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EFFECT OF HAND HOEING AND HERBICIDE APPLICATION ON ANNUAL WEED CONTROL IN PEANUT

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ABSTRACT

Two field experiments were carried out at El- Ismailia Agricultural Research Station, Agricultural Research Center during 2007 and 2008 successive summer seasons in a sandy soil under sprinkler irrigation system to study the effect of the integration between hand hoeing and some chemical weed control treatments on the dry weight (g/m^2) of annual weeds, growth characters, yield and its components, seed oil percentage of peanut (*Arachis hypogaea* L.).Treatments were arranged in a split plots design with four replicates. The results revealed that one hand hoeing combined to all chemical weed control treatments decreased the dry weight of annual weeds (g/m^2) at 75 and 105 days after sowing in both seasons and increased all growth characters, yield components, pod yield (ardab/fed.) and straw yield (ton/fed.) of peanut as compared with chemical weed control treatments alone. Clethodim herbicide caused the highest reduction in dry weight of annual weeds *i.e.* 99.2 and 85% at 75 days after sowing in 2007 and 2008 seasons, respectively as compared with unweeded check.

Applying clethodim or butralin had the superiority in depressing broad leaved weeds , while fluazifop-butyl came in the second rank. Concerning grassy weeds, bentazon or clethodim was superior in suppressing them . Adding hoeing once to herbicides revealed that bentazon and butralin gave a significant reduction in dry weight of grasses. Regarding total annual weeds, applying either clethodim or butralin was superior in their control, followed by fluazifop-butyl.

The best yield of peanut was achieved using clethodim , followed by fluazifop-butyl and butralin. Whereas bentazon gave the lowest yield of peanut pods / fed . Seed oil content was not affected by the applied treatments in both seasons .

The effect of hand hoeing x herbicides interaction was not significant on all studied characters in both seasons.

***Key words*:** *bentazon , butralin, clethodim, fluazifop-butyl, herbicides, peanut, weed .*

1. INTRODUCTION

Peanut (*Arachis hypogaea* L.*)* is one of the most important leguminous oil crops allover the world . It's seeds contain about 50% oil and 27% high quality protein **(**Hassan and Metwally , 2001**).** In Egypt, peanut is considered as one of the important summer oil seed crops especially because of its successful cultivation in light and sandy soils as well as in the new reclaimed areas . In 2008 season , the cultivated area allover the country was 146173 feddans where, the yield averaged about 19.1 ardabs of pods per feddan. Many annual and perennial weeds infest peanut fields. Weeds compete with peanut plants for moisture, sunlight and nutrients, that may cause substantial reduction in yield and its quality . The first 3 to 4 weeks of crop-growth period are critical for weed competition in peanut **(**Kalaiselvan *et al*., 1991). Weed competition with peanut for the whole season reduced yield up to 77.7 % (Ibrahim,1995), 83.7 % (El-Sehly,2005) and 75 % (Gnanamurthy and Balasubramaniyan (1998)). Hand hoeing is still the main common method for controlling weeds in Egypt. This treatment improved weed control and facilitated the penetration and development of pods under the soil surface. It is worthy to note that, in the new reclaimed areas the scarcity in the hand-labors is becoming a problem. Now the use of herbicides in peanut fields has been considered as one of the important practices contributing to give

satisfactory weed control, increase peanut yield and improve its quality. Burke *et al*.(2004) reported that clethodim at 140 g (a.i) / ha., gave 90 – 100 % control *for Digitaria sanguimalis* L. Wilcut *et al* .(1990) found that , fluazifop – butyl reduced Texas panicum (grassy weed) fresh weight by 98% compared to the untreated weed check . El-Sehly (2005) reported that fluazifop-p-butyl at the rate of 187.5 g (a.i)/fed, fluazifop-p-butyl at the rate of 125 g (a.i)/fed. + hand hoeing, butralin incorporated at the rate of 1200 g (a.i)/fed. were more effective in controlling weeds. The objectives of the present investigation were to study the effect of integration between hand hoeing and chemical weed control on yield and yield components and associated annual weeds of groundnut in newly reclaimed soil at El-Ismailia Agricultural Research Station under sprinkler irrigation system.

