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Integrated weed management of wheat under sprinkler irrigation in South Tahreer region in Egypt. II – Effectiveness on wheat productivity

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ABSTRACT

Two field trials were carried out under sprinkler irrigation system with wheat crop at the Desert Development Center (DDC), El-Khartoum Village, American Univ. Cairo, Egypt, during 1996 - 1998 seasons, to evaluate the effects of pre-irrigated with tillage or contact herbicide (paraquat), non pre-irrigated sowing and twenty herbicidal treatments on wheat productivity. The herbicidal treatments are included tribenuron-methyl, metosulam, chlorosulfuron, isoproturon, fenoxaprop-ethyl, tralkoxydim, diclofop-methyl, flamprop-isopropyl, clodinafop-propargyl and imazamethabenz-methyl. Pre-irrigation with tillage or contact herbicide gave higher biological and grains yield, number of grains / spike, number of spikes / m^2, 1000-kernel weight, plant height, spike length and number of spikelets / spike in the first season. On the other hand, biological and grains yield significantly increased with two pre-irrigated systems compared with non pre-irrigated one, in the second season. Most of the herbicidal treatments significantly increased wheat biological and grains yield, number of spike / m^2 and number of grains / spike in both seasons. However, the high values were obtained with the combinations between grassy and broad-leaves herbicides.

INTRODUCTION

Weeds could cause losses in wheat yield from 30 to 50 % (Bhan *et al,* 1985; Jack, 1985; RexLieble and Douglas, 1987 and Rao, 2000). Densities of 70 and 160 wild oat plants per square yard reduced wheat yield 22.1 and 39.1 %, respectively as compared to a crop with a weed free control (Frans and Talbert, 1977; Harry and James, 1985; Rhoads *et al*, 1985 and Milberg and Hallgren, 2004). Weed competition to wheat usually occurs from the two leaf stage to the onset of reproductive growth leading to reduction in tillering ear formation and in stem weight and height besides giving poor grain filling when the removal of *Chenopodium album* was delayed from 35

to 140 days, a reduction percentage of 23.3 in the effective number of tillers was obtained (Kolar, *et al.,* 1977; Rodgers, 1978; Roberts, 1982 and Rathors, 1985). Canary grass at a population of 85 plants per square feet resulted in 60 % reduction in wheat yield (Cudney and Hill, 1979). However, increasing competition from ryegrass caused corresponding yield reduction in wheat, by decreasing fertile tillers and fertile spikelets production and it was found to be more competitive in the late sown crops (Reeves, 1976 and Khodayari *et al.*, 1983). Wheat grain yield was linearly reduced by up to 1.025 gm / m / day, throughout the duration of wild oats competition (Mc-Namara, 1976 and Ravn, 1984).

Weed control techniques are therefore aimed at the reduction in the competitive ability of weeds in a crop and the prevention of weed problems in the next crop. The former is increasingly based on chemical use, and the latter also requires suitable cultural and agronomic practices. Wheat productivity is often improved by efficient application of agronomic practices, among which is weed control. Many herbicides proved to be effective in the control of broad leaved and grasses weeds such as bromoxynil, chlorsulfuron, metchlorsulfuron methyl, isoproturon, tribenuron-methyl, bentazone, diclofop-methyl, difenzoquat, fenoxaprop-ethyl, tralkoxydin, flamprop-isopropyl, clodinafop-propargyl and imazamethabenz-methyl which are well known herbicides in wheat production areas (Singh and Singh, 1992). The post-emergent alaninopropionates, aryloxyphenoxy propionates and the cyclohexanediones has enabled the control of abroad spectrum of annual grasses in wheat crop (Andrew, 1992; Soliman, 1995 and Deirdre *et al*., 1996). During the 1980s, three new herbicidal classes emerged that were potent, selective, broad-spectrum inhibitors of plant growth at field rates measured in grams per hectare. The herbicide groups are sulphonylureas, imidazolinones and triazolopyrimiding.

