

EFFECT OF *Bemisia tabaci* (GENN.) AND WEEDS MANAGEMENT IN CUCUMBER FIELDS ON INFESTATION WITH COTTON WHITEFLIES IN NEIGHBOURING COTTON FIELDS

Shedeed, M. I. ; S. M. Hassan and H. B. Homam

Plant Protection Research Institute, Nadi El-Said Street, Dokki, Giza 12618, Egypt

ABSTRACT

Cotton whitefly *Bemisia tabaci* (Genn.) can be managed in cucumber fields by hand hoeing of weeds two times during the season and spraying of chloropyrifosmethyl (Reldan 50% EC), pirimiphos-methyl (Actellic 50% EC), or mineral oil such as Caple-2, botinacal oil such as Jojoba oil or neem seed extract or by using Caple-2+ micronized sulphur.

The effect of *B.tabaci* and weeds management was monitored by counting the cotton whiteflies, which induces the new infestation in neighbour cotton fields. The investigations were conducted at Monofia Governorate during 2002 & 2003 cotton seasons.

The obtained results indicated that weed management and spray with the insecticide, Actellic 50% EC or (mineral oil, Caple-2 +micronized sulphur) in cucumber fields had significant effect on reduction of infestation of *B. tabaci* in cotton fields.

INTRODUCTION

The cotton whitefly, *Bemisia tabaci* (Genn.) (Homoptera : Aleyrodidae) is ranked among the most noxious insects attacking field and greenhouse crops around the world (Mound and Halsey, 1978). Whiteflies transmit over 70 viral diseases to plants (Duffus, 1987). The serious damage of the cotton whitefly to plants results directly from feeding and indirectly through the transmission of plant disease (Coasta 1976; Bird and Maramorosch 1978). *B. tabaci* is one of the 1156 species of whiteflies. The literature search showed the very wide ranged of host plants of *B. tabaci* and the list contained 506 plant names representing 74 families including weed species, cucumber *Cucumis sativus*, and cotton *Gossypium* spp. throughout the world (Cock, 1986). It causes serious damage by sucking plant juices or by acting as a vector of virus diseases, thus is known to transmit viruses and numerous virus-like-agents. Cotton and cucumber crops are known as major and cash crops which cultivated 518319, 59747 feddans ,respectively in Egypt during the year of 2000, (EAS, 2000).

The weed consider alternative host to cotton whitefly which infested the neighbored cotton fields. So this work aims to control the weeds which grow in cucumber fields by mechanical methods (hand hoeing) combined with chemical controls against *B.tabaci*, this according with Homam and his co-workers (2004) who control the weeds (hand hoeing) which grow in cucumber and muskmelon and aphid cotton to reduce the infestation by aphid cotton in neighbour cotton fields.. Also the work try an attempt to replacements the highly toxic chemical compounds by another low effect on pollution.

MATERIALS AND METHODS

Field experiments were conducted at Ganzour village Monofia Governorate during two successive seasons, 2002 and 2003.

The program was design according to Homam et al. 2004 and started after selecting two separated hods (A & B) planted by cucumber (Beta - Alfa hybrid). Cucumber plants located in the north and the cotton plants (Giza - 65 variety) in the south, between A and B hods planted by corn in order to avoid the occurrence of interference effect. The cucumber fields were planted on 5th and 3rd Feb. in 2002 and 2003, respectively. Cotton planted on 29th and 8th March in 2002 and 2003, seasons respectively.

An area of about 1.5 feddan (6300 m²/for each hods) were chosen. In the north half of the first hod A the weeds management by hand hoeing (two times) and spraying Reldan 50% 250 cm³/100 L.W., for two times against *B.tabaci* in cucumber fields on reducing of infestation with cotton fields on neighbour cotton fields. The first application of cucumber field on 20nd & 22nd April in seasons 2002 & 2003, respectively, and the second on 10th, 12nd May 2002 & 2003, respectively, using a motor sprayer. While the north half of second hod B the weeds not management and no application. In each area planted with cotton a random samples of 30 leaves were collected in paper bag to investigate *B.tabaci* nymphs in laboratory.

To study the effect of some other insecticides against *B.tabaci* in cucumber fields and the population of this pest on neighbor cotton fields an area of about 0.75 feddan were chosen. In order to apply the randomized complete blocks design the area of cucumber were divided into 28 plots each of 100 m² approximately. Each treatment was replicated four times.

