Chemical Weed Control in Sugar Beet

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ABSTRACT

A field experiment was carried out to evaluate the efficiency of some herbicide treatments (with and without handweeding) on sugar beet yield and yield components for two successive seasons (2010 and 2011) at Abbis farm, Faculty of Agriculture, Alexandria University, Alexandria, Egypt.

The treatments were Phenmedipham 6.5%+ metametron 28% + ethofumesate 6.5% (crus) with a rate of 2 kg/feddan and 2.5 kg/feddan, Phenmedipham 5.54% + desmedipham 4.34% + lenacil 2.5% + ethofumesate 6.93 (betanal maxxpro), acetochlor (harness), Phenmedipham 7.5% + desmedipham 1.5% + ethofumesate 11.5% (betasana trio), handweeding twice and Unweeded check, all previous herbicide treatments were repeated twice either with or without handweeding.

The dominant weed in both seasons was *Beta vulgaris*. The results in the first season showed that the best herbicide treatments which gave maximum weed reduction were handweeding twice, Acetochlor + handweeding, (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) 2.5 kg/fed + handweeding , (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) 2 kg/fed + handweeding, (Phenmedipham 7.5% + desmedipham 1.5% + ethofumesate 11.5%) + handweeding and (Phenmedipham 5.54% + desmedipham 4.34%+ lenacil 2.5%+ ethofumesate 6.93%) + handweeding with no significant differences between them with a percentage of weed control (98.7, 97.7, 96.7, 96.2, 95.8 and 93.7), respectively.

In the second season the best weed reduction was achieved by (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) with a rate of 2.5kg/fed + handweeding with a percentage of control (97.3%), handweeding twice (96.8%), (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) with a rate of 2kg/fed+ handweeding (96.1%), Acetochlor + handweeding (95.8%), (Phenmedipham 7.5%+ desmedipham 1.5% + ethofumesate 11.5%) + handweeding (93.6%) and (Phenmedipham 5.54% + desmedipham 4.34%+ lenacil 2.5%+ ethofumesate 6.93%)+ handweeding (91.6%) with no significant differences between them.

The highest yield in the first season was found in the case of (Phenmedipham 6.5%+ metametron 28% + ethofumesate 6.5%) 2.5 kg/fed which gave 35.32 ton/fed followed by handweeding twice with a yield 31.82 ton/fed and (Phenmedipham 5.54%+ desmedipham 4.34%+ lenacil 2.5%+ ethofumesate 6.93%) with a yield 29.59 ton/fed with no significant differences between them in the second season the highest feddan production was reported in the case of (Phenmedipham 6.5%+ metametron 28%+ ethofumesate 6.5%) 2.5 kg/fed+ handweeding and handweeding twice (34.23 and 33.18 ton/fed, respectively) with no significant difference between them.

The length and diameter of the root were not affected by the tested herbicides, also the percentage of sugar were not affected by all treatments, but in the first season, the highest sugar yield per feddan was found in the case of five treatments which were (Phenmedipham 6.5%+ metametron 28% + ethofumesate 6.5%) 2.5 kg/fed + handweeding, (Phenmedipham 5.54% + desmedipham 4.34%+ lenacil 2.5%+ ethofumesate 6.93%) + handweeding, handweeding twice, (Phenmedipham 6.5%+ metametron 28% + ethofumesate 6.5%) 2 kg/fed+ handweeding and (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) 2.5 kg/fed with sugar yield (5.4, 4.98, 4.73, 4.64 and 4.35 ton/fed, respectively with no significant differences between them while in the second season the four treatments that gave highest yield were (Phenmedipham 6.5% + metametron 28% + ethofumesate 6.5%) 2.5 kg/fed+ handweeding, handweeding twice, acetochlor+ handweeding and (Phenmedipham 7.5%+ desmedipham 1.5% + ethofumesate 11.5%) + handweeding as they gave (5.58, 5.28, 4.93 and 4.64 ton/fed, respectively.

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 of the beet has a sugar content of around 17%.

