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Efficacy of some Herbicides and Agricultural Practices on the Productivity of Sugar Beet (*Beta vulgaris* L.)

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ABSTRACT

Two field experiments were conducted on sugar beet crop (*Beta vulgaris)* to increase the quality of yield in sugar beet by applying mixtures of pre- and post-emergence herbicides and non-chemical strategies. Triflusulfuron-methyl, phenemedipham7.5+ desmedipham 1.5+ ethofumesate 11.5, S-metolachlor, propaquizafop, and clethodim, in addition, Triflusulfuron-methyl +hand hoeing, phenmedipham 7.5+ desmedipham 1.5+ ethofumesate 11.5 +hand hoeing, first hand hoeing, second hand hoeing and untreated check were evaluated. All combinations were repeated twice. Percentage of weed reduction, total of all weeds, yield, yield components, percentages of total soluble solids (TSS), total yield of sugar beet ton per feddan and the percentages of weed density were calculated. Results revealed that, triflusulfuron-methyl + hand hoeing followed by phenmedipham7.5+ desmedipham 1.5+ ethofumesate 11.5+ hand hoeing and twice hand hoeing recorded equally the same effect followed by triflusulfuron-methyl followed by first hand hoeing when compared with untreated check. The reduction (weed control) percentages were 98, 96, 96, 84 and 81, respectively compared with untreated (check) in the first season. However, in the second season, the reduction percentages were 98, 96, 96, 86 and 80, respectively. The highest value of fresh weight and the most two abundant species weeds were *Beta vulgaris* and *Medicago hispida*. Also, the results revealed that, there were significant effects between weed control treatments on crop yield (ton/fed) and untreated check during the two seasons, where the lowest yield was 9.38 ton/fed. while, the highest yield was 32.2 ton/fed. in the twice hand hoeing treatment. On the other hand, the effect of tested herbicides on fresh weight of grassy weeds (g/m^2) in two seasons, in the first season, twice hand hoeing was found to be more effective followed by clethodim, propaquizafop and then S-metolachlor, where the percentages of reduction were 99, 93, 86 and 85, respectively compared with untreated check. However, in the second season, the reduction percentages were 100, 98, 95 and 95, respectively. The highest value of fresh weight and the most abundant weed was *Phalaris sp*. Also, the results showed significant effects between weed control treatments on crop yield (ton/fed), during the first season with low crop yield (2.22 ton/fed.) in untreated check and the high crop yield (33.525 ton/fed.) in propaquizafop treatment. The highest value of crop yield was 24 ton/fed. in twice hand hoeing and the lowest was 9.3 ton/fed. in untreated check in the second season. In two seasons, data showed that weed control treatments increased the tested yield parameters as a following: triflusulfuron-methyl +hand hoeing > phenmedipham 7.5+ desmedipham 1.5+ ethofumesate 11.5 > twice hand hoeing > first hand hoeing and Pop-S. In addition, the data showed that clethodim was found to be the most effective in weed control, highest value of yield component followed by S-metolachlor, propaquizafop and then twice hand hoeing. However, clethodim was the most effective in weed control with the highest value of yield components wheras twice hand hoeing was the lowest one. It can be concluded that, triflusulfuron-methyl +hand hoeing was highly effective in weed control with highest value of yield components, while hand hoeing is the lowest one.

Keywords: post-emergence, S-metolachlor, phenedippham, untreated check, ethofumesate Sugar beet ,weeds, herbicides, *Beta vulgaris*

INTRODUCTION

Sugar beet is an important crop of arable rotations throughout the major growing regions of Egypt. It provides a valuable break crop returning organic matter to the soil and preventing the buildup of disease. The root has a sugar content of around 17 up to 25%. The top leaves of the sugar can be used feed cattle and sheep or may be ploughed back into the land to be used as a natural fertilizer. Weeds are considered to be a serious problem in most agricultural systems. The control of weeds is vital for increasing yield and quality of production (Vasileiadis *et al* 2007). Weeds cause yield losses, hamper harvest, reduce quality of the harvest product, and perhaps harbor insects and diseases that may harm the crop. These weeds may cause about 60% losses in crop yield and at the highest densities of weeds, losses can reach up to 100%. Therefore, the controlling weeds is considered to be of crucial importance (Wiltshire *et al* 2003).

