Efficacy of certain herbicides on broad-leaved weeds in wheat crop (*Triticum aestivum* L.)

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ABSTRACT

Field experiments were carried out at Mutobus District, Kafr El-Sheikh Governorate to evaluate the efficacy of Ackocynil^R (bromoxynil octanoate 32.75% EC) at 1.00 L. fed^{-1}, Brominal W^R (bromoxynil octanoate 24% EC) at 1.00 L. fed^{-1}, Derby^R (florasulam 7.5 %+ flumetsulam 10%) at 30 ml fed^{-1}, Icopart^R (pyraflufen-ethyl 2% SC) at 250 ml fed.$^{-1}$ and Sinal^R (metosulam 10% SC) at 40 ml fed.$^{-1}$ in comparison with handweeding twice (at 21 and 42) days after sowing and untreated check (weed free) during 2017/2018 and 2018/2019 seasons on broad-leaved weeds in wheat crop. *Anagallis arvensis, Beta vulgaris, Cichorium pumpilum, Medicago sativa, Rumex dentatus* and *Sanchus oleraceus*, were the predominant weed species during the both seasons, except, *Anagallis arvensis*, which was found in the second season only. All predominant weeds in the experimental field were identified as broadleaved weeds. Among predominant weed species, *Beta vulgaris* and *Medicago sativa* were the most predominant during 2017/2018 and 2018/2019 seasons. Results clearly indicated that all herbicidal treatments showed significant herbicidal activity against weeds compared to the control during the two examined seasons. Among the herbicides examined, Ackocynil^R and Brominal W^R were the most options in controlling weeds as well as increasing yield components and grain yield in wheat crop than the other treatments.

Keywords: Wheat, Herbicides, Handweeding, weeds, Grain yield; yield components.

INTRODUCTION

Wheat (*Triticm aestivum* L.) is the most important crop in Egypt. It represents about 10% of the total value of agricultural production and about 20 % of all agricultural imports (FAO, 2016). The demand of wheat crop is ever increasing due to rapid increase in human populations making it imperative to raise wheat productivity.

Weeds are one of the major constraints in wheat production, as they reduce productivity due to competition (Khan *et al*., 2002; Siddiqui *et al*., 2010), serve as alternate host for various insects and fungi by providing habitats for pathogens (Capinera, 2005) and increase harvesting costs (Ozpinar, 2006). Weeds compete with crop plants for nutrients, soil moisture and sunlight and caused reduction in crop yields in correlation with weed competition. However, an increase in one kilogram of weed growth is corresponding to reduction in one kilogram of crop growth (Rao, 1988). Weeds cause yield reduction up to 15-50 % depending upon the weed density and flora (Jat *et al*., 2003). Furthermore, Weeds not only reduce yield, but also decrease quality of the product and increase the cost of harvesting. Weed control is one of the most effective cultural strategy for increasing wheat yield (Glal, 2003).

Herbicides are the most important tool for weed management to improve yield and quality of wheat crop. Chemical weed control is quick, more effective and cheaper. So, it is promoting over other weed control methods (Ali and Shams El-Din, 1997).

The objective of the present work is to investigate the effectiveness of various herbicides and handweeding on predominant broad-leaved weed species and their effect on yield and yield components of wheat crop.

MATERIALS AND METHODS

The field experiments were conducted during the two wheat-growing seasons in 2017/2018 and 2018/2019 in wheat field at Motobis district, Kafr Elshikh Governorate, to evaluate activity of herbicides Ackocynil^R (bromoxynil octanoate 32.75 % EC) at 1.00 L. fed^{-1} , Brominal W^R (bromoxynil-octanoate 24% EC) at 1.00 L. fed^{-1} , Derby^R (florasulam 7.5 %+ flumetasulam 10%) at 30 ml fed^{-1}, Icopart^R (pyraflufen-ethyl 2% SC) at 250 ml fed^{-1} , Sinal^R (metosulam 10% SC) at 40 ml fed^{-1} and handweeding twice (21 and 42) days after sowing (DAS) on weeds in wheat field in comparison with untreated check (Table 1). Experimental plots were arranged in a Randomized Complete Block Design (RCBD), each treatment was replicated 3 times with plot size 21 m^2 (7.00 m length and 3.00 m width). Wheat seeds (cv. Gommezah-11) were seeded in 10th and 16th November during the two tested seasons 2017/2018 and 2018/2019, at the rate of 60 kg fed^{-1}. Post-emergence herbicides were applied at 30 days after sowing (DAS) using knapsack sprayer (Gloria Hoppy No. 299 TS) at 200 L. water fed^{-1}., at their recommended rates, while handweeding treatment was done twice (at 21 and 42 DAS). The other agricultural practices used for wheat growing in the region were followed.