Harvesters cut off the top leaves of the sugar beet which are used as animal feed for cattle and sheep or are ploughed back into the land as a natural fertilizer. The root is then cleaned to remove any soil attached to it before it is transported. Roots awaiting delivery to the factory are stored in protected storage to maintain the highest possible quality and sugar.

Weeds are known to cause crop yield losses, hamper harvest, reduce quality of the harvest product, and perhaps harbour insects and diseases that may harm the crop.

Yield losses are of the greatest concern and have been predicted using early season assessments of the weed population such as weed seedling density, relative time of emergence, weed pressure, and relative leaf area

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(Schweizer and May, 1993; Dieleman and Mortensen, 1998).

Sugar beet is a poor competitor with weeds in arable fields because it is slow growing early in the season and has a low canopy in its first year of a biennial life cycle (May, 2003). Sugar beet is not competitive with emerging weeds until it has at least 8 true leaves. The total potential losses from weeds would be between 50 and 100% of the potential crop yield (May, 2001). Weeds that emerge 8 weeks after sowing, and particularly after the sugar beet plants have eight or more leaves, are less likely to affect yield (Scott et al., 1979). The most competitive are annual weeds, mostly broadleaved species that emerge with, or shortly after, the crop, grow taller than the crop and produce dense shade. These weeds often grow to a height two to three times that of sugar beet by midsummer, sugar beet herbicides seldom have a wide enough weed control spectrum or sufficient residual activity to control all weeds, and tank mixes and sequences of different herbicides are commonly used in order to provide a broad spectrum of weed control (May and Wilson, 2006).

The most popular active ingredients are phenmedipham, metamitron, ethofumesate, desmedipham, triflusulfuron-methyl, lenacil, clopyralid and chloridazon (May, 2001). Herbicides are usually applied in tank mixes /Deveikyte, 2000; May, 2001; Wilson et al., 2005; Deveikyte and Seibutis, 2006).

Weeds damages in developing countries, by applying different methods of control, resulted in 10% decrease in performance of sugar beet. Without any control of weeds, damages fluctuate between 10 to 100% according to environmental conditions and genus of cultivated plant, economically (Kropff and Vanlour, 1993). Due to that chemical methods are among the most important ways of management in cultivating farms, using appropriate paths to improve the performance of herbicides must be considered.

Handweeding 10-20 weeks after planting sugar beet can keep the field clean until harvest time (Dawson, 1977).

The aim of this study is to find out the best treatment to control the weeds specially broad leaf weeds in sugar beet under Egyptian conditions.

MATERIALS AND METHODS

A field experiment was carried out in Abbis farm (Faculty of Agriculture farm), Alexandria, Egypt for two successive seasons 2010 and 2011) to estimate the effect of some herbicidal treatments on both broad and narrow leaf weeds.

This experiment was designed as a randomized complete block design with four replicates, tables (1 and 2) shows the herbicides application time and rate.

All tested herbicides were applied with a CP3 knapsack sprayer with red fan type nozzle. Handweeding twice and unweeded check were included in both season.

All cultural practices like fertilization and irrigation were applied as usual in sugar beet production.

Herbicides were evaluated after 45 days from application by collecting all weeds grown in $1m^2$ randomly, weeds were sorted and weighted.

Percentage of weed reduction of each weed species as well as total of all weeds were calculated, also the effect of tested herbicides on yield, yield components (root length and diameter) were measured.

Table 1. Common name, trade name, concentration, formulation, and source of herbicidal treatments

Herbicides	Common name	Trade name	Concentration (%)	Formulation	source
1	Phenmedipham 6.5% + metametron 28%+ ethofumesate 6.5%	Crus	41	WG	Bridge trade
2					
3					
4					
5	Phenmedipham 5.54%+ desmedipham 4.34%+ lenacil 2.5%+ ethofumesate 6.93%	Betanal maxxPro	19.31	OD	Cairo company
6					
7	Acetochlor	Harness	84	EC	Fine seeds
8					
9	Phenmedipham 7.5% + desmedipham 1.5% + ethofumesate 11.5%	Betasana trio	20.5	SC	May trade
10					

11	Handweeding
12	Unweeded check

Table 2. Treatments, Rate/feddan and Time of application

Treatments		Rate/feddan	Time of application
1	Crus	2 kg	Post-emergence
		2.5 kg	Post-emergence
2	Betanal maxx pro	0.5 L	Post-emergence
3	Harness	0.75 L	Pre-emergence
4	Betasana trio	0.9 L + 0.9L	0.9 L (two leaves stage) then 0.9 L (after 8 days from first treatment)
5	Handweeding		
6	Unweeded check		

Percentage of sugar (Brix) was also measured by a hand refractometer (Atago N1, Brix 0~32 %).