Reduction from uncontrolled emerge weeds within early stages can reduce root yields by 26–100% (Schweizer and Dexter 1987; Rosso *et al*. 1996). The yield losses cannot be predicted because there are different varieties of weeds different weather and site, susceptibility of weeds to herbicides, and herbicide efficacy (Wellmann *et al*., 2000). The common herbicides applied in sugar beet are chloridazon, clopyralid, desmedipham, endothal, ethofumesate, lenacil, metamitron, phenmedipham and triflusulfuron-methyl (May and Wilson 2006). The present experiments were carried out in two growing seasons to evaluate and compare between the efficacy of certain herbicides and to compare between hand hoeing as a part of an integrated approach with mechanical and chemical weed control performance in sugar beet crops to minimize the competition between the productivity of crop and infestation of weeds.

MATERIALS AND METHODS

Field experiments were carried out in Abbis Farm (Faculty of Agriculture Farm), Alexanderia, Egypt, for two successive seasons 2017 and 2018 to estimate the efficacy of some herbicidal treatments on both broad leaf and grassy weeds in Sugar beet crop (*Beta vulgaris)*. The experiments were designed as a randomized complete block design with four replicates. Plot area was $21m^2$ and sugar beet variety was Pleno (Bel101229) obtained from the Agricultural Research Center, Ministry of Agriculture, Egypt. Chemicals; Triflusulfuron – methyl, mixture of Phenmedipham7.5 +Desmedipham1.5 +Ethofumesate11.5, S-Metolachlor, Propaquizafop and Clethodim were obtained from the Agricultural Research Center, Ministry of Agriculture, Egypt.

Table 1. Illustrate the common name, trade name, source, rate of application and the time of application of the tested herbicides.

Trade name	Active ingredient	Rate (g (Cm^3) /F)	Application Timing	Source
Broadleaves Herbicides:				
1- POP-S 50% - WDG	Triflusulfuron – methyl	20g+20g	Post - emergence	My-Trade
2-BetaSana Trio 20.5 % - SC	Phenmedipham7.5+Desmedipham 1.5+Ethofumesate11.5	900Cm^3	Post - emergence	Syngenta- Agro
Grasses Herbicides:				
1- Dual Gold 96% -EC	S-Metolachlor	420 Cm^3	Pre- emergence	Starkeem
2- Damax-D 10% - EC	Propaquizafop	350 Cm^3	Post - emergence	Arista live
3- Select Super 12.5% EC	Clethodim	500 Cm^3	Post - emergence	Starkeem

SC: suspension concentrate, WDG: wettable dispersing granules and EC: emulsifiable concentrate.

Sowing date were 3/11/2017 for first season and 8/11/2018 for second season. All tested herbicides treatments were applied as a post-emergence except metolachlor (pre-emergence) with a CP3 Knapsack sprayer with red fan nozzle. Hand hoeing twice and untreated check were included in both two seasons. All cultural practices like fertilization, irrigation and pests control were applied as usual in sugar beet production. Herbicide treatments were evaluated after 45 days from application by collecting all weeds grown in one meter square randomly. Weeds were sorted and weighted (gram per meter square). Percentage of weed reduction of each weed species as well as total of all weeds and the percent of weed density were calculated. Also the effect of herbicide treatment on yield, yield components (plant, blade and stem length; leaf area and width of blade). In addition, plant, blade, and stem fresh weight; fruit length and fruit diameter were measured and the percentage of total soluble solids (TSS) was also measured by a hand refractometer. Also, the total yield of sugar beet (ton per feddan) and the percent of weed density were calculated. Statistical analysis of data were analyzed by SAS program according to the methods of analysis variance (ANOVA) for the randomized complete block design with four replications using "SAS" computer Software

RESULTS AND DISCUSSION

The most common weeds recorded in sugar beet crops during the two seasons 2017 & 2018 included *Anagallis arvensis, Medicago hispida, Beta vulgaris, Malva* spp and *Coronopus squamatus* as broad-leaf weeds, as well as *Phalaris* sp, *Lolium* sp and *Avena* sp as grassy weeds.

