Egypt. J. of Appl. Sci., 35 (11) 2020 *132-143*

EFFECT OF SOWING METHODS AND WEED CONTROL TREATMENTS ON ASSOCIATED WEEDS , YIELD AND YIELD COMPONENTS OF WHEAT

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ABSTRACT

Two filed experiments were conducted at San El- Hagar , El-Sharqia Governorate ,Egypt in two successive growing seasons of 2015/2016 and 2016/2017 to investigate the effect of some sowing methods (broadcast and drill) and some weed control treatments(Thirteen weed control treatments were used as follows:1- Unweeded (control),2- Hand weeding once , 3- Granstar ,4-Topik 5- Panter, 6- Ballas ,7- Tournex ,8- Granstar + Panter,9-Topik+panter ,10- Granstar + Ballas,11-Topik +Ballas,12- Granstar +Tournex and 13-Topik +Tournex). on associated weed species and wheat productivity .The obtained results showed that drill sowing method gave the lowest total dry weight of annual weeds and the highest number of spikes /m^2 , grain weight / spike , grain yield / feddan and straw yield / fed . Spraying wheat plants with mixed herbicide from Topik +Tournex gave the lowest total dry weight of annual weeds, on the contrary, it the highest values of number of spikes/m^2, grain weight of spike (g) , grain yield per feddan (ardab) as well as straw yield per feddan(ton) . Sowing wheat with drill method and treated with Topik +Tournex treatment gave the lowest total dry weight of annual weeds, on the other hand , it gave the highest values of number of spikes/m^2, grain weight of spike (g) , grain yield per fed (ardab) as well as straw yield per fed (ton).

INTRODUCTION

Wheat (*Triticum aestivum, L.*) is considered as one of the important cereal crops in Egypt and all over the world used in human food and animal feed. Nowadays, increasing wheat production is the first important step of the Egyptian strategic aims to bridge the gap between wheat production and consumption. Such increase is likely to be achieved by increasing wheat cultivated areas and growing high yielding varieties combined by optimizing various agricultural practices. The intensive competition between wheat and Egyptian clover as well as sugar beet during the winter season ceils the possibility of more extension in wheat cultivated area in the old land. New reclaimed soils

predominate is most newly cultivated. These soils suffer from a very low soil fertility level, weeds competition and very low water holding as well as nutrients retention capacities.

Weeds are considered a great constraint in agriculture, particularly in wheat. Wheat is often infested with numerous types of weeds, which compete with crop plants resulting in grain yield depression. Getting rid of weeds is achieved through direct methods such as herbicides application or by hand weeding and other indirect measures, such as agricultural practices as crop rotation, land preparation and sowing methods. Herbicidal control of weed must be considered in combination with other improved agronomic practice such as sowing method.

Fakkar *et al* (2013)in Egypt, found that sowing methods Afir drill and broadcast on raised beds at 75 cm widths gave the highest values for plant height, spike length, weight of the spike, the number of spikes /m^2, grain protein, or content(%) straw yield (ton/fed) and grain yield (ardeb/fed) in both seasons. **Muhammad *et al* (2013)** in Pakistan showed that sowing methods had a significant effect on biological yield of wheat crop. Wheat crop sowing by drill method produced the maximum biological yield as compared to broadcast method. **Chauhdary *et al* (2016)** in Netherlands found that wheat sowing under bed planting showed better results with highest plant height, numbers of tillers , numbers of grains per spike , 1000 grain weight and grain yield , while, these parameters were observed as the lowest under broadcasting among all treatments**. Galal (2003)**in Egypt found that sowing drill method decreased the dry weight of grass, broad-leaved and total weeds. **Shah *et al* (2019)** in Pakistan showed that weed control efficiency was maximum (24.08%) for ridge sowing method. The highest grain yield of wheat (2.84 t /ha) obtained from line sowing method. So, it is concluded and recommended that for controlling broadleaved weeds hand weeding through line sowing method results in a good yield of rainfed wheat. **Malik *et al* (2012)** in Kenya found that among different treatments, the lowest weed biomass was achieved in hand weeding treatment. Plots treated with herbicide Buctril super (Bromoxonil+MCPA) also produced excellent results in reducing weed biomass. **Singh *et al* (2017)**in India found that yield attributing characters viz., number of effective tillers running row/meter and number of grains/spike differed significantly with respect to herbicide treatments. Grain and straw yields also differed significantly among herbicidal treatments. All tank mix applications of

herbicide showed maximum weed control efficiency and maximum values for grain and straw yield than single application of herbicide.