Statistical analysis of data were carried out by assistat software version beta (Silva and Azevedo, 2009).

RESULTS AND DISCUSSION

Tables (3) and (4) shows that the dominant weed in the first season was *Beta vulgaris* with a a percentage of infection (51.6%) followed by *Medicago polymorpha* (33.4%), Phalaris minor (8.8%), *Marva parviflora L.* (3.2%) and *Vicia monantha Retz.* (3.1%). In the second season the dominant weed was also *Beta vulgaris* with a percentage of infection (52%) followed by *Medicago polymorpha L.* (32.4%), *Phalaris minor* (9.6%), *Marva parviflora L.*(3.3%) and *Vicia monantha Retz.* (2.7%). On the other hand, tables(3) and (4) also showed that the highest weed control in the first season was found in the case of handweeding twice, harness + handweeding, crus 2.5 kg/fed + handweeding, crus 2 kg/fed + handweeding, betasana trio + handweeding and betanal maxxpro + handweeding with no significant differences between them with a percentage of weed control (98.7, 97.7, 96.7, 96.2, 95.8 and 93.7), respectively, which indicated the role of handweeding in sugar beet weed control, the least percentage of control was observed in the case of betanal maxxpro (42.8% control). This is due to the ability of these treatments together with the handweeding to control the dominant weeds (*Beta vulgaris* and *Medicago polymorpha*).

The same results were obtained in the second season as the best treatments were crus 2.5kg/fed + handweeding with a percentage of control (97.3%), handweeding twice (96.8%), crus 2kg/fed + handweeding (96.1%), harness + handweeding (95.8%), betasana trio + handweeding (93.6%) and betanal maxxpro+handweeding (91.6%) with no significant differences between them, the least weed control was found in the case of Betanal maxxpro (51.1%).

Concerning with narrow leaf weeds (*Phlaris minor*) in the first season, the best control was found in the case of harness+handweeding (97.9%), followed by handweeding twice (96.9%), the least control was in the case of betasana trio (46.1%). In the second season, handweeding twice gave the best %control (96.5%) followed by crus 2kg/fed and crus 2.5kg/fed as they gave 90.7 and 90.6 % control, respectively. The least control was shown by betanal maxxpro (57.5%).

From table (5), it was noticed that the highest yield in the first season was found in the case of crus 2.5kg/fed (35.32 ton/fed) + handweeding followed by handweeding twice (31.82 ton/fed) and betanal maxxpro + handweeding (29.59 ton/fed) with no significant difference between the last two treatments, crus 2.5 kg/fed gave an acceptable yield (27.09 ton/fed) as there was no significant difference between it and Betanal maxxpro + handweeding, crus 2 kg/fed + handweeding, betasana trio + handweeding and harness + handweeding (29.59, 29.15, 28.98, 26.96 ton/fed, respectively), the least yield per feddan was found in the case of unweeded check (14.07 ton/fed) followed by crus 2kg (19.45 ton/fed).

In the second season (table 6), the highest yield was found in the case of crus 2.5 kg/fed + handweeding and handweeding twice (34.23 and 33.18 ton/fed , respectively) with no significant differences between them, also there were no significant differences between harness + handweeding, betasana trio + handweeding, crus 2 kg/fed + handweeding and betanal maxxpro + handweeding (28.56, 27.51, 26.59 and 26 ton/fed, respectively), the least yield per feddan was found in the case of unweeded check (10.63 ton/fed), harness and crus 2 kg/fed gave a low yield 19.91 and 17.64 ton/fed, respectively with no significant differences between them.