The effect of herbicide treatments applied in the two seasons 2017 & 2018 on fresh weight g / m2 of some broad leaf weeds is illustrated in Tables (2 and 3). The results demonstrate that the tested herbicides and the mechanical control caused significant influenced by weed removal (control) at different treatments. POP-S 20 +20g/Fed.+ hand hoeing followed by Beta SanaTrio 900+900 cm3/Fed.+ hand hoeing and twice hand hoeing recorded equally the same effect followed by POP-S and first hand hoeing compared with resulted from unweeded check plots. The corresponding reduction percentages weed control were 98, 96, 96, 84 and 81, respectively compared with untreated (check) in the first season. However, in the second season, the reduction percentages were 98, 96, 96, 86 and 80, respectively compared with unweeded check. The highest value of fresh weight and the most two dominant weeds were Beta vulgaris and Medicago hispida, where, the highest weed control percentage was 98 resulted from POP-S 20 +20g/Fed.+ hand first hoeing and the lowest one was 80% resulted from hand hoeing. On the other hand, the results revealed that, there were significant effects between weed control treatments on crop yield (ton/fed), during first season in unweeded check resulted the lowest yield (9.38 ton/fed.) while, the highest yield 32.2 ton/fed. in twice hand hoeing treatment. On the second season, the highest value of crop yield was 33.9 ton/fed. in twice hand hoeing and the lowest was 10.1 ton/fed. in untreated plots. Treatments increased yield followed the twice hand hoeing, POP-S 20 +20g/Fed.+ hand hoeing, Beta SanaTrio 900+900 Cm3/Fed.+ hand hoeing, first hand hoeing and POP-S respectively. Similar results obtained by Gagro and Dadacek (1996), who indicated that the best results were obtained in crop yields with herbicides treatment 2 l/ha of Betanal [phenmedipham] + 2 kg Goltix [metamitron]+ hoeing. In addition, Farzin and Hossein (2004), cleared that maximum control of weed in sugar beet was achieved with desmedipham plus phenmedipham plus propaquizafop at 0.46+0.46+0.1 kg a.i./ha and desmedipham + phenmedipham + thofumesate at rate of 0.23+0.23+0.23 kg a.i./ha. However, Deveikyte and Seibutis (2006), noticed that reduction of weeds by applying phenmedipham +desmedipham + ethofumesate at (15, 91+71+112 g a.i. /ha) and triflusulfuron respectively, reduced the biomass of broad-leaf weeds and weed control ranged from 55.0 to 85.0%. Also, Rapparini (2008), found that the application of desmedipham + henmedipham + ethofumesate proved to be highly effective against annual dicotyledonous weeds, giving 95.1-95.8% control at two doses.

Data presented in Tables (4 and 5) show that weed control treatments significantly reduced fresh weight of grassy weeds (g/m^2) in two seasons.

Twice hand hoeing followed by Select Super, Damax-D and then Dual Gold, where found to be most potency the reduction percentages were 99, 93, 86 and 85 respectively compared with untreated (check) in the first season. However, in the second season, the reduction percentages were 100, 98, 95 and 95, respectively. The highest value of fresh weight and the most dominant weed was *Phalaris sp* in unweeded check

Also, the data revealed that, there were significant effects between weed control treatments on crop yield (ton/fed), during the first season (the lowest crop yield was 2.22 ton/fed. in untreated), while, the highest crop yield was 33.525 ton/fed. in Damax-D treatment. On the second season, the highest value of crop yield was 24 ton/fed. in twice hand hoeing and the lowest was9 .3 ton/fed. in untreated plots.

Table 2. Effect of different treatments on some broad leaf weeds fresh weight (g / m^2) in sugar beet crop (*Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.

Treatment and Rate/ Fadden	Fresh weight of broad leaves in (g / m^2)												Yield ton/Fedd.
	Beta vulgaris		*Medicago hispida*		*Malva* spp		*Anagallis arvensis*		*Coronopus squamatus*		Total		
	Mean[a]	C%	Mean	C%	Mean	C%	Mean	C%	Mean	C%	Mean	C%	
POP-S 20+20g/Fed.	140±16.3^{b}	67	0.5±0.1^{b}	100	75±14.2^{bc}	79	3.5±1.7^{b}	97	10.5±3.7^{b}	81	229.5	84	18.83±0.9^{d}
POP-S 20 +20g/Fed.+ hand hoeing	14±3.3^{d}	97	0±0^{b}	100	19±2^{c}	95	0.5±0.3^{b}	100	0.5±0.2^{b}	99	34	98	29±0.93^{b}
BetaSana Trio 900+900Cm^3/Fed. + hand hoeing	37±11.3^{cd}	91	5±2.8^{b}	99	15±2.2^{c}	96	0±0^{b}	100	0±0^{b}	100	57	96	24.9±1.2^{c}
First hand hoeing	85±19.1^{bc}	80	58±15.6^{b}	88	108±19.4^{b}	70	13±3^{b}	87	6±2.3^{b}	89	270	81	20.7±1.2^{d}
Twice hand hoeing	19±4.1^{cd}	95	8±2.8^{b}	98	26±3.5^{c}	93	2±0.6^{b}	98	2±1^{b}	96	57	96	32.2±1.9^{a}
Untreated (Check)	420±95^{a}	0	500±94^{a}	0	365±43.8^{a}	0	100±13.2^{a}	0	55±9.1^{a}	0	1440	0	9.38±2.1^{e}
% of weed density	29.2		34.7		25.3		6.9		3.8		100.0		
$LSD_{0.05}$	67.7		78.5		63.0		26.4		15.3				2.1

[a]Data are expressed as means ± SE from experiments with two times.
Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

Table 3. Effect of different treatments on some broad leaf weeds fresh weight (g / m^2) in sugar beet crop (*Beta vulgaris)* (Pleno (Bel 101229)) during 2018 winter season.