Thirty days after herbicidal application, weeds in one square meter for each plot area were collected using a quadrate 50 cm x 50 cm placed randomly at 4 chosen spots. Weeds were sorted, identified, counted, weighed and classified, then density and biomass of weeds and weed control efficiency (WCE) were calculated as following:

Weed density = average number of each weed m^{-2}

Weed biomass = Average fresh weight of each weed (gm m^{-2}).

Weed control efficiency (Reduction % in weed biomass of each treatment) was determined as follow:

Weed control efficiency (WCE) = C-T/C x 100. Where:

C = Mean weed biomass of the untreated area.

T = Mean weed biomass of the treated area.

At harvest, wheat plants were harvested manually, air dried for three days, and ten plants were chosen randomly, from the central rows of each plot area to determine biological yield, 1000- grain weight (seed index). Straw yield (kg $plot^{-1}$), Harvest index and wheat grain yield, these parameters were calculated as follow:

Biological yield = average weight of all plants in each plot (kg $plot^{-1}$).

1000-grain weight = average 10 main spikes chosen randomly.

Straw yield = weight the biological yield in each plot then subtracting the grain weight for the biological yield.

Harvest index= (Total grain yield Kg. /Biological yield Kg.) x100

Grain and straw yields of wheat were recorded from the whole area for each plot as (kg $plot^{-1}$) then, increase percent was determined as follow:

Increase % $= \frac{T-C}{T} \times 100$.

Where: T= Weight of the grain or straw yield of wheat in the treated plots.

C= Weight of the grain or straw yield of wheat in the untreated plots.

Statistical Analysis of the data were subjected to the analysis of variance (ANOVA) according to Gomez and Gomez (1984), and means were compared using Fishers test and the Least Significant Differences (LSD) were determined at 0.01 and 0.05 % probability levels.

RESULTS AND DISCUSSION

Effect of herbicidal treatments on weed density

Results in (Table 2) illustrated that *Beta vulgaris, Cichorium pumplium, Medicago intertexta, Melilotus indica, Rumex dentatus* and *Sanchus oleraceus* were the major weed species in the experimental field during 2017/2018 and 20178/2019 seasons, while, *Anagallis arvensis* was found in 2018/2019 season only. Moreover, the obtained results showed that the broadleaved weeds were the predominant during the both studied seasons. These results are in harmony with those obtained by Naseer-ud-Din *et al*. (2011), Mussa (2002), Soliman and Hamza (2015). Among weed species observed, *Beta vulgaris* and *Medicago intertexta* were the most dominant weeds during the two studied seasons, they represented 30.72 and 19.27 % from the total weeds in the first season and 26.37 and 19.56 % in the second season. Highest weed density (Weed numbers m^{-2}) was recorded in the untreated control. While, the lowest weed density was found with herbicides treated plots and handweeding treatment during the two experimental seasons. Ackocynil^R treated plots was the best option in decreasing weed density of broadleaved weeds (92.10 and 91.09 %) in 2016-2017 and 2017-2018 seasons followed by Brominal W^R (89.47 and 89.11 % and Derby^R (85.53 and 85.11 %). Icopart^R and Sinal^R treated plots gave a moderate reduction in density of broadleaved weeds during the both seasons. Handweeding treatment gave 65.79 and 71.29 % reduction, in the two tested seasons. These results are in conformity with those obtained by Nati (1994) and Salarzai *et al*. (1999) who concluded that application of herbicides significantly affected the weed population per unit area. Cheema *et al*. (2006) mentioned that chemical weed control was much better and economical than conventional method. El-Kholy *et al*. (2013) reported that herbicidal treatments gave minimum population of broadleaved weeds in the wheat fields. Ahmad *et al*. (1995) concluded that herbicides application decreased weed population effectively. Knezevic *et al*. (2008)

and Shehzad *et al*. (2012) who concluded that the highest reduction in population and biomass of weeds differed according to weed species, herbicidal efficacy and the predominant agroclimatic conditions. Moreover, Hameed *et al.* (2019) reported that the prominent broadleaved weeds found were *Medicago intertexta*, *Chenopodium album*, *Fumaria indica, Convolvulus arvensis, Anagallis arvensis* and *Euphorbia helioscopia*. Among herbicides applied, Buctril-super and brominal-W controlled broadleaved weeds effectively.