2. MATERIALS AND METHODS

Two field experiments were carried out at El-Ismailia Agricultural Research Station during 2007 and 2008 successive summer seasons. Treatments were arranged in split plot design with four replicates. Hand hoeing treatments were arranged in the main plots while, chemical weed control treatments were arranged in the sub plots as follows:-

2.1. Main plots (hand hoeing treatments)

2.1.1. Without hoeing

2.1.2. Hand hoeing once at 75 DAS (first survey)

2.2. Sub plots (herbicidal treatments).

2.2.1. Butralin[N-secondary-butyl-4-tertiary-butyl-2,dinitroaniline]. applied at the rate of 1200 g (a.i) / fed. as pre- emergence.

2.2.2. Bentazon [3- isopropyl-1H-2, 1,3-enzothiod-iazin 3H- one 2,2-dioxide], applied at the rate of 480 g (a.i) / fed. as post-emergence at 30 days after sowing.

2.2.3. Fluazifop– butyl [Butyl-2- [4-(5-trifluoromethyl-2- Pyridyloxy) phenoxy] propionate], applied at the rate of 187.5 g (a.i)/ fed.as post- emergence at 30 days after sowing.

2.2.4. Clethodim**:[** (±)- 2-[(E)- 1- [(E)- 3- chloro allyloxyimino] propyl [2- (ethyl thio) propyl]- 3 – hydroxyl - cyclohex-2-enone, applied at the rate of 125 g (a.i)/ fed.as post- emergence, at 30 days after sowing .

2.2.5. Unweeded check (control)

All herbicide treatments were sprayed with a knapsack sprayer (C P 3) at a volume rate of water 200 L / fed. Peanut Cv Giza 5 seeds (35kg/fed.) were inoculated with the specific strain of *Bradyrhizobium* sp. then sown in rows 60 cm apart and 10 cm between hills . A plot area was 21 $m^{2.}$ (4.2 m in width X 5 m apart).Each plot consisted of 7 ridges.Sowing took place on the second week of April and harvested on the first week of October in both seasons. All cultural practices of growing peanut were applied according to the crop recommendations. Irrigation was done by sprinkler irrigation system at 3-day intervals. The preceding winter crop in both seasons was wheat (*Triticum aestivum* L.). The soil texture of the experimental field was sandy.

Table (1): Mechanical and chemical analysis of the soil at the experimental site.*

Analysis	Season	
	2007	2008
Physical analysis:		
Coarse sand	**60.8**	**61.2**
Fine sand	**33.7**	**34.1**
Silt and clay	**5.5**	**4.7**
Soil texture	**Sandy**	**Sandy**
Chemical analysis :		
pH	**7.51**	**7.32**
EC (m mohs/cm) at 25°C	**0.24**	**0.37**
O.M. (%)	**0.38**	**0.32**
$CaCO_3$ (%)	**1.62**	**1.75**
Available soluble (ppm)		
N	**22.7**	**27.53**
P	**5.48**	**6.45**
K	**56.30**	**59.20**

* Nassar and Osman (2008)

2.3. Data recorded

2.3.I. Weed assessment

Weeds were hand pulled from one square meter sample, chosen randomly from each plot at 75 and 105 days after sowing (DAS). Weeds were identified according to Tackholm (1974). Weeds were air dried for 3 days and then dried in the oven at 70°C until a constant weight. The dry weight of broad leaved, grassy and total annual weeds in g/m^2 was recorded.

2.3.2. Crop traits

At harvest, samples of ten plants were taken off at random from each plot to determine yield and yield components.

2.3.2.1. Yield components

1. Number of pods per plant. 2. Weight of pods per plant (g).

2.3.2.2. Yield

Four ridges from each experimental plot were taken off to determine the following:

1- Pod yield (ardab /fed.). 2- Straw yield (ton / fed.).

2.3.2.3. Yield quality

1. Oil percentage in seeds: determined according to A.O.A.C. (1955) using Soxhlet apparatus.

2.4. Statistical analysis

Data obtained were subjected to statistical analysis according to Snedecor and Cochran (1980) and the least significant differences (LSD) at 5% level were calculated to compare mean values of the treatments.

3. RESULTS AND DISCUSSION

Weed assessment revealed that dominant weed species in the experimental site were (crabgrass) *Digitaria sanguinalis* L. ,(Egyptian finger grass), *Dactyloctenium aegyptium* L. p.Beauv and (field sand bur) *Cenchrus biflorus* Roxb as annual grassy weeds **;** (purslane) *Portulaca oleracea* L. , and (spurge) *Euphorbia geneculata* as annual broad-leaved weeds in both seasons.

