

## EFFECT OF SOWING METHODS AND SOME WEED CONTROL TREATMENTS ON DODDER CONTROL IN CLOVER CROP.

Soliman, I. E. and M. M. Abd El-Hamid

Weed Res. Laboratory, Field Crops Res. Inst., A.R.C., Giza, Egypt.

### ABSTRACT

Two field experiments were carried out at sakha experimental station during 2004/ 2005 and 2005/2006 seasons to investigate the effect of different sowing methods (dry method and dry method after false irrigation) and some herbicides i.e. glyphosate, butralin, imidazolin, bentazon, propyzamide and hand combing treatment on controlling dodder weed *Cuscuta planiflora* and growth of clover plants *Trifolium alexandrinum* L. Results indicated that the hand combing treatment and different sowing methods were not enough in dodder control, but it used only as a help factor in control program. Also, the results indicated that butralin herbicide showed good control of dodder under the sowing after false irrigation, followed by propyzamide, glyphosate, imidazolin and bentazon treatments. Also, showed that the parasitic weed dodder caused a great reduction in fresh weight of clover plants.

Clover plants infected with dodder showed that the lowest contents of chlorophyll a, b and total chlorophyll compared with healthy plants. Data also cleared that all tested herbicides showed least effective on chlorophyll content. Also, showed the that the reduction percentage of chorophylli content was increased by increasing the time of treatment.

### INTRODUCTION

Dodder *Cuscuta planiflora* Ten, is known to be the main pest attacking the Egyptian clover *Trifolium alexandrinum* in Egypt, while other species of dodder have been reported on some other plants in different locations in Egypt ( Tacholem, 1965). Al- Shair, (1986) mentioned that *Cuscuta planiflora* decreased *Trifolium alexandrinum* fresh and dry weights at the first and second cuts, the number of seed / inflorescence, seed yield and germination percentage and incresed seed number / g.

Giannopolitis (1979) reported that propyzamide is the standard herbicide currently used for controlling dodder in suger beet. Also, (Kontsiotou 1979) reported that the best control of *Cuscuta spp.* in lucerne yield was given by propyzamide at 300 ml/ ha. and chlorthal dimethyl at 1.1 L/ha. applied pre-emergence.

Hamouda *et al.* (1989) indicated that dodder control increased as the rate of pronamide increased up to 1.25 kg a.i./ fed. when used as pre- and post-emergence in Egyptian clover. Abd El-wahed (1996) found that glyphosate at ( 400 g a.i./ fed.) gave (94 -97%) control of *Cuscuta spp.* in Egyptian clover. The half rate (200 g a.i./ fed.) gave the same results (90 - 92%) control, while glyphosate at (100 and 50 g a.i./ fed.) was less effective on *Cuscuta spp.* than the first and second rate. Also, Molnar *et al.* (1998) showed that Round up Bioforce (glyphosate) at 0.8 L/ ha. gave (94%) control of *Cuscuta planiflora*. Zaki *et al.* ( 1998) applied glyphosate (0.5 -1.125 l/ha.) on Egyptian clover *Trifolium alexandrinum* to control dodder *Cuscuta spp.* in clover. The results showed that glyphosate gave good control of dodder.

The integrated control of dodder *Cuscuta spp.* may serve as alternative to high rate of herbicides, especially when used to synergetic other methods of control and reduce water pollution and costs of using the potent and highly expensive herbicides. Sher and Shad (1989) found that manual control (hand plucking) of *Cuscuta spp.* does not give effective control. Allowing *Cuscuta spp.* to germinate and then destroying it by tillage gave some control and when combined with hand plucking complete control was achieved. Post-emergence application of granular Chloroprotham at 6 lb/ acre (before *Cuscuta* attachment to lucerne), propyzamide at 1 –2 pre-emergence and dichlobenil applied to lucerne seeds at 1.5 –8 once or twice/ season were all effective at controlling *Cuscuta spp.* A list of biological control agents, which can be used against *Cuscuta spp.*

Ahmed *et al.* (1995) studied the efficiency of two herbicides bentazon and glyphosate on growth of clover *Trifolium alexandrinum* L. The results cleared that herbicides treatments decreased chlorophyll a and b, compared to untreated healthy plants.