These results agreed with Mohammad *et al* (2011), Who found that herbicides such as Metamitron and PDA

(Phemedipham + Desmedipham + Autophpmisete) and mixtures of Clopyralid and desmedipham and mixture of Desmedipham and trisulfuron methyl increased the performance of root yield up to 73.66, 70.73, 67.23 and 60.33 ton/hactar.

Table 3: Effect of herbicidal treatments on broad and narrow leaf weeds (fresh weight g/m2) during 2010

	Treatments	*Beta vulgaris*		*Medicago polymorpha L.*		*Vicia monantha Retz.*		*Marva parviflora L.*		*Phalaris minor Retz.*		Total	
		weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R
1	Crus 2kg/fed	995.0	29.2	26.3	97.1	12.5	85.3	21.3	75.4	81.0	66.3	1136.0	58.3
2	Crus 2kg/fed + Handweeding	62.5	95.6	11.3	98.8	6.3	92.6	0.0	100.0	23.5	90.2	103.5	96.2
3	Crus 2.5 kg/fed	572.5	59.3	13.8	98.5	3.8	95.6	6.3	92.8	69.8	70.9	666.0	75.6
4	Crus 2.5 kg/fed + Handweeding	57.5	95.9	6.3	99.3	1.3	98.5	0.0	100.0	26.0	89.2	91.0	96.7
5	Betanal maxxPro	1320.0	6.0	86.0	90.5	51.3	39.7	0.0	100.0	101.5	57.7	1558.8	42.8
6	Betanal maxxPro + Handweeing	92.5	93.4	42.0	95.4	1.0	98.8	0.0	100.0	35.0	85.4	170.5	93.7
7	Harness	737.5	47.5	365.0	59.9	23.8	72.1	22.5	73.9	39.0	83.8	1187.8	56.4
8	Harness + Handweeding	22.5	98.4	28.8	96.8	6.5	92.4	0.0	100.0	5.0	97.9	62.8	97.7
9	Betasana trio	1187.5	15.5	50.0	94.5	11.0	87.1	0.0	100.0	129.3	46.1	1377.8	49.5
10	Betasana trio + Handweeding	63.0	95.5	8.0	99.1	4.5	94.7	0.0	100.0	40.3	83.2	115.8	95.8
11	Handweeding	17.5	98.8	8.8	99.0	1.3	98.5	0.0	100.0	7.5	96.9	35.0	98.7
12	Unweeded check	1405.0	0.0	910.0	0.0	85.0	0.0	86.3	0.0	240.0	0.0	2726.3	0.0
	$LSD_{0.05}$											88.1	
	% Infestation	51.6		33.4		3.1		3.2		8.8			

% R= Percentage of weed reduction

Table 4. Effect of herbicidal treatments on broad and narrow leaf weeds (fresh weight g/m2) during 2011

	Treatments	*Beta vulgaris*		*Medicago polymorpha L.*		*Vicia monantha Retz.*		*Marva parviflora L.*		*Phalaris minor Retz.*		Total	
		weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R	weight (g/m2)	% R
1	Crus 2kg/fed	1100.0	29.6	31.3	96.8	8.8	89.4	22.5	77.2	115.5	59.8	1278.0	57.5
2	Crus 2kg/fed + Handweeding	60.0	96.2	17.5	98.2	12.5	84.8	0.0	100.0	26.8	90.7	116.8	96.1
3	Crus 2.5 kg/fed	612.5	60.8	16.3	98.3	6.3	92.4	10.0	89.9	70.8	75.4	715.8	76.2
4	Crus 2.5 kg/fed + Handweeding	35.0	97.8	13.8	98.6	3.8	95.5	2.5	97.5	27.0	90.6	82.0	97.3
5	Betanal maxxPro	1162.5	25.6	125.0	87.2	57.5	30.3	2.5	97.5	122.3	57.5	1469.8	51.1
6	Betanal maxxPro + Handweeing	125.0	92.0	80.0	91.8	5.0	93.9	2.5	97.5	40.3	86.0	252.8	91.6
7	Harness	837.5	46.4	475.0	51.3	30.0	63.6	27.5	72.2	47.3	83.6	1417.3	52.9
8	Harness + Handweeding	37.5	97.6	50.0	94.9	8.5	89.7	0.0	100.0	31.3	89.1	127.3	95.8
9	Betasana trio	1025.0	34.4	42.5	95.6	10.0	87.9	0.0	100.0	100.3	65.1	1177.8	60.8
10	Betasana trio + Handweeding	117.5	92.5	22.5	97.7	3.8	95.5	0.0	100.0	49.5	82.8	193.3	93.6
11	Handweeding	57.5	96.3	25.0	97.4	5.0	93.9	0.0	100.0	10.0	96.5	97.5	96.8
12	Unweeded check	1562.5	0.0	975.0	0.0	82.5	0.0	98.8	0.0	287.5	0.0	3006.3	0.0
	$LSD_{0.05}$											69.9	
	% Infestation	52.0		32.4		2.7		3.3		9.6			