The objective of this investigation was to study the effect of sowing methods and weed control treatments and their interactions on weeds, yield and yield components of wheat Giza 168 cultivar grown under new reclaimed land conditions at San El- hagar , El-Sharqia Governorate ,Egypt.

MATERIALS AND METHODS

Two filed experiments were conducted at San El- Hagar , El-Sharqia Governorate ,Egypt in two successive growing seasons of 2015/2016 and 2016/2017 to investigate the effect of some sowing methods and some weed
control treatments on wheat productivity and associated weed species. Wheat
variety Giza 168 (*Triticum aestivum* L.) was sown in both seasons.
The experiment treatments were as follows:

A- Sowing methods

Two sowing methods were studied as follows:

1. Afirbraodcast: Soil was bellowed twice then grains were hand broadcasted then compacted and irrigated .

2. **Drill sowing**: Soil was pillowed twice and leveling then grains were sown by planter in rows 20 cm apart and irrigation was followed.

B- Weed control treatments

Thirteen weed control treatments were used as follows:

1- Unweeded (control)
2- Hand weeding once at 35 days from sowing
3- Granstar (75% DF) at the rate of 8 g/fed at 35 days from sowing date.
4-Topik (15% W.P) at the rate of 140g/fed at 35 days from sowing date.
5- Panter (55%S.C.) at the rate of 600 cm^3/fed at 35 days from sowing date.
6- Ballas (4.5%O.D.) at the rate of 160cm^3/fed at 35 days from sowing date.
7- Tournex (50% S.C) at the rate of 1.5L/fed at 35 days from sowing date.
8- Granstar (75% DF) at the rate of 8g/fed + Panter (55%S.C.) at the rate of 600 cm^3/feddan at 45 days from sowing date
9-Topik (15% W.P) at the rate of 140g/fed+panter(55%S.C.) at the rate of 600 cm^3/feddan at 45 days from sowing date

10- Granstar (75% DF) at the rate of 8g/fed + Ballas (4.5%O.D.) at the rate of 160cm^3/feddan at 45 days from sowing date.
11-Topik (15% W.P) at the rate of 140g/fed +Ballas (4.5%O.D.) at the rate of 160cm^3/fed at 45 days from sowing date.
12- Granstar (75% DF) at the rate of 8g/fed +Tournex (50% S.C) at the rate of 1.5L/fed at 35 days from sowing date.
13-Topik (15% W.P) at the rate of 140g/fed +Tournex (50% S.C) at the rate of 1.5L/fed at 35 days from sowing date.

Trade, common and chemical names of herbicides used were presented in Table (1).

Table (1) : Trade, common and chemical name of herbicides used in the experiment.

Trade name	Common name	Chemical name
Granstar 75% DF	Tribenuron – methyl	2-(4-methoxy-6-methyl-1,2,3-triazinyl)methylamino]carbonyl]amino]sulfonyl]benzoate
Topik 15% W.P	Clodinafop-propargyl	[prop-2-ynyl(R)-2-[4-(5-chloro-3-fluropyridin-2yloxy)phenoxy]propionate]
Panter 55% S.C	Isoproturon	3-(4-isopropylphenyl)-1,1-dimethylurea; 3-*p*-cumenyl-1,1-dimethylurea
Pallas 4.5 % O.D	Pyroxsulam	N-(5,7-dimethoxy[1,2,4]triazolo[1,5-a]pyrimidin-2-yl)-2-methoxy-4-(trifluoromethyl)pyridine-3-sulfonamide
Tournex 50% S.C	Isoproturon	3-(4-isopropylphenyl)-1,1-dimethylurea; 3-*p*-cumenyl-1,1-dimethylurea

A split- plot design with three replicates was used sowing methods were allocated in the main plots and weed control treatments in the sub plots. The plot area was 10.5 m/^{2} (3.5 m lenght × 3 m width). Seeding rate was used as recommended (60 kg/fed.). Herbicides were sprayed by Cp3 knapsack sprayer with 200 litter of water/fed.

