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YIELD AND YIELD COMPONENTS OF MAIZE AND SUNFLOWER AS AFFECTED BY PRECEDING CROP AND N-FERTILIZER LEVEL.

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ABSTRACT

Two field experiments were conducted at Sids Experimental Research Station, Beni Suief Governorate in 2001 and 2002 summer seasons in a split- plot design with three replications. Preceding winter crops (lentil, sugar beet and flax) were in main plots and N levels in the sub-plots with rates of 80, 105 and 130 kg N/fed for maize and 30, 45 and 60 kg N/ fed for sunflower.

The main results could be summarized as follows:

Highly significant differences due to the preceding winter crop were obtained in plant growth characters and yield of maize and sunflower. Maximum values were after lentil and minimum values after flax. Grain yield/ fed of maize grown after sugar beet and flax were 2.28, 14.01 % and 5.87, 17.92 % lower than those obtained after lentil in both seasons, respectively. While the reduction in seed yield/ fed of sunflower grown after sugar beet and flax were 11.72, 15.35 % and 7.85, 15.11 % compared with grown after lentil during the two seasons, respectively.

All growth characters of maize and sunflower were increased by increasing N levels up to 130 kg N/ fed for maize and 45 kg N/ fed for sunflower. The increments in grain yield of maize as affected by adding 130 kg N/fed over 80 and 105 kg N/ fed were 16.84, 8.12 % and 10.62, 5.75 % in both seasons, respectively. While the increments in seed yield of sunflower fertilized were 14.57, 10.28 % and 16.42, 8.21 % for 30 and 60 kg N/ fed. lower than yields obtained with 60 kg N/ fed in both seasons, respectively.

It could be concluded that the highest maize grain yield and sun flower seeds yield could be obtained by planting maize or sunflower after legume crops such as lentil and fertilized with 130 and 45 kg N/ fed for maize and sunflower, respectively.

INTRODUCTION

Maize and sunflower are positive affected by different factors such as preceding winter crops, cropping system, soil fertility and fertilizer level. Sequential cropping increasing yield as a result to correction in soil physical properties, in addition to better utilization of soil resources, Khalil *et al*; (2001). So, planting maize and sunflower after different winter crops and using mineral N- fertilizer may increase their productivity.

Maize grown after legume crops surpassed that after non-leguminous crops in grain yield, Shafshak *et al*; (1982) and El- Douby (2002). Cereal yield superiority after legume crops have been attributed to less N- uptake by the legume and increasing residual organic matter, MacCall, (1991), in addition to N- carrying from legume residue to the subsequent non legume crop, Senarante and Hardarson (1989).

Adding N- fertilizer attributed to increase grain yield of maize, reach optimize maize plant height, ear leaf area, number of grains/ row, grain yield/ ear and per fed, Khalil *et al*; (2001). Increasing N- fertilizer up to 120 or 150 kg N/fed attributed to increase all growth characters of maize i-e., plant and some agronomic characters, ear height, stem diameter, plants carrying two ears % and surviving plants, Matta et. Al., (1990) and Shams El- Din and El-Habbak (1996) and El- Douby (2002). Zahran *et al.*, (1997) found that application of 75 kg N/fed to T.W.C 310 and 90 kg N/fed to Balady c.v. gave satisfactory results.

Sunflower seed yield and growth characters significantly affected by preceding crop. Farghaly, (2001) mentioned that plant height, head diameter, head weight, seed yield/ plant and seed yield/ fed increased when sunflower followed faba bean, then sugar beet, whereas the lowest values produced after wheat.

Sorour and Attia (1988) showed that sunflower plant height, head diameter, seed yield/ plant, seed yield/ fed increased by increasing N-fertilizer. Abd El- Wahed (1996) found that 60 kg N/ fed of sunflower resulted in the maximum plant height, head diameter, seed yield/ plant, weight of 100 seeds and seed yield/ fed. Farghly (2001) indicated that seed yield of sunflower with 75 kg n /fed was higher than 45 kg N/ fed.

