EFFECT OF RESIDUAL AND STRAW FOR THREE PRECEDING CROPS ON GROWTH, YIELD AND YIELD COMPONENTS OF WHEAT UNDER DIFFERENT NITROGEN FERTILIZER LEVELS

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ABSTRACT

Two field experiments were conducted at Etay El-Baroud Experimental Station in El-Beheira Governorate, during 2013/2014 and 2014/2015 seasons, to investigate the effect of maize, soybean and sunflower as preceding crops and their residual effects, as well as the effect of some straw treatments on growth yield and its components of wheat CV. Sakha 94) under three rates of nitrogen fertilizer, i. e, 50, 70 and 90 kg/fed. The results of this investigation could be summarized as follows:

1-The results indicated that all studied characters of wheat were significantly affected by the preceding summer crops except, plant height, number of spikes/m^2, grain weight/spike and 1000 kernel weight which did not affected by the preceding crops. The data showed that sunflower as a preceding crop left good residual effect on wheat plant which gave the highest values for all studied characters.

2-With respect to straw treatments of the preceding summer crops, the results showed that the differences between these treatments had significant effect on each of number of spikes/plant, grain yield/plant; grains weight/m^2 and grain yield/fed. The date showed that chopping and scouring straw of the preceding crop into soil did not improve yield and its components of wheat compared to that of without chopping and scouring (control).

3-Only each of grain yield/plant, grains weight/m^2 and grain yield/fed. as well as straw yield/fed. were significantly affected by nitrogen fertilizer levels, and wheat plant, gave the highest values of yield/plant, grains weight/m^2 and grain yield/fed. when plants fertilized by 70 kg nitrogen /fed. while, straw yield showed the highest value when wheat plants fertilizer by 90 kg nitrogen/fed..

4-The results indicated that the interaction between preceding crops and straw treatments had significant effect on each of number of spikes/plant, yield/m^2, grain yield/plant and grain yield/fed., interaction between preceding crops and fertilizer levels had significant effect, on grain yield/plant and grain yield/fed. on the other hand, the interaction between straw and fertilizer levels showed significant effect on number of spikes/plant while, the interaction between preceding crops, straw treatments and nitrogen fertilizer levels affected significantly on 1000 kernel weight.

INTRODUCTION

Now cereals occupy a major rank in the crop structure in the Egyptian agriculture. In spite of this majority some cereal crops as

wheat still beyond self-sufficiency and did not enough with the rapid increasing in population. Wheat is one of the main cereal crops and also, one of most important summer crops in Egypt. Wheat is grown after most of the winter crops such as i. e, cotton, maize, rice, soybean and other summer crops and its necessary to be the high productivity of wheat in the main purpose. However, the literature abounds with researches on the effects of cropping sequences and preceding crop.

Several studies concluded that preceding crops showed great effect on yield and its components of wheat. Shafshak et al (1974) studied the effect of two succeeding crops, i. e. maize and wheat; they found that the grain yield, straw yield and grain/straw ratio of wheat after legumes were significantly higher than those after non-legumes.

Zahera and Seif El-Nasr (1993), found that yield and some its components of wheat were significantly affected by the summer preceding crops, i. e. peas, fahlberseem as well as fodder maize and the highest values of wheat characters were recorded when wheat sown after peas.

Metwally, et al. (1994) stated that maize and rice as a proceeding crops showed significant effects on yield and its components of wheat. Abd El-Aal, et al. (1996) recorded significant effects on yield and its components of wheat as affected by preceding crops. Seif El-Nasr and Zahera (1998), recorded that grains and straw yields/fed. of wheat were significantly affected by cotton, rice and maize as preceding crops.

With respect to straw treatment, Abro, et al. (2011) suggested that applying corn straw has obvious effects not only holding soil water, regulating soil temperature, and improving soil bulk density but also on increasing soil carbon storage transformation in agricultural soils. Crecchio, et al. (2003) reported that it is very important to provide organic matter for soil. Lao, et al. (2002), found that straw, as an important organic fertilizer and renewable resource, contains abundant C, N, K and other nutrients and is readily available. Sun, et al. (2004), indicated that fertility may be improved by influencing the diversity and activity of soil microbial. Liu, et al. (2009), stated that fertilization as an a common and important agricultural management practice, is primarily to increase soil nutrients and provide essential nutrient for crop growth, but it can also effect soil microbial community structure, improve the molecular diversity of soil microbial.