The aim of the present investigation was to study the effect of some herbicides and sowing methods in controlling dodder and their effect on growth of clover plants.

## **MATERIALS AND METHODS**

Two field experiments were conducted at Sakha Agricultural Research Station during two successive seasons 2004/ 2005 and 2005/ 2006 to study the effect of some weed control treatments for controlling dodder *Cuscuta planiflora* in clover *Trifolium alexandrinum* L. ( c.v. meskawy) under two different sowing methods, (dry method and dry method after false irrigation). Dodder seeds were mixed with soil at 10 % of clover seed, (W/ W). Sowing dates were October 5 and 11 in the two seasons respectively. Split plot design was used with four replications. The main plot were assigned to the sowing methods. Meanwhile, weed control treatments were randomly distributed at the sub plots. The plot area was 10.5 m<sup>2</sup> and artificially infested by dodder seed. In this study nine treatments were used as follows :

- 1 – Round up (glyphosate 48% WSC ) at 0.06 L/ fed., after two weeks from the cutting and with the appearance of dodder.
- 2 – Basagran (bentazon 48% AS ) at 1 L/fed., after two weeks from the cutting and with the appearance of dodder.
- 3 – Imidazolin (AC299,263 18% EC ) at 0.4 L/ fed., after two weeks from the cutting and the appearance of dodder .
- 4 – Amex (butralin 48% EC ) at 1.5 L/ fed., surface application (after sowing and before irrigation).
- 5 – Kerb (propyzamide) 50% WP at 1.0 kg/ fed., soil incorporation.
- 6 – Kerb (propyzamide 50% WP) at 1.0 kg/ fed., after two weeks from the cutting followed by direct irrigation.
- 7 – Hand combing (twice), the first after the second cutting, and the second after the third cutting.

8 – Healthy plants (non-infested).

9 – Control (infested).

**Table (a): Nomenclature of herbicides used in this investigation.**

Common name	Trade name	Chemical name
Glyphosate	Round up	N-(Phosphonomethyl glycine) – isopropylammonium.
Bentazon	Basagran	3 – isopropyl – 1 H – 2, 1, 3 – benzothiadizin – (3 H) one 2,2 – dioxide.
Imidazolin	AC299,263	2 – (4 – isopropyl – 1 methyl – 5 - oxo 2 – Imidazolin 2 – yl) – 5 - (methoxymethyl) nicotinic acid.
Butralin	Amex	4 – (1,1 – dimethylethyl) –N – (1 – methylpropyl) – 2, 6 – dinitrobenzenamine.
Propyzamide	Kerb	3,5 – dichloro –N – (1 – dimethyl – 2 - propynyl) benzamide.

The samples were taken after cutting to determine the fresh weight (ton/ fed.) for clover, while other samples were taken after 21, 28 and 35 days from treatment to determine the reduction percentage in the fresh weight of grown dodder *Cuscuta planiflora*.

To evaluate the herbicidal action, dodder weeds were randomly collected by hand combing from each plot (using 50 cm x 50 cm quadrat). Percent of reduction (R%) was calculated according to Topps and Wain (1957) formula as following:-

$$R \% = \frac{A - B}{A} \times 100$$

Where:-

A = The fresh weight of weeds in untreated plot.

B = The fresh weight of weeds in treated plot.

All agronomic practices in clover such as land preparation, fertilization and irrigation were done as recommended during the two seasons study.

**Chlorophyll content:**

Chlorophyll content in leaves of clover were measured according to Sweeny and Martin (1961). Chlorophyll a, b and total chlorophyll were recorded as mg chlorophyll/ gm sample (fresh weight) and also as inhibition percent of the treated sample, considering the untreated ones as standard. Control treatment was carried out using clover leaves that was not subjected to any herbicide.

**Statistical analysis :**

Data of the two experiments were subjected to proper analysis of varians according to Snedecor and Cochran (1980). The combined analysis was conducted for the data of the two rperiments according to Gomez and Gomez ( 1983 ). Means were compared at 5% level of significance by the least significant different ( L.S.D.) test. All statistical analysis was performed by using analysis of variance of (IRRISTAT and ( MSTAT) computer software packge.