This research aims to study the effect of some preceding winter crops and N- fertilizer levels on yield and yield components of maize and sunflower.

MATERIALS AND METHODS

A field study was carried out at Sids Experimental Farm, Agricultural research Station, Beni Sueif Governorate during 2000/2001 and 2001/2002 seasons to study the effect of some preceding winter crops, i-e. Lentil *(Lens Cultinaris*, Med.), sugar beet (*Beta vulgaris*) and flax (*Linus Annus*) with three nitrogen fertilizer levels, 80, 105 and 130 kg N/ fed for maize and 30, 45 and 60 kg N/ fed for sunflower on yield and yield components.

Split plot design with three replications was used, the main plots were devoted to preceding crops, while the subplots were allocated for N fertilizer treatments. The soil texture is clay, pH 7.8 and 2.3 % organic matter. Some of chemical analyses before and after preceding winter crops under study are shown in Table (1).

Table (1): Soil chemical analysis for experimental site.

Chemical analysis	Before preceding crops	After preceding crops		
		Lentil	Sugar beet	Flax
N	43.0 ppm	51.0	46.0	40.0
P	12.8 ppm	14.5	11.1	11.5
K	310.0 ppm	330.0	290.0	300.0
CaCo3%	1.48	1.38	1.35	1.30
Ecm- moh/cm	0.47	0.43	0.40	0.38

Available N, P and K were determined according to Black (1965).

Physical analysis of the soil was:

Coarse sand	Fine sand	Silt	Clay	Soil textural
%	%	%	%	
2.1	11.10	36.60	50.20	clay

The subplot area was 21 m2 containing 5 ridges each one 7.0 m in length and 60 cm in width for sunflower and 24.5 m2 containing 5 ridges each one 7.0 m in length and 70 cm in width for maize. Cultivar S.C. 10 was sown on 25 th and 28 th of May and sunflower var. (vedoc) was sown on 5 th and 10 th of May during the successive seasons. Nitrogen fertilizer was applied in three equal doses during the preparation of land and just before first and second irrigation of maize and sunflower. The form of nitrogen application was ammonium nitrate (33.5 % N). All cultural practices were uniformly applied as recommended for maize and sunflower crops.

Maize characters were recorded as follows:

plant height (cm), stem diameter (mm), leaf area of topmost ear leaf (cm), ear position (cm), plants carrying two ears %, ear characters, i-e. ear length (cm) and diameter (mm), number of rows/ ear, number of grains/ row, 100 grains weight, shelling % and grain field/ fed (Ardab).

Sunflower characters were recorded as follows:

Plant height (cm), head diameter (cm), weight of head (g), weight of seeds/ head (g), shelling %, weight of 100- seeds (g) and yield of seeds/ fed (kg).

Data were statistically analyzed according to the procedures outlined by Gomez and Gomez (1984) and L.S.D. at 5% level was used to compare between means.

RESULTS AND DISCUSSIONS

1. The effect of the preceding crop:

1.1. Maize:

Data in Table (2) indicated that all growth characters of maize were significantly affected by preceding crops, except ear leaf area, ear height, number of rows/ ear and shelling % in both seasons. Results revealed that when maize plants were sown after lentil, the highest values were recorded followed by sugar beet, while the lowest values were taken with flax in both seasons. This result may be attributed to higher residual amount of nitrogen after lentil as a surface roots crop, and that led to increase in intracellular meristems activity and subsequently increase in internodes elongation. These results are in agreement with those obtained by Shafshak *et al.*, (1982). The analysis of variance indicated that significantly differences among preceding crops in both seasons. Lentil was effective in enriching the soil with nitrogen and organic matter, also the effect of lentil residues in improving the physical, chemical and biological characters of the soil may contribute much to the superiority of maize when followed lentil (Table 2). Similar results were obtained by MacCall (1991) and Senarante and Hardarson (1989).

some ear characters (ear diameter, ear length and no. of grains/ row) and weight of 100 grains were significantly affected and recorded higher values when maize was grown after lentil than grown after sugar beet or flax. In general, this result was expected due to the effect of lentil residues on maize plants as shown in Table (2). This result is in coincident with those recorded by Shafshak *et al.*; (1982) and El- Douby (2002). Number of rows/ ear and shelling % were not influenced by preceding crops since these characters are mainly considered as genetically ones. This result is in harmony with those obtained by Shams El- Din and El- Habbak (1996).