Table: soil mechanical and chemical analysis of the experimental sites are presented in Table (2) according to **Page (1982).**

Table (2): soil mechanical and chemical analysis of the experimental sites in 2015/2016 and 2016/2017 season

season	Practical size distribution			
	Sand (%)	Silt (%)	Clay (%)	Texture class
1	12.13	33.31	54.56	Clay
2	21.25	32.52	46.23	Clay

chemical analysis

season	pH	EC (dS m^{-1})	Cations (mmolc^{-1})				Anions (mmolc^{-1})			
			Ca++	Mg++	Na+	K+	CO3- -	HCO3-	Cl-	SO4- -
1	8.11	2.47	4.37	4.92	14.86	0.56	0.00	9.10	7.93	7.68
2	8.23	2.62	4.53	5.79	15.38	0.48	0.00	10.22	7.84	8.12

pH: 1:2.5 w/v soil water suspension and EC: Soil paste extract

The sowing dates were 21th and 24th of November in the first and second season, respectively. Phosphorus fertilizer was applied as calcium

super phosphate (15.5%P_2O_5) during soil preparation at the rate of 200 kg/fed. Nitrogen fertilizer in the form of ammonium nitrate at the rate of 70 kg N/ fed was added in the two equal half , the first half was applied at 25days from sowing date and another half was applied at 70 days from sowing date. The other normal agricultural practices of wheat growing were done as recommended.

Data recorded:-

The following data were recorded:

I-Weed survey

Weed were hand pulled from one square meter randomly of each plot after 75 days from sowing, and classified into the following two groups as well as the following data were recorded:

1- Total dry weight of annual weeds(g /m^2).

Weeds (annual narrow and broad) were air dried for 3 days then oven dried at 70 C^o for 24 hours.Therefore, the dry weight of annual broad, narrow-leaved weeds and totalannual weeds were estimated as g/m^2.

II-Yield and yield attributes

At harvest time ten plants were randomly taken from each plot to determine the following characters:

1. Number of spikes/m^2

2. Grain weight/spike(g).

3. Grain yield (ardab/fed): The grain of each plot (10.5 m2) was weighted and the mean grain yield (ardab/fed.) was calculated.

4. Straw yield (ton/fed) .

Statistical analysis:-

All data were statistically analyzed according to technique of analysis of variance (ANOVA) for the split-split plot design as mentioned by **Gomez and Gomez (1984)** by means of "MSTAT-C" computer software package and least significant differences revised (L.S.D.) at 5% level of probability was calculated for compare between treatments means.

RESULTS AND DISCUSSION

1. (Total dry weight of annual weeds (g/m^2):

Average total dry weight of annual weeds g/m^2 as affected by sowing methods and weed control treatments and their interaction at75 days from sowing in 2015/2016 and 2016/2017 seasons are shown in Table 3.

Results recorded in Table 3 indicate that sowing methods were significantly affected total dry weight of annual weeds in both seasons.

Sowing wheat plants by drill method gave the lowest total dry weight of annual weeds 15.40 and 9.02 g/m^2 ,on the other hand, the highest total dry weight of annual weeds 16.57 and 11.11 g/m^2 recorded with sowing wheat plants by broadcast method in 2015/2016 and 2016/2017 seasons, respectively. sowing wheat plants with Afir drill method gave 7.60 and 23.17 % decrease in total dry weight of annual weeds compared to sowing wheat broadcast method in 2015/2016 and 2016/2017 seasons, respectively. The depressed effect of drill method on total dry weight of annual weight may be due to a severe competition among wheat plants and weeds for the environmental resources i.e. nutrient , water , place and light. These results are in harmony with those of **Galal (2003) and Shah *et al* (2019).**

Results presented in Table 3 show that the effect of weed control treatments was significant on total dry weight of annual weeds in both seasons . Spraying wheat plants with mixed herbicide from Topik (15% W.P) at the rate of 21g/feddan +Tournex (50% S.C) at the rate of 1.5L/feddan at 45 days from sowing date gave the lowest total dry weight of annual weeds 7.47 and 4.83 g/m^2, on the contrary, the highest total dry weight of annual weeds 57.94 and 46.20 g /m^2 was found with wheat plants grown on the control (unweeded) treatment as compared with all other weed control treatments in 2015/2016 and 2016/2017 seasons , respectively. Spraying wheat plants with Topik +Tournex decreased total dry weight of annul weeds by 64.91 and 61.61% as compared with hand weeding treatment in 2015/2016 and 2016/2017 seasons, respectively. These results may be attributed to that Topik controlling narrow leaved weeds while Tournex controlling broad leaved weeds so application of Topik +Tournex resulted in brooding the spectrum of weed controlled. These results are in agreement of by **Galal (2003) , Fakkar *et al* (2013).**

Results presented in Table 3 show that the interaction effect between sowing methods and weed control treatments was significant on total dry weight of annual weeds in both seasons . Sowing wheat with drill method and treated with Topik +Tournex treatment gave the lowest total dry weight of annual weeds (6.80) and 4.49 g/m^2 , on the other hand, sowing wheat plants by broadcast method and unweeded (control) gave maximum total dry weight of annual weeds 60.91 and 51.17 g/m^2 as compared with all other weed control treatments in 2015/2016 and 2016/2017 seasons , respectively.