Effect of weed control treatments on total broadleaved weeds

Weed density m^{-2}

Data in (Table 3) show the effect of herbicides and handweeding on density and biomass of the total broadleaved weeds in wheat crop during two consecutive seasons 2017-2018 and 2018-2019.

Data in (Table 3) show the effect of herbicides and handweeding on density and biomass of the total broadleaved weeds in wheat crop during two consecutive seasons 2017/2018 and 2018/2019. Maximum reduction in the total weed density (weeds m^{-2}) was recorded in Ackocynil^{R} treated plots, followed by brominal W^{R} and Derby^{R} herbicides, they caused 92.10, 89.47 and 85.55 % reduction, in the first season and 91.09, 89.11 and 85.15 % in the second season compared to untreated plots. Sinal^{R}, Icoprt^{R} and handweeding treatments gave moderate reduction in the total weed density during this study, they recorded 76.32, 73.68 and 65.79 % reduction, respectively, in 2017/2018 season, and 77.23, 83.17 and 71.29 % reduction in 2018/2019 season. Highest weed density was recorded in the untreated plots. Hashim *et al*. (2002) reported that maximum weed density was recorded in the unweeded check in wheat fields. Moreover, Khalil *et al*. (2008) found that the lowest weed density was recorded in the herbicidal treated plots, whereas, the maximum weed density was recorded in the unweeded plots. However, in plots treated with tribenuron methyl, flumetsulam and metosulam herbicides significantly reduced the density of several weeds in wheat crop.

Weed biomass

Data in (Table 3) illustrated that all herbicidal treatments significantly increased biomass of total broadleaved weeds during the both seasons. Results clearly revealed that Ackocynil^{R} treated plots gave 94.12 and 94.59 % WCE, in the two seasons followed by Brominal W^{R} (91.16 and 89.11 %) WCE, Icopart^{R} (88.73 and 83.17 %) WCE, Sinal^{R} (88.41 and 92.44 %) WCE and Derby^{R} (87.92 and92.44 %) WCE. Handweeding treatment recorded 81.93 and 81.22 % control of biomass of total broadleaved weeds during the both studied seasons. Highest density of total broadleaved weeds was observed in unweeded check. In this regard, Marwat *et al*. (2006) showed that bromoxynil-octanoate was the best option in reducing density and biomass of broadleaved weeds in wheat. These results are in agreement with those obtained by Sabra *et al*. (1999) who found that Sinal^{R} (Metosulam) recorded 100% reduction in broad-leaved weeds. Zand *et al*. (2007) showed that metsulfuron methyl+ sulfosulfuron at 36 gha^{-1} is a suitable option for the post-emergence control of the broadleaved and grass weeds in wheat. El-Metwally and El-Rokiek (2007) who found that Harmony-extra^{R} (tribenuron-methyl+ thifensulfuron-methyl at 24 g fed^{-1}. as active ingredient) which have the same Derby^{R} mode of action showed a satisfactory WCE of broad-leaved weeds in wheat crop. Tribenuron-methyl was the most effective herbicide against weeds by bromoxynil-octanoate,florasulam+ lumetsulam and diflufenican + isoproturon (Saad *et al.* 2011). Also, Safina and Absy (2017) mentioned that all tested herbicides decreased weed density, weed biomass and gave high WCE compared to weedy check. This could be attributed to the high efficiency of weed control treatments which subsequently resulted in reduction of weeds-wheat competition (Soliman and Hamza, 2015).