## RESULTS AND DISCUSSION

## 1–Effect of sowing methods, weed control treatments and their interaction on dodder control in clover.

Reduction percentages of dodder as affected by the means are presented in Table (1). Concerning the effect of sowing methods on dodder *C. planiflora*, results clearly indicated that the difference between sowing methods was not significant on dodder control. However, it is clear that the second method (dry method after false irrigation) recorded more reduction in fresh weight of dodder as compared to the first method during both seasons.

With regard to the effect of weed control treatments on dodder in clover, data indicated that *C. planiflora* was very sensitive to butralin at 1.5 L/ fed. and propyzamide at 1.0 kg/ fed. (either soil incorporated or post-emergence applied). These treatments reduced the fresh weight of dodder by 96.15, 94.10 and 90.15 % respectively. It was observed that dodder seed germination did not complete by the mentioned treatments, particularly at 35 days after herbicides application.

Table(1): Effect of sowing methods, weed control treatments and their interactions on reduction percentages of fresh weight of dodder in clover (combined analysis of 2004/ 2005 and 2005/ 2006 experiments ).

Treatments	Rate/F.	21 days*			28 days			35 days		
		Sowing methods			Sowing methods			Sowing methods		
		S1**	S2***	Mean	S1**	S2***	Mean	S1**	S2***	Mean
Glyphosate	0.06 L	59.50	78.00	68.75	72.90	83.20	78.05	87.20	93.40	90.30
Bentason	1L	50.50	69.70	60.10	60.40	80.30	70.35	68.20	84.70	76.45
Imidazolin	0.4 L	58.00	71.40	64.70	77.60	81.40	79.50	82.60	90.00	86.30
Butralin( surface)	1.5L	100.0	100.0	100.0	93.00	100.0	96.50	92.30	100.0	96.15
Propyzamide( incorp.)	1kg	100.0	100.0	100.0	91.70	100.0	95.85	90.60	97.60	94.10
Propyzamide(post)	1kg	41.00	80.90	60.95	81.40	87.60	84.50	87.50	92.80	90.15
Hand combing		40.00	55.60	47.80	29.60	49.80	39.70	21.30	44.60	32.95
Non-infested		100.0	100.0	100.0	99.00	100.0	99.50	99.00	100.0	99.50
Control( infested)		3.00	18.70	10.85	5.50	36.50	21.00	9.00	45.00	27.00
Mean		61.33	74.92		67.90	79.87		70.86	83.12	
L.S.D. at 5% level for :-										
Sowing methods(S)		N.S.			N.S.			N.S.		
Weed control treatments (W)		5.00			5.30			5.20		
Interaction (S xW)		6.40			7.10			7.00		

Days\*= Time after treatment . S1\*\*= Dry sowing method .  
S2\*\*\*= Dry sowing method after false irrigation.

Glyphosate at 0.06 l/ fed. and imidazolin at 0.4 l/ fed. gave good effect on *C. planiflora*, where it reduced the fresh weight of dodder by (90.30 and 86.30 % respectively after 35 days from treatment. These two herbicide treatments were more effective than the two soing methods Also, it was

observed that butralin, propyzamide, imidazolin and glyphosate prevented the infestation with *C. planiflora* up to 35 days after treatment.

Hand combing (twice) was not feasible of effect on dodder infestation during both seasons, where it reduced the fresh weight of *C. planiflora* as 32.95 % at 35 days after treatment.

From the results presented in Tables ( 1 ) it could be concluded that hand combing treatment recorded poor reduction in dodder. It is not useful to depend on hand combing as effective treatment against dodder, but it may be used as a help only factor. These results agreed with the results of Sher and Shad (1989) who reported that manual control (hand plucking) of *Cuscuta spp.* does not give effective control.

The interaction between sowing methods and weed control treatments, showed that this interaction had significant effects on reduction percentage of dodder fresh weight at 35 days after treatment. The application of butralin and propyzamide gave the best results under the second sowing method (dry method after false irrigation). The previous results showed that the herbicides caused significant reduction in fresh weight of dodder in clover after different times of treatment. On the other hand, the results showed that sowing methods gave no significant differences in dodder control, while, their interaction caused significant reduction of dodder in clover plants.