Nitrogen nutrient is very important for growth and development of wheat plants as well as many other plants and it is necessary to apply the optimum nitrogen fertilizer level to obtain highest yield of wheat/fed.. Most of investigators recorded that yield of wheat increased by increasing nitrogen fertilizer. Mitkees, et al. (1993) found that the highest grain yield of wheat was obtained by using 190 kg

N/ha (80 kg N/fed.). Seif El-Nasr and Zahran (1998) recorded that growth, yield and yield components as well as grain and straw yield/fed. were significantly increased by increasing nitrogen fertilizer rate up to 90 kg/fed.+ 45 kg p_2o_5 + 36 kg k_2o /fed. Zahera and Seif El-Nasr (1993) indicated that the growth, yield and yield components were improved with the higher rate of nitrogen fertilizer, i. e. 80 kgs/fed.

The present instigation was carried to studding the influence of preceding summer crops, some straw treatments of these preceding crops and nitrogen fertilization as will as their interaction effects on growth, yield and its components of wheat.

MATERIALS AND METHODS

Two field Experiments were carried out at Etay El-Baroud Experimental Station in El-Beheira Governorate, in the two successive seasons 2013/2014 and 2014/2015 to study the effect of 18 treatments on growth characters, yield and yield components of wheat. The treatments were:

1-Three preceding summer crops, maize (T. W. C.), soybean (Giza 21) and sunflower (Giza 1).

2-Two forms of straw cutting, a) – the first one with no chopping or scouring for straw with soil (without incorporated straw in to soil S_1).

b) – the second is by incorporated straw into soil S_2,

3-Three levels of nitrogen fertilization (urea 46.5%) (50, 70 and 90 kg N/fed.).

A split-split plot design with three replications was used. The three preceding summer crops were allocated in the main plots, the two forms of straw were randomly arranged in the sub plots, while N fertilizer levels were distributed in the sub-sub plots. The area of sub-sub plot was 10.5 m^2 (1 / 400 feddan), 3.5 m long x3.0 m width. All preceding summer crops were given their convention cultural practices. At harvest of preceding summer crops all sub-sub plots were divided to two equal parts, straw did not incorporated into soil (S1) in one part, the other part of sub-sub plot, straw incorporated into soil (S2).

Table (1): Physical and chemical analysis of the experimental soil during 2013/2014 and 2014/2015

Physical and chemical analysis	2013/2014	2014/2015
Sand	25.91	26.64
Silt	13.83	12.58
Clay	51.95	53.15
Soil texture	clay	clay
Organic mater	2.15	2.21

PH	7.01	8.01
Available N (ppm)	30.06	17.08
Available P (ppm)	10.4	20.6
Available K (ppm)	207.69	392.01
EC (m mhos) cm^{-1} (1:5)	1.51	1.73

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

Soil sampler was collected Seeds or grains of the preceding crops were sown in May 25 and 28 in the first and second seasons, respectively. Grains of wheat (C.V before and after wheat planting (combined values between two seasons 2013/2014 and. 2014/2015 Giza 94) were sown in November 15 and 17 in the first and second seasons, respectively.
Twice from a soil depth of (0-30 cm) after harvesting before seeding wheat, as well as, after wheat harvest.

Table (2): Effect of preceding crops on soil contents of N, P and K in 2013/2014 and 2014/2015)

Preceding crop	N. No3 (ppm)		P (ppm)		K (ppm)	
	B. W.	A. W.	B. W.	A. W.	B. W.	A. W.
Maize	39.98	32.66	6.99	1.95	532	399
Soybean	66.87	34.66	14.48	14.26	657	653
Sunflower	63.09	25.33	19.02	15.03	688	681

