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THE EFFICIENCY OF CERTAIN INSECTICIDES ON THE BROAD BEAN FLY *LIRIOMYZA CONJESTA* (BECK .) (DIPTERA : AGROMYZIDAE)

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ABSTRACT: Five insecticides namely, chlorpyrifos - methyl, malathion, profenofos, methomyl, and pirimicarb were evaluated against the broad bean fly, Liriomyza conjesta (Beck.) in the two successive seasons 2000/2001 and 2001/2002. Results showed that these insecticides induced significant reduction in the pest infestation and increase in the larval mortality as well .

Profenofos was the most effective insecticide and malathion was the least effective one. The tested insecticides could be descendingly arranged at the percentage of reduction in infestation as followes: Profenofos, chlorpyrifos - methyl, methomyl, pirimicarb and malathion.

Key Words : Efficiency, insecticides , infestation, *Liriomyza conjesta,* broad bean.

INTRODUCTION

The broad bean, vicia faba L., is the major leguminous field crop in Egypt and plays an important role as an Egyptian food consumed as fresh green pods, immature fresh seeds and dry mature seeds.

The broad bean leaf miner *L. conjesta* (Beck.) is one of the most deleterious insect infesting broad been in the field causing considerable loss in the yield (Saleh and Guirguis, 1976; Hassanein, 1989.; El–Khouly *et al.* , 1997 and Ibrahim & Abd El-Moity,1997; Salem *et al.*, 1998) who reported that the losses in faba bean yield increased with the rise of larval population density.

Several authors pointed out the leafminer species infesting faba bean in different localities in Egypt, *L. conjesta* (Beck.).; *L. trifiolii* (Burg.).; and *L .bryoniae* (Kaltenbach) (Guirguis *et al.*, 1983.; Mousa *et al.*, 1994., Amer *et al.*, 1995.; and Salem *et al.*, 1998).

Many authors carried out several experiments to detect the efficiency of conventional insecticides against this pest, (El–Nahal , 1970; Ali *et al.*, 1974;

El–Heamaesy *etal.*, 1974.; Ibrahim *et al.*, 1983.; Barakat *et al.*, 1994.; Abdallah *et al.*, 1996; and Abd El-Wahab *et al.*, 1999).

The present work aimed to the efficacy of insecticides, chlopyrifos – methyl, malathion, profenofos, methomyl and pirimicarb in the leaf miner *L . conjesta* infesting broad bean.

MATERIALS AND METHODS

The tested insecticides were chlorpyrifos–methyl (Reldan) 50% E.C.; malathion 57% E.C.; profenofos (Selecron) 72% E.C.; methomyl (lannate) 90% S.P.; and pirimicarb (pirimor) 50% W.P. The insecticides were used at the rate of 250 ml., 187.5 ml., 100 ml., 150 g., and 75 g. per 100 liter of water, respectively.

The field experiment :

The field work was carried out in the experimental farm of the Faculty of Agriculture, Sohag, South Valley University, during the 2000/2001 and 2001/2002 seasons. The broad bean *Vicia faba* L., Variety Giza 2, seeds were sowed in November of both seasons. The experimental area was divided into plots of 40 m (1/100 fed.) each and arranged in completely randomized blocks with four replicates. Four plots were left untreated to serve as control. The normal agricultural practices were adopted. The insecticides were applied two times at two weeks interval, on December / 25/2000 and January / 10/2001 season and December / 30/2001 and January / 16/2002 season at the rates mentioned before using Ground spray motor. The control plots were left unsprayed. Also, care was taken to avoid any drift among the treated plots. Inspection of infestation was carried out just before spraying and 3, 7, 14 days after spraying.

Bioactivity of tested insecticides :

Samples of 100 infested leaflets were randomly collected from each replicate. Three leaflets representing upper, middle and lower levels of the chosen shoots were placed in polyethelene bags and transferred to the laboratory for inspection. The total numbers of mines per sample were recorded. During inspection the total alive larvae were counted using a binocular microscope .

Percent reduction in infestation was calculated using Henderson and Tilton equation (1955). The data were also statistically analysis using Duncan's multiple range test. Duncan, (1955) .

