhan: M. F. and A. H. Bassiony Abdel-Maksoud (2003). Proper agronomic practices required to maximize productivity of some maize varieties in old and reclaimed soils: Effect of sowing dates on response of two maize hybrids to nitrogen fertilization. Egypt. J. Appli. Sci. 18(5B).

Salama, G.G.D. (1989). Effect of plant density and some different methods of weed control on weedness, yield and yield components of maize. Minia J. Agric. Res. & Dev., 11(1): 1-20.

Saleh, S.A.; S.E.A. Toamia and A.H.A. Zohry (2003). Effect of agricultural management practices and bio & N-fertilizers on maize growth and yield. Egyptian J. Agric. Res.; 81(3): 1099-1116.

Sharara, F.A.; T.A. El-Shahawy and K.G. El-Rokiek (2005). Effect of some novel herbicides on the controlling weeds associated with maize plants. J. of Agron.; 4(2): 88-95.

Shekhawat, P.S. and R.C. Gautam (2002). Effect of row spacing and weed control methods on the growth attributes and grain yield of maize under tilled and untilled conditions. Ann. Agric. Res.; 23(4): 626-629.

Singh, A.P. and P.C. Singh (2003). Effect of different weed control methods on growth and yield of rabi-sown hybrid maize cv. hybrid 4640. J.of Living World; 10(2): 12-15.

Tantawy, A.A.; M.A. Yousef and M.S. Meky (1993). Effect of plant population, plant distribution and weed control treatments on yield, yield components and protein content of corn (*Zea mays* L.). Minia J. Agric. Res. & Dev., 16(1).

Tripathi, S.B. and C.R. Hazra (2002). Forage productivity of winter maize under legume covers as influenced by nitrogen fertilization. Indian Grassland and Fodder Res. Inst., Jhansi- 284003 (U.P.), India.

Watson, D. J. (1952). The physiological basis of variation in yield. Adv. Agron. 4, 101-145.

تأثر مستويات السماد النيتروجيني وبعض طرق المكافحة الميكانيكيـــة للحشـــائش على النمو والمحصول ومكوناته لنبات الذرة الشامية

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** المعمل المركزي لبحوث مقاومة الحشائش مركز البحوث الزراعية

أقيمت تجربتان حقليتان في المزرعة البحثية لمحطة البحـوث الزراعيـة بشـندويل فـي موسمي٢٠٠٤ و٢٠٠٥ بيدف دراسة تأثير ثلاثة مستويات من السماد الآزوتي (٩٠ ،١٢٠ ،١٥٠ كجم نيتروجين للفدان) وخمس معاملات ميكانيكية لمكافحة الحشائش (العزيق بعد ١٥ و ٣٠ يـوم من الزراعة، العزيق بعد ١٥ و ٤٥ يوم من الزراعة، العزيق بعد ٣٠ و ٤٥ يوم من الزراعـة، العزيق بعد ١٥ و٣٠ و ٤٥ يوم من الزراعة، وبدون عزيق) على النمو والمحصول ومكوناتـه لنبات الذرة الشامية (هجين فردى ١٠) . استخدم تصميم القطع المنشقة فى اربع مكررات حيث تم وضع مستويات التسميد النيتروجينى فى القطع الرئيسية بينما تم وضع معاملات مقاومة الحشائش فى القطع الشقية.

وتشير النتائج المتحصل عليها على الأتي:

أدت زيادة مستويات السماد الآزوتي المضافة إلى زيادة معنوية لصفات النمو ، ومكونات المحصول، ومحصول الحبوب للفدان. أعطى المستوى المنخفض من الازوت اقـل وزن جـاف للحشائش النجيلية والعريضة الأوراق والحشائش الكلية.

احدثت كل معاملات مكافحة الحشائش انخفاضا فى الوزن الجـاف للحشـائش النجيليـة وعريضة الأوراق والوزن الجاف الكلى للحشائش ، كذلك أدت هذه المعاملات إلى زيـادة كـل صفات النمو ومكونات المحصول ومحصول الحبوب للفدان زيادة معنوية مقارنة بعدم المقاومة .

ومن النتائج السابقة فأنه للحصول على اعلى انتاجية من محصول الذرة الشامية هجـين فردى ١٠ يوصى بإجراء ثلاث عزقات بعد ١٥ و٣٠ و٤٥ يوم من الزراعة مع التسميد بمعـدل ١٥٠كجم ازوت للفدان تحت ظروف هذه الدرلسة.