% R= Percentage of weed reduction

Table 5. Effect of herbicidal treatments on yield (ton/feddan), yield components (length and diameter (cm)) and percentage of sugar (Brix) during 2010

	Treatments	Length (cm)	diameter (cm)	yield (ton/feddan)	Brix	sugar yield (ton/fed)	% from unweeded check
1	Crus 2kg/fed	27.04	35.08	19.45	15.90	3.09	144.10
2	Crus 2kg/fed + Handweeding	27.94	39.88	29.15	15.93	4.64	216.33
3	Crus 2.5 kg/fed	26.75	34.58	27.09	16.05	4.35	202.64
4	Crus 2.5 kg/fed + Handweeding	26.88	38.38	35.32	15.30	5.40	251.87
5	Betanal maxxPro	31.56	36.25	24.82	14.53	3.61	168.03
6	Betanal maxxPro + Handweeding	23.31	32.25	29.59	16.83	4.98	232.02
7	Harness	27.25	30.58	20.83	12.50	2.60	121.36
8	Harness + Handweeding	21.44	34.13	26.96	15.28	4.12	191.96
9	Betasana trio	24.75	34.45	24.19	15.50	3.75	174.76
10	Betasana trio + Handweeding	25.10	35.50	28.98	14.23	4.12	192.13
11	Handweeding	29.25	30.63	31.82	14.88	4.73	220.56
12	Unweeded check	26.31	31.75	14.07	15.25	2.15	
	$LSD_{0.05}$	5.61	8.64	2.66	3.84	1.08	

Table 6: Effect of herbicidal treatments on yield (ton/feddan), yield components (length and diameter (cm)) and percentage of sugar (Brix) during 2011

	Treatments	Length (cm)	diameter (cm)	yield (ton/feddan)	Brix	sugar yield (ton/fed)	% from unweeded check
1	Crus 2kg/fed	25.90	35.60	17.64	16.08	2.84	166.79
2	Crus 2kg/fed + Handweeding	27.50	38.25	26.59	16.33	4.34	255.28
3	Crus 2.5 kg/fed	26.25	35.08	23.52	16.15	3.80	223.42
4	Crus 2.5 kg/fed + Handweeding	26.58	36.65	34.23	16.30	5.58	328.17
5	Betanal maxxPro	28.50	32.35	23.10	15.83	3.66	215.01
6	Betanal maxxPro + Handweeding	23.30	33.35	26.00	17.13	4.45	261.87
7	Harness	28.38	30.90	19.91	13.25	2.64	155.15
8	Harness + Handweeding	22.98	31.25	28.56	17.25	4.93	289.77
9	Betasana trio	26.88	28.83	24.36	15.78	3.84	226.03
10	Betasana trio + Handweeding	27.25	30.03	27.51	16.85	4.64	272.65
11	Handweeding	27.70	32.00	33.18	15.90	5.28	310.30
12	Unweeded check	26.25	31.50	10.63	16.00	1.70	
	$LSD_{0.05}$	5.71	6.74	3.56	2.7	0.91	

Conecrning with yield components, the highest length of root in the first season was found in the case of betanal maxxpro (31.56cm) with no significant difference between all treatments except in the case of harness betanal maxxpro + handweeding and betasana trio with and without handweeding. In the second season, there was no significant difference between all treatments which indicated that the herbicide treatments don't affect the sugar beet root length.