II-Grain yield and its componets

Average number of spikes/m^2 , grain weight of spike(g) , grain yield per fed (ardab) and straw yield per feddan (ton)as affected by sowing methods and weed control treatments and their interaction in 2015/2016 and 2016/2017 seasons are shown in Tables 4,5,6 and 7.

Results recorded in Table 4 to 7 indicate that sowing methods were significantly affected number of spikes/m^2 , grain weight of spike(g) , grain yield per fed (ardab) and straw yield per fed (ton) in 2015/2016 and 2016/2017 seasons . Sowing wheat plants by drill method increased number of spikes/$m^2$by 8.67 as well as 12.82 % , grain weight of spike (g) by 3.36 as well as 1.66 % , grain yield per fed (ardab) by 12.17 as well as 14.37 % and straw yield per fed (ton) by 16.95 as well as 15.98 % as compared with broadcast sowing method in 2015/2016 as well as 2016/2017 seasons , respectively .

The superiority of drill sowing method in increasing grain yield and its components my be attributed to drill sowing method had the highest(Tables 4 and 5) number of spike /m^2 and grain weight / spike, therefore increased grain yield per fed. These results are in harmony with those obtained by **Fakkar *et al* (2013) and Chauhdary *et al* (2016).**

Results presented in Table 4 to 7 show that the effect of weed control treatments was significant on number of spikes/m^2 , grain weight of spike (g) , grain yield per fed (ardab) and straw yield per fed (ton) in both seasons . Spraying wheat plants with mixed herbicide from Topik (15% W.P) at the rate of 140g/fed +Tournex (50% S.C) at the rate of 1.5L/fed at 35 days from sowing date gave the highest values of number of spikes/m^2 (478 and 480), grain weight of spike(2.50 and 2.47 g) , grain yield per fed (24.12 and 24.60ardab) as well as straw yield per feddan (5.95 and 6.09 ton), on the contrary, growing wheat plants without weed control (unwedded) gave the lowest values of number of spikes/m^2 (323 and 335), grain weight of spike(2.08 and 2.09 g) , grain yield per fed (11.82 and 13.67 ardab) as well as straw yield per feddan (2.87 and 3.32 ton), as compared with all other weed control treatments in 2015/2016 and 2016/2017 seasons , respectively

The increase in grain and straw yield caused by treating wheat by mixed from Topik and Tournex may be attributed to Topik controlling narrow leaved weeds while Tournex controlling broad leaved weeds so application of Topik +Tournex resulted in brooding the spectrum of weed controlled which led to decreasing competition between weeds and wheat plants thus increased number of spike /m^2 and grain weight / spike

as well as enhancement grain yield per fed . These results are in agreement of **Malik *et al* (2012) and Singh *et al* (2017).**

Results tabulated in Table 4 to 7 show that the interaction effect between sowing methods and weed control treatments was significant on number of spikes/m^2 , grain weight of spike(g) , grain yield per fed (ardab) and straw yield per fed (ton) in both seasons . sowing wheat with drill method and treated with Topik +Tournex treatment gave the highest values of number of spikes/m^2 487 and 498, grain weight of spike 2.68 and 2.66(g) , grain yield per fed 25.17 and 26.22 (ardab) and straw yield per fed 6.34 and 6.55 (ton) , on the other hand, sowing wheat plants by broadcast method and (control) treatment gave the lowest values of these traits in the same respect as compared with all other interaction treatments in 2015/2016 and 2016/2017 seasons , respectively.

Generally ,it could recommended that sowing wheat why drill method with treated why Topik 140g/fed +Tournex 1.5 L/fed treatment gave the highest values of grain and straw yields per fed at San El-Hagar ,conditions El-Sharqia Governorate ,Egypt .

