

## EFFICACY OF SOME NON-CHEMICAL INSECTICIDES AGAINST *THRIPS TABACI* LIND. AND ITS ASSOCIATED PREDATORS.

SABRA, IBRAHIM M., M. A. EL-NAGAR AND M. M. I. KHEWA

Plant Protection Research Institute- Agricultural Research Center- Dokki

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### Abstract

To avoid chemical control problems and environmental contamination, different non-chemical pesticides (natural or microbial origin); Jojoba oil, *Beauveria bassiana*, *Bacillus thuringiensis* and Menf compound (mixture of natural materials) in addition to the chemical pesticide; pirimiphos-methyl were investigated in field studies in onion by spraying these compounds for one time against *Thrips tabaci* and its associated predators. The studies were carried out in 2003/4 and 2004/5 seasons at Fayoum Governorate, Egypt. Pirimiphos-methyl showed the highest effectiveness against thrips and its predators, followed by Jojoba oil which showed moderate effectiveness against thrips and its predators. *B. bassiana* showed insignificant difference in comparison with Jojoba oil but showed low effectiveness against the predators. Menf compound showed the lowest effectiveness against both thrips and predators.

### INTRODUCTION

Onion thrips *Thrips tabaci* Lind. (*Thripidae: Thysanoptera*) is the most common important pest of onion *Allium cepa* and cotton seedlings, whereas, it attack onion plants from seedlings until harvesting and cause sever damage to the plant and yield. Heavy infestations of *T. tabaci* (more than 40 thrips/plant) resulted in onion yield losses up to 43% (Sato and Nakano, 1990 and Fournier *et al.*1995).

Because of consuming the fresh green onion and onion bulbs and also to avoid chemicals control problems, recently attempts have been made to use non-chemical origin insecticides as a potential components of integrated pest management (Gillespie 1986, Bhardwaj and Gupta 1992, Gindin *et al.*, 1996 and Goodwin *et al.*, 2002).

The present work was conducted to evaluate the efficacy of some non-chemical insecticides against *T. tabaci* and its associated predators.

## MATERIALS AND METHODS

Three non chemical insecticides; Jojoba oil, Menf compound (1/2 L food cetric acid 6% + 3 Kg sugar + 3 Kg garlic + 1/2 Kg penny royal + 5 L potassium soap ), and Biovar (*Beauveria bassiana*) in addition to recommended insecticide; Actellic 50 % EC ( pirimiphos-methyl) were applied for one time to control *T. tabaci* on onion plants at the rates of 625 Cm<sup>3</sup> /100 L, 1 L/300 L, 250 Gm/100L, 200 Gm/100 L and 500 Cm<sup>3</sup> /100 L, respectively. The spraying was done when the populations of both thrips and it's predators were higher, at the end of March in 2003/2004 and 2004/2005 seasons.

The experimental area was <sup>1</sup>/<sub>2</sub> feddan, divided into 4 equal plots and 6 treatments (each 1/48 of feddan). Three rows between each treatment or plot was included as guard rows to prevent the drift of used compounds from treatment plots to control plots. The experiment was achieved in Fayoum Governorate, planted with onion seedlings (Giza 20 variety), received the normal agricultural practices and sprayed three times with recommended fungicide.

Six samples of 20 plants from each treatment in addition to control were randomly collected before spraying at 1, 3, 5 and 7 days after spraying. The samples were transferred to the lab. and the plants were dissected and examined with stereomicroscope to recorded the numbers of thrips individuals/plant (immatures and adults). The numbers of predators was recorded before spraying and after seven days of spraying.

Data were analyzed with analysis of variance (ANOVA) and the percentage of reduction of population densities were obtained according the Protocol of Ministry of Agriculture with the method of Henderson and Telton (1955).

## RESULTS AND DISCUSSION

### 1- Efficacy of tested compounds against *Thrips tabaci*:

#### a- During 2003/4 season:

Data in Table (1) revealed that, the tested compounds reduced the population density of *T. tabaci* on onion plants in comparison with the control. Regarding the initial effect (one day after spraying), the chemical insecticides; Actellic [pirimiphos-methyl] 0.5% was more effective in controlling thrips than other compounds resulting in 73.2% reduction followed by Jojoba oil (63.2%), Biovar (62.3%), and Menf compound (29.6%). The same observation was found after 3, 5, and 7 days of spray.