Effect on yield and yield components

Biological yield (kg plot^{-1})

The obtained results in (Tables 4 and 5) indicated that all tested treatments significantly affected biological yield of wheat crop during the both seasons when compared with unweeded check. Sinal^{R} treated plots was the best option in increasing biological yield of wheat crop (19.05 %) in 2017-2018 season, followed by Ackocynil^{R} (18.65 %) and Brominal W^{R} (16.42 %). While, Derby^{R}, Icopart^{R} herbicides recorded a moderate increase in biological yield of wheat in the first season. However, in the second season, Ackocynil^{R} treated plots gave maximum increase in biological yield followed by Sinal^{R} and Brominal W^{R}. Moreover, Derby^{R} and Icopart^{R} herbicides recorded 10.09 and 9.72 % % increase in biological yield, where the lowest increase in biological yield was observed in handweeding treated plots during the both tested seasons. Similarly, Cheema *et al*., (2006) reported that the maximum biological yield was obtained in the plots which treated with herbicides, while the unweeded check plots recorded the lowest yields.

Straw yield (kg plot^{-1})

Data in (Tables 4 and 5) showed that there were no significant differences between herbicidal treatments and untreated control. Ackocynil^R and Sinal^R treatments gave highest increase in straw yield of wheat followed by Brominal W^R, Icopart^R and Derby^R, with values 14.65, 14.00, 12.67, 10.44 and 7.90 % increase in the first season compared to control. Similar trend of results was observed in the second season. While, on the other side, the lowest increase in straw yield was obtained with handweeding treatment in the two studied seasons. There were significant differences between treatments in straw yield (ton / ha^{-1}) at harvest time in the both growing seasons were recorded. This is might be due to the increase of plant height at the harvest as a result of better weeds control treatments relative to untreated check (El-Metwally *et al.,* 1999). Muhammad *et al*. (2012) revealed that post-emergence application of herbicides recorded maximum wheat grain and straw yield.

Harvest Index

Data listed in (Tables 4 and 5) indicated that all weed control treatments improved harvest index of wheat crop during 2017/2018 and 2018/2019 seasons when compared to untreated treatment. Results clearly indicated that Ackocynil^R treated plots was the best option in increasing harvest index followed by Sinal^R, Brominal W^R and Derby^R herbicides, they increased harvest index by 14.41, 13.83, 11.79 and 10.39 % in the first season. While, in the second season, Ackocynil^R gave (19.62 %) increase followed by Brominal W^R (16.22 %), Sinal^R (16.09 %) and Derby^R (12.38 %). Results also revealed that Icopart^R and handweeding treatments gave the lowest increases in harvest index in the both applied seasons, they recorded 4.97 and 5.67 %, in 2017/2018 season and 10.02 and 6.36 % in 2018/2019 season compared with the untreated.

1000-grain weight

The obtained results indicated that application of herbicides and handweeding significantly affected harvest index of wheat crop during the two seasons (Tables 4 and 5). Maximum increase in harvest index of wheat crop was achieved with Ackocynil^R treated plots followed by Brominal W^R, Sinal^R and Derby^R. Ackocynil^R gave (19.05 and 21.67 %) increase, in 2017/2018 and 2018/2019 seasons, Brominal W^R recorded (15.35 and 19.21 %) increase, while, Sinal^R achieved (15.09 and 18.52 %) increase in the two seasons. In addition, Derby^R gave (12.59 and 15.83 %) in the both seasons. Icopart^R treated plots increased 1000-grain weight by 12.55 and 16.06 % during 2017/2018 and 2018/2019 seasons. Minimum increase in 1000-grain weight was noted with handweeding treated plots during the two studied seasons. These results are in agreement with Hassan *et al*. (2003) and Safina and Absy (2017) who reported that application of herbicides recorded maximum increase in the 1000-grain weight due to increased weed control resulting in increased net photosynthesis and dry matter accumulation in the grain. Similar trends of the results were obtained by Fayed (1992), Khalil *et al*. (1993), El-Metwally *et al*. (1999) and Gupta (2004). Amare *et al*. (2014) reported that effect of herbicides on 1000-grain weight might be due to effective weed control treatments. Soliman and Hamza (2015) mentioned that the lowest wheat parameters were recorded in the untreated control and could be due to the negative effect of weeds on crop growth which may be resulted in the competition between wheat and weed plants. Similar findings were found by El-Metwally *et al*. (1999) and Al-Askar, Nagla (1998). Shehzad *et al*. (2012) reported that the lowest grain production per spike and 1000-grain weight was observed in untreated plots, due to severe competition between the crop plants and weeds. This competition prominently reduced the nutrients mobility towards the grains which ultimately affected the grain development potential of the plant. These results on weeds competition reduction are agree with the previous finding of Qureshi *et al*. (2002) and Ijaz *et al*. (2008). Nanher *et al*., (2015) reported that the increased values in yield attributes of wheat crop might have been due to negligible weed crop-competition and increased nutrients and water uptake by the crop leading to increased rate of photosynthesis, supply of photosynthates to various metabolic sinks might have favoured yield attributes and overall improvement in vegetative growth which favorably influenced the tillering, flowering, fruiting and ultimately resulted in increased grain weight. These findings are in line with those reported by Singh and Saha, (2001), Yadav *et al*. (2001) and Jat *et al.* (2003).