The present work was conducted in two successive seasons during 1996-1998 in South Tahreer region to transfer and utilization of integrated weed management control of weeds to increase wheat yield and yield components.

MATERIALS AND METHODS

Tillage, land leveling, method of sowing, seeding date and rate, irrigation system, crop varieties, fertilization, herbicides application and

planting and harvesting machinery is the essential components of a viable integrated weed management system.

An area of 2.5 feddan from unit 17 at Desert Development Center (DDC), El-Khartoum village was selected to conduct integrated weed management program under hand move sprinkler irrigation system. The field was naturally infested with grassy and broadleaf weeds and the soil texture was sand. The soil was ploughed and disked deeply on November, 1996 and 1997, to break up soil, and then the soil was leveled. The field area was divided into three main plots. The lands in the first and second main plots were irrigated on November 20 in two trials, to germinate the first flush of weeds. In this case population of weeds were reduced either by tillage or contact herbicide (paraquat 0.5 L / fed.) before wheat sowing. On the other hand, the third main plot did not irrigate. High quality of wheat grains, variety sides 6 was used. Planting depth was not deeper than 2 inches and cross sowing method of wheat (75 kg / fed.) was done in all field experiments by using seed drill. The date of sowing was at November, 30 in two seasons and sowing irrigation at December, first. The experimental design was a split plot with four replicates. The main plots show either pre-irrigated with tillage or with contact herbicide and none pre-irrigated. The subplots show herbicidal treatments. The area of subplot was 30 m^2 (6m x 5m). Four weeks after wheat sowing post-emergence application of herbicides and their combinations were applied using a knapsack sprayer. The herbicidal treatments, their formulations, rates and trade and common names are presented in Table (1). Fifty units from (p) super phosphate and 50 units from (k) potassium sulphate were incorporated with the soil during seedbed preparation and 10 units from (N) ammonium sulphate + 110 units from (N) ammonium nitrate were added per feddan by fertigation system with water irrigation. One liter from Wuxal, foliar fertilizer per feddan was also applied.

Numbers of wheat spikes per square meter were counted by using quadrate (50 cm x 50 cm) for each plot. At harvesting stage, the height of wheat plants was measured three times for each plot. Ten spikes from each plot were collected to determine spike length, number of spikeletes / spike, kernel numbers / spike and 1000-grains weight. Wheat crop in each plot was harvested and weighed to recorded biological yield (grain and straw yield), then the wheat was threshed for each plot and the grain yield was calculated per feddan (ton/fedd.). Obtained data were subjected to analysis of variance (Snedecor and Cochran, 1967).

Table (1): Common and trade names, rate and formulation of herbicide treatments

No of Treat.	Common name	Trade name	Rate/fedd.	Formulation
1	Tribenuron methyl	Grandstar	8 gm	75% DF
2	Metosulam	Sinal	40 ml	10% SC
3	Chlorosulfuron	Glean	15 gm	75% DF
4	Isoproturon	Arelon	750 ml	50% FL
5	Isoproturon + fenoxaprop-ethyl	Arelon + puma super	750ml + 500ml	50% FL + 75% EW
6	Isoproturon + tralkoxydim	Arelon + Grasp	750 ml + 1250 ml	50% FL + 10% EC
7	Isoproturon + Diclofop-methyl	Arelon + Illoxan	750 ml + 1250 ml	50% FL + 36% EC
8	Isoproturon+flamprop-isopropyl	Arelon + suffix-BW	750 ml + 1250 ml	50% FL + 20% EC
9	Isoproturon+Imazamethabenz-methyl (ready mix)	IPU / Assert	1250 ml	150/240 SC
10	Tribenuron-methyl+tralkoxydim	Grandstar + Grasp	8 gm + 1250 ml	75% DF + 10% EC
11	Chlorosulfuron+Diclofop-methyl	Glean + Illoxan	15 gm + 1250 ml	75% DF + 36% EC
12	Metosulam+clodinafop-propargyl	Sinal + Topic	40 ml + 100 ml	10% SC + 24% EC
13	Tralkoxydim	Grasp	1250 ml	10% EC
14	Diclofop methyl	Illoxan	1250 ml	36% EC
15	Fenoxaprop – ethyl	Puma super	500 ml	75% EW
16	Flamprop – isopropyl	Suffix–BW	1250 ml	20% EC
17	Imazamethaenz-methyl	Assert	1250 ml	25% FL
18	Clodnafop – propargyl	Topic	100 ml	24% EC
19	Diclofop-methyl 250 gm + fenoxaprop-ethy l23gm (ready mix)	Dopler	1500 ml	27% EC
20	Untreated check	--	--	--