Treatment and Rate/ Fadden	Fresh weight of broadleaves weed in g / m^2												Yield ton/Fed.
	Beta vulgaris		*Medicago hispida*		*Malva* spp		*Anagallis arvensis*		*Coronopus squamatus*		Total		
	Mean[a]	C%	Mean	C%	Mean	C%	Mean	C%	Mean	C%	Mean	C%	
POP-S WDG 50%20 +20g/Fed.	143±11.7b	66	0±0c	100	45±19.1c	87	4±2.5b	95	9±2.5b	85	201	86	19.02
POP-S WDG 50%20 +20g/Fed. + hand hoeing	20±7.4d	95	0±0c	100	14±4.3c	96	0±0b	100	0±0c	100	34	98	30.1
BetaSana Trio 50% SC900 Cm^3 +900 Cm^3/Fed. + hand hoeing	28±12.8d	93	11±3.8c	98	18±8.4c	95	0±0^{b}	100	0±0c	100	57	96	25.3
First hand hoeing	90±12.7c	79	59±5b	88	105±20.8b	70	16±8.5b	81	11±8b	82	281	80	19.7
Twice hand hoeing	15±6.8d	96	9±3.4c	98	22±5c	94	3±1.1b	96	5±3.8bc	92	54	96	33.9
Untreated (Check)	425±62.4a	0	473±51.2a	0	351±53.3a	0	85±25a	0	62±7.5a	0	1396	0	10.1
% of weed density	30.4		33.9		25.1		6.08		4.4		100.0		
$LSD_{0.05}$	38.2		30.8		31.4		16.4		7.7				

[a]Data are expressed as means ± SE from experiments with two times.
Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

Table 4. Effect of different treatments on some Grassy Weeds fresh weight (g / m^2) of sugar beet crop (*Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.

Treatment and Rate/ Feddan	Fresh weight of grasses in g / m^2								Total Yield Ton / Feddan
	Phalaris sp		*Lolium* sp		*Avena* sp		Total		
	Mean [a]	C%	Mean	C%	Mean	C%	Mean	C%	
Diual Gold 96%EC 420 Cm^3/Fed	95±30^{b}	85	29±11.3^{b}	86	17±5^{b}	76	141	85	31.775±1.02^{ab}
Damax-D 10% EC 350 Cm^3/Fed.	99±32.7^{b}	85	16±7.3^{b}	92	14±3.2^{b}	80	129	86	33.525±2.56^{a}
Select Super 12.5% EC 500 Cm^3/Fed.	40±6.53^{c}	94	10±5.1^{b}	95	10±4^{b}	86	60	93	30.95±1.67^{b}
Twice hand hoeing	8±3.26^{c}	99	2±1.6^{b}	99	1.5±0.9^{b}	98	11.5	99	32.75±1.7^{ab}
Untreated (Check)	645±66^{a}	0	208±53.6^{a}	0	70±15.8^{a}	0	923	0	2.22±0.36^{c}
% of weed density	69.9		22.5		7.6		100.0		
$LSD_{0.05}$	47.9		37.7		19.4			2.48	

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.
[a]Data are expressed as means ± SE from experiments with two times.

Table 5. Effect of different treatments on some Grassy Weeds fresh weight (g / m^2) of sugar beet crop (*Beta vulgaris)* (Pleno (Bel 101229)) during 2018 winter season.

Treatment and Rate / Feddan	Fresh weight of grasses in g /m^2								Yield ton/Fedd
	Phalaris sp		*Lolium sp*		*Avena sp*				
	Mean	% C	Mean	% C	Mean	% C	Total	% C	
Dual Gold 430 Cm^3/Fed.	3.5±1.4[b]	99	6.5±3[b]	94	0.5±1[b]	99	10.5	98	23.41
Damax-D350 Cm^3/Fed.	15±7.5[b]	95	7±3.8[b]	94	0±0[b]	100	22	95	22
Select Super500 Cm^3/Fed.	0±0[b]	100	0± 0[b]	100	0±0[b]	100	0.0	100	23.7
Twice hand hoeing	9±6.3[b]	97	10± 4.4[b]	91	1.5±0.9[b]	97	20.5	95	24
Untreated (Check)	298.5±41.1[a]	0	108.5±23.6[a]	0	46.5±12.7[a]	0	453.5	0	9.3
% of weed density	65.8		23.9		10.3		100		
$LSD_{0.05}$	25.3		15.2		7.2				