B. W (before planting wheat) A. W (after planting wheat)

The soil samples were analyzed for nitrate N using Kjeldahl method described by Jakson (1958), available phosphorus according to Olsen et al. (1954). Available potassium was flame photo metrically determined as described by Volk and Truog (1934). Wheat plants were fertilized with 15.5 kg p_2o_5 / fed before sown wheat, while nitrogen fertilization was added to wheat plants according to the treatments of the experiment in two equal dose, the first before the first irrigation and the second before the second irrigation. At the harvest time of wheat sample of ten plants were chosen randomly from each plot to estimate plant height (cm), number of tillers/plant, number of spikes/plant, spike length (cm), number of spikes/square meter, grain yield/spike (g), 1000 kernel weight(KW) (g), grain yield/plant (g), grain yield/square meter (g) were estimated in middle plot, while grain yields (Ardab) and straw yield (ton)/fed. were estimated from whole plot. The collected data were statistically analyzed according to the method described by Snedcor and Cochean (1980), the means and interactions effects were compared according to the Least Significant Difference (L.S.D.) test at 0.05 levels.

RESULTS AND DISCNSSION

1- Effect of preceding crops on growth, yield and its components of wheat

Data in Table (3) show the effect for preceding crops on yield and its attributes of wheat as it cleared in 2013/2014 and 2014/2015 seasons. The obtained data cleared that each of plant height, spike length, number of spikes/m^2, weight grains/spike and 1000 kernel weight was not significantly affected by the residual effect left by the preceding crops in both seasons. Zahera and Seif El-Nasr (1993) found similar results. On the other hand, the preceding crops, had significant effect on the number of tillers/plant and number of spikes/plant, the results indicate that wheat plants grown after sunflower were superior to those grown after maize or soybean in this traits. These results indicate that wheat plants grown after sunflower gave high estimates in these traits than those grown after soybean or maize where, the values of number of tillers and number of spikes/plant in case planting after sunflower achieved increases about (34, 31and 23, 25 %) in both seasons than that in case of planting after maize as well as increases about (30, 30and 26, 27 %) in both seasons for planting after sunflower compared to those planting after soybean. These increases may be attributed to the short period which sunflower plants staying in soil (90 day) compared to these (120 day) for soybean or maize, where soil may be not stress after sunflower culture. The results could be interpreted through the fact of this long duration and higher capability to deprive soil nutrients and consequently remove more minerals than sunflower and, hence, appeared these effects (Shafshak, et al. 1984) and grains yield/fed. was significantly affected by the preceding crops, the data evidenced that grain yield/plant and grains weight/m^2 as well as grain yield/fed. of wheat grown after sunflower were significantly higher than those growing after maize or soybean. The results indicated that the increases in grain yield/fed. obtained from wheat grown after sunflower were (3.11, 1.45 and 3.04, 1.57) Ardab/fed.in two studded seasons over yields obtained than those growing after maize and soybean, respectively. The results show that the highest average grain yield 18.56Ardab/fed. was recorded when wheat grown after sunflower followed by wheat grown after soybean (17.11 and 17.37 Ardab/fed.) with significant difference whereas, the lowest value was recorded after maize (15.45 and 15.90 Ardab/fed.) in two seasons respectively. This superiority of wheat grown after sunflower may be attribute to the high values of most of yield components such as number of spikes/plant, spike length and grain yield/plant. Shivaramu et al. (1994), indicated that the time of incorporation of straw into soil left an important effect on soil properties and also the crop productivity, they

found that soil properties and chlorophyll content were higher when incorporation straw before 20 day of sowing than that incorporated at time of sowing.

2- Effect of straw treatments

Data in Table (3) show that the differences between the two treatments of straw failed to reach the 5% level of significance where, these treatments of straw had not significant effects on plant height, number of tillers/plant, number of spikes/plant, spike length, number of spikes/m^2, weight grains/spike and 1000 kernel weight. On the other hand, the data show that incorporated straw into soil made some effects on grain yield/plant, grains weight/m^2 and grain yield/fed were significantly influenced by straw treatments, where the incorporated straw into soil gave some bad effect which lead to low grain yield/plant, grains yield/m^2 and grain yield/fed compared to that without straw incorporate into soil. That effect may be attributed to C / N ratio in soil. With respect to grain yield/fed., the same effect was obtained where, the straw treatment had significant effect on this character, where, incorporating of straw into soil decrease the yield/fed. by 4 and 5% in both seasons compared to that without straw incorporating into soil. Isidron et al (2000) reported that allelochemicals of mature maize foliage had an inhibitory effect on the sunflower, maize and soybean. Srisa-Ard (2007) also indicate that crop residues derived from roots of both sunflower and soybean plants, had significant inhibitors effects on plant height, root dry weight top growth dry weight and total dry weight of sunflower plants. Sharma et al. (2007) stated that number-rich residues of the caster and sunflower are mostly burnt because of their high C / N ratio and application of crop residues with a high C / N ratio often leads to adverse impacts on available N in soil and growth of crops planted immediately after crop residues incorporation. Subhash Babu et al (2014) concluded that a review of literature clearly indicated that sunflower residue improves the soil biological, chemicals and physical properties, which may enhance the agricultural sustainability in the near future.