RESULTS AND DSICUSSION

1. First Season: Wheat yield and yield components on South Tahreer in 1996 – 1997 were presented in Table 2 for comparison between pre-irrigated and tillage or contact herbicide and none-pre-irrigated. Pre-irrigated system didn't have any significant effect on any yield and yield components except the number of grains / spike and 1000-kernel weight, where pre-irrigated with tillage method gave the highest number of grains/spike (55.8) followed by the pre-irrigated with contact treatment (49.1), while the none pre-irrigated gave lowest grains number/spike (42.1).

Also, tillage gave 1000-kernel weight (58.11g), followed by each of contact and none-irrigated methods (54.74 and 53.95 g.), respectively. With regard of herbicidal treatments, they had significant effects on both yield and its components except 1000 – kernel weight.

Both of Glean + Illoxan and Grandstar + Grasp mixtures gave the highest number of spikes per unit area which accounted for 262.6 and 259.6 respectively, followed by Grandstar, Glean, Arelon separate or mixed with Illoxan, IPU / Assert, Sinal + Topic, Suffix-BW, Assert, Topic and Dopler. However, Grasp gave the lowest number of plants per square meter (190), this may be due to phytotoxicity of it. This result agrees with the finding of Tag-El-Din (1987).

Regarding to biological yield and grains yield, Grandstar + Grasp and Arelon + Puma Super caused highest biological yield with 4.219 and 3.900 tons / fed, respectively, whereas Grand star + Grasp and Arelon realized grain yields of 1.394 and 1.307 tons / fed., respectively.

With respect of number of grains / spike, mixing Arelon with Suffix-BW gave the highest value (57.7 grains / spike) followed by Grand star + Grasp, Gleam + Illoxan and Glean where their values were 53.5 and 52.8 grains / spike, respectively.

Data of vegetative characters were presented in Table 3. Pre-irrigated system didn't have any significant effects on the three studied characters, plant height, spike length and number of spikelets / spike. Herbicidal treatments had significant effects only on both of plant height and spike length. In case of graminicide, Topic gave the tallest plants (82.5 cm.), but Glean gave the tallest spikes (12.9 cm.). In contrast, Arelon mixed with Puma Super, IPU/Assert, Grasp, Puma super; Suffix-BW and Assert gave the shortest plants. Plant heights were 77.1, 70.3, 75.4, 76.0, 74.3 and 76.4 cm, for the above mentioned herbicide treatments, respectively.

2. Second Season: Wheat yield and its components in South Tahreer region in 1997 / 98 season are presented in Table 4. Data showed that there were significant differences between the pre-irrigated system on number of spikes per square meter, biological and grain yields, and 1000-Kernel weight, but the differences between the pre-irrigated systems didn't reach to the significant level for the number of grains/spike. Although none pre-irrigated

Table (2): Means of wheat yield and its components of pre-irrigated with Tillage (Till) or contact herbicide (Cont.) and none pre-irrigated (None) as affected by herbicidal treatments (South Tahreer, 1996 – 1997 season)