Grain yield (kg plot^{-1})

Grain yield of wheat significantly affected by all applied treatments when compared to the unweeded check (Tables 4 and 5). Statistical analysis of the obtained data indicated that Ackocynil^R and Sinal^R were the best treatments in increasing wheat grain yield followed by Brominal W^R and Derby^R, they increased grain yield of wheat by 30.66, 30.24, 26.26 and 20.54 % in 2017-2018 season. Moreover, Ackocynil^R, Sinal^R, BrominalW^R and Derby^R treated plots gave maximum increase in the second season. Icopart^R and Handweeding treated plots recorded the lowest increase in wheat grain yield, with values 7.02 and 12.78% increase in 2017/2018 season and 17.14 and 9.60% in 2018/2019 season. Generally, all the tested herbicides increased wheat grain and yield and reduced weed density of weeds per square meter. Similar findings were reported by Hesammi *et al.* (2010), Mahmood *et al.* (2012), Shehzad *et al.* (2012), Hussain *et al.* (2013) and Singh *et al.* (2013) who reported the effectiveness of herbicide applications having been increased the grain yield of wheat. Broadleaved weeds control treatments gave high WCE compared to the weedy check. Mekky *et al*. (2010) and Soliman *et al*. (2011) found that increase in wheat grain yield might be due to the high weeds control efficiency of the herbicidal treatments, their significant effects in raising grains yield per unit area and wheat parameters such as spike length, number of grains spike^{-1} and weight of grains spike^{-1} which leading to the high grain yield. Furthermore, the poor grains yield of wheat in the untreated plots might be attributed to the reduction in the values of wheat growth characters, which occurred as a result of the competition between wheat and weed plants on light, water and nutrients. Shehzad *et al*. (2012) reported that increase in grain yield might be to weeds control by herbicides, which diverted the nutrients availability to the crop, which in turn ensured in maximum grain yield was due to a greater number of grains per spike and 1000-grain weight compared to the control. Likewise, Naseer-ud-Din *et al*. (2011) reported that increased grain yield of wheat in treated plots may be attributed to availability of more nutrients, light, moisture and space resulting in crop growth. These findings are in a great analogy with those mentioned by Satao *et al*. (1993), Khan and Haq (1994), Sharar *et al*. (1994), Ahmad *et al*. (1995), Malik *et al*. (1998) and Madafiglio *et al*. (2006) who reported that wheat grain yield enhances with the use of herbicides due to increase in spike length, grains per spike and spike bearing tillers and grain weight.

COCCLUSION

Generally, it can be concluded that the application of the candidate herbicides is considered very important effective treatments for controlling broad-leaved weeds associated to the wheat crop resulted in an increase in the biological, straw yield, harvest index, 100-grain weight and grain yield of wheat. C.V (Gommezah-11) compared to the hand weeding treatment and weedy check at Mutobus District, Kafr EL-Sheikh Governrate during 2017/2018 and 2018/2019 seasons.

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Table 1. Trade names, concentrations, formulation and rates of the used herbicides.

Trade names	Concentrations and Formulations	Common names	Rate Fed.-1*
Ackocynil^R	32.75% EC	bromoxynil octanoate	1.00 L.
Brominal W^R	24% EC	bromoxynil octanoate	1.00 L.
Derby^R	17.5% SC	florasulam7.5 %+ flumetsulam 10 %	30 ml
Icopart^R	2% SC	pyraflufen-ethyl	250 ml
Sinal^R	10% SC	metosulam	40 ml
Handweeding	Twice	-------	21 and 42 DAS
Untreated	---------	--------	

*According to the Ministry of Agriculture and Land Reclamation (Agricultural Pesticides Committee).