3- Effect of nitrogen levels

Data in Table (3) indicated that although increasing nitrogen fertilizer rate from 50 to 90 kgs/fed tended to increase plant height, but differences failed to reach the 5% level of significance. Similarly, number of tillers/plant, spike length, number of spikes/m^2, grains weight/spike and weight of 1000 grain these treats were not significantly responded for the increasing of fertilizer levels, Basilious et al (1992) indicated that increasing the rate of N fertilizer to more than 60 kg N/fed did not reflect significant radiation in number of

spike/plant. Data in Table (3) show that grain yield/plant, grain weight/m^2 and grain yield/fed. were significantly increased by increasing nitrogen fertilizer level up to the second level (N2), where the increasing were 0.06 and 0.07g/plant, 10.56 and 10.71 g/m^2 and 0.38 and 0.48 Ardab/fed. in both seasons respectively, while these characters decreased with the N_3 level of nitrogen. With respect to straw yield/fed., the results indicated that straw yield was significantly increased with increasing nitrogen levels even the third level (90 kg N/fed.), where straw yield increased by 9, 8% and 16, 13% with increasing nitrogen level from 50 to 70 and from 50 to 90 kg/fed in both seasons respectively. Zahera and Sef El-Nasr (1993) found that adding 80 kg N/fed. significantly increased grain yield/plant, grain yield /fed and straw yield/fed. Amjed et al. (2011) showed that number of tillers/m^2, plant height, spike length, number of grains/spike, 1000 kernel weight and grain yield were significantly increased by increasing the nitrogen level over control and the highest grain yield was obtained by an application of 180 kg N/ha.

The data indicated that nitrogen fertilizer levels had significant effect on grain yield/fed., where the second nitrogen fertilizer (N_2) increased grain yield by (0.38 and 0.48 Ardab/fed.), on the other hand when adding the third level (N_3), the yield decreased by (0.46 and 0.36 Ardab/fed.) compared to the yield with the low nitrogen fertilizer level (N_1) in two studded seasons, this result evidence the recommended dose of nitrogen fertilizer (70 kg N/fed.) for wheat.

4- Effect of interaction

4-I- Effect of interaction between preceding crops and straw on growth, yield and its components of wheat

Data in Table (4) indicated that preceding crops and straw interaction did not influence significantly plant height, number of tillers/plant, spike length, number of spikes/m^2, grains weight/spike, 1000 kernel weight and straw yield. On other hand, the differences between the two those factors interaction reached to 5% level of significance, effects on each of grain yield/plant and grain yield/m^2 as from wheat sowing after sunflower and without incorporated straw into soil, while the lowest values were found when wheat sowing after maize and incorporated straw into soil as well as grain yield/fed.. The highest values for grain yield/plant were (5.05 and 5.29g) recorded wheat growing after sunflower and without incorporating straw into soil in both seasons. With respect to grain yield/m^2 and grain yield/fed. the highest values were (639.61, 657.28 and 18.65, 18.99 Ardab) obtained from wheat grown after sunflower and incorporated straw into soil, while the lowest values were (491.98, 510.98 and 14.22, 14.56 Ardab)

recorded when wheat grown after maize and incorporated straw into soil in two studded seasons, respectively.