Table (3): Average total dry weight of weeds (g/m^2) of wheat as affected by sowing methods and weed control treatments and their interaction at 75days from sowing date in 2015/2016 and 2016/2017 seasons.

Weed control tratments	2015/2016 Season			2016/2017 Season		
	Sowing Methods			Sowing Methods		
	BroadCast	Drill sowing	Mean	BroadCast	Drill sowing	Mean
Control	60.91	54.97	57.94	51.17	41.23	46.20
Hand weeding	21.31	21.26	21.29	13.77	11.40	12.58
Granestar	16.45	14.09	15.27	5.21	5.90	5.55
Topik	13.44	15.69	14.56	4.69	6.59	5.64
Panter	15.41	13.26	14.33	11.29	5.73	8.51
Pallas	9.70	10.32	10.01	6.67	5.97	6.32
Tournex	10.31	9.80	10.06	6.47	5.03	5.75
Granestar+Panter	13.51	12.74	13.13	9.57	6.58	8.07
Panter+Topik	10.15	8.49	9.32	7.70	6.23	6.97
Granestar+Pallas	9.98	10.78	10.38	6.37	6.57	6.47
Topik+Pallas	15.39	11.99	13.69	10.00	5.73	7.87
Granestar+Tournex	10.72	9.98	10.35	6.37	5.73	6.05
Tournex+Topik	8.13	6.80	7.47	5.17	4.49	4.83
Mean	16.57	15.40		11.11	9.02	
L.S.D at 5% level. For:						
2 Sowing Methods(s)			*			*
Weed control (w)			1.6			0.66
interaction (sXw).			2.26			2.69

Table (4): Average number of spikes/m² of wheat as affected by sowing methods and weed control treatments and their interaction in 2015/2016 and 2016/2017 seasons

Weed control tratments	2015/2016 Season			2016/2017 Season		
	Sowing Methods			Sowing Methods		
	BroadCast	Drill sowing	Mean	BroadCast	Drill sowing	Mean
Control	304	342	323	323	347	335
Hand weeding	340	388	364	338	391	365
Granestar	430	451	440	429	449	439
Topik	395	462	428	381	443	412
Panter	366	455	411	362	471	417
Pallas	370	437	404	365	443	404
Tournex	419	418	419	418	426	422
Granestar+Panter	386	372	379	385	429	407
Panter+Topik	402	428	415	400	464	432
Granestar+Pallas	420	448	434	417	479	448
Topik+Pallas	397	420	409	395	432	413
Granestar+Tournex	392	432	412	391	448	420
Tournex+Topik	469	487	478	462	498	480
Mean	392	426		390	440	
L.S.D at 5 %level. for:						
Sowing Methods(s)			*			*
Weed control (w)			8.55			4.28
interaction (sXw).			12.1			6.28

Table (5): Average grains weight /spike of wheat as affected by sowing methods and weed control treatments and their interaction in 2015/2016 and 2016/2017 seasons

Weed control tratments	2015/2016 Season			2016/2017 Season		
	Sowing Methods			Sowing Methods		
	BroadCast	Drill sowing	Mean	BroadCast	Drill sowing	Mean
Control	1.97	2.19	2.08	1.98	2.20	2.09
Hand weeding	2.03	2.33	2.18	2.18	2.34	2.26
Granestar	2.58	2.39	2.49	2.57	2.40	2.48
Topik	2.38	2.45	2.42	2.35	2.44	2.39
Panter	2.42	2.51	2.47	2.41	2.50	2.46
Pallas	2.61	2.54	2.58	2.60	2.52	2.56
Tournex	2.31	2.44	2.38	2.50	2.45	2.48
Granestar+Panter	2.33	2.42	2.37	2.34	2.39	2.36
Panter+Topik	2.33	2.54	2.43	2.31	2.51	2.41
Granestar+Pallas	2.63	2.43	2.53	2.62	2.40	2.51
Topik+Pallas	2.35	2.48	2.42	2.39	2.46	2.42
Granestar+Tournex	2.47	2.52	2.50	2.45	2.49	2.47
Tournex+Topik	2.55	2.68	2.62	2.54	2.66	2.60
Mean	2.38	2.46		2.40	2.44	
L.S.D at 5 %level.for:						
Sowing Methods(s)			*			*
Weed control (w)			0.25			0.1
interaction (sXw).			N.S			0.15

Table (6): Average grain yield (arddab/feddan) of wheat as affected by sowing methods and weed control treatments and their interaction in 2015/2016 and 2016/2017 seasons