[a]**Data are expressed as means ± SE from experiments with two times.**

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

The results are parallel with the finding of Bosak and Janos (1997), who reported that, the Dual 960 EC [metolachlor] at 2.2-2.5 l/ha. + Goltix 70 WP [metamitron] at 2-3 kg/ha, was highly effective treatment against *Chenopodium* sp., *Matricaria* sp. and *Polygonum* sp. in sugar beet crop which reduced weed by 99%, compared to unweeded check. Similar results were also obtained by Padenov and Gadzhieva (2004), where the, use of mixture Betanal Progress OF (90 g/l phenmedipham, 70 g/l desmedipham and 110 g/l ethofumesate with Pilot [quizalofopp-ethyl] increased the control of many weed species in sugar beet crop. In addition, Yukhin (2006), found that, pre-planting application of Dual Gold [metolachlor] + application of Betanal Progress AM [desmedipham + phenmedipham + ethofumesate] in mixture with Fusilade Forte [fluazifop-P-butyl] during the vegetative growing season of sugar beet was highly effective against weeds.

The effect of different treatments on yield parameters (plant, blade and stem length; leaf area and width of blade) in sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during two seasons are shown in Tables (6 and 7). The data showed that weed control treatments were increased the tested yield parameters in the order Pop-S+hand hoeing > Beta SanaTrio 900+900 Cm^3 > twice hand hoeing > first hand hoeing and Pop-S the percentages of increase were 185.7, 75.3, 72.2, 61.9 and 55.6 respectively compared with untreated (check) in the first season. However, in the second season, the percentages were 159.3, 98, 77, 70.2 and 35.5, respectively, compared with untreated (check). The results are in parallel with Chauhan and Motiwale (1985), who reported that the weeds in sugar beet decreased root yields by 35 – 54%, compared with hand weeding, and the application of 2 kg Nortron [ethofumesate], 3 kg cloridazon and 2 kg alachlor /ha gave yields of 52.1, 46 and 48 t/ha, respectively compared with 45 ton with hand weeding and 27 ton without weed control. Domaradzki (2007), reported that all weeding systems based on mixtures (3 herbicides Betanal Progress [desmedipham +ethofumesate +phenmedipham] + Safari [triflusulfuron] +Goltix [metamitron] + adjuvant) increased sugar beet yields compared to the standard systems (Betanal Progress[desmedipham + ethofumesate + phenmedipham] applied 3 or 4 times)

Table 6. Effect of different treatments on yield parameters (plant, blade and stem length; leaf area and width of blade) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.[a]

Herbicide Treatment	Plant, height (cm)	stem length (cm)	Blade length (cm)	Blade width (cm)	leaf area (cm^2)	Total	%C
Untreated (Check)	23.2±1.47[c]	13.9±1.47[c]	9.83±1.2[c]	5.8±0.95[c]	40.36±11.4[c]	93.03	0
Pop-S 20+20	37.5±4.22[b]	25.53±4.2[b]	14.4±1.03[b]	6.8±0.5[bc]	60.56±6.7[bc]	144.8	55.6
Pop-S+hand hoeing	49.7 ±0.92[a]	33.2±0.92[a]	21.1±1.45[a]	10.2±1.5[a]	151.56±20.4[a]	265.8	185.7
Beta Sana Trade 900+900 Cm^3	37.3±2.87[b]	22.5±2.87[b]	15.2±0.58[b]	7.6±0.6[b]	80.5±8.11[b]	163.1	75.3
First hand hoeing	37.1±3.53[b]	23.8±3.53[b]	13.26±2[b]	7.4±0.75[b]	69.06±16.4[bc]	150.62	61.9
Twice hand hoeing	38.2±1.4[b]	24±1.47[b]	13.7±1.4[b]	7.9±0.3[b]	76.4±9.93[b]	160	72.2
$LSD_{0.05}$	5.6	4.94	2.55	1.46	10.88		

[a]**Data are expressed as means ± SE from experiments with two times.**

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

Table 7. Effect of different treatments on yield parameters (plant, blade and stem length; leaf area and width of blade) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2018 winter season.[a]