3.1. Effect of herbicidal treatments

3.1.1. Annual weed growth

3.1.1.1. Broad-leaved weeds

The data presented in Table (2) revealed that the application of clethodim or butralin was more effective in controlling broad-leaved weeds at the first survey, than other treatments. Treatment with fluazifop-butyl, came in the second order in depressing this group of weeds. It is worthy to note that the combination between herbicidal and hoeing treatments was more efficient in peanut weed control especially with butralin and clethodim at the first season and butralin and fluazifop-butyl at the 2 nd one.

Regarding the 2nd survey, clethodim and fluazifop-butyl treated as post-emergence significantly surpassed other treatments in suppressing broad-leaved weeds, whereas bentazon and butralin treatments were superior when combined with hoeing once (Table3).

3.1.1.2. Grassy weeds

With regard to the first survey (75 DAS), applying either bentazon or clethodim herbicides

Table (2): Effect of the integration between hand hoeing and herbicidal treatments on dry weight of broad leaved, grassy and total annual weeds in peanut at 75 DAS in 2007 and 2008 seasons.

Weed control treatment			First survey (75 DAS)					
		Rate g (a.i)/ fed.	Dry weight(g) (2007 season)			Dry weight(g) (2008 season)		
			Broad leaved weeds	Grassy weeds	Total annual weeds	Broad leaved weeds	Grassy weeds	Total annual weeds
Without hoeing	Butralin	1200	4.3	59.7	64.0	15.2	31.6	46.8
	Bentazon	480	296.4	2.5	298.9	357.9	0.4	358.3
	Fluazifop-butyl	187.5	50.7	25.8	76.5	111.8	3.1	114.9
	Clethodim	125	2.6	9.0	11.6	69.0	0.8	69.8
	Control		409.5	35.7	445.2	402.1	47.0	449.1
Mean			152.7	26.5	179.2	191.2	16.6	207.8
One hoeing	Butralin	1200	1.0	0.01	1.1	1.8	0	1.8
	Bentazon	480	40.9	2.7	43.6	44.3	0	44.3
	Fluazifop-butyl	187.5	23.0	3.6	26.6	2.1	0.6	2.7
	Clethodim	125	2.2	4.0	6.2	23.7	0.5	24.2
	Control		233.5	14.1	247.6	279.2	3.6	282.8
Mean			60.1	4.9	65.0	70.2	0.9	71.1
Over mean	Butralin	1200	2.7	29.8	32.5	8.5	15.8	24.3
	Bentazon	480	168.7	2.6	171.3	201.1	0.2	201.3
	Fluazifop-butyl	187.5	36.9	14.7	51.6	56.9	1.8	58.7
	Clethodim	125	2.4	6.5	8.9	46.3	0.6	46.9
	Control		321.5	24.9	346.4	340.6	25.3	365.9
LSD at 5% level		Herbicides	2.0	05	1.5	0.6	0.7	0.6
		Hoeing	1.9	1.7	2.0	2	1.4	1.7
		Interaction	Ns	Ns	Ns	Ns	Ns	Ns

was superior in suppressing grasses in peanut fields in both growing seasons. Hoeing once in addition to the herbicidal treatments revealed that bentazon and butralin was more effective in controlling grassy weeds. They showed the least dry weight of grasses compared to the rest treatments.

Regarding the second survey (105 DAS), spraying either butralin or bentazon had the most suppression effect on grassy weeds , while when herbicides were combined with hoeing, butralin application was superior in grass control followed by fluazifop-butyl and clethodim.

control as shown in the 1st survey (after 75 days from sowing). Practice of one hoeing in addition to chemical weed control treatments revealed that butralin was the best treatment in suppressing weeds followed by clethodim in the 1st season and fluazifop-butyl in the 2nd one.

Concerning the 2nd survey, clethodim and fluazifop-butyl were superior than the other herbicides in weed control. Whereas applying butralin or fluazifop-butyl combined with one hoeing was more effective in weed control.

These results are in agreement with those obtained by Ibrahim (1995) and El-Sehly (2005).

Table (3): Effect of the integration between hand hoeing and herbicidal treatments on dry weight of broad leaved, grassy and total annual weeds in peanut at 105 DAS in 2007 and 2008 ,seasons.