Grain yield of maize was significantly affected by preceding crops in both seasons (Table 2). Grain yield of maize showed the same trend as growth and yield component characters. The reduction in maize grain yields after sugar beet and flax were 2.28, 14.01 % in the first season and 5.87, 17.92 % in the second season, compared with maize grown after lentil. A similar result was obtained by El- Douby (2002).

1.2. Sunflower:

Data presented in Table (3) show significant differences in studied yield components of sunflower as affected by the preceding winter crops in both seasons. The highest values were observed for sunflower growth after lentil, whereas, the lowest values were observed after flax in both seasons. Seed yield/ fed of sunflower grown after lentil was significantly higher than that grown after sugar beet and flax by 11.72, 15.35 % in the first season and 7.85, 15.11 % in the second season, respectively.

The result could be attributed to the effect of lentil as a legume crop in enriching the soil with nitrogen and organic matter and the effect of its residue in improving the physical, chemical and biological characters of the soil, these encouraged better growth of the following sunflower. These results could be coincident with those obtained by Shafshak *et al.*; (1982), and Farghaly (2001).

Table (2): Effect of preceding winter crops on plant characteristics, yield and yield components of maize during 2001 and 2002seasons.

Characters Preceding crops	Plant height (cm)	Stem diameter (mm)	area leaf area	Ear height (cm)	Ear diameter (cm)	Ear length (cm)	No. of rows/ear	No. of grain/row	Weight of 100 grain	Shelling %	No. of two ear/ plant	Yield/ ardab (fed)
2001 season												
Lentil	264.67	35.67	734.58	136.33	39.67	20.76	13.64	38.75	34.50	81.25	1.15	19.34
Sugar beet	261.25	30.00	730.83	136.08	38.42	20.00	13.47	37.42	33.42	81.00	1.14	18.90
Flax	257.58	34.58	730.42	131.25	37.17	19.56	13.43	36.30	32.42	80.92	1.12	16.63
L.S.D(0.05)	2.76	0.78	N.S	N.S	1.21	1.15	N.S	1.03	0.61	N.S	0.08	0.65
2002 season												
Lentil	266.00	35.83	735.83	137.25	39.50	21.56	13.92	41.33	35.50	81.00	1.18	18.75
Sugar beet	263.67	34.75	714.17	136.50	38.92	20.55	13.87	38.67	33.08	80.75	1.16	17.65
Flax	258.67	34.50	703.33	135.83	36.58	19.83	13.47	37.75	32.00	80.67	1.10	15.39
L.S.D(0.05)	2.15	0.80	N.S	N.S	2.11	0.78	N.S	2.03	0.51	N.S	0.09	0.81

Table (3): Effect of the preceding winter crops on plant characters, yield and yield components of sunflower during 2001 and 2002 seasons.

Characters Preceding crops	Plant height (cm)	Head diameter (cm)	Weight of head (g)	Seeds weight/ head (g)	Shelling %	Weight of 100 seeds (g)	Seed yield/fed (kg)
2001 season							
Lentil	178.58	21.36	92.50	55.50	60.00	6.30	1069.50
Sugar beet	172.58	20.80	88.50	53.32	60.25	6.27	944.17
Flax	163.50	18.76	85.70	51.58	60.19	6.09	905.33
L.S.D at 0.05	10.09	1.88	6.15	4.31	N.S	0.73	61.99
2002 season							
Lentil	174.67	20.50	92.25	55.67	60.35	6.41	1008.33
Sugar beet	169.17	19.67	87.50	53.67	59.05	6.37	929.17
Flax	165.17	18.92	81.88	51.66	60.25	6.27	856.02
L.S.D at 0.05	4.10	1.12	7.52	4.87	N.S	N.S	64.80