## **2 – Effect of sowing methods and weed control treatments and their interaction on some yield components of clover plants:**

### **2.1. Fresh weight of clover:**

The main value of fresh weight of clover plants (ton/fed.) at first, second and third cuttings as affected by sowing methods, weed control treatments and their interactions are presented in Tables ( 2 ). Data indicated that the differences between sowing methods on their effect on foliage clover crop were not significant. These results were true at the three cuttings in both growing seasons. However, the second sowing method (dry method after false irrigation) increased the fresh weight of clover by about 1.15, 0.96 and 0.62 ton/fed. in the three cuttings respectively as compared to first sowing method (only dry method). The second method was the best for clover production hence it avoid the stronger competition of dodder weed due to their low weed population density. Data also revealed that the fresh weight of clover plants (ton/fed.) was significantly affected by weed control treatments. It could be noticed that the plots which were treated with hand combing resulted in insufficient weed control. However, all of the studied herbicides significantly increased the fresh weight of clover plants as compared to infested control treatment. These findings were true after three cuttings, and this effect was constant from season to another. These results were agreed with that obtained by Al-Menoufi *et al.* (1985) who reported that fresh weight of Egyptian clover forage decreased significantly in plots infested with more than 2% of *C. planiflora*. Also these results agreed with Al-Shair (1986) who reported that *C. planiflora* decreased *Trifolium alexandrinum* fresh weight at the 1<sup>st</sup> and 2<sup>nd</sup> cuts.

The most effective treatment for increasing fresh weight of clover plants was propyzamide when used (incorporation in soil or post-emergence)

it recorded the highest fresh weight (9.49 and 9.63 ton/fed. followed by imidazolin at rate of 0.4 L/fed. (8.42 ton/fed.) and glyphosate at 0.06 l/fed. The superiority of those herbicides against dodder *Cuscuta planiflora* could be attributed to the continuous destroying effect of the sequential application. Butralin recorded the lowest fresh weight of clover during the first cutting, because it caused phytotoxicity of clover plants, but clover plants completely recovered at the end of this cutting. Bentazon treatment recorded the least fresh weight compared with other herbicides, since it was almost equal with hand combing treatments.

It is striking that all tested herbicides increased the fresh weight of clover plants as compared to infested control treatment, also they were effective against dodder *C. planiflora*, but with different ratios, in spite of they had side effects on clover plants, one did not find other treatments instead of using the herbicides to dodder *C. planiflora* control till now.

**Table (2): Effect of sowing methods, weed control treatments and their interactions on clover plant fresh weight (ton/f.), (combined analysis of 2004/ 2005 and 2005/ 2006 experiments).**

Treatments	Rate/F.	Frist cutting			Second Cutting			Third Cutting		
		Sowing methods			Sowing methods			Sowing methods		
		S1**	S2***	Mean	S1**	S2***	Mean	S1**	S2***	Mean
Glyphosate	0.06 L	10.00	10.79	10.40	11.10	12.14	11.62	8.46	8.26	8.36
Bentazon	1L	9.29	10.53	9.91	8.62	9.75	9.19	6.87	7.78	7.33
Imidazolin	0.4 L	9.00	12.77	10.89	9.85	11.33	10.59	8.01	8.83	8.42
Butralin( surface)	1.5L	7.75	7.76	7.76	9.00	9.56	9.28	7.76	8.30	8.03
Propyzamide (incorp.)	1kg	10.00	10.62	10.31	11.33	12.22	11.78	9.72	9.26	9.49
Propyzamide(post)	1kg	11.83	11.66	11.75	11.79	12.68	12.24	9.43	9.82	9.63
Hand combing		11.39	11.72	11.53	7.92	9.64	8.78	6.40	7.56	6.98
Non-infested		12.00	12.94	12.47	11.82	12.24	12.03	9.99	11.44	10.72
Control( infested)		9.00	11.81	10.41	7.56	8.07	7.82	6.35	7.33	6.84
Mean		10.03	11.18		9.89	10.85		8.11	8.73	
L.S.D. at 5% level for :-										
Sowing methods(S)		N.S			N.S			N.S		
Weed control treatments (W)		1.43			0.66			0.82		
Interaction (S xW)		N.S			N.S			1.02		

S1\*\*= Dry sowing method . S2\*\*\*= Dry sowing method after false irrigation

## 2.2. Plant length of clover :

Data persented in Table (3) show the effect of sowing methods, weed control treatments and their interactions on plant length ( cm ) at frist, second and third cutting Concerning sowing methods, data clearly indicated that plant length was not significantly affected, hence it could be noticed that plant length approximately was equal in the two sowing methods. Weed control treatments had significant effects on plant length at frist, second and third cutting . All tested herbicides increased the plant length at the three times as compared with the hand combing treatment, the latter approximately slightly increased or equal with the infested control treatment.