Herbicide Treatment	Plant, height (cm)	stem length (cm)	Blade length (cm)	Blade width (cm)	leaf area (cm^2)	Total	%C
Untreated (Check)	26.7±0.72[d]	14.7±0.5[c]	10.7±1.2[e]	5.8±0.95[c]	42±4.7[d]	99.9	0
Pop-S 20+20	37.53±2.5[c]	22.3±2[b]	15.2±0.28[cd]	6.8±0.5[bc]	95.2±8.7[bc]	176.83	77
Pop-S + hand hoeing	49.86±2.4[a]	27.8±3.7[a]	22.9±0.51[a]	10.2±1.5[a]	148.2±16.2[a]	259	159.3
BetaSana Trio 900+900 Cm^3	44.2±1.2[b]	25.8±1.96[ab]	17.9±2.8[b]	7.6±0.55[b]	102.2±9.6[b]	197.7	98
First hand hoeing	29.2±2[d]	16.5±0.3[c]	12.9±0.96[de]	7.4±0.75[b]	69.4±4.5[c]	135.4	35.5
Twice hand hoeing	39.9±5.6[c]	24.4±1.4[ab]	16.2±1.0[bc]	7.9±0.25[b]	81.5±6.5[bc]	170	70.2
$LSD_{0.05}$	3.94	3.6	2.5	1.4	15.8		

[a]**Data are expressed as means ± SE from experiments with two times.**

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

The effect of herbicidal treatments on yield parameters (plant, blade, stem weight, fruit length, diameter and TSS) in sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during the two growing seasons are shown in Tables (8 and 9) Data showed that in Tables (8 and 9) weed control treatments increased the tested parameters in the order Pop-S+hand hoeing > Beta Sana Trio 900+900 Cm^3 > twice hand hoeing > Pop-S and first hand hoeing, whereas, the percentages of increase were 384, 306, 221, 170.6 and 122, respectively compared with untreated (check) in the first season. However, in the second season, the percentage were 409, 339, 209, 172

and 115, respectively. These results revealed that, Pop-S+hand hoeing was highly effective in weed control and gave the highest value of yield component and the hand hoeing is the lowest one. On the other hand, all treatment either in the frist season or second season did not affect the TSS values. The results are in agree with Abd El-Aal (1995), who found that TSS values did not significantly differ between treated and unweeded sugar beet plots. Zargar *et al.* (2010), indicated that times of mechanical control and herbicides have the most reduction on density and weeds biomass of (*Chenopodium album* and *Amaranthus retroflexus*) and mechanical control at 4-6 leaves stage or using herbicide Goltix + Betanal progress were the most efficient treatments.

Table 8. Effect of different treatments on yield parameters (plant, blade and stem weight; fruit length, diameter and TSS) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.[a]

Herbicide Treatment	Plant, weight (gm)	stem weight (gm)	Blade weight (gm)	Fruit length (cm)	Fruit diameter	TSS	Total	%C
Untreated (Check)	70.2±13^{d}	31.1±2.4^{e}	22.3±7.6^{d}	10±2.4^{c}	6.2±0.3^{d}	24±1^{a}	163.8	0
Pop-S 20+20	198.2±21.6^{c}	130.3±11.3^{b}	67.7±11.3^{b}	13±1^{c}	8.7±1.2^{b}	25.33±0.28^{a}	443.2	171
Pop-S + hand hoeing	391±23.4^{a}	221±12.4^{a}	127.7±5^{a}	16.7±0. 5^{b}	11±0.86^{a}	25. 5±0.5^{a}	793	384
Beta Sana Tario 900+900 Cm^{3}	297.8±16.8^{b}	196.6±11.7^{a}	112.5±8.1^{a}	21.75±1.2^{a}	10.7±1.5^{ab}	25.66±1.2^{a}	665	306
First hand hoeing	207.6±15.5^{c}	66.2±8. 8^{c}	45±7.5^{c}	12.6±1.2^{c}	7.3±0.6^{c}	24.66±0.57^{a}	363.4	122
Twice hand hoeing	228±11.7^{bc}	177.2±18. 1^{ab}	65.7±6.7^{bc}	19.3±1.1^{ab}	10.5±1.8^{a}	25±2^{a}	525.7	221
$LSD_{0.05}$	20.4	21.2	22.33	3.6	2.004	1.84		

[a]Data are expressed as means ± SE from experiments with two times.

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

Table 9. Effect of different treatments on yield parameters (plant, blade and stem weight; fruit length, diameter and TSS) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2018 winter season.[a]