RESULTS AND DISCUSSION

Data in Tables (1 and3) revealed that the five tested insecticides significantly reduced the percent reduction in infestation . The tested insecticides could be descendingly

arranged as follows: Profenofos, Chlorpyrifos – methyl, methomyl, pirimicarb and malathion. The average reduction percentages were 61.40, 56.00, 51.20, 47.7, and 43.8 as well as 63.90, 58.80, 53.30, 48.40, and 42.80 during the two successive seasons . Barakat *et al.* (1994) reported that profenofos , at 0.75 L/fed., was the most effective insecticide where percent reduction in infestation reached 66.4%, while pirimicarb at 0.2 Kg/fed., was the least effective one. Abdalla *et al.* (1996) found that Selecron (profenofos) and Nudrin (methomyl) were the most effective compounds in controlling *L . conjesta* (Beck.) .

Data in Tables (2 and 4) show the larvicidal action of the five tested insecticides . It is abvious that number of living larvae / 100 leaflets was greatly decreased after insecticide application. Counting the surviving larvae may be more accurate than counting the mines which does contain dead larvae empty mines as well as the living ones . Again , and as has been found with the number of miner , the insecticides profenofos was the most effective compound, and malathion was the least effective one. Chlorpyrifos –methyl, methomyl and pirimicarb occupied an intermediate position.

The average reduction in infestation percentages were 92.13, 89.70, 88.03, 72.32 and 66.00.; and 94.30, 90.36, 84.93, 71.17 and 66.80 for profenofos, chlorpyrifos -methyl, methomyl, pirimicarb and malathion during the two successive seasons. These results were in agreement with those of Barakat *et al.* (1994) who found that profenofos was the most effective insecticides while primicarb was the least effective one. Ibrahim *et al.* (1983) reported that three to four sprays with Reldan, Rup and Lannate could be recommended for control of broad bean leaf miner in the fields.

In agreement with the previous findings, Abd El – Wahab *et al.* (1999)found that fenitrothion gave the highest initial and residual activities against on *L. conjesta* , followed by profenofos, and the natural and mineral oils. Abdallah *et al.* (1996) reported that Selecron (profenofos) and Nudrin (methomyl) were the most effective compounds in controlling *L. conjesta.*

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Table 1. Number of mines/100 leaflets and percent reduction of mines caused by *Liriomyza conjesta* after application of some insecticides on broad bean plants during 2000/2001 season.

Treatment	Number of mines / 100 leaflets before treatment	Number of mines/ 100 leaflets at the indicated days after treatment						Mean	% reduction in infestation
		1 st spray			2nd spray				
		3	7	14	3	7	14		
Profenofos	62.0 a	53.0 a	47.0 b	36.0 b	28.0 b	21.0 c	12.0 d	32.83	61.40
Chlorpyrifos-methyle	62.0 a	55.0 a	49.0 b	39.0 b	32.0 b	28.0 bc	22.0 c	37.50	56.00
Methomyl	57.0 c	53.0 a	50.0 b	42.0 b	31.0 b	30.0 bc	23.0 c	38.17	51.20
Pirimicarb	61.0 a	56.0 a	56.0 ab	48.0 b	39.0 b	33.0 bc	31.0 b	43.83	47.70
Malathion	59.0 b	58.0 a	54.0 b	50.0 b	40.0 b	38.0 b	33.0 c	45.50	43.80
Control	46.0 D	58.0 A	65.0A	67.0 A	66.0 A	63.0 A	60.0 A	63.17	-

- Significant at 0.05

Table 2. Number of Living larvae/100 leaflets and percent reduction in the living larvae of *Liriomyza conjesta* after application of some insecticides on broad plants during 2000/2001 season.