Tr.	Biological Yield (ton / feddan)				Grain Yield (ton / feddan)				No. of grains / spike				No. of spike / m²				1000 kernel weight (g.)			
	None	Cont.	Till.	Av.	None	Cont.	Till	Av	None	Cont.	Till	Av.	None	Cont.	Till.	Av.	None	Cont.	Till.	Av.
1	3.822	3.600	4.183	3.897ab	1.262	1.302	1.297	1.285ab	38.8	38.7	50.8	42.8d	276.5	223.5	214.5	238.2ab	52.7	51.0	55.2	53.0
2	3.130	3.656	3.861	3.549b	1.151	1.360	1.375	1.295ab	45.4	50.3	55.0	50.2bc	266.3	227.0	194.5	229.3b	52.7	53.3	58.1	54.7
3	3.666	3.393	3.539	3.533b	1.307	1.126	1.316	1.250ab	40.1	48.5	63.8	52.8ab	249.8	251.5	234.8	245.3ab	55.6	54.1	57.5	55.8
4	3.101	3.817	3.627	3.515b	1.229	1.261	1.433	1.307ab	43.6	42.6	51.6	47.3bc	258.5	262.0	230.5	250.3ab	54.4	53.5	55.1	54.3
5	4.094	3.510	4.095	3.900a	1.521	1.170	1.404	1.024c	40.9	55.3	57.8	51.3b	150.5	270.0	246.5	222.3b	54.6	51.3	58.1	54.6
6	4.056	3.422	4.037	3.838ab	1.463	0.966	1.258	1.229b	44.9	52.2	49.8	48.9bc	176.0	215.5	229.3	206.9bc	56.3	53.4	63.2	57.6
7	4.017	3.696	4.056	3.920ab	1.526	1.278	1.248	1.284ab	43.8	50.9	56.7	50.5bc	246.0	260.5	235.5	247.3ab	54.7	51.0	56.6	54.1
8	3.564	3.627	3.656	3.549b	1.121	1.214	1.068	1.135bc	50.4	57.2	65.6	57.7a	210.0	263.0	197.0	223.3b	52.6	52.6	58.1	54.4
9	3.354	3.652	4.212	3.406b	1.303	0.848	1.243	1.131bc	45.2	45.4	58.8	49.8bc	229.0	240.5	256.0	241.8ab	55.9	53.4	56.4	55.2
10	3.939	3.686	5.031	4.219a	1.375	1.390	1.419	1.394a	45.1	51.4	64.3	53.5ab	233.0	260.5	285.3	259.6a	56.2	53.6	61.9	57.2
11	3.180	3.422	4.241	3.616b	1.229	1.141	1.375	1.248ab	40.3	46.5	72.8	53.2ab	264.8	250.0	273.0	262.6a	55.2	52.9	60.9	56.3
12	3.452	3.656	4.446	3.851ab	1.097	0.980	1.433	1.170bc	39.5	54.6	60.1	51.4b	236.0	254.5	257.0	249.2ab	54.4	53.4	61.0	56.3
13	2.720	3.308	3.688	3.237b	0.966	0.995	1.009	1.000c	36.6	52.7	44.8	44.7c	165.5	193.5	241.3	190.0c	50.7	57.1	64.8	57.6
14	3.301	3.686	4.017	3.601b	0.995	1.185	0.995	1.058c	36.3	54.2	59.9	50.2bc	196.5	225.3	239.5	220.4b	53.9	52.5	54.3	53.9
15	3.247	3.510	4.056	3.604b	1.082	1.244	1.507	1.277ab	39.5	51.3	41.5	44.1c	245.5	195.5	245.5	228.2b	54.6	52.1	57.1	54.6
16	3.159	3.422	4.300	3.627b	1.115	1.312	1.141	1.122bc	41.8	47.9	60.1	49.9bc	283.8	219.0	233.5	245.4ab	52.9	58.3	54.7	55.3
17	3.600	3.276	4.095	3.658b	1.141	1.039	1.448	1.209bc	39.8	42.6	54.5	45.6c	263.0	208.5	255.3	242.3ab	53.1	60.7	55.0	56.3
18	3.289	3.393	4.066	3.583b	1.156	0.980	1.258	1.131bc	38.4	45.7	46.5	43.5c	218.5	255.5	260.0	244.7ab	53.8	62.3	54.7	56.9
19	3.744	3.598	4.329	3.890ab	1.200	1.097	1.360	1.219b	41.8	46.2	53.4	47.1bc	298.3	238.5	223.5	252.4ab	54.4	60.4	58.5	57.8
20	1.931	2.311	2.779	2.34c	0.702	0.629	0.907	0.746d	40.4	47.8	52.4	46.9bc	192.0	216.0	220.5	209.5bc	53.9	52.1	61.9	56.0
Ave.	3.413	3.424	4.016		1.183	1.107	1.277		42.1c	49.1b	55.8a		230.0	235.7	237.6		53.95b	54.74b	58.11a	