Data also, revealed that herbicide butralin at rate 1.5 l/f. gave the tallest plants and increased the plant length by about 7.22 , 14.29 and 27.27 % at the three cuttings respectively, as compared to the infected control treatment, followed by imidazolin at rate 0.4 l/f., propyzamide when used post-emergance and glyphosate at 0.06 l/f. Clover plnt length was not affected significantly by the interaction between sowing methods and weed control treatment. The tallest plants were recorded under the second sowing methods by applying the tested herbicides at frist, second and third cutting.

**Table (3): Effect of sowing methods, weed control treatments and their interactions on clover plant height ( combined analysis of 2004/ 2005 and 2005/2006 experiments ).**

Treatments	Rate/F.	First Cutting			Second Cutting			Third cutting		
		Sowing methods			Sowing methods			Sowing methods		
		S1**	S2***	Mean	S1**	S2***	Mean	S1**	S2***	Mean
Glyphosate	0.06 L	45	50	47.5	50	56	53	70	85	77.5
Bentason	1L	45	50	47.5	45	45	45	65	74	69.5
Imidazolin	0.4 L	45	45	45	49	52	50.5	75	80	77.5
Butralin( surface)	1.5kg	47	50	48.5	50	55	52.5	80	85	82.5
Propyzamide (incorp.)	1kg	50	50	50	47	55	51	65	75	70
Propyzamide(post)	1kg	50	50	50	50	55	52.5	70	85	77.5
Hand combing		45	50	47.5	41	46	43.5	62	76	69
Non-infested		45	50	47.5	57	63	60	80	90	85
Control( infested)		45	45	45	43	47	45	60	50	60
Mean		46.33	48.89		48.00	52.67		69.67	77.78	
L.S.D. at 5% level for :-										
Sowing methods(S)		N.S			N.S			N.S		
Weed control treatments (W)		3.76			6.02			6.23		
Interaction (S xW )		N.S			N.S			N.S		

S1\*\*= Dry sowing method . S2\*\*\*= Dry sowing method after false irrigation.

### 2.3. Seed yeild of clover:

Data presented in Table (4) showed the effect of sowing methods, weed control treatments and their interactions on seed yield (kg/fed.) at harvest in both 2004/2005 and 2005/2006 seasons. In respect to the effect of sowing methods, data clearly indicated that th second sowing methods significantly increased this character compared to the other studied sowing method during both season. The second sowing method recorded the highest yield (273.96 and 261.56 kg/fed., respectively at 2004/2005 and 2005/2006 seasons). The results tended to be much lower with first sowing method, where seed yield losses reached 60.75 and 36.60 kg/fed. at harvest in 2004/2005 and 2005/2006 seasons, respectively. Such decrease in seed yield might be attributed to the decrease in most of clover plants characters such as reduction of fresh and dry weights of clover plants. Data on the response of seed yield to weed control treatments revealed that weed control treatments had a significant effect on final seed yield of clover in both growing seasons.

Dense dodder grown with clover plants all over the growing season in control plots resulted in the lowest yield (61.69 and 49.79 kg/fed.) and seed

yield losses, reached 82.92 and 84.62% in 2004/2005 and 2005/2006 seasons, respectively as compared to yield harvested from plots uninfested and untreated. These results are similar to that obtained by Al- Menoufi et al. (1985) and Al-Shair (1986) they reported that the weight of produced seeds and their number inflorescence reduced significantly in plots infested with more than 2% of *C. planiflora*. Also these results agreed with that of Feesehaie (1992) who reported that yield losses due to *Cuscuta spp.* often are serious, but the most severe infestation can cause up to complete crop failure.