Treatment	Number of living / leaflets before treatment	Number of mines/ 100 leaflets at the indicated days after treatment						Mean	% reduction in infestation
		1 st spray			2nd spray				
		3	7	14	3	7	14		
Profenofos	21.0 a	0.00 c	2.00 c	3.00 d	0.00 c	4.00 c	7.00 c	02.67	92.13
Chlorpyrifos-methyle	23.0 a	0.00 c	3.00 c	4.00 cd	0.00 c	5.00 c	11.0 bc	03.83	89.70
Methomyl	25.0 a	1.00 c	5.00 c	7.00 c	0.00 c	7.00 c	9.00 bc	04.83	88.03
Pirimicarb	25.0 a	15.0 ab	16.0 b	15.0 b	2.00 bc	7.00 c	12.0 bc	11.17	72.32
Malathion	24.0 a	10.0 b	15.0 b	18.0 b	4.00 b	16.0 b	16.0 b	13.17	66.00
Control	22.0 a	25.0 a	34.0 a	42.0 a	39.0 a	36.0 a	37.0 a	35.50	-

- Significant at 0.05

Table 3. Number of mines/100 leaflets and percent reduction of mines caused by *Liriomyza conjesta* after application of some insecticides on broad bean plants bean during 2001/2002 season.

Treatment	Number of mines/ 100 leaflets before treatment	Number of mines/ 100 leaflets at the indicated days after treatment						Mean	% reduction in infestation
		1 st spray			2nd spray				
		3	7	14	3	7	14		
Profenofos	52.0 a	41.0 b	37.0 c	30.0 b	21.0 c	16.0 c	10.0 a	25.83	63.90
Chlorpyrifos-methyle	50.0 a	46.0 ab	38.0 c	29.0 b	25.0 c	19.0 c	13.0 cd	28.33	58.80
Methomyl	48.0 a	46.0 ab	39.0 c	32.0 b	27.0 c	22.0 bc	19.0 bcd	30.83	53.30
Pirimicarb	46.0 a	45.0 ab	40.0 bc	35.0 b	28.0 d	25.0 bc	23.0 bc	32.67	48.40
Malathion	54.0 a	54.0 a	50.0 ab	44.0 b	41.0 b	36.0 b	30.0 b	42.50	42.80
Control	43.0 a	52.0 ab	57.0 a	63.0 a	61.0 a	57.0 a	65.0 a	59.17	-

- Significant at 0.05

Table 4. Number of Living larvae/100 leaflets and percent reduction in the living larvae of *Liriomyza conjesta* after application of some insecticides on broad bean plants during 2001/2002 season.

Treatment	Number of living larvae/ leaflets before treatment	Number of mines/ 100 leaflets at the indicated days after treatment						Mean	% reduction in infestation
		1 st spray			2nd spray				
		3	7	14	3	7	14		
Profenofos	28.0 b	0.00 d	0.00 f	7.00 c	0.00 d	0.00 d	4.00 d	1.83	94.30
Chlorpyrifos-methyle	38.0 a	0.00 d	2.00 c	8.00 c	0.00 d	6.00 c	9.00 cd	4.17	90.36
Methomyl	33.0 ab	0.00 d	5.00 d	8.00 c	1.00 d	8.00 c	12.0 bc	5.66	84.93
Pirimicarb	33.0 ab	8.00 c	13.0 c	15.0 b	4.00 c	10.0 bc	15.0 bc	15.83	71.17
Malathion	41.0 a	14.0 b	17.0 b	20.0 b	9.00 b	14.0 b	19.0 b	15.50	66.80
Control	41.0 a	40.0 a	46.0 a	47.0 a	46.0 a	50.0 a	51. 0 a	46.67	-

- Significant at 0.05

فاعلية بعض المبيدات الحشرية على ذبابة الفول اليروميزا كونجستا

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يهدف هذا البحث إلى تقييم فعالية خمس مبيدات هى الكلوربيروفوس - ميثايل ، الملاثيون ، البروفينفوس ، الميثوميل والبريمكارب ضد ذبابة الفول ليروميزا كونجستا خلال موسمى ٢٠٠٠/٢٠٠١ ، ٢٠٠١/٢٠٠٢.

أوضحت النتئج أن هذه المبيدات أظهرت انخفاض ملحوظ فى نسبة الإصابة وزيادة اليرقات الميتة للآفة وكان مبيد البروفينفوس هو أكثر المبيدات فعالية كان الملاثيون أقل المبيدات فعالية .

ويمكن ترتيب المبيدات حسب فعاليتها تنازلياً على النسبة المئوية لخفض الإصابة كالآتى : البروفينفوس ، الكلوربيروفوس ، الميثوميل ، البريمكارب ، الملاثيون .