Tr.: Herbicides treatments

Table (3): Means of wheat yield and its components of pre-irrigated with Tillage (Till) or contact herbicide (Cont.) and none pre-irrigated (None) as affected by herbicidal treatments (South Tahreer, 1996 – 1997 season)

Tr.	Plant height (Cm.)				Spike length (Cm.)				No. of spikelets / spike			
	None	Cont.	Till.	Av.	None	Cont.	Till.	Av.	None	Cont.	Till.	Av.
1	86.2	73.8	78.5	79.5ab	10.4	12.5	11.6	11.5l.	17.5	17.7	18.7	17.9
2	71.9	78.1	82.8	77.6ab	12.3	12.9	13.0	12.7b	19.6	18.2	18.5	18.8
3	75.3	80.3	80.4	78.6ab	11.8	13.0	13.3	12.9a	18.1	18.4	19.2	18.5
4	76.9	77.0	83.0	78.9ab	12.0	12.4	11.0	11.8j	19.3	19.2	18.1	18.9
5	75.6	75.3	80.4	77.1b	11.5	13.0	12.1	12.2f	18.5	20.6	18.4	19.1
6	75.8	73.0	85.0	77.9ab	11.7	12.7	13.6	12.7b	18.9	18.8	19.1	18.9
7	79.0	77.1	81.1	79.1ab	10.8	12.9	13.0	12.2f	17.2	18.3	18.9	18.1
8	77.8	79.6	80.9	79.4ab	10.8	13.8	13.3	12.6c	17.7	18.8	19.3	18.6
9	72.1	66.4	72.5	70.3b	12.0	11.3	13.8	12.4d	18.9	15.9	19.5	18.1
10	76.2	79.1	81.9	79.1ab	11.3	13.2	13.4	12.6c	19.3	19.3	19.5	19.4
11	75.9	79.1	83.5	79.5ab	11.1	11.7	13.7	12.1g	18.2	18.4	19.7	18.8
12	74.1	79.9	88.9	81.0ab	10.7	12.8	12.5	12.0h	17.4	18.4	18.8	18.2
13	71.0	79.6	75.6	75.4b	10.6	13.2	11.5	11.8j	17.7	18.9	17.3	18.0
14	77.1	79.0	77.0	77.7ab	12.1	13.1	11.6	12.3e	20.0	19.2	19.4	19.5
15	73.4	75.9	78.6	76.0b	10.5	12.0	10.1	10.9p	17.4	17.7	18.3	17.8
16	71.1	75.9	75.9	74.3b	10.7	12.0	13.1	11.9i	18.2	18.4	18.1	18.2
17	76.8	74.8	77.6	76.4b	10.4	11.7	11.1	11.1o	17.4	17.3	17.8	17.5
18	80.4	84.0	83.0	82.5a	11.1	12.2	10.4	11.2m	19.4	18.3	16.9	18.2
19	76.9	77.4	88.6	81.0ab	10.7	11.4	11.4	11.2m	17.8	17.1	17.8	17.6
20	69.2	81.8	87.5	79.5ab	10.3	11.9	12.8	11.6k	16.7	18.1	17.8	17.5
Ave.	75.8	77.3	81.0		11.13	12.53	12.20		18.28	18.39	18.43	

gave the highest number of spikes / m^2 (308.01) and the heaviest grains (52.41), but this system gave the lowest

Table (4): Means of wheat yield and its components of pre-irrigated with Tillage (Till) or contact herbicide (Cont.) and none pre-irrigated (None) as affected by herbicidal treatments (South Tahreer, 1997 – 1998 season)