This drop in seed yield in case of the infested plots might be attributed to the reaction in the values of growth characters particularly fresh and plant height of clover plants, which occurred as a result of the competition between clover and dodder weed. Comparing between the tested herbicides and hand combing treatment, data showed that herbicides were significantly superior in seed yield in both seasons. This effect may be due to that these herbicides were sufficient to provide the desired weed control particularly under the high weed population densities, and also assure on the important of using the suitable herbicides for the problem of dodder.

**Table (4): Effect of sowing methods, weed control treatments and their interactions on clover seed yield (kg/ f.) in 2004/2005 and 2005/2006 seasons.**

Treatments	Rate/F.	2004/2005			2005/2006		
		Sowing methods			Sowing methods		
		S1**	S2***	Mean	S1**	S2***	Mean
Glyphosate	0.06 L	262.5	301.9	282.2	252.3	283.8	268.0
Bentason	1L	157.5	252.0	204.7	147.3	252.5	199.8
Imidazolin	0.4 L	220.5	254.6	237.6	168.3	262.8	215.5
Butralin( surface)	1.5L	199.4	231.0	215.2	198.5	210.3	204.3
Propyzamide( incorp.)	1kg	273.0	322.9	297.9	273.3	315.5	294.3
Propyzamide(post)	1kg	294.0	336.6	315.3	304.8	336.0	320.4
Hand combing		94.5	136.3	115.4	94.8	189.3	142.0
Non-infested		363.0	359.5	361.3	290.3	357.0	323.6
Control( infested)		52.5	70.9	61.7	52.6	47.0	49.79
Mean		212.99	273.96		197.98	261.56	
L.S.D. at 5% level for :-							
Sowing methods(S)		N.S			N.S		
Weed control treatments (W)		25.28			41.26		
Interaction (S xW)		33.34			N.S		

S1\*\*= Dry sowing method. S2\*\*\*= Dry sowing method after false irrigation.

Integrated dodder control treatments (dry method after false irrigation in addition to the tested herbicides) caused a great significant improvement in seed yield of clover plants compared with the hand combing treatment. Single application of all the tested herbicides, this effect constant effect from season to another, but it was observed from results tabulated that sowing methods only were useful in dodder control in case of soil infestation with dodder, while unuseful in case of infest the seeds with infested dodder. This means that its only suitable to avoid the competition of dodder weed



because of the low weed population density, also the results tabulated were assured on the important of using of the suitable herbicides to the excepted problem of dodder weed.

**3 - Effect of tested herbicides on chlorophyll contents:**

Data presented in Tables (5) showed that five weeks after the bentazon herbicide application at rate of 1.0 L/fed. the percentage inhibition (1%) of chlorophyll contents of the leaves of clover plants was determined by 39.81, 34.39 and 37.25% for chlorophyll a, b and total chlorophyll respectively. This herbicide was more effective than any other used one. This phenomenon could be due to that bentazon was accelerated chlorophyll degradation particularly in the presence of sun light. Similar results had been reported by Ahmed *et al.* (1995) who found that application of bentazon on clover plants infected with dodder reduced chlorophyll a and b content compared with plants infected with dodder and untreated.

**Table (5): Effect of some herbicides on chlorophyll contents (Mg/g ) in clover leaves plants after 21 and 35 days from application.**

Treatments	Rate/F	21 days					
		Chlorophyll a		Chlorophyll b		Total chlorophyll	
		Mg /g*	1%**	Mg /g*	1%**	Mg /g*	1%**
Glyphosate	0.06 L	1.33	20.83	1.19	16.78	2.52	18.97
Bentason	1L	1.2	28.57	1.09	23.77	2.29	26.37
Imidazolin	0.4 L	1.3	22.62	1.16	18.88	2.46	20.9
Butralin( surface)	1.5L	1.36	19.05	1.18	17.48	2.54	18.33
Propyzamide(incorp.)	1kg	1.39	17.26	1.22	14.68	2.61	16.08
Propyzamide(post)	1kg	1.44	14.28	1.24	13.28	2.68	13.83
Infested		0.83	50.29	0.76	46.85	1.59	48.87
Control(uninfested)		1.68	0	1.43	0	3.11	0
		35 days					
Glyphosate	0.06 L	1.41	33.17	1.34	29.10	2.75	31.25
Bentason	1L	1.27	39.81	1.24	34.39	2.51	37.25
Imidazolin	0.4 L	1.29	38.86	1.31	30.68	2.60	35.00
Butralin( surface)	1.5L	1.43	32.23	1.33	29.62	2.76	31.00
Propyzamide(incorp.)	1kg	1.50	28.91	1.40	25.92	2.90	27.50
Propyzamide(post)	1kg	1.55	26.54	1.47	22.22	3.02	24.50
Infested		0.73	65.40	0.74	60.84	1.47	63.25
Control(uninfested)		2.11	0.00	1.89	0.00	4.00	0.00