Weed control treatment		Rate g (a.i)/ fed.	Second survey (105 DAS)					
			Dry weight(g) (2007 season)			Dry weight(g) (2008 season)		
			Broad leaved weeds	Grassy weeds	Total annual weeds	Broad leaved weeds	Grassy weeds	Total annual weeds
Without hoeing	Butralin	1200	138.5	6.0	144.5	150.1	0.7	150.8
	Bentazon	480	272.2	6.8	279.0	215.9	8.1	224.0
	Fluazifop-butyl	187.5	107.8	11.8	119.6	87.9	13.3	101.2
	Clethodim	125	44.7	13.5	58.2	78.0	13.8	91.8
	Control		275.9	15.8	291.7	227.3	15.7	243.0
Mean			167.8	10.8	178.6	151.8	10.3	162.1
One hoeing	Butralin	1200	22.1	0	22.1	6.1	3.3	9.4
	Bentazon	480	0	128.0	128.0	4.0	52.3	56.3
	Fluazifop-butyl	187.5	23.7	2.5	26.2	37.1	3.8	40.9
	Clethodim	125	33.5	2.9	36.4	57.6	4.1	61.7
	Control		246.4	15.4	261.8	300.3	20.2	320.5
Mean			90.7	4.2	94.9	89.9	7.1	97.0
Over mean	Butralin	1200	80.3	3.0	83.3	78.1	2.0	80.1
	Bentazon	480	200.1	3.4	203.5	132.1	6.1	138.2
	Fluazifop-butyl	187.5	65.8	7.2	73.0	62.5	8.5	71.0
	Clethodim	125	39.1	8.2	47.3	67.8	8.9	76.7
	Control		261.1	15.6	276.7	263.8	18.0	281.8
LSD at 5% level		Herbicides	0.6	0.5	0.6	0.8	0.9	0.8
		Hoeing	1.7	0.7	1.7	1.9	1.1	2
		Interaction	Ns	Ns	Ns	Ns	Ns	Ns

3.1.1.3.Total annual weeds

Application of clethodim or butralin was superior to the other treatments in annual weed

Burke *et al*.(2004), reported that clethodim at 140 g (a.i) / ha. gave 90 – 100 % control *for Digitaria sanguimalis* L**.** Wilcut *et al.* (1990)

found that, fluazifop – butyl reduced Texas panicum (grassy weed) fresh weight by 98% compared to the untreated weed check (96%). El-Sehly (2005), reported that fluazifop-p-butyl at the rate of 187.5 g (a.i)/fed ., butralin incorporated at the rate of 1200 g (a.i) /fed. , were more effective in controlling weeds.

3.2. Effect of hand hoeing

Results in Tables 2 and 3 revealed that hand hoeing once was effective in reducing total weed dry weight by 63.7 , 65.8 (first survey) and 46.9 , 40.2 % (second sutvey) in the two successive seasons , respectively . This was attributed to the reduction in broad-leaved weeds more than in grassy ones.

Results also showed that the hoeing x herbicides interaction had insignificant effect on weed dry weight at 75 and 105 DAS in both seasons . However , practice of one hand hoeing + herbicides decreased the dry weight of broad-leaved, grassy and total annual weeds (g/m^2) at the first survey by 60.6, 81.6 and 64.3 %, respectively in 2007 season while, in 2008 season the previous reductions were 63.3, 94.5 and 66.9%, respectively (Table 2).The same trend was found at the second survey in both seasons (Table 3). Adding one hand hoeing to chemical weed control significantly decreased the dry weight of broad-leaved, grassy and total annual weeds by 45.9, 61.1 and 46.9 %, respectively in 2007 season while, the previous reductions were 40.8, 31.1 and 40.2 %, respectively in 2008 season. These results are in agreement with those obtained by El-Sehly (2005), who reported that fluazifop-p-butyl at the rate of 125 g (a.i)/fed. + hand hoeing , butralin incorporated at the rate of 1200 g (a.i)/fed. were more effective in controlling weeds.(Moshtohry *et al*., 2007; Nassar and Osman 2008).

Effect of weed control treatments on peanut yield and its components

The data in **Table (4**) show that adding one hand hoeing to herbicides significantly increased the number and weight of pods / plant by 17.6 and 36.4 %, respectively in the 1st season and 40.1 and 71.8%, respectively in the 2 nd season as compared with those without. These results may be due to the growth suppression of weed population hoeing when integrated weed control treatment of hand hoeing and herbicides was applied. This caused less competation peanut plants for growth factors compared to herbicide application without hoeing which was reflected on increasing peanut number and weight of pods/plant.