2. The effect of nitrogen fertilizer:

2.1. Maize:

Data in Table (4) indicated that growth characters, i.e; plant height, ear leaf area and stem diameter significantly increased by increasing N fertilizer levels from 80 up to 130 kg N/ fed. The highest values of growth characters were obtained with 130 kg N/ fed in both seasons. The increments in growth characters due to the increase in N fertilizer levels application may be attribute to the increasing of meristemic activity and stimulation of cell elongation in maize plants.Similar results were reported by Matta *et al.*,(1990)

All studied yield components of maize increased significantly by increasing N fertilizer levels up to 130 kg N/ fed in both seasons (Table 3), except shelling percentage and number of rows/ ear which was not significantly affected in both seasons.

Ear characters, i.e; ear length and diameter, number of rows/ ear and number of grains/ ear significantly increased by increasing fertilizer rates in both seasons, except number of rows/ ear (Table 4). Also, weight of 100 grain behaved in parallel way of ear characters in both seasons. These results are in increasing growth characters because of good supply of N fertilizers. These results are in accordance with those obtained by Shams El-Din and El- Habbak (1996) and El- Douby (2002).

With regard to shelling percentage, the results showed no significant effect was detected on this character which is rarely affected by agricultural practices.

Maize grain yield/ fed was significantly affected by N fertilizer levels in both seasons (Table 4). Maize grain yield related to fertilization treatments, so there was a consistent and remarkable increase in maize grain yield by increasing N fertilizer levels up to 130 kg N/ fed, compared with 80 and 105 kg N/ fed. The increase in maize yield were 16.84, 8.12 % and 10.62, 5.75 % in both seasons, respectively. Similar results were obtained by Zahran *et al.*, (1997).

2.2. Sunflower:

As shown in Table (5), results revealed that increasing N levels up to 60 kg N/ fed significantly increasing all the studied characters of sunflower in both seasons. Maximum values of plant height, head diameter, head weight, seed weight/ head and 100- seed weight were observed with adding 60 kg N fed. The results in seed yield/ fed were 14.57, 10.28 % and 16.42, 8.21 %, for adding 30 and 45 kg /N fed, compared with adding 60 kg N/ fed. in both seasons, respectively.

These results reflect the effect of N-fertilization on vegetative growth and interception of light energy through photosynthesis (product accumulation and source/ sink relation), Sorour and Attia (1988), Abd El Wahed (1996) and Farghaly (2001).

Table (4): Effect of nitrogen rate on plant characteristics, yield and yield components of maize in 2001 and 2002 seasons.

Characters Nitrogen rates	Plant height (cm)	Stem diameter (mm)	Ear Leaf area	Ear height (cm)	Ear diameter (cm)	Ear length (cm)	No. of rows/ ear	No. of grains/row	Weight of 100 grains	Shelling %	No. of two ear/ plant	Yield ardab/ (fed)
2001 season												
80 kg N/ fed.	205.33	35.11	704.44	127.22	35.67	19.14	13.30	35.50	32.53	81.22	1.11	16.59
105 kg N/ fed	286.78	36.22	832.22	149.11	43.56	20.11	13.33	37.50	33.42	81.00	1.14	18.33
130 kg N/ fed	293.22	37.67	839.44	155.00	46.33	21.09	13.93	39.84	34.39	81.00	1.17	19.95
L.S.D(0.05)	4.81	0.857	53.62	7.05	2.23	1.16	0.71	2.75	1.53	2.47	0.11	1.13
2002 season												
80 kg N/ fed.	264.22	33.11	703.89	133.11	34.67	19.94	13.71	37.98	32.62	81.11	1.14	16.32
105 kg N/ fed	291.11	37.22	786.67	148.11	44.44	20.54	13.90	39.25	33.53	81.00	1.15	17.21
130 kg N/ fed	296.67	37.78	833.89	157.67	47.33	21.46	14.08	40.52	34.44	80.89	1.16	18.26
L.S.D(0.05)	3.79	1.067	44.80	7.84	2.19	1.05	0.68	3.30	0.80	3.19	0.086	0.75

Table (5): Effect of nitrogen rate on plant characteristics, yield and yield components of sunflower during 2001 and 2002 seasons.