Weed control tratments	2015/2016 Season			2016/2017 Season		
	Sowing Methods			Sowing Methods		
	Broad Cast	Drill sowing	Mean	Broad Cast	Drill sowing	Mean
Control	11.38	12.27	11.82	13.64	13.70	13.67
Hand weeding	16.38	16.53	16.46	15.95	16.77	16.36
Granestar	21.23	22.07	21.65	20.87	23.46	22.17
Topik	14.23	21.60	17.92	16.18	20.04	18.11
Panter	20.73	23.60	22.17	19.77	24.17	21.97
Pallas	21.30	22.50	21.90	20.92	23.22	22.07
Tournex	18.57	19.34	18.96	18.09	20.69	19.39
Granestar+Panter	15.25	18.13	16.69	16.53	20.92	18.72
Panter+Topik	16.63	21.40	19.01	18.71	23.01	20.86
Granestar+Pallas	22.16	23.53	22.84	23.84	24.75	24.30
Topik+Pallas	15.20	20.53	17.87	16.80	21.25	19.03
Granestar+Tournex	19.40	22.33	20.86	17.15	23.46	20.31
Tournex+Topik	23.07	25.17	24.12	22.97	26.22	24.60
Mean	18.12	20.69		19.57	21.67	
L.S.D at 5 %level.for:						
Sowing Methods(s)			*			*
Weed control (w)			0.63			0.5
interaction (sXw).			0.89			0.7

Table (7): Average straw yield/feddan(ton) of wheat as affected by sowing methods and weed control treatments and their interaction in 2015/2016 and 2016/2017 seasons

Weed control tratments	2015/2016 Season			2016/2017 Season		
	Sowing Methods			Sowing Methods		
	BroadCast	Drill sowing	Mean	BroadCast	Drill sowing	Mean
Control	2.54	3.01	2.78	3.31	3.32	3.32
Hand weeding	2.19	4.08	3.14	3.78	4.15	3.97
Granestar	5.2	5.41	5.31	5.11	5.74	5.43
Topik	3.35	5.3	4.33	4.14	5.23	4.69
Panter	5.08	5.82	5.45	4.74	6.22	5.48
Pallas	5.22	5.52	5.37	5.13	5.68	5.41
Tournex	4.34	4.73	4.54	4.42	5.13	4.78
Granestar+Panter	3.61	4.43	4.02	4.03	5.18	4.61
Panter+Topik	4.11	5.32	4.72	4.57	5.68	5.13
Granestar+Pallas	5.34	5.75	5.55	5.85	6.1	5.98
Topik+Pallas	3.4	5.14	4.27	4.1	5.27	4.69
Granestar+Tourne x	4.65	5.46	5.06	4.17	5.76	4.97
Tournex+Topik	5.56	6.34	5.95	5.63	6.55	6.09
Mean	4.2	5.1		4.54	5.39	
L.S.D at 5 %level.for:						
Sowing Methods(s)			*			*
Weed control (w)			0.13			0.18
interaction (sXw).			1.18			0.26

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تاثير طرق الزراعة ومقاومة الحشائش على الحشائش المصاحبة والمحصول ومكوناته فى القمح

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أجريت تجربتين حقليتين فى منطقة صان الحجر محافظة الشرقية فى موسمى ٢٠١٥/٢٠١٦ و٢٠١٦/٢٠١٧ لدراسة ثاثير طرق الزراعة وبعض معاملات مقاومة الحشائش على الحشائش المصاحبة والمحصول ومكوناته فى القمح. وكانت معاملات التجربة كما يلى :

أ- طرق الزراعة :- تمت زراعة القمح بطريقتى البدار والتسطير

ب - معاملات مقاومة الحشائش :- تم دراسة ثلاث عشرة معاملة كما يلى :

١- بدون مقاومة (كنترول)

٢- نقاوة يدوية مرة واحدة بعد ٣٥ يوم من الزراعة

٣-رش النباتات بمبيد جرانستار٧٥% بمعدل ٨ جرام / فدان بعد ٣٥ يوم من الزراعة .