Mg/g\* = Weight chlorophyll determined by Mg per g of leaves of clover plants.

1%\*\* = Percent inhibition of the the chlorophyll weight was calculated in relation to control.

The imidazolin herbicide showed moderate effect as an inhibitory agent for chlorophyll formation. Inhibition percentage in total chlorophyll content of clover leaves caused by 0.4 l/fed. of imidazolin, thirty five days after treatment was amounted 35 %. Butralin herbicide at rate 1.5 L/fed. surface application (after sowing and before irrigation) and glyphosate at rate 0.06 L/fed. nearly recorded the same moderate effect for chlorophyll content. Percentages inhibition were 31 % for butralin and 31.25 % for glyphosate herbicides after

thirty five days from application, the results tabulated, revealed that this herbicides were approximately equal with those results from bentazon after twenty one days from application.

Results tabulated also, revealed that the herbicide propyzamide at rate of 1.0 kg/fed. whether used as incorporation in soil or pre-emergence was the least effective one among all the tested compounds 16.08 and 13.83% for total reducing chlorophyll contents as a,b and total respectively. On the other hand, the parasitic weed dodder caused a great reduction in chlorophyll a, b and total chlorophyll contents after thirty five days, it gave 65.48, 60.84 and 63.25 % inhibition respectively.

## REFERENCES

- Abd El-wahed ,Rodaina (1996). Studies on the effect of certain herbicides for dodder *Cuscuta spp.* Control in certain leguminous crops .Ph.D.Thesis, Fac. of Agric. Cairo Univ .
- Ahmed,S.A., A.A.A. Hassan and Salwa S. M. Gawesh (1995). Effect of some herbicides on control of dodder in clover plants. J. Agric. Sci. Mansoura Univ., 20(10): 4271-4279.
- AL- Menoufi, O. A., M.A.Rezk, A. K. Mostafa and S.El- Shair (1985). Studies on the parasitism of *Cuscuta spp.* Series 4. *Cuscuta* species and some of their hosts in the Nile Delta Region. J. Agric. SC. Mansoura Univ. 10(3): 847-849.
- AL-Shair, S.A.(1986). Effect of dodder *Cuscuta spp.* on some Egyptian crops. Alex. J. Agric. Res. 31 ( 2 ): 481.
- Fessehaie, R. (1992). Review of *Cuscuta spp.* problems and control Ethiopain weed science, comittee, 67-78-
- Giannopolitis, C.N. (1979). Inhibition of seed germination and early stem elongation of *Cuscuta australis* by ethofumesate. weed Research,19: 95-100.
- Gomez,K.A. and A.A. Gomez ( 1983 ). Statistical procedures for Agricultural Res. A Wiley Interscience Publicaion, John Wiley and Son (2<sup>nd</sup> ed. ).
- Hamouda,F.M., S.E.El-Shandidy, K.G.Salem and M.El-Maghraby(1989). Effect of pronamide on dodder control, forage green, yield and nodulation in clover *Trifolium alexandrium*. Pesticide Confe., Tanta. Univ. Sept. 11-12.
- Kontsiotou, E.K. (1979). Dodder control in alealfa stands by herbicides. Georgike, Ereuna, 3, (3): 250 – 285.
- Molnar, F., B.Gyulai and M. Czepo(1998). A new possibility of controlling dodder *Cuscuta spp.* in the field. Novanyvedelem. 34: 7, 379 - 383.
- Sher,M.A. and R. A. Shad (1989). Distribution hosts and measures to control dodder. Progressive farming. 9:6, 17 - 20.
- Snedecor, G .W. and W.G. Cochran (1980). Statistical methods. 6<sup>th</sup> Ed., I owa state Univ., press., ames., USA: 325-330.
- Sweeny, J.P. and M.E. Martin (1961). Stability of chlorophyll in vegetables as effected by Ph. Food Technology, 15 (5): 263 –266.