These results are in agreement with those obtained by Moshtohry *et al.* (2007) and Nassar and Osman (2008).

Concerning peanut yield, the combination of one hoeing to herbicides significantly increased peanut yield (ardab / fed.) by 40.4% at the first season and increased straw yield by about 9.5% through both seasons. These results may be due to the suppression of weed growth decreasing the crop/weed competition and increased the yield components characters of peanut such as number and weight of pods / plant. These results are similar to those obtained by David *et al*. (1984), and Wilcut *et al*. (1987). On the other hand, seed oil content did not affect by adding one hand hoeing to herbicide application in both seasons (Table 4). These results are in agreement with those obtained by Ibrahim (1995). Concerning number and weight of pods/plant , application of clethodim herbicide gave the highest values of number and weight of pods/plant in both seasons, whereas fluazifop-butyl or butralin , came in the second rank . While the lowest values were achieved by bentazon application. In 2007 season, the highest values of number and weight of pods/plant were 21 and 39.6 gr., respectively as compared with weedy check value being (8.4 and 7.5gr.). In 2008 season the highest value in number and weight of pods/plant were 19.3 and 29.8gr., respectively as compared with weedy check (15.3 and 8.1gr.).These results are in agreement with those obtained by El- Sehly (2005) and Ahmed *et al.* (2008).

The best pod yield of peanut was achieved using clethodim in both seasons. This compound produced seed yield as over means 19.3 ardab/fed. giving relative yield about 470.7 as compared to the untreated check (100) in the 1st season and 17.3 ardab/fed. and relative yield of 208.4 in the 2nd season.

Fluazifop-butyl application came in the second rank in both seasons, giving seed yield of 18.2 and 15.5 ardabs /fed. and relative yield of 443.9 and 186.7 as compared to the unweeded check (100) during both seasons, respectively . Butralin treatment gave seed yield of 17.3 and 15.4 ardabs/fed. and relative yield of 431.7 and 185.4. The lowest seed yield was given by bentazon spraying which was 9.4 and 12.9 ardabs/fed. in both growing seasons, respectively . These results may be due to the herbicide was clethodim more efficient in controlling on associated annual weeds in peanut plots which minimized weed/crop competition hence pod and straw yield of peanut

Table (4): Effect of the integration between hand hoeing and chemical weed control on pod number & weight per plant , pod & straw yield/ feddan and seed oil % of peanut in 2007 and 2008 seasons.

Weed control treatments		Rate g (a.i) /fed.	Season 2007						Season 2008					
			Pods number/ plant	Pods weight (g)/ plant	Pod Yield ardab/fed.	Relative yield	Straw yield ton/fed.	Oil %	Pods number/ plant	Pods weight (g)/ plant	Pod Yield ardab/ Fed.	Relative yield	Straw yield (ton/fed.)	Oil %
Without hoeing	Butralin	1200	15.1	18.4	16.4	364.4	1.4	51.3	12.7	21.2	14.4	169.4	1.1	49.4
	Bentazon	480	4.8	8.9	3.1	69.0	1.7	52.4	16.3	8.0	12.4	146.0	1.2	47.0
	Fluazifop-butyl	187.5	13.7	24.7	15.3	340	2.4	51.8	11.9	20.4	16.8	198.0	1.1	48.6
	Clethodim	125	21.0	38.6	18.1	402.2	2.6	52.7	12.8	21.0	16.8	198.0	1.2	48.3
	Control		8.4	7.2	4.5	100	2.3	53.1	15.4	7.8	8.5	100	1.3	48.0
Mean			12.5	19.5	11.4	255.1	2.1	52.2	13.7	15.6	13.8	162.2	1.1	49.6
One hoeing	Butralin	1200	16.0	33.4	19.0	513.5	2.4	51.9	16.7	38.3	16.4	202.5	1.1	49.7
	Bentazon	480	12.6	23.1	15.8	427.0	2.4	51.8	17.2	28.6	13.4	165.4	1.1	49.7
	Fluazifop-butyl	187.5	15.7	28.4	21.1	570.2	2.7	52.1	21.7	23.3	14.3	176.5	1.0	49.4
	Clethodim	125	21.0	40.5	20.5	554.1	2.7	52.8	25.7	35.9	17.9	221.0	1.3	48.7
	Control		8.4	7.8	3.7	100	1.7	52.1	15.1	8.3	8.1	100	1.3	50.4
Mean			14.7	26.6	16.0	433.0	2.3	52.1	19.2	26.8	13.9	173.1	1.2	48.3
Over mean	Butralin	1200	15.6	25.9	17.7	431.7	1.9	51.6	14.7	29.8	15.4	185.5	1.1	49.5
	Bentazon	480	8.7	16.0	9.4	229.2	2.1	52.1	16.8	18.3	12.9	155.4	1.1	48.4
	Fluazifop-butyl	187.5	14.7	26.6	18.2	443.9	2.5	51.9	16.8	21.9	15.5	186.7	1.0	49.0
	Clethodim	125	21.0	39.6	19.3	470.7	2.6	52.7	19.3	28.5	17.3	208.4	1.2	48.5
	Control		8.4	7.5	4.1	100	2.0	52.6	15.3	8.1	8.3	100	1.3	49.2
L S D at 5% Level	Herbicides		0.6	0.8	0.9	0.7	0.6	0.5	0.7	0.6	0.6	0.5	Ns	0.9
	Hoeing		1.3	1.7	1.7	1.0	Ns	1.2	1.6	1.2	Ns	1.9	Ns	1.7
	Interaction		Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns

was increased. The yield reduction with applying bentazon may be due to its phytotoxicity to peanut plant which damaged crop growth. Concerning straw yield, the highest values were obtained with clethodim spraying followed by fluazifop-butyl during both seasons. These results are in agreement with those obtained by Ahmed *et al*. (2008), Moshtohry *et al*. (2007) and Nassar and Osman (2008). Seed oil percentage was not significantly affected by mechanical and chemical weed control treatments in both seasons (Table 4). The interaction between hand hoeing and chemical weed control had no significant effect on all studied characters.

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تأثير استخدام المبيدات والعزيق فى مكافحة حشائش الفول السودانى

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ملخص

أجريت تجربتان حقليتان بمحطة البحوث بالإسماعيلية- التابعة لمركز البحوث الزراعية –وزارة الزراعة خلال الموسمين الصيفيين 2007و 2008 فى تربة رملية تحت نظام الرى بالرش لدراسة التكامل بين العزيق وبعض المبيدات

لدراسة تأثيره على الحشائش الحولية وصفات النمو وكمية الحاصل للفول السودانى . إستخدم تصميم القطع المنشقة فى أربعة مكررات.أشارت النتائج إلى أن إضافة عزقة للمعاملات الكيماوية لمقاومة الحشائش أدى إلى نقص معنوى فى الوزن الجاف (جم/ م2) للحشائش الحوليه فى الموسمين وأدت إلى زيادة معنوية لصفات النمو و غلة الفول السوداني (أردب / فدان) ومكوناته وحاصل العرش (طن/فدان) مقارنة بالمعاملات الكيماوية منفرده. أدت المعاملات الكيماويه إلى نقص معنوى فى الوزن الجاف (جم/ م 2) للحشائش الحولية فى الموسمين .أعطت المعاملة بالمبيد كلوسيدم (سلكت سوبر) بمعدل 125جم ماده فعاله أعلى نسبة نقص فى الوزن الجاف للحشائش الحوليه بعد 75 يوم من الزراعة و التي قدرت ب 99.2 ،85% فى الموسم الأول والثانى على التوالى مقارنة بمعاملة الكنترول .و أعطت المعاملة بمبيد كلوسيدم (سلكت سوبر) أعلى قيمة لعدد ووزن القرون / نبات فى كلا الموسمين و قدر بحوالى 21 ، 39.6 على التوالى مقارنة بقيمة معاملة الكنترول (8.4 ،7.5 على التوالى) فى الموسم الأول وفى الموسم الثانى قدر بحوالى 19.3 ، 29.8 على التوالى مقارنة بقيمة معاملة الكنترول(15.3 ،8.1 على التوالى). أعطت معاملة كلوسيدم أعلى قيمة لمحصول القرون (أردب /فدان) والعرش (طن/فدان) فى كلا الموسمين. لم تتأثر نسبة الزيت بالبذوربمعاملات المبيدات أو التفاعل بينها و بين العزيق معنويا فى كلا الموسمين.

المجلة العلمية لكلية الزراعة – جامعة القاهرة – المجلد (62) العدد الثاني (إبريل 2011):153-160.