Herbicide Treatment	Plant, weight (gm)	stem weight (gm)	Blade weight (gm)	Fruit length (cm)	diameter Fruit	TSS	total	%C
Untreated (Check)	72.6±2.9^{c}	34.3±5.02^{a}	31.9±5.3^{a}	10.7±3.4^{b}	6.5±0.5^{c}	25.33±0.28^{a}	181.3	0
Pop-S 20+20	221. 9±14.3^{b}	150±8^{bc}	74.9±4.9^{bc}	12.7±1.2^{b}	8.3±0.57^{b}	25.33±0.57^{a}	493	172
Pop-S + hand hoeing	434.5±23.8^{a}	296.3±45^{a}	138.6±19.3^{a}	16.8±0. 3^{a}	11.2±0.28^{a}	24.8±0.34^{a}	922.2	409
Beta Sana Tario 900+900 Cm^{3}	393.3±16.1^{a}	248±34.7^{a}	99.1±11.6^{b}	20.3±0.6^{a}	11±1^{a}	24.3±3.05^{a}	796	339
First hand hoeing	179.8±17.7^{b}	105.4±16.02^{c}	60.1±8.2^{cd}	11.7±0.6^{b}	7.16±0.28^{bc}	25.5±0.5^{a}	390	115
Twice hand hoeing	242.3±11.4^{b}	187.5±13.8^{b}	76.2±9.7^{bc}	18.2±0.3^{a}	10.8±1.04^{a}	24.3±2.3^{a}	559.3	209
$LSD_{0.05}$	17.3	29.6	30.9	3.6	1.29	2.78		

[a]Data are expressed as means ± SE from experiments with two times.

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level

The effect of grassy herbicides treatments on the yield parameters (plant, blade, stem length, leaf area and width of blade) and (Plant, blade, stem weight, Fruit length, diameter and TSS) in sugar beet crop *(Beta vulgaris)* were recorded in Tables (10 and 11) The data showed that treatments increased the tested parameters of yield as a follow: Select Super followed by Diual Gold > Damax-D and twice hand hoeing compared with untreated check in the first season. The results showed that, Select Super was the highly effective in weed control and to give the highest value of yield component, while twice hand hoeing was the lowest one. It was found that, the application of Fusilade super 12.5% (fluazifop-p-butyl) at 3.2 – 4.0 l/ha. against quackgrass (*Elymus repens* L.) in fodder beet fields at the 3 to 6 leaf stage, increased root yield by 31-40% Tyla and Petroviene (1996). Ulina *et al.* (2003), recorded that the post-emergence applications of Betanal Progress [desmedipham +phenmedipham] at 1l/ha. in combination with Lontrel-300 [clopyralid] and Furore Super [fenoxaprop] increased the yield and the sugar content of sugar beet.

Table 10. Effect of different treatments on yield parameters (plant, blade and stem length; leaf area and width of blade) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.[a]

Herbicide Treatment	Plant height (cm)	stem length (cm)	Blade length (cm)	Blade width (cm)	leaf area (cm^{2})	total	%C
Diual Gold350 Cm^{3}/Fed	41.6±2.7^{a}	22.9±2.2^{b}	17.93±1.7^{a}	10±0.9^{b}	118.5±10. 5^{ab}	211	87.5
Damax-D350 Cm^{3}/Fed.	42.2±2.7^{a}	24.03±3.3^{ab}	15.8±2.1^{a}	10.4±0.9^{ab}	111.5±12.1^{b}	204	81.3
Select Super 500 Cm^{3}/Fed.	44.7±6.2^{a}	26.3±4.07^{a}	17.5±1.8^{a}	11.5±1.1^{a}	134.5±16^{a}	235	109
Twice hand hoeing	36.2±3.2^{b}	18.3±2.3^{c}	16.2±3.3^{c}	9.1±0.7^{c}	99±11.8^{c}	179	58.9
Untreated (Check)	23.7±1.07^{c}	11.88±1.6^{d}	11.6±1.4^{b}	6.9±0.9^{d}	58.4±7.1^{d}	112.5	0
$LSD_{0.05}$	5.08	2.89	2.5	1.35	19.98		

[a]Data are expressed as means ± SE from experiments with two times.

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level

Table 11. Effect of different treatments on yield parameters (plant, blade and stem weight; fruit length, diameter and TSS) of sugar beet crop *(Beta vulgaris)* (Pleno (Bel 101229)) during 2017 winter season.[a]

Herbicide Treatment	Plant weight (gm)	Stem weight (gm)	Blade weight (gm)	Fruit length (cm)	Fruit diameter	TSS	Total	%C
Untreated (check)	99.6±9.1^{c}	54±4.3^{c}	52.8±7.1^{b}	8.75±0.25^{d}	6.25±0.2^{c}	25.4±0.4^{ab}	249	0.0
Diual Gold350 Cm^{3}/Fed	363±32^{ab}	225.8±14^{ab}	126±9. 6^{a}	13±1^{c}	8.75±1.25^{b}	26.4±1.3^{a}	763	206.4
Damax-D350 Cm^{3}/Fed.	327.3±21^{b}	197.5±21.2^{b}	129.5±11.3^{a}	16±2. 5^{b}	10.63±0.53^{a}	25.75±1.1^{a}	707	184
Select Super500Cm^{3}/Fed.	407.3±20^{a}	255.8±24^{a}	136.8±14.3^{a}	21.75±1.5^{a}	11.5±2.5^{a}	25.5±1.5^{ab}	859	245
Twice hand hoeing	334±24^{b}	224.5±8. 2^{ab}	117.8±16.7^{a}	14.75±1.25^{bc}	7±0.0^{bc}	23.88±0.28^{b}	722	190
$LSD_{0.05}$	45	44.35	29.8	1.89	1.84		1.65	

[a]Data are expressed as means ± SE from experiments with two times.