Tr	No. of spikes/m²				Biological yield (ton/fed.)				Grain yield (ton/fed.)				No. of grains/spike				1000 kernel weight (g)			
	None	Cont.	Till	Av	None	Cont.	Till	Av	None	Cont.	Till	Av	None	Cont.	Till	Av	None	Cont.	Till	Av
1	278.5	205.0	187.5	223.7c	3.20	3.71	3.90	3.607b	1.01	1.19	0.94	1.073ab	38.2	33.0	34.2	35.17i	53.5	49.0	51.6	51.2ab
2	326.2	142.5	325.5	264.1c	3.37	4.15	3.78	3.768b	1.14	1.31	0.96	1.140ab	36.5	34.0	32.0	34.17j	52.7	49.7	40.5	51.0ab
3	267.0	192.0	318.0	325.7a	3.44	4.34	4.16	3.997ab	0.99	1.30	1.05	1.115ab	33.2	41.0	32.5	35.56i	51.2	49.2	53.0	51.2ab
4	300.0	305.0	246.0	337.0c	3.31	4.06	4.07	3.815b	0.835	1.29	1.20	1.111ab	44.7	44.0	38.2	42.33e	54.0	51.7	54.0	53.1ab
5	310.5	312.0	356.0	312.8ab	3.34	4.23	4.25	3.943ab	1.07	1.28	1.17	1.172ab	40.0	44.0	41.5	41.83cd	50.7	48.5	54.0	51.4ab
6	272.5	270.0	304.0	281.7bc	3.34	4.21	4.12	3.901ab	1.067	1.29	1.34	1.232ab	46.2	46.5	44.2	45.67a	54.5	49.5	53.2	52.4ab
7	[illegible]	230.0	295.4	[illegible]	3.41	4.16	3.78	3.788b	0.989	1.20	1.10	1.177ab	38.0	48.0	43.0	42.33e	50.2	48.0	49.7	49.3b
8	340.0	289.0	299.0	336.0bc	3.24	4.11	4.54	3.974ab	1.208	1.16	1.18	1.166ab	44.5	45.5	41.5	41.83b	49.1	49.7	52.2	50.6b
9	349.5	128.0	318.5	318.7ab	3.44	4.30	4.23	3.991ab	1.22	1.34	1.20	1.273ab	43.2	40.7	34.7	39.50g	51.0	51.7	54.2	53.0ab
10	309.5	286.0	321.5	305.7ab	3.38	4.16	4.23	3.923ab	1.20	1.26	1.19	1.224ab	37.5	39.5	39.5	38.83gh	56.7	49.7	53.0	53.2ab
11	345.0	327.0	311.5	327.8ab	3.27	4.09	3.93	3.774b	1.125	1.40	1.27	1.268ab	36.2	49.2	41.2	40.92d	53.5	51.7	53.5	52.9ab
12	355.0	318.0	267.0	312.3b	3.27	4.16	4.50	3.984ab	1.19	1.44	1.26	1.297a	37.0	46.7	37.5	40.42de	53.2	53.2	51.2	52.9a
13	291.0	277.0	280.0	282.7bc	3.38	3.92	3.44	3.595b	0.90	1.28	1.12	1.193ab	41.5	46.0	40.0	42.50c	51.3	49.3	52.5	51.1ab
14	282.5	235.0	273.0	263.5c	3.35	4.20	4.04	3.869ab	1.237	1.47	1.29	1.330a	38.5	39.0	42.0	39.83f	52.2	50.3	54.0	52.2ab
15	391.0	337.0	366.0	364.7a	3.31	4.13	3.65	3.698b	1.38	1.37	1.31	1.353a	37.7	40.7	37.2	38.50h	52.0	50.5	54.7	52.4ab
16	320.5	239.0	245.0	268.2c	3.06	3.71	3.72	3.498bc	1.085	1.015	1.36	1.156ab	37.2	43.2	32.7	37.75h	53.7	49.2	52.0	51.7ab
17	304.5	256.0	266.0	277.7bc	3.27	4.32	3.97	3.923ab	0.90	1.47	1.16	1.189ab	37.5	42.0	40.2	39.92a	54.5	50.2	52.7	52.5ab
18	380.5	308.5	392.5	360.5ab	3.10	4.34	4.06	3.904ab	1.19	1.16	1.31	1.290a	37.0	36.2	41.0	38.75gh	49.5	51.0	53.0	51.2ab
19	362.0	311.5	362.0	345.2ab	3.27	5.04	4.34	4.281a	1.25	1.50	1.468	1.021b	45.0	36.4	43.2	41.67cd	52.5	50.5	53.2	52.1ab
20	166.0	170.0	158.5	164.8d	2.77	3.29	3.18	3.082c	0.73	0.83	0.80	[illegible]	28.5	28.5	32.5	29.83k	47.2	48.2	50.2	48.6b
Av	308.01a	271.83b	283.15b		3.29b	4.15a	4.01a		1.090c	1.296a	1.195b		38.93	40.94	38.56		52.41a	50.08b	52.71a	