Characters N rates	Plant height (cm)	Head diameter (cm)	Weight of head (g)	Seeds weight/ head (g)	Shelling %	Weight of 100 seed (g)	Seed yield/fed (kg)
2001 season							
30 kg N level	176.78	19.39	87.90	50.47	60.20	5.92	916.89
45 Kg N level	180.89	21.38	89.89	56.47	60.93	6.52	1073.23
60 kg N level	179.33	20.41	88.91	53.47	60.00	6.29	962.89
L.S.D at 0.05	9.04	0.53	0.42	3.48	0.92	0.15	38
2002 season							
30 kg N level	176.56	17.72	81.88	51.86	60.08	6.13	847.89
45 Kg N level	179.00	21.65	92.54	55.59	60.18	6.57	1014.45
60 kg N	179.00	19.71	87.21	53.56	60.77	6.35	931.15
L.S.D at 0.05	3.49	0.28	0.31	2.48	0.64	0.18	42

3. Interaction effects:

3.1. Maize:

Data presented in Table (6) revealed that ear length, number of grains/ row, weight of 100 grain, number of ears/ plant and grain yield of maize, were significantly affected by the interaction between the preceding crops and the N application level of maize in both seasons. Results also indicated that maize grown after lentil and receiving 130 kg N/ fed showed

maximum grain yield of maize, ear length, number of grains/row, weight of 100 grains and number of ears/ plant in both seasons. While, the lowest values for growth, yield and yield components were obtained when maize was grown after flax and fertilized with 80 kg N/ fed in both seasons.

3.2. Sunflower:

Results in Table (7) showed significant interaction effect on head and seed yield/ fed, head diameter, 100- seed weight and seed yield per fed in both seasons. Sunflower grown after lentil and fertilized with 45 kg N/fed gave maximum values for most studied characters in both seasons. On the other hand, the lowest values were observed when sunflower was grown after flax and fertilized with 30 kg N/ fed.

Generally, the data in (Tables 6 and 7) showed that maize and sunflower gave the highest yield when growing after lentil and fertilized with 130 and 45 kg N/ fed, respectively.

Table (6): Interaction effect of preceding crops with N fertilizer levels on maize yield and yield components.

Characters		Ear length (cm)	No. of grains/ row	Weight of 100 grain	No of ears/ plant	Yield Ardab/ fed
Preceding Crops	N levels					
2001 season						
Lentil	80kg /N	19.76	35.80	33.60	1.12	17.29
	105 kg	20.82	38.70	34.50	1.15	19.39
	130 N	21.70	41.60	35.40	1.18	21.34
Sugar beet	80 N	19.00	35.20	32.51	1.11	16.85
	105 N	20.00	37.42	33.40	1.14	18.95
	130 N	21.00	39.58	34.35	1.17	20.90
Flax	80 N	18.66	34.15	31.40	1.09	15.63
	105N	19.50	36.40	32.35	1.12	16.66
	130 N	20.58	38.35	33.42	1.15	17.60
L.S.D at (0.05)		2.01	4.76	2.65	0.19	3.00
2002 season						
Lentil	80 N	20.62	40.43	34.55	1.17	17.85
	105 N	21.56	41.33	35.50	1.18	18.65
	130 N	22.50	42.23	36.45	1.19	19.75
Sugar beet	80 N	19.61	36.70	32.10	1.15	16.70
	105 N	20.55	38.67	33.08	1.16	17.60
	130 N	21.49	40.64	34.06	1.17	18.65
Flax	80 N	19.60	36.80	31.20	1.09	14.40
	105 N	19.50	37.75	32.00	1.10	15.39
	130 N	20.40	38.70	32.80	1.12	16.38
L.S.D at (0.05)		1.83	5.72	1.39	0.15	2.67

Table (7): Interaction effect of preceding crops and N fertilizer levels on sunflower yield, and yield components.