Table 2. Biomass and density of the broad-leaved weeds in wheat field at 60 days after sowing in 2017/2018 and 2018/2019 seasons.

Names of weeds	2017-2018 season				2018-2019 season			
	Biomass (gm m^{-2})	%	density (No.m^{-2})	%	Biomass (gm m^{-2})	%	density (No.m^{-2})	%
*Anagallis arvensis**	00.00	00.00	00.00	00.00	06.05	03.75	00.75	02.97
Beta vulgaris	39.57	30.72	05.50	28.95	42.54	26.37	06.75	26.74
Cichorium pumpilum	14.42	11.19	1.75	09.21	14.11	08.75	01.75	06.93
Medicago intertexta	24.82	1927	0.4.25	22.37	31.56	19.56	05.00	19.80
Mililotus indica	17.18	13.34	0.300	15.79	24.74	15.34	04.50	17.82
Rumex dentatus	11.16	08.66	0.100	07.89	17.68	10.97	03.00	11.88
Sonchus oleraceus	21.66	16.82	0.300	15.79	24.62	15.26	03.50	13.86
Total	128.81	100.00	19.00	100.00	161.30	100.00	25.25	100

*This weed was found in the second season only.

Table 3. Effect of herbicides and handweeding on biomass and density of total broad-leaved weeds in wheat (cv. Gommezah11) field at 60 days after sowing in 2017/2018 and 2018/2019 seasons.

Treatments	Rate Fed.-1	2017-2018 season				2018-2019 season			
		Biomass (gm m^{-2})		Density No.m^{-2}		Biomass (gm m^{-2})		Density No.m^{-2}	
		Mean fresh weight (g mm^{-2})	WCE	Mean number m^{-2}	%	Mean fresh weight (gm m^{-2})	WCE	Mean number m^{-2}	%
Ackocynil^R 32.75% EC	1 L.	07.57	94.12	01.50	92.10	08.72	94.59	02.25	91.09
Brominal W^R 24% EC	1 L.	11.39	91.16	02.00	89.47	10.48	93.50	02.75	89.11
Derby^R17.5% SC	30 ml	15.56	87.92	0.275	85.53	12.19	92.44	03.75	85.15
Icopart^R 2% SC	250 ml	14.52	88.73	0.300	73.68	16.86	89.55	04.25	83.17
Sinal^R 10% SC	40 ml	14.93	88.41	04.50	76.32	12.19	92.44	05.75	77.23
Hndweeding (Twice)	(21, 42 DAS)	28.27	81.93	06.50	65.79	30.30	81.22	07.25	71.29
Untreated	---	128.81	00.00	19.00	00.00	161.31	00.00	25.25	00.00

L.S.D for treatments at 5%:5.69, 1.63, 4.45, 2.06 without control at 1%:7.79, 2.24, 6.10, 1.51

L.S.D for treatments at 5%:16.39, 2.39, 10.24, 2.43 with control at 1%:22.32, 3.26, 13.94, 3.31

Table 4. Efficacy of herbicidal treatments on yield and yield components of wheat (cv.Gommezah 11) in 2017/2018 season.

Treatments	Rates Fed-1	Biological yield (Kg plot-1)	Increase %	Grain yield (Kg plot-1)	Increase %	Straw yield (Kg plot-1)	Increase %	Harvest index	Increase %	1000-grain weight (gm)	Increase %
Ackocynil^R 32.75% EC	1 L.	56.95	18.65	16.17	30.36	40.78	14.00	28.39	14.41	36.85	19.05
Brominal W^R 24% EC	1 L.	55.43	16.42	15.27	26.26	40.16	12.67	27.55	11.79	35.24	15.35
Derby^R 17.5% SC	30 ml	52.25	11.33	14.17	20.54	38.08	07.90	27.12	10.39	34.13	12.59
Icopart^R 2% SC	250 ml	51.27	9.64	12.11	07.02	39.16	10.44	25.57	04.97	34.11	12.55
Sinal^R 10% SC	40 ml	57.23	19.05	16.14	30.24	41.09	14.65	28.20	13.83	35.13	15.09
Hnd weeding (Twice)	(21, 42 DAS)	49.11	5.66	12.91	12.78	36.20	03.12	25.76	05.67	32.28	07.59
Untreated	-----	46.33	00.00	11.26	00.00	35.07	00.00	24.30	00.00	29.83	00.00

L.S.D for treatments at 5%:7.49, 2.57, 4.37, 4.12, 2.34 without control at 1%:10.26, 3.51, 5.98, 5.65, 3.10
L.S.D for treatments at 5%:7.38, 2.41, 4.43, 3.85, 2.13 with control at 1%:10.05, 3.28, 6.03, 5.24, 2.07

Table 5. Efficacy of herbicidal treatments on yield and yield components of wheat (cv.Gommezah 11) in 2018/2019 season.