Table(5) also showed that there was a very slight difference in root width of sugar beet in the first season as the highest width was found in the case of crus 2 kg/fed + handweeding (39.88cm) with no significant difference between all treatments except in the case of harness and handweeding twice (30.58 and 30.63 respectively) which was the least. Similarly in the second season (table 6) crus 2 kg/fed + handweeding recorded the highest width (38.3cm) with a significant difference with unweeded check, harness + handweeding, harness, betasana trio + handweeding and betasana trio (31.50, 31.35, 30.90, 30.03 and 28.83cm, respectively).

The data in table (5) showed that the percentage of sugar (brix) of the crop was not affected in the first season extremely by the treatments, the highest results was noticed in the case of betanal maxxpro + handweeding (16.83%) with no significant difference between the rest of treatments except in the case of harness which was the least (12.50%), there were no significant differences between either betanal maxxpro + handweeding and the rest of treatments or harness and the rest of treatments which was common between them.

In the second season, there were no significant differences between all treatments except in the case of harness least result (13.35%) which was illustrated in table (6).

Betanal maxxpro+ handweeding, betasana trio and handweeding were in between harness and the rest of treatments with no significant difference. These results indicates that the percentage of sugar was not affected by all tested herbicides.

This study agreed with Tevor *et al* (2006), who studied a post combination of desmedipham plus phenmedipham at 0.045 + 0.045 kg ai/ha (desphen) or desmedipham plus phenmedipham plus ethofumesate[3] (1:1: 1 ratio) (desphenetho) at 0.09 kg ai/ha plus triflusulfuron at 0.004 kg ai/ha plus clopyralid at 0.026 kg ai/ha plus 1.5% methylated seed oil received registration in 1998 and 2000 in North Dakota and Michigan, respectively and found that herbicide rates are reduced by 80%, compared to standard-split applications. Sugar beet populations and recoverable white sucrose per hectare did not differ among post herbicide treatments.

Abdallahi and Ghadiri (2004) found that maximum reduction in weed biomass was observed with desmedipham plus phenmedipham plus ethofumesate at 0.23 + 0.23 + 0.23 kg ai/ha and desmedipham plus phenmedipham plus propaquizafop at 0.46 + 0.46 + 0.1 kg ai/ha. Efficacy of grass herbicides was reduced when they were combined with pyrazon. Highest crop injury in both years was observed with desmedipham plus phenmedipham plus ethofumesate at 0.23 + 0.23 + 0.23 kg/ ha. Highest and lowest root yields in both years were produced in weed-free and weedy check plots, respectively. All herbicide treatments produced lower sugar beet yields than the hand-weeded check. Of the herbicide treatments evaluated, the highest sugar beet yields were with desmedipham plus phenmedipham plus propaquizafop at 0.46 + 0.46 + 0.1 kg/ha in 2001 and with desmedipham plus phenmedipham plus ethofumesate at 0.23 + 0.23 + 0.23 kg/ha in 2000. Sucrose content and other sugar beet characteristics were not affected by the herbicide treatments

Also, it was found that planting pattern had proper effect on weeds biomass that best results were obtained in twin row planting 60 cm. Also, mechanical control at 4 leaves stage of sugar beet had the best effect on weeds density and biomass. metamitron plus combination of phenmedipham + desmedipham + ethofumesat had also the best effect on weeds density and biomass. (Zargar and Rostami, 2011).

The results in table (5) indicated that sugar yield per feddan in the first season increased in five treatments (crus 2.5 kg/fed + handweeding, betanal maxxpro + handweeding, Handweeding twice, crus 2 kg/fed + handweeding and crus 2.5kg/fed) as they gave 5.4, 4.98, 4.73, 4.64 and 4.35 ton/fed, respectively with percentage from unweeded check 251.87, 232.02, 220.56, 216.33 and 202.64 %, respectively, also the results in this table showed that there was no significant difference between betasana trio+ handweeding and harness + handweeding as they both gave 4.12 ton/fed.