٤ - رش النباتات بمبيد توبك ١٥% بمعدل ١٤٠ جرام / فدان بعد ٣٥ يوم من الزراعة .
٥ - رش النباتات بمبيد بانتر٥٥% بمعدل ٦٠٠ سم^{٣} / فدان بعد ٣٥ يوم من الزراعة .
٦- رش النباتات بمبيد بلاس٤.٥% بمعدل ١٦٠ سم^{٣} / فدان بعد ٣٥ يوم من الزراعة .
٧- رش النباتات بمبيد تيورينكس٥٠% بمعدل ١.٥لتر / فدان بعد ٣٥ يوم من الزراعة .
٨- رش النباتات بمبيد جرانستار٧٥% بمعدل ٨جرام/فدان + بانتر٥٥%بمعدل٦٠٠سم^{٣}/فدان بعد ٣٥يوم من الزراعة .
٩- رش النباتات بمبيد توبك ١٥%بمعدل ١٤٠جرام/فدان + بانتر٥٥%بمعدل٦٠٠سم^{٣}/فدان بعد ٣٥ يوم من الزراعة .
١٠- رش النباتات بمبيد جرانستار٧٥% بمعدل ٨جرام /فدان + بلاس٤.٥%بمعدل ١٦٠سم^{٣}/فدان بعد ٣٥ يوم من الزراعة .
١١- رش النباتات بمبيد توبك١٥%بمعدل ١٤٠/فدان + بلاس ٤.٥%بمعدل١٦٠سم^{٣}/فدانبعد ٣٥ يوم من الزراعة .
١٢- رش النباتات بمبيد جرانستار٧٥% بمعدل ٨جرام/فدان + تيورينكس٥٠%بمعدل ١.٥لتر/فدان بعد ٣٥ يوم من الزراعة .
١٣- رش النباتات بمبيد توبك١٥% بمعدل ١٤٠جرام/فدان + تيورينكس٥٠% بمعدل ١.٥لتر /فدان بعد ٣٥ يوم من الزراعة .

وكان تصميم التجربة قطع منشقة مرة واحدة فى ثلاث مكررات خصصت القطع الرئيسية لطرق الزراعة والقطع الشقية لمعاملات مقاومة الحشائش وتتلخص أهم النتائج كما يلى :

اظهرت النتائج تأثيرا معنويا لطرق الزراعة على كل الصفات المدروسة فى كلا الموسمين .وقدأعطت زراعة القمح بطريقة التسطير اقل وزن جاف للحشائش الكلية بينما أعطت اعلى قيم لعدد السنابل /م٢ ووزن حبوب السنبلة ومحصول الحبوب بالاردب/فدان ومحصول التبن بالطن / فدان فى كلا الموسمين.

كما اظهرت النتائج تأثيرا معنويا لمعاملات الرش بمبيدات الحشائش على كل الصفات المدروسة فى كلا الموسمين .وقد سجل رش النباتات بمبيد توبك + تورينكس بعد ٣٥ يوم من الزراعة اعلى قيم لعدد السنابل /م٢ ووزن حبوب السنبلة /جم ومحصول الحبوب بالاردب/فدان ومحصول التبن بالطن / فدان فى كلا الموسمين بينما اعطت اقل وزن جاف للحشائش الكلية مقارنة بكل المعاملات المدروسة فى كلا الموسمين .بينما سجلت معاملة الكنترول (بدون مقاومة) اقل القيم لكلا من عدد السنابل /م٢ ووزن حبوب السنبلة ومحصول الحبوب بالاردب/فدان ومحصول التبن بالطن / فدان فى كلا الموسمين.وعلى العكس من ذلك فقد اعطت اعلى وزن جاف للحشائش الكلية مقارنة بكل المعاملات المدروسة فى كلا الموسمين.

كان التفاعل بين طرق الزراعة ومعاملات مقاومة الحشائش تأثيرا معنويا فى كلا الموسمين، حيث اعطت زراعة القمح بطريقة التسطير مع الرش بمخلوط من مبيد توبك + تيورنيكس اعلى القيم لعدد السنابل /م٢ ووزن حبوب السنبلة ومحصول الحبوب بالاردب/فدان ومحصول التبن بالطن / فدان فى كلا موسمى الدراسة.وعلى العكس من ذلك فقد اعطت اقل وزن جاف للحشائش الكلية مقارنة بكل المعاملات المدروسة فى كلا الموسمين.

وتوصى هذة الدراسة بزراعة القمح بطريقة التسطير مع مقاومة الحشائش بمخلوط من مبيد توبك + تيورينكس بعد ٣٥ يوم من الزراعة للحصول على اعلى محصول من الحبوب والتبن للفدان تحت ظروف منطقة صان الحجر محافظة الشرقية.