Characters		Weight of head (g)	Head diameter (cm)	Seed weight/ head (g)	Weight of 100 seed (g)	Seed yield/fed (kg)
Preceding crops	N kg/ fed					
2001 season						
Lentil	30 kg	91.40	20.66	52.60	5.70	980.25
	45 kg	92.50	21.63	55.50	6.30	1059.17
	60 kg	93.60	22.60	58.40	6.90	1169.09
Sugar beet	30 kg	87.50	19.80	50.24	6.07	905.17
	45 kg	88.54	20.85	53.32	6.27	959.13
	60 kg	89.46	21.75	56.40	6.47	1170.21
Flax	30 kg	84.80	17.72	48.56	5.98	865.26
	45 kg	85.70	18.76	51.58	6.09	870.33
	60 kg	86.60	19.80	54.60	6.20	980.40
L.S.D at (0.05)		2.10	1.12	3.03	N.S	106.53
2002 season						
Lentil	30 kg	86.30	18.60	53.72	6.21	908.40
	45 kg	92.25	20.50	55.67	6.41	1008.33
	60 kg	98.20	22.40	57.62	6.61	1108.26
Sugar beet	30 kg	82.45	17.60	51.59	6.07	849.24
	45 kg	87.50	19.67	53.67	6.37	929.17
	60 kg	92.55	21.64	55.75	6.67	1009.10
Flax	30 kg	76.90	16.87	50.26	6.12	786.04
	45 kg	81.88	18.97	51.33	6.27	856.02
	60 kg	86.86	20.92	53.40	6.42	926.00
L.S.D at (0.05)		4.303	1.04	3.01	N.S	88.12

REFERENCES

Abd El- Wahed, A.E. (1996). Response of sunflower to phosphorus and potassium fertilization under different levels of nitrogen. Proc. 7 th Conf. Agron. (1): 429-437.

Black, C.A. (1965). Methods of soil analysis. Am. Soc. Agron. Madison, Wisc. USA.

El- Douby, K.A. (2002). Effect of preceding crops and bio- mineral fertilizer on growth and yield of maize. Annals of Agric.Sci., Moshtohor,40 (1): 27-37.

Farghly,B.S.(2001).Effect of the preceding winter crop and nitrogen fertilization on yield and yield components of maize and sunflower. Egypt. J. agric. Res., 79 (4).

Gomez, K.A. and A.A. Gomez (1984). Statistical procedures for agricultural research. John Willey and sons, New York

Khalil, H.E.; S.Sh. El- Tabbakh; M.M. El- Ganbeehy and S.E. Toaima (2001). response to preceding winter crops and phosphorus levels. J.Agric. Sci. Mansura Univ., 26 (1): 105-115.

Sorour, S.Gh. P. and S.A.M. Attia (1988). Response of sunflower to some planting patterns and nitrogen levels, proc. 3rd Conf. Agron.,11:315-323.

Senarnte and Hardarson (1989). Estimation of residual N effect of faba bean and peas on two succeeding cereal using N-15 Methodology. Plant and Soil., (110): 81-89.

Shams El- Din, G.M. and K.E. El Habbak (1996). Use of nitrogen and potassium fertilization levels by maize grown under plant densities for grain yield. Ann. Of Agric. Sci. Moshtohor, 4 (2): 513-528.

Shafshak, S.E.; A.S. El-Debaby; M.S. Salem and G.Y. Gelilah (1982). Crop rotationstudies in Egypt. III. Growth and yield of maize as affected by crop rotation and fertilization residues. Res. Bull. 209 p. 1-38 Fac. Of Agric. Ain Shams Univ., Egypt.

Matta, S.E.G.; E.A.E. Khedr ; G.M.A. Mahgoub and M.A.K. Shalaby (1990). Effect of plant population density and nitrogen fertilization on growth and yield of some late maturing maize varieties. Egypt, J. Appl. Sci., 5 (8): 529-531.