The least sugar yield was found in the case of unweeded check (2.15 ton/fed), harness (2.6 ton/fed) with percentage from unweeded check (121.36%) and crus 2 kg/fed (3.09 ton/fed) with percentage from unweeded check (144.1%) with no significant differences between them.

In the second season as shown in table (6), the highest increment in sugar yield per feddan was reported in four treatments crus 2.5 kg/fed+ handweeding, handweeding twice, harness+ handweeding and betasana trio + handweeding as they gave (5.58, 5.28, 4.93 and 4.64 ton/fed, respectively), with percentage from unweeded check 328.17, 310.3, 289.77 and 272.65%, respectively with no significant differences between them, also there was no significant diffence between harness + handweeding (4.93 ton/fed), betasana trio + handweeding (4.64 ton/fed) and betanal maxxpro + handweeding (4.45 ton/fed) with percentage from unweeded check 289.77, 272.65 and 261.87%, respectively.

The unweeded check gave the least sugar yield per feddan (1.7 ton/fed), also harness and crus 2 kg/fed gave lower sugar yield than the rest of treatments (2.64 and 2.84 ton/fed, respectively) with percentage from unweeded check 155.15 and 166.79%, respectively.

The previous results in both seasons indicated the important role of herbicide treatments with the aid of handweeding in increasing the sugar beet yield as well as sugar yield in sugar beet crop.

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الملخص العربي

المكافحة الكيماوية للحشائش فى بنجر السكر

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تم اجراء تجربة حقلية لتقييم كفاءة بعض مبيـدات الحـشائش (سواء مع العزيق اليدوى أو بدونه) على محصول بنجـر الـسكر لموسمين متتاليين(٢٠١٠ و ٢٠١١) فى مزرعة كلية الزراعة (أبيس)- جامعة الإسكندرية- الإسكندرية- جمهورية مصر العربية.

كانت المعاملات هى فينميديفام ٦,٥% + ميتاميترون ٢٨% + ايثوفيوميثيت ٦,٥% (كروس) بمعـدل ٢ كجـم/فـدان و ٢,٥ كجم/فدان، فينميـديفام ٥,٥٤% + ديـسميديفام ٤,٣٤% + ليناسيل ٢,٥% + ايثوفيوميسيت ٦,٩٣% (بيتانال ماكس بـرو)، أسيتوكلور (هارنس)، فينميديفام ٧,٥% + ديسميديفام ١,٥% + ايثوفيوميسيت ١١,٥% (بيتاسانا تريو)، عزيق يدوى و كنترول.

أوضحت النتائج أن الحشيشة السائدة هـى الـسلق فى كـلا الموسمين كما أظهرت نتائج الموسم الأول أن المعاملات التى أعطت أفضل خفض للحشائش كانت العزيق اليدوى مرتين، أسيتوكلور، (فينميديفام ٦,٥% + ميتاميترون ٢٨% + ايثوفيوميثـت ٦,٥%) بمعدل ٢,٥ كجم/فدان + عزيق يـدوى، (فينميـديفام ٦,٥% + ميتاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) بمعدل ٢ كجم/فدان + عزيق يـدوى، (فينميـديفام ٧,٥% + ديـسميديفام ١,٥% + ايثوفيوميسيت ١١,٥%) + عزيق يدوى و (فينميديفام ٥,٥٤% + ديـسميديفام ٤,٣٤% + ليناسـيل ٢,٥% + ايثوفيوميـسيت ٦,٩٣%) + عزيق يدوى) بدون أى فرق معنوى بينهم و بنـسبة مكافحـة (٩٨,٧%، ٩٧,٧%، ٩٦,٧%، ٩٦,٢%، ٩٥,٨% و ٩٣,٧%) على التوالى.