Reduction percentages of *T. tabaci* increased with the time elapsed after treatment. It clearly evident that proved to be superior to all other non chemical compounds whereas the mean reduction for Actellic was 85.0%, followed by Jojoba oil (69.7%), Biovar (65.1%), and Menf compound (36.0%). The differences between each compound were significant except between Jojoba oil and Biovar. The percentages of reduction were less than 90% because the pre-pupa and pupae of thrips are present in the soil which re-attacks onion plants.

**b- During 2004/5 season:**

In 2004/5 season, data presented in Table (1) revealed that, the tested compounds reduced the population densities of thrips on onion plants whereas the initial kill of Actellic was the highest being 81.3%, but Menf compound gave the lowest percentage of reduction being 42.5%, while the remains compounds; Biovar and Jojoba oil take intermediate position being 76.7% and 76.4%, respectively. The same observation was detected after 7 days of spray. After 3 and 5 days of spray the same observation was found except for Jojoba oil which exchanged their position. In general, the insecticide of chemical origin (Actellic) gave the highest mean percentage of reduction (86.0%) followed by Jojoba oil (78.8%) which slightly differ from Biovar (75.7%), while Menf compound gave the lowest mean percentage of reduction (54.4%). The differences between means percentage of reduction of Actellic and Jojoba oil or Biovar and Jojoba oil were insignificant, while were significantly higher than Menf compound. In laboratory tests, *Thrips tabaci* proved to be susceptible to *B. bassiana* isolates which killed all treated insects within 4 days (Gillespie, 1986). Also in laboratory experiments, Bhardwaj and Gupta, 1992 found that, aqueous extracts of garlic leaves or cloves had no effect on *Thrips tabaci*. In Israel, Gindin *et al* (1996) reported that, *B. bassiana* showed the highest virulence towards *Thrips tabaci*. In Egypt, Omar and El-kholy (2001) reported that, Jojoba oil gave the lowest reduction percentage of thrips population being 72.1%. Also, Sallam and Hosseney, (2003) found that, pirimiphos-methy reduced the population of thrips but it was the lowest effective chemical insecticide against thrips.

**2- Efficacy of tested compounds against predators associated with thrips:**

The effect of tested compounds against predators associated with thrips is presented in Table (2). In 2003/4 season, results showed that Actellic was the most effective pesticides against predators, whereas the reduction percentage was relatively

higher than the other tested compounds, it was 63.2, 70.8, 92.3, 74.5 and 65.1% for *Aeolothrips fasciatus*, *Coccinella undecimpunctata*, *Syrvus corollae*, *Orius albidipennis* and true spiders, respectively. The Jojoba oil gave moderate reduction percentages being, 55.8, 50.0, 50.0, 25.0, and 54.2% for the same predators, respectively. The microbial insecticides (Agrein and Biovar) and Menf compound showed the lowest reduction percentages of predator's population. Thus, Biovar reduced predator's population by 37.5, 41.7, 25.0, 16.6 and 8.3%, respectively. Menf compound showed no effect on *O. albidipennis* while reduced the population of *A. fasciatus*, *C. undecimpunctata*, *Syrvus* and true spiders by 15.8, 33.3, 25 and 56.7%, respectively.

In 2004/5 season, results showed that Actellic, also was the most effective pesticides against predators, whereas the reduction percentage was relatively higher than the other tested compounds, it was 80.0, 70.9, 90.6, 76.4 and 43.7% for *A. fasciatus*, *C. undecimpunctata*, *Syrvus*, *O. albidipennis* and true spiders, respectively. Also, Jojoba oil showed a moderate percentage of reduction being 58.4, 25.0, 8.9, 25.0 and 40.0%, respectively. Biovar reduced only population of *O. albidipennis* by 18.7%, but not effect on both *A. fasciatus* and true spiders. *C. undecimpunctata* and *Syrvus* were not observed in Biovar treatment plot pre-spraying. Menf compound reduced only the populations of both *A. fasciatus* and true spiders by 23.1 and 33.3%, respectively. *Syrvus* was not found in Menf treatment plots pre-spraying. In this respect, Omar and El-kholy (2001), reported that Jojoba oil had the lowest toxic effect against predators associated with thrips, whereas chemical insecticide had the highest effect. In general, Actellic was the most toxic pesticide against thrips and its predators. The Jojoba oil was moderately effective against thrips and its predators. Biovar was moderately effective against thrips but less effective against associated predators. While Menf were less effective against thrips and its predators