- Tackholem, V. (1965). Student flora of Egypt. 1st ed. Anglo – Egyptian Bookshop, Cairo, PP. 888.
- Topps, J.H. and R. L. Wain (1957). Investigation of fungitoxicity of 3 and 5 – alkyl salicylanilid and parachloroanilin. Ann. Appl. Biol., 45 (3): 506 – 511.
- Zaki, M.A., H.S. El-Metwaly, R.A. Hassan and J. Maillet (1998). Studies on dodder *Cuscuta* spp. control comptes-rendus 6 eme Sym. Mediterranean EWRS, Montpellier, France, 13 –15 Mai, 1998. 147 – 150.

## تأثير طرق الزراعة وبعض مبيدات الحشائش على مكافحة الحامول في البرسيم المصري

ابراهيم السيد سليمان و مسعد محمود عبدالحميد

معمل بحوث الحشائش- معهد المحاصيل الحقلية - مركز البحوث الزراعية - الجيزة - مصر.

أقيمت تجربتان حقليتان في مزرعة محطة البحوث الزراعية بسخا - كفر الشيخ خلال موسمي الزراعة ٢٠٠٤-٢٠٠٥ و ٢٠٠٥-٢٠٠٦ لدراسة تأثير طرق الزراعة المختلفة وهي:-  
أ - طريقة العفير العادي

ب - طريقة العفير المحسن ( الزراعة بعد ريه كدابة).

وبعض معاملات مكافحة الحشائش ( جليفوسيت - بيوترالين- ايميدازولين - بنتازون وبروبيزاميد بالاضافة الى معاملة النقاوة اليدوية ) على مكافحة حشيشة الحامول ونمو نباتات البرسيم.

صممت التجربة في قطع منشقة مرة واحدة في أربع مكررات حيث وزعت طرق الزراعة عشوائيا في القطع الرئيسية بينما وزعت معاملات مكافحة الحشائش في القطع المنشقة. وقد تم زراعة التجربة بصنف برسيم ممقاوى في كلا موسمي الزراعة.

أوضحت النتائج أن معاملة النقاوة اليدوية وطرق الزراعة المختلفة بمفردها غير كافية لمكافحة حشيشة الحامول ولكن يمكن استخدامها فقط كعوامل مساعدة في برنامج مكافحة المتكاملة. ايضا اشارت النتائج الى أن مبيد بيوترالين اعطى مكافحة جيدة للحامول تحت ظروف الزراعة بعد ريه كدابة (العفير المحسن) يليه مبيد بروبيزاميد ثم جليفوسيت وايميدازولين ثم بنتازون.

أدت الاصابة بالحامول الى حدوث نقص كبير في الوزن الرطب ومحصول البذرة للبرسيم كما أدت الى حدوث نقص كبير في محتوى نباتات البرسيم من كلوروفيل أ ، ب والكلوروفيل الكلي مقارنة بنباتات البرسيم السليمة والعفير مصابة .

كما أظهرت النتائج أن جميع مبيدات الحشائش المستخدمة أدت الى نقص ضعيف في محتوى كلوروفيل ا ، ب. حيث سجل مبيد بنتازون اعلى تأثير تثبيطي لمحتوى الكلوروفيل الكلي في اوراق البرسيم يليه مبيد ايميدازولين ثم جليفوسيت ثم بيوترالين وفي النهاية يأتي مبيد بروبيزاميد الذي سجل اقل نسبة تثبيط للكلوروفيل وذلك بعد ٣٥ يوم من المعاملة.

لذا توصي هذه الدراسة بإمكانية استخدام المبيدات سالفة الذكر بالمعدلات والمواعيد المذكورة كبديل للنقاوة اليدوية لمكافحة حشيشة الحامول في البرسيم حيث أعطت مكافحة جيدة للحامول بدون تأثيرات ضارة على نباتات البرسيم.