The tested insecticides and their rates per 100 L. of water were as follows:

- 1-Reldan 50% EC (cloropyrifos-methyl) at 250 cm³
- 2-Actellic 50% EC (pirimiphos-methyl) at 375 cm³
- 3-Caple-2 (mineral oil) at 1.5 L.
- 4-Caple-2 + Micronized sulpher at 1.0 L. + 125 gm, respectively.
- 5-Jojoba oil at 1.0 L.
- 6-Neem seeds extract at 200 cm³
- 7-Untreated control sprayed with water only.

A random samples of 30 leaves were collected from each of the four replicates. Inspection of samples was made immediately before spraying and after 1, 3, 5 and 7 days after treatments. The % mortality for each treatment was calculated according to Henderson and Tilton (1955) formula. All the aforementioned data were statistically analyzed according to Snedecor (1961).

RESULTS

Effect of weeds and *B. tabaci* management in cucumber field on rate of infestation with *B. tabaci* in neighbour cotton field.

During the first year of investigations (2002), infestations with cotton whitefly in cotton fields, which were neighbor to treated cucumber fields,

decreased to reach about 9.57% on 1st of July. This reduction in infestation percentage of cotton whitefly may due to weeds and cotton whitefly management in cucumber fields. In the second year of investigation (2003) a similar rates of reducing had been obtained at the beginning, it reached 2.46% on 6th of July and then it increased to reach 52.71 % on 18th of Aug., later on it decreased to be 20.73% on 9th Sept For both two years, the seventh week of investigation showed the highest reduction rates of infestation with *Bemisia tabaci* in the cotton fields neighbor to cucumber fields as shown in (Table 1) .

Table (1): Effect of weeds and cotton whitefly, *Bemisia tabaci* management In cucumber fields on rate of infestation with *B. tabaci* in neighbor cotton fields at Monofia Governorate, 2002and 2003 seasons.

2002, season	Mean No of <i>B. tabaci</i> nymphs per 30 leaves		Reduction %	2003, season	Mean No of <i>B. tabaci</i> nymphs per 30 leaves		Reduction %
	Treatment				Treatment		
	A	B			A	B	
1,July	47.25	52.25	9.57	6,July	49.50	50.75	2.46
8,July	50.75	69.00	26.45	13,July	51.25	68.50	25.18
15,July	67.00	108.75	38.39	20,July	69.50	110.25	36.96
22,July	83.50	124.50	32.93	27,July	71.25	121.00	41.12
29,July	76.25	143.50	46.86	4,Aug.	78.50	141.25	44.42
6,Aug.	91.75	182.25	49.56	11,Aug.	93.25	185.50	49.73
13,Aug.	117.75	257.75	54.32	18,Aug.	118.50	251.00	52.71
20,Aug.	169.25	281.00	39.77	25,Aug.	169.75	285.25	40.49
27,Aug.	253.50	315.25	19.59	2, Sep.	256.00	311.50	17.82
4, Sep.	271.50	344.75	21.25	9, Sep.	275.25	347.25	20.73

Treatment (A): Mean No. of *B. tabaci* nymphs on plants of cotton fields neighbor to treated cucumber.

Treatment (B): Mean No. of *B. tabaci* nymphs on plants of cotton fields neighbor to untreated cucumber

Effect of spraying with different insecticides against *B. tabaci* on cucumber plants:

Data in (Table 2) indicated that the treatment with Caple-2 + micronized sulphur gave the highest initial mortality percentage (90.66 and 91.10%) during the two seasons, respectively. While the treatment with the mineral oil (Caple-2) and plant oil (Jojoba oil) gave the least initial mortality (86.40, 86.19% and 86.81, 87.02%) during the two seasons of 2002 and 2003, respectively.

The obtained data indicated that the tested insecticides could be classified into 3 categories according to their initial effect in managing *B. tabaci* nymphs during the two seasons, as follows:

- i- The first category included (Caple-2 + Micronized sulpher)in the population reduction reaching 90.66 & 90.10%, respectively during 2002 and 2003.
- ii- The second category included (Reldan 50%, Neem seed extract and Actellic 50%). The reduction% were 88.00, 87.79 and 86.96, respectively during 2002. While the reduction% were 89.02, 88.48 and 87.64, respectively during 2003.

iii- The third category represented by Caple-2 and Jojoba oil. The population reduction% recorded 86.40 & 86.19% and 86.81 & 87.02 %, respectively. The effects of the used insecticides after 2-7 days are shown in Table

(2).The population reduction% for tested insecticides can be classified into 2 categories during 2002 and 2003, respectively as follows:

i- The first group included (Caple-2 + Micronized sulphur and Actellic 50%).