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Table (1): Reduction percentages of *T. tabaci* after spraying with certain compounds on onion in Fayoum Governorate, Egypt during 2003/2004 and 2004/2005 seasons.

Treatment	% Reduction of thrips at indicated days after spraying				
	1	3	5	7	Mean
2003/4					
Actellic	73.2	85.1	91.2	90.5	85.0a
Jojopa	63.2	69.9	70.2	75.5	69.7b
Biovar	62.3	61.3	68.5	68.2	65.1b
Menf	29.6	33.0	44.6	36.7	36.0d
2004/5					
Actellic	81.3	83.5	87.1	91.9	86.0a
Jojopa	76.4	82.6	81.5	74.9	78.8ab
Biovar	76.7	76.9	69.1	80.2	75.7b
Menf	42.5	55.5	61.8	58.0	54.4b

L.S.D (2003/4) = 4.98 & L.S.D (2004/5) = 8.30

Table (2): Reduction percentages of predators associated with *T. tabaci* after 7 days of spraying with certain compounds on onion in Fayoum Governorate, Egypt during 2003/4 and 2004/5 seasons.

Treatment	% Reduction of indicated predators after 7 days				
	<i>A. fasciatus</i>	<i>C. undecimpunctata</i>	<i>S. corollae</i>	<i>O. albidipennis</i>	True spider
	2003/4				
Actellic	63.2	70.8	92.3	74.5	65.1
Jojopa	55.8	50.0	50.0	25.0	54.2
Biovar	37.5	41.7	25.0	16.6	8.3
Menf	15.8	33.3	25.0	0.0	56.7
	2004/5				
Actellic	80.0	70.9	90.6	76.4	43.7
Jojopa	58.4	25.0	8.9	25.0	40.0
Biovar	0.0	-	-	18.7	0.0
Menf	23.1	0.0	-	0.0	33.3

## فعالية بعض المبيدات الغير كيمائية ضد تربس القطن والبصل ومفترساته

إبراهيم مخيم صبرة ، مصطفى عبد الحميد النجار ، محمود محمد إبراهيم خيوه

معهد بحوث وقاية النباتات ، مركز البحوث الزراعية ، الدقي.

للحد من تعداد التربس وتجنب مشاكل المقاومة الكيمائية وتلويث البيئة بالمبيدات أجريت دراسة حقلية لاختبار فعالية بعض المبيدات الحشرية من اصل غير كيمائي (ميكروبية أو طبيعية) ضد حشرة تربس البصل والمفترسات المصاحبة له ومقارنتها بمبيد كيمائي وذلك برشها على محصول البصل بمحافظة الفيوم خلال موسمي ٢٠٠٣/٢٠٠٤ و ٢٠٠٤/٢٠٠٥. وقد أوضحت النتائج أن المبيد الكيمائي بريميفوس ميثيل (اكتيليك) أعطى نسبة خفض عالية في تعداد التربس ومفترساته بالمقارنة بباقي المواد المختبرة، بينما أعطى زيت الجوجوبا نسبة خفض متوسطة لكل من التربس ومفترساته، أعطى فطر البيوفاريا *Beauveria bassiana* نسبة خفض متوسطة في تعداد التربس وكان تأثيره ضعيف على المفترسات، بينما اظهر مركب منف ٦ تأثير ضعيف على التربس ومفترساته. وكانت الفرق بين نسبة الخفض في التعداد لكل من زيت الجوجوبا وفطر البيوفاريا غير معنوي وعليه يمكن استخدام هاتين المادتين في مقاومة التربس على البصل.