Treatments	Rates Fed-1	Biological yield (Kg plot-1)	Incrase %	Grain yield (Kg plot-1)	Increase %	Straw yield (Kg plot-1)	ncrease %	Harvest index	Increase %	1000-grain weight (gm)	Increase %
Ackocynil^R 32.75% EC	1 L.	54.77	16.10	15.91	32.56	38.86	09.37	29.05	1962	36.51	21.67
Brominal^R W 24% EC	1L.	52.55	12.56	14.65	26.76	37.90	07.07	27.87	16.22	35.40	19.21
DerbyR 17.5% SC	30 ml	51.11	10.09	13.62	21.22	37.49	06.06	26.65	12.38	33.98	15.83
Icopart^R 2% SC	250 ml	50.90	09.72	12.95	17.14	37.95	07.19	25.95	10.02	34.07	16.06
Sinal^R 10% SC	40 ml	53.61	14.29	14.92	28.08	38.69	08.97	27.83	16.09	35.10	18.52
Hnd weeding (Twice)	(21,42DAS)	47.76	03.79	11.87	09.60	35.89	01.87	24.85	06.36	31.81	10.09
Untreated	-------	45.95	00.00	10.73	00.00	35.22	00.00	23.35	00.00	28.60	00.00

L.S.D for treatments at 5%:3.01, 1.22, 3.56, 1.92, 1.87 without control at 1%:4.13, 1.68, 4.88, 2.63, 1.66
L.S.D for treatments at 5%:3.67, 1.17, 3.43, 2.37, 2.11 with control at 1%:4.99, 1.59, 4.66, 3.23, 3.15

فاعلية مبيدات الحشائش على الحشائش عريضة الأوراق في محصول القمح

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الملخص العربي

تم إجراء التجارب الحقلية في مركز مطوبس بمحافظة كفر الشيخ لتقييم كفاءة عدد من مبيدات الحشائش و هى مبيد أكوسينيل (بروموكسينيل اوكتانويت EC % 32.75 بمعدل لتر للفدان، برومينال دبليو (بروموكسينيل اوكتانويت EC % 24) بمعدل لتر للفدان، ديربى (فلوراسولام 7.5 % + فلوميتسولام SC % 10) بمعدل 30 مل للفدان، إيكوبارت (بيرافلوفين إيثيل SC % 2) بمعدل 250 مل للفدان، سينال (ميتوسيولام SC % 10) بمعدل 40 مل للفدان مقارنة بعملية النقاوة اليدوية مرتين بعد 21 و 42 يوم الزراعة ومعاملة الكنترول (غير المعامل) خلال موسمي 2017-2018 و 2018-2019 م. و لقد أظهرت النتائج أن الحشائش السائدة فى محصول القمح كانت الحشائش عريضة الأوراق و هى الزغلنت، السلق، السريس، النفل، الحميض و الجعضيض خلال موسمي الدراسة ما عدا حشيشة الزغلنت لم تظهر إلا في موسم 2018-2019 م وكانت حشيشة السلق والنفل الأكثر وجودا خلال فترة التجربة. ولقد أكدت النتائج أن كل معاملات مكافحة الحشائش قد أظهرت فاعلية إبادية للحشائش السائدة بصورة معنوية خلال مواسم إجراء التجارب في حقول القمح وكذلك زيادة مكونات المحصول وكمية محصول الحبوب مقارنة بغير المعامل. وكان مبيد اكوكسينيل وبرومينال دبليو أفضل المبيدات المستخدمة في مكافحة الحشائش وزيادة مكونات المحصول ومحصول الحبوب في حقول القمح خلال موسمي الدراسة.

الكلمات الاسترشادية: القمح، مبيدات الحشائش، نقاوة يدوية، حشائش، محصول الحبوب، محتويات المحصول.