Table (3): Effect of preceding crops, straw of preceding crops and nitrogen fertilizer levels on growth, yield and its components of wheat as a combined data over 2013/2014 and 2014/2015 seasons

Treatments			Plant height (cm)	No of tillers /plant	No of spikes /plant	Spike length (cm)	No of spikes m^2	Grain weight/ spike(g)	1000 KW(g)	Grain yield/ plant(g	Grain yield /m^2	Grain yield/ fed(A)	Straw yield/fed(t)
2013 - 2014	Crops	Maize	87.36	1.38	1.36	11.00	222.73	2.32	41.98	3.57	530.57	15.45	2.647
		Soybean	87.11	1.39	1.38	11.01	235.16	2.38	42.41	3.72	584.33	17.11	2.412
		Sunflower	89.81	2.01	1.97	12.12	243.47	2.61	43.90	4.66	637.97	18.56	3.483
		LS.D. at 5%	NS	0.18	0.33	NS	NS	NS	NS	0.51	36.96	0.99	0.33
	Straw	S1(control)	88.96	1.65	1.63	11.28	234.88	2.49	42.58	4.20	597.43	17.33	2.890
		S2(in soil)	87.22	1.53	1.50	11.47	232.70	2.38	42.94	3.76	571.15	16.75	2.804
		L.S.D. at 5%	NS	NS	NS	NS	NS	NS	NS	0.24	17.27	0.44	NS
	N levels	N1(50kg/ fed)	86.56	1.57	1.53	11.36	230.65	2.50	42.88	4.09	587.95	17.07	2.600
		N2(70kg/ fed)	87.99	1.72	1.71	11.63	242.62	2.41	43.41	4.15	598.51	17.45	2.857
		N3(90kg/ fed)	89.70	1.48	1.46	11.15	229.10	2.40	41.99	3.72	566.25	16.61	3.085
		L.S.D. at 5%	NS	NS	NS	NS	NS	NS	NS	0.32	18.97	0.48	NS
2014 - 2015	Crops	Maize	89.92	1.64	1.61	11.41	229.70	2.39	42.54	3.71	549.57	15.90	2.765
		Soybean	89.96	1.57	1.57	11.32	246.22	2.46	43.03	3.96	599.23	17.37	2.469
		Sunflower	90.59	2.13	2.12	12.77	250.86	2.66	42.56	4.90	655.70	18.94	3.552
		LS.D. at 5%	NS	0.20	0.21	NS	NS	NS	NS	0.24	49.47	0.75	0.69
	Straw	S1(control)	90.78	1.82	1.84	11.97	244.86	2.54	43.10	4.38	614.60	17.89	3.080
		S2(in soil)	89.83	1.73	1.71	11.69	239.74	2.46	42.32	3.99	588.40	16.91	2.777
		L.S.D. at 5%	NS	NS	NS	NS	NS	NS	NS	0.21	18.54	0.63	0.28
	N levels	N1(50kg/ fed)	89.14	1.72	1.80	11.88	237.02	2.57	42.85	4.28	605.14	17.36	2.714
		N2(70kg/ fed)	90.11	1.92	1.91	12.24	248.76	2.47	42.32	4.35	615.85	17.84	2.951
		N3(90kg/ fed)	91.21	1.69	1.68	11.37	240.35	2.45	42.96	3.93	583.51	17.00	3.122
		L.S.D. at 5%	NS	NS	0.27	NS	NS	NS	NS	0.26	19.57	0.46	0.28
Interaction effects			In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons	In both seasons
C x S			NS NS	NS NS	NS NS	NS NS	NS	NS	NS NS	1.74 NS	NS	0.36	31.93 32.11	0.76 1.09	NS NS
C x N			NS NS	NS NS	NS NS	NS NS	NS	NS	NS NS	NS NS	NS	0.45	NS	NS	NS 0.80	NS NS
S x N			NS NS	NS NS	NS NS	NS NS	19.08	22.03	NS NS	NS NS	NS	NS	NS	NS	0.68 NS	NS NS
C x S x N			NS NS	NS NS	NS NS	NS NS	NS	NS	NS NS	3.77 NS	NS	NS	NS	NS	NS NS	NS NS

Table (4) Effect of interaction between preceding crops and straw of preceding crops on 1000 kernel weight, grain yield/plant, grain yield/m2 and grain yield/fed (ardab)