أما فى الموسم الثانى فكانت المعاملات التى أعطت أفضل نـسبة خفض للحشائش هى (فينميديفام ٦,٥% + ميتـاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) بمعدل ٢,٥ كجم/فدان + عزيـق يـدوى بنسبة مكافحة ٩٧,٣% ثم العزيق اليدوى مرتين بنـسبة مكافحـة ٩٦,٨% ثم (فينميـ ـديفام ٦,٥% + ميتـ ـاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) بمعدل ٢ كجم/فدان + عزيق يدوى بنسبة مكافحة ٩٦,١% ثم أسيتوكلور + عزيق يدوى بنـسبة مكافحـة ٩٥,٨% ثم (فينميـ ـديفام ٧,٥% + ديـ ـسميديفام ١,٥% + ايثوفيوميسيت ١١,٥%) + عزيق يدوى بنسبة مكافحة ٩٣,٦% ثم (فينميديفام ٥,٥٤% + ديسميديفام ٤,٣٤%+ ليناسيل ٢,٥% + ايثوفيوميسيت ٦,٩٣%) + عزيق يدوى بنسبة مكافحـة ٩١,٦% بدون فرق معنوى بينهم.

كان أعلى إنتاج للفدان فى الموسم الأول فى حالة (فينميـديفام ٦,٥% + ميتـ ـاميترون ٢٨% + ايثوفيوميثيـ ـت ٦,٥%) ٢,٥ كجم/فدان + عزيق يدوى حيث أعطى ٣٥,٣٢ طـن/فـدان ثم العزيق اليدوى مرتين و أعطى ٣١,٨٢ طن/فدان ثم (فينميـديفام ٥,٥٤% + ديـ ـسميديفام ٤,٣٤% + ليناسـ ـيل ٢,٥% + ايثوفيوميسيت ٦,٩٣%) + عزيـق يـدوى وأعطـى ٢٩,٥٩ طن/فدان بدون فرق معنوى بينهم)، أما فى الموسم الثانى فكانـت أعلى إنتاجية للفدان فى حالة (فينميـديفام ٦,٥% + ميتـاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) ٢,٥ كجم/فدان + عزيق يدوى والعزيق اليدوى مرتين حيث كـان النـاتج ٣٤,٢٣ و ٣٣,١٨ طن/فدان على التوالى بدون فرق معنوى بينهم.

كما أثبتت النتائج عدم وجود تأثير للمعاملات المستخدمة على طول الجذر أو قطره فى بنجر الـسكر كمـا أن النـسبة المئويـة للسكر(بريكس) لم تتأثر بذة المعاملات لكن أعلى إنتاج للسكر فى الفدان كان فى الموسم الأول فى خمسة معاملات وهى (فينميـديفام ٦,٥% + ميتـ ـاميترون ٢٨% + ايثوفيوميثيـ ـت ٦,٥%) ٢,٥ كجم/فدان + عزيق يدوى، (فينميديفام ٥,٥٤% + ديـسميديفام ٤,٣٤% + ليناسيل ٢,٥% + ايثوفيوميسيت ٦,٩٣%) + عزيـق يدوى، العزيق اليدوى مرتين، فينميـديفام ٦,٥% + ميتـاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) ٢ كجم/فدان + عزيـق يـدوى و(فينميديفام ٦,٥% + ميتاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) ٢,٥ كجم/فدان حيث أعطـت انتاجيـة سـكر (٥,٤، ٤,٩٨، ٤,٧٣، ٤,٦٤ و ٤,٣٥ طن/فدان، على التوالى)، أما فى الموسـم الثانى فكانت الأربعة معاملات التى أعطت أعلى انتاجيـة سـكر للفدان هى (فينميديفام ٦,٥% + ميتاميترون ٢٨% + ايثوفيوميثيت ٦,٥%) + عزيق يدوى، العزيق اليدوى مرتين، أسيتوكلور + عزيق يـ ـدوى و (فينميـ ـديفام ٧,٥% + ديـ ـسميديفام ١,٥% + ايثوفيوميسيت ١١,٥%) + عزيق يدوى حيث كان الناتج (٥,٥٨، ٥,٢٨، ٤,٩٣ و ٤,٦٤ طن/فدان) على التوالى.