Mean values within a column sharing the same letter are not significantly different at the 0.05 probability level.

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كفاءة مبيدات الحشائش وبعض المعاملات الزراعيه على انتاجية بنجر السكر

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تم تقييم كفاءة بعض مبيدات الحشائش مع المعاملات الزراعيه فى موسمين زراعيين متتالين (٢٠١٧& ٢٠١٨) بمزرعة كلية الزراعه (أبيس) – جامعة الأسكندريه. المعاملات كالتالى والمستخدمه لمكافحة عريضة الأوراق: مبيد حشائش تراى فلوسلفيورون – ميثيل (بوب اس ٥٠%) ومركب فينمديفام ٧.٥% + ديسميديفام ١.٥%+ايثوفيوميست ١١.٥% ، مركب (بيتا سانا تريو) بمعدل ٩٠٠سم^{٣} للفدان بجانب عزقه واحده مع المركب ومنفردة وكذلك عزقتينمن ناحيه أخرى تم اختبار مركب اس- ميتولاكلور (ديوال جولد ٩٦%) ومركب بروباكيوزافوب (دامكس- د ١٠%) بمعدل ٣٥٠سم^{٣} للفدان ثم مركب كلوسيديم (سلكت سوبر١٢.٥% على حشائش رفيعة الأوراقأظهرت النتائج المتحصل عليها فى الموسم الأول: المعامله بمبيدات الحشائش عريضة الأوراق أدت الى نسبة مكافحة (خفض فى الحشائش) ٩٨% و ٩٦%و ٩٦ % ثم ٨١% على التوالى ، أما فى الموسم الثانى كانت نسبة مكافحة (خفض فى الحشائش) ٩٨% و٩٦ % و ٩٦ و ٨٦ % ثم ٨٠% على التوالى وأن الحشيشه السائدة هى السلق يليها النفل فى الموسمين الزراعيين. من ناحيه أخرى أدت مكافحة الحشائش فى الموسم الأول الى فروق معنويه فى انتاجية الفدان من المحصول كانت انتاجية الفدان فى المعامله المرجعيه هى ٩.٣٨ طن للفدان مقابل ٣٢.٢ طن للفدان فى معاملة عزقتين. بينما انتاجية الفدان فى الموسم الثانى هى ١٠.١ طن للفدان فى المعامله المرجعيه مقابل ٣٣.٩ طن للفدان باستخدام عزقتين. أيضا تم دراسة تأثير المعامله بمبيدات كلوسيديم ومركب بروباكيوزافوب و اس- ميتولاكلور ثم عزقتين على الحشائش رفيعة الأوراق أوضحت نتائج تأثير مبيدات الحشائش المختبرة على حشائش رفيعة الأوراق فى الموسم الأول أن استخدام عزقتين أعطت افضل النتائج وكان أقلهم هو مركب اس- ميتولاكلور ونسبة المكافحه فى الموسم الأول كانت ٩٩ و ٩٣ و ٨٦ ثم ٨٥ % وفى الموسم الثانى كانت ١٠٠ و ٩٨ و ٩٥ ثم ٩٥% على التوالى مقارنة بالمعامله المرجعيه وأن الحشيشه السائدة هى الفلاريس وكل ذلك انعكس بدوره على انتاجية الفدان للمحصول كانت فى المعامله المرجعيه ٢.٢٢ طن للفدان مقابل ٣٣.٥ طن للفدان فى المعامله بمركب بروباكيوزافوب فى الموسم الأول بينما انتاجية الفدان فى الموسم الثانى هى ٩.٣ طن للفدان فى المعامله المرجعيه مقابل ٢٤ طن للفدان باستخدام عزقتين. أظهرت النتائج المتحصل عليها فى الموسمين الزراعيين أن مكافحة الحشائش أدت الى زياده فى خصائص مكونات أجزاء المحصول (طول النبات، طول العنق، طول النصل، عرض النصل، مساحة الورقة، وزن النبات، وزن العنق، وزن النصل، قطر الثمرة، طول الثمرة و نسبة السكريات الكليه الذائبه). من ناحيه أخرى أوضحت النتائج أنه لا يوجد فروق معنويه بين المعاملات المختلفه فى نسبة السكريات الكليه الذائبه.