Treatments		1000-kernel weight (g)	Grain yield/ plant (g)	Grain yield /m^2 (g)		Grain yield /fed. (Ardab)	
Crops	Straw	2013/14	2014/15	2013/14	2014/15	2013/14	2014/15
Maize	S1(control)	40.56	3.87	569.16	588.17	16.69	17.25
	S2(in soil)	43.40	3.54	491.98	510.98	14.22	14.56
Soybean	S1(control)	42.03	4.00	586.80	601.51	17.39	17.54
	S2(in soil)	42.78	3.91	581.85	596.94	16.83	17.20
Sunflower	S1(control)	45.15	5.29	636.33	654.12	18.65	18.88
	S2(in soil)	42.65	4.52	639.61	657.28	18.81	18.99
L.S.D. at 5% level		1.74	0.36	0.36	32.11	32.11	1.09

Table (5) Effect of interaction between preceding crops and nitrogen fertilizer levels on grain yield/plant and grain yield/fed (Ardab)

Treatments		Grain yield/plant(g)	Grain yield/fed(Ardab)
Crops	Nitrogen fertilizer	2014/15	2014/15
Maize	50 kg N/fed	3.55	15.37
	70 kg N/fed	3.77	16.06
	90 kg N/fed	3.81	16.28
Soybean	50 kg N/fed	3.94	17.35
	70 kg N/fed	4.21	17.65
	90 kg N/fed	3.72	17.11
Sunflower	50 kg N/fed	5.37	19.37
	70 kg N/fed	5.09	19.82
	90 kg N/fed	4.25	17.62
L. S. D at 5%		0.45	0.80

Table (6) effect of interaction between straw of preceding crops and nitrogen fertilizer levels on number of spike/m^2 and grain yield/fed (Ardab)

Treatments		No of spikes/m^2		Grain yield/fed (Ardab)
Straw	Nitrogen fertilizer	2013/14	2014/15	2013/14
S1 (control)	50 kg N/fed	224.09	231.23	17.47
	70 kg N/fed	241.45	248.54	18.00
	90 kg N/fed	239.09	254.80	17.09
S2 (in soil)	50 kg N/fed	237.21	244.34	16.67
	70 kg N/fed	242.12	248.99	16.91
	90 kg N/fed	218.77	225.89	16.12
L. S. D. at 5%		19.08	22.03	0.68

4-II-Effect of interaction between preceding crops and nitrogen fertilizer levels on growth, yield and its components of wheat

The obtained data in Table (5) showed that only grain yield/plant and grain yield/fed. in 2014/2015 season were significantly affected by the interaction between preceding crops and nitrogen fertilizer levels also, the data showed that growing wheat after sunflower made the wheat plant were high responded to the low level (N_1) of nitrogen fertilizer which gave the highest values (5.37, 5.09g and 19.87, 19.82 Ardab) of grain yield/plant and grain yield/fed. respectively. On the other hand, adding the same level (N_1) of nitrogen fertilizer for wheat plants sowing after maize gave the lowest values (3.55g and 15.37Ardab) of grain yield/plant and grain yield/fed. respectively. The other studied traits of wheat were not significantly affected by the interaction between preceding crops and nitrogen fertilizer levels. Zahera and Seif El-Nasr (1993) found that interaction effect of preceding crops and nitrogen fertilizer levels did not influenced significantly on plant height, number of spikes/plant, grain yield/plant and grain yield/fed. as well as straw yield/fed..

4-III-Effect of interaction between straw and nitrogen fertilizer levels on growth, yield and its components of wheat

Data presented in Table (6) indicated that differences between treatments of interaction did not reach to the 5% level of significance for all the studied characters of wheat, only number of spikes/m^2 and grain yield/fed. which appeared to affected by the interaction between straw and nitrogen fertilizer levels, number of spikes/m^2 was the highest values (241.45 and 248.54) were obtained when wheat plants were fertilized by 70 kg N/fed. and without incorporated straw into soil while, the lowest values (218.77 and 225.89) of number of spikes/m^2 resulted by incorporated straw into soil and adding 90 kg N/fed. in both seasons respectively, while grain yield/fed. was significantly affected by the interaction between straw and nitrogen fertilizer levels in 2013/14 season and the same trend for number of spikes/m^2. This result may be interpreted according to C/N ratio in soil because the microorganism in soil such as bacteria need to nitrogen to live and analyzed the residual of preceding crops such as straw, this will reduce the available nitrogen which effect on growth yield, reduce their values.