Tr.: Herbicides treatments

biological and grain yields (3.29 and 1.090 ton/fed.), respectively. It may be due to the lowest harvest index for this system compared to the other two systems. For the same reason, pre-irrigated with contact herbicide gave the lowest number of spikes per square meter (271.83) and the lightest grains (50.08 g.), but it gave the highest biological and grain yields (4.14 and 1.296 ton / fed.), respectively. Also, data in Table 4 presented the herbicidal treatment effects on both biological and grain yields and their components. With respect to the number of spikes per square meter, Puma super separate or mixed with Arelon, Glean + Illoxan, Topic and Dopler gave higher spike numbers / m^2 than the other treatments. Numbers of spikes/m^2 for the mentioned treatments were 364.7, 332.8, 327.8, 360.5 and 345.8, respectively. As for biological yield, mixing Arelon with both of Puma super, Grasp, Suffix-BW; and Assert; Glean; Illoxan; Topic separate or mixed with Sinal; Dopler; and Grandstar + Grasp gave high biological yields compared with the other treatments. Biological yields for the mentioned treatments before were 3.943, 3.901, 3.974, 3.991, 3.997, 3.869, 3.904, 3.984, 4.283 and 3.923, tons / fed., respectively. However, many herbiida treatments gave high or moderate grain yields compared with un-weeded check. Arelone alone or mixed with both of Puma super, Grasp, Suffix-BW, Illoxan; Grasp alone; and Dopler gave higher number of grains/spike than the other herbicidal treatments. They gave 42.33, 41.83, 45.67, 43.83, 42.33, 42.50, 42.50 and 41.67 grains / spike, respectively. However, mixing Arelon with both of Illoxan or Suffix-BW and the check treatments gave the lightest grains compared with the other studied treatments, where their 1000-Kernel weights were 49.3, 50.6 and 48.6 g., respectively.

Table (5) illustrated the main effects of pre-irrigation system and herbicidal treatments on the studied vegetative characters in South Tahreer region in 1997 / 98 season. Data showed that pre-irrigated system affects on the plant height, spike length and number of spikelets/spike didn't reach to the significance level. On the other hand, herbicidal treatments had significant effects only on the number of spikelets/spike. Arelon separate or mixed with both of Puma Super, Grasp, Illoxan, Suffix-BW; IPU/Assert; Glean + Illoxan; Sinal + Topic; Grasp; Puma super; Suffix-BW and Dopler as grassy herbicides gave higher number of spikelets/spike than the other herbicidal treatments. They gave 19.08, 18.40, 19.73, 19.12, 19.13, 18.18, 18.40, 18.25, 18.50, 18.50, 18.25 and 19.40 spikelets / spike, respectively.