MacCall, D. (1991). Studies on maize (*Zea mays*) at Bunda, Malwi, II: Yield in short rotation with legume. Exp. Agric., (25): 367-374.

Zahran, F.A.,; E.M. Mesrawy and Haifaa S. Abd El-Ghani (1997). Effect of nitrogenous and biofertlizers on late wilt, downy mildew disease and yield of maize. Ann. Of Agric. Sci., Moshtohor, 35 (4): 2641-2652.

أثر المحصول ومكونا ته للذرة الشامية وعباد الشمس بالمحصول السابق والتسميد الأزوتي

صلاح السيد عطية طعيمة و سيد عبد العزيز صالح
قسم بحوث التكثيف المحصولى ، معهد بحوث المحاصيل الحقلية ، مركز البحوث الزراعية

أقيمت تجربتان حقليتان بمحطة البحوث الزراعية بسدس- محافظة بنى سويف خلال موسمى ٢٠٠١- ٢٠٠٢ لدراسة تاثير المحصول السابق (عدس-بنجرالسكر- الكتان) ومعدلات التسميد الأزوتي للذرة الشامبة وعباد الشمس اللاحقين. وكان التصميم المستخدم هو القطع المنشقة مرة واحدة في ثلاث مكررات حيث كانت المحاصيل السابقة هي القطع الرئسيه بينما اشتملت القطع المنشقة علي معدلات التسميد الازوتى ٨٠ ، ١٠٥ ، ١٣٠ كجم /فدان للذرة الشامية و ٣٠ ، ٤٥ ،٦٠ كجم/ فدان لعباد الشمس .

وكانت أهم النتائج المتحصل عليها فيما يلى :-

١- ظهرت اختلافات عالية المعنوية فى تأثير المحصول السابق على معظم الصفات المدروسة للذرة الشامية و عباد الشمس اللاحقين حيث أعطا الذرة الشامية و عباد الشمس المنزرعين بعد عدس قياسات أكبر بالمقارنة بالزراعة بعد بنجر السكر أو كتان. وكان الانخفاض فى محصول الفدان من الذرة الشامية المنزرعة بعد بنجر السكر أو الكتان بحوالي ٢,٢٨ ، ١٤,٠١، و ٥,٨٧، ١٧,٩٢ % للذرة ، بينما كان الانخفاض فى محصول عباد الشمس ١١,٧٢ ، ١٥,٣٥ و ٧,٨٥ ، ١٥,١١ % فى كلا الموسمين على التوالى.

٢- أوضحت النتائج أن كل الصفات المدروسة للذرة الشامية وعباد الشمس زادت مع زيادة معدلات التسميد الأزوتى المضافة حتى ١٣٠ كجم /فدان فى الذرة الشامية و ٤٥ كجم /فدان لعباد الشمس. كما أظهرت النتائج أن محصول الفدان من الذرة الشامية المضاف له ١٣٠ كجم /فدان أزوت زاد عن معدل ١٠٥ ، ٨٠ كجم/ فدان بنسبة ٨,١٢ ،١٦,٨٤ ، ٥,٧٥ ، ١٠,٦٢ % للذرة فى كلا الموسمين على التوالى. كذلك محصول الفدان من عباد الشمس المضاف له ٤٥ كجم أزوت/ فدان زاد بحوالي ١٠,٢٨ ، ١٤,٥٧ و ٨,٢١ ، ١٦,٤٢ % عن المضاف له ٦٠ ، ٣٠ كجم/ أزوت للفدان لكلا الموسمين علي التوالى.

نستنتج من النتائج السابقة ان أعلا محصول للذرة وعباد الشمس أمكن الحصول علية بالزراعة عقب المحاصيل البقولية مثل العدس. والتسميد بمعدل ١٣٠ كجم أزوت / فدان للذرة والتسميد بمعدل ٤٥ كجم أزوت / فدان لعباد الشمس تحت ظروف منطقة سدس محافظة بني سويف.