4-IV-Effect of interaction between preceding crops, straw and nitrogen fertilizer levels on growth, yield and its components of wheat

Effect of interaction between preceding crops, straw and nitrogen fertilizer levels on growth, yield and its components of wheat is shown

in Table (7). Data indicated that plant height, number of tillers/plant, spikes/plant, spike length, number of spikes/m^2, straw yield/fed., grains weight/spike, grains yield/m^2 and grain yield/fed. did not affected by the three studied factors. On the other hand, 1000 kernel weight was significantly in 2013/2014 season only, the highest value was obtained when wheat grown after sunflower and fertilizer by the (N_2) level as well as without incorporated straw into soil, while the lowest value was (40.12g) obtained when wheat grown after maize and fertilizer by (N_1) level without incorporated straw into soil.

Table (7) Effect of interaction between preceding crops, straw of preceding crops and nitrogen fertilizer levels on 1000 kernel weight in 2013/14 seasons

Treatments	Maize		Soybean		Sunflower	
	S1 (control)	S2 (in soil)	S1 (control)	S2 (in soil)	S1 (control)	S2 (in soil)
50 kg/fed	40.12	46.45	42.44	41.89	46.55	39.82
70 kg/fed	41.23	41.77	42.11	45.00	47.01	43.36
90 gN/fed	40.33	42.00	41.55	41.45	41.90	44.77
L.S.D.at 5%	3.77					

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تأثير المحاصيل السابقة وبقايا المحصول السابق على القمح تحت معدلات سماد ازوتى مختلفة

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أقيمت تجربتان حقايتان بمزرعة محطة البحوث الزراعية – ايتاى البارود – محافظة البحيرة خلال موسمى 2014/2013 و 2015/2014 لدراسة تأثير كل من الذرة الشامية وفول الصويا وعباد الشمس كمحاصيل سابقة وكذلك تأثير قش هذة المحاصيل على صفات النمو والمحصول للقمح كمحصول لاحق تحت ثلاثة مستويات من السماد ألازوتى.

واوضحت النتائج الاتى:

1-دلت النتائج ان كل صفات القمح تحت الدراسة تأثرت بالمحاصيل السابقة معنويا ما عدا ارتفاع النبات, عدد السنابل/النبات, وزن حبوب السنبلة ووزن الالف حبة. ايضا اظهرت النتائج ان اعلى القيم فى صفات المحصول ومكوناتة كانت فى القمح المنزرع بعد عباد الشمس.

2-اظهرت النتائج ان فرم قش المحصول السابق وخلطة بالتربة لم يؤدى الى تحسين او زيادة فى الصفات المدروسة على القمح, بينما عدد السنابل/النبات, محصول النبات, وزن حبوب/م^2 ومحصول الفدان الذى لم يخلط قش محصولها السابق بالتربة (كنترول), زادت معنويا على التى خلط قش محصولها السابق بالتربة.

3-تأثرت صفات محصول النبات, وزن حبوب المتر المربع ومحصول /فدان(بالاردب) معنويا بمستويات التسميد الازوتى فى القمح وكلن معدل التسميد 70 كجم ازوت/فدان أعطى اغلى القيم بينما معدل التسميد 90 كجم ازوت/فدان اعطى اعلى محصول قش/فدان(بالطن).

4-دلت النتائج على ان التفاعل بين تأثير المحاصيل السابقة وقش المحصول السابق قد أثر معنويا غلى كل من عدد السنابل/النبات, وزن حبوب المتر المربع, محصول النبات ومحصول الفدان. كذلك أثر التفاعل بين المحصول السابق والتسميد معنويا على محصول النبات ومحصول الفدان, بينما أثر التفاعل بين قش المحصول السابق ومستويات التسميد معنويا على عدد السنابل/النبات فقط. من جهة اخرى لم يؤثر التفاعل الثلاثى بين المحاصيل السابقة, قش المحصول السابق ومستويات التسميد الازوتى على الصفات قيد الدراسة فى القمح ما عدا صفة وزن الالف حبة فكان اعلى وزن الف حبة بزراعة القمح عقب عباد الشمس مع عدم خلط قش العباد بالتربة تحت معدل تسميد 70 كجم ازوت/فدان, بينما كان أقل وزن الالف حبة بزراعة القمح عقب ذرة شامية مع خلط قش الذرة بالتربة تحت معدل تسميد 50 كجم ازوت/فدان.