Table (5): Means of wheat yield and its components of pre-irrigated with Tillage (Till) or contact herbicide (Cont.) and none pre-irrigated (None) as affected by herbicidal treatments (South Tahreer, 1997 – 1998 season)

Tr.	Plant height (Cm.)				Spike length (Cm.)				No. of spikelets / spike			
	None	Cont.	Till.	Av.	None	Cont.	Till.	Av.	None	Cont.	Till.	Av.
1	91.0	91.0	88.5	90.2	9.5	9.4	10.1	9.7	19.25	17.4	16.9	17.85b
2	85.3	82.0	88.5	85.3	9.6	9.0	9.6	9.4	18.6	17.3	16.55	17.48b
3	82.8	91.8	86.3	86.9	8.9	8.9	8.9	8.9	17.0	16.6	16.3	16.63b
4	88.8	89.8	80.5	86.3	10.8	10.2	10.2	10.4	20.45	17.92	18.85	19.08ab
5	89.5	94.0	81.0	88.2	10.3	10.1	9.8	10.1	18.75	18.5	17.95	18.4ab
6	87.8	92.5	86.3	88.8	11.0	11.2	9.6	10.6	20.95	20.45	17.8	19.73a
7	94.5	94.0	86.0	91.5	9.8	10.4	9.8	10.0	18.75	19.97	18.6	19.12ab
8	87.0	84.5	87.3	86.3	10.7	10.4	9.9	10.4	20.35	18.62	18.42	19.13ab
9	84.3	88.3	85.5	86.0	10.1	9.3	9.3	9.6	19.65	18.0	16.9	18.18ab
10	91.5	94.5	89.5	91.8	9.5	9.3	9.8	9.6	18.25	16.7	18.25	17.73a
11	92.0	89.8	87.0	89.6	9.4	10.0	9.7	9.8	18.45	18.95	17.8	18.4ab
12	94.0	87.5	79.8	87.1	9.9	9.8	9.4	9.7	18.6	18.0	18.15	18.25ab
13	87.8	87.5	82.0	85.8	9.7	11.3	9.5	10.2	18.55	19.2	17.75	18.5ab
14	98.3	86.0	82.8	89.0	9.6	9.4	10.0	9.7	17.35	17.8	18.35	17.83b
15	87.8	91.8	80.5	86.7	9.7	10.5	10.0	10.1	18.4	18.9	18.2	18.5ab
16	83.5	88.3	84.0	85.3	9.4	10.5	9.2	9.8	18.4	19.7	16.65	18.25ab
17	89.5	90.8	82.8	87.7	8.8	10.7	10.0	9.9	17.8	19.3	16.9	18.0b
18	94.5	91.8	86.8	91.0	9.7	9.3	9.6	9.6	18.55	17.1	17.95	17.87b
19	95.0	89.0	85.8	89.9	10.4	10.4	10.0	10.3	20.65	19.0	18.55	19.4ab
20	84.0	86.0	75.5	81.8	8.5	9.0	8.8	8.8	16.45	16.5	16.7	16.55b
Ave.	89.43	89.53	84.30		9.80	10.0	9.69		18.76	18.30	17.68	

Tr.: Herbicides treatments

Little attention has been paid for controlling grassy weeds along with broad leaf weeds in wheat in Egypt. Information is desired on chemical control of mixed populations of broad leaf and grassy weeds infesting wheat and their effects on biological and grain yield; and yield components under weed management practices at South Tahreer region. The general results in two seasons showed that, pre-irrigated with tillage or contact herbicide (Gramaxon) improved biological and grain yields and some of yield components compared to none-pre-irrigated system. This result agrees with the finding of Samarajecwa *et al.*, 2005 who found that no-tillage system resulted in the lowest wheat yield. Also, the present study showed that most of herbicide treatments increased biological and grain yields compared with un-weeded check and the highest values were obtained with herbicide combinations. These results are in agreement with the findings of Ghanima *et al.,* (1993); Hassanein *et al.,* (1994); Sabra *et al.,* (2003) and Soltani, *et al.,* (2006). They pointed out the importance of integration between more than one method of weed control specially sowing methods and herbicides to increase the efficiency of weed control and grain yield and yield components of wheat crop.

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