The population reduction reaching 86.60 & and 84.92% , and 85.64, 85.78%, respectively during 2002 and 2003.

ii-The second group represented by (Jojoba oil, Reldan 50%, Caple-2 and Neem seed extract). The reduction% were 84.14, 83.95, 83.52 and 81.70%, respectively during 2002. On the other hand the reduction% were 81.85, 84.86, 83.51 and 83.72%, respectively during 2003.

Table (2): Effect of different insecticides on the population of cotton whitefly *B. tabaci* (Genn.) infesting cucumber fields at Monofia Governorate during 2002 and 2003 seasons.

Insecticides	Rate/100 L.W.	2002		2003	
		C. M. P. after			
		1 day	2-7 days	1 day	2-7 days
Caple-2	1.5 L.	86.40 c	83.52 b	86.81 c	83.51 b
Caple-2 + Micronized sulphur	1.0 L. + 125 gm.	90.66 a	86.60 a	91.10 a	85.64 a
Neem seed extract	200 cm ³	87.79 b	81.70 b	88.48 b	83.72 b
Jojoba oil	1.0 L.	86.19 c	84.14 b	87.02 c	81.85 b
Reldan 50% EC	125 cm ³	88.00 b	83.95 b	89.02 b	84.86 b
Actellic 50% EC	250 cm ³	86.96 b	84.92 a	87.64 b	85.78 a

C. M. P. = Corrected Percentage of Mortality.

Mean within columns followed by the same letter are not significantly different (Multiple-t-test, least significant difference).

DISCUSSION

Integrated pest control is a pest population management system that utilizes all suitable techniques in a compatible manner to reduce pest populations and maintain them at levels below those causing economic injury. Integrated control achieves this ideal by harmonizing available techniques in an organized way, by making the control practices compatible and by blending them into a flexible and evolving system.

In the present study the combination of mechanical controls (hand hoeing) and chemical control has been stressed to successful integrated control against *B. tabaci* in cotton. In an attempt to replacements the highly toxic chemical compounds by another low effect on pollution. The weed consider alternative host to cotton whitefly which infested the neighbored cotton fields. So this work aims to control the weeds which grow in cucumber fields by mechanical methods (hand hoeing) combined with mineral oil+micronized sulphur, were give promise result.

The strategy of integrated Pest Management (IPM) aim to control the serious pest by destruction of alternate host (Thung,1934) or to control the pests on alternate host plants. (Abdel-Wahab et al.,2001)controlled the

weeds and *Thrips tabaci* (Lind.) in onion and garlic field. Also (Homam et al., 2004) mentioned that weed management is necessary to achieve a good control of the cucumber and muskmelon plants to reduce the infestation of the neighbor cotton fields. Moshihry (1993) found also that weed management in soybean fields decreased the new infestation with *A. gossypii*.

The obtained results indicated that weed management and spray with the insecticides Actelic 50%EC or mineral oil Caple-2+ micronized sulphur in cucumber fields had significant effect on reduction of infestation of *B. tabaci* in cotton fields. Homam (2000) consider Capil-2 a physical poison and its toxic effect on the whitefly, *B. tabaci* could be attributed to its suffocation effect against both immature and mature stages.

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تأثير التحكم في ذبابه القطن البيضاء (*Bemisia tabaci* (Genn.) والحشائش في حقول الخيار علي الأصابة بذبابه القطن البيضاء في حقول القطن المجاور

محمد ابراهيم شديد ، صلاح الدين محمد حسن ، همام بخيت همام
معهد بحوث وقاية النباتات- شارع نادى الصيد- الدقى- جيزة ١٢٦١٨ - مصر

أجريت تجربتان حقليتان في محافظه المنوفية خلال موسمين متتالين في عامي
٢٠٠٢، ٢٠٠٣ بهدف خفض تعداد حوريات ذبابة القطن البيضاء باستخدام العزيق اليدوي
للحشائش مرتين في حقول الخيار و استخدم مبيد الريلدان ٥٠% و الاكتيلك او زيت
معدني (كابيل-٢)، او زيت نباتي (زيت جو جوبا) أو مستخلص بذور النيم أو استخدام
زيت كابيل-٢+الكبريت الميكرونى .

أوضحت النتائج المتحصل عليها أن عزيق الحشائش و الرش بمبيد الاكتيلك أو الزيت
المعدني(كابيل-٢)+الكبريت الميكرونى أعطوا تأثير معنوي في خفض غزو ذبابة القطن
البيضاء في حقول القطن.

وهي محاولة لاستبدال المركبات الكيميائية قوية السمية بأخرى أقل تأثير في التلوث البيئي.
استخدام المكافحة الميكانيكية (العزيق اليدوي) للحشائش مع زيت المعدني(كابيل-٢)
+الكبريت الميكرونى أعطى نتائج واعدة .