Egypt. Acad. J. biolog. Sci., 2 (2): 13 - 22 (2009)
E.mail.egyptianacademic@yahoo.com ISSN: 1687–8809
Received:19/7/2009 www.eajbs.eg.net

Biological control of *Thrips tabaci* (lind.) and *Aphis gossypii* (Glover) using different predatory Phytoseiid mites and the biocide vertimec on Eggplant at Behaira Governorate.

Magdy, Y. El-Kholy and El Sayed, M. A. K. El-Saiedy
Pests and Plant Protection Depaetment , National Research Centre, Dokki, Gizza, Egypt.

ABSTRACT

Three predatory mite species, *Phytoseiulus persimilis* (Athias-Henriot), *Neoseiulus cucumeris* (Oudemans) and *Neoseiulus californicus* (McGregor) and biocide denatol were evaluated as potential biological control agents for *Thrips tabaci* (lind.) and *Aphis gossypii* (Glover) on two eggplant cultivars in open field at Behaira Governorate. Field releases of different numbers of mites per plant during 2008 season showed that *Neoseiulus cucumeris* reduced the number of thrips and aphid in two cultivares of eggplant. We found that earlier releases (averages from 20-25 individuals / leaf) resulted in reducing thrips and aphids numbers and lowering their damage. We coclude that inoculative release of *Neoseiulus cucumeris* one of a potentially useful thrips and aphids management strategy, but needs improvements in release timing and strategy will be required to provide commercially acceptable control.

Key words: *Phytoseiulus persimilis, Neoseiulus colifornicus, Neoseiulus cucumeris, Thrips tabaci , Aphis gossypii*, biocide, eggplant

INTRODUCTION

The importance of cultivating vegetables has extensively increased year after year; due to their economic value. However, most of these agricultural crops are subjected to attack by many piercing sucking insect pests such as aphids, whiteflies and thrips (El-Khawas, 2005). The cotton aphid, (*Aphis gossypii* Glov.) is one of the most widespread species of aphids, and displays a large range of host-plants, covering very different families. This impressive behavior made it a major pest of numerous crops (Fuchsberg *et al.*, 2007).

The eggplant (*Solanum melongena*) is a tropical and subtropical plant growing in high temperatures which can produce up to 15 kg of fruit/plant (Filgueira, 2000). Among pests of this crop, the aphids, *Aphis gossypii* (Glover) (Homoptera: Aphididae) and the thrips, *Thrips tabaci* Lind. (Thysanoptera: Thripidae) (Etienne *et al*., 1990; Hosoda *et al*., 1993 and Kajita *et al*., 1996) are very important. Eggplants when severely attacked by thrips present leaves with small size and silver appearance and deformed fruits (Kawai, 1986; Sakimura *et al*., 1986 and Gallo *et al*., 2002). Aphid attack causes severe damage to eggplant by feeding on sap, rolling leaves, and secreting honeydew (Hosoda *et al*., 1993 and Gallo *et al.*, 2002). In different crops, *T. tabaci* and *A. gossypii* have been controlled primarily with insecticides (Hosoda *et al*., 1993 and Kajita *et al*., 1996), but the extensive use of these pesticides can promote negative impacts on human health and on ecosystems, besides reducing the number of species and density of natural enemies, developing resistance and increasing production costs (Etienne *et al*., 1990; Nagai, 1990; Hosoda *et al*., 1993 and Kajita *et al*., 1996). To reduce these problems, it is necessary to minimize the chemical control

by replacement pesticides by using biocides and releasing predatory mites (El-Saiedy, 2003; El-Saiedy and Romeih, 2007). So this work aimed to evaluate the efficiency of three predatory mite species *Phytoseiulus persimilis* Athias-Henriot, *Neoseiulus cucumeris* Oudemans and *Neoseiulus californicus* McGregor and biocide vertimec in controlling *Thrips tabaci* (lind.) and *Aphis gossypii* (Glover) on two eggplant cultivars in open field at Behaira Governorate. Also to get quality and quantity of crop yields and get food without residual of pesticides.

MATERIALS AND METHOS

Experimental design:

Four experimental treatments were conducted. Each treatment was replicated three times. The replicate consisted of four lines area for each 0.5 meters. width x 10 meters. long. The experimental design was complete randomized blocks. Two cultivars of eggplant were chosen in this work, Baladi and black baity. The experiment were carried out at Behaira Governorate from May to August 2008.

Sampling Procedure:

Samples were taken weekly for the four treatments on the two cultivars. Twenty leaves were randomly collected, kept into polyethylene bags, tightly closed with rubber bands, then kept in an ice box and transferred to laboratory for examination using a stereomicroscope. Adults of *Thrips tabaci* , *Aphis gossypii* and predatory mites were counted and recorded.

Control studies:

To study the effect of different types of biocontrol agents, four treatments were Carried out on two cultivars of eggplant using three predacious mites *P. persimilis, N. cucumeris, N. Californicus* and biocide Denatol. These forementioned experiments compared with control

Rearing of *Tetranychus urticae:*

Rearing of *Tetranychus urticae* was carried on potted beans *phaseolus vulgaris* L. in an isolated compartment 1.5 x 2.0 m. in experimental glasshouse. The strain of *T. urticae* was originated from infested leaves of Castor oil collected at Gizza Governorate .

Rearing of the predatory mites:

The predatory mites *P. Persimilis, N. cucumeris* and *N. Californicus* were reared using methods modified from (McMurtry and Scriven 1965), large plastic boxes 26 x 15 x10 cm. were used , cotton pad were placed in the middle of each box, leaving a space provided with water as a barrier to prevent predatory mites from escaping . Excised bean leaves highly infested with *T. urticae* were Provided every day as food source for mites and plastic boxes were kept in an incubator at 25 °C ± 2 and 70 ± 10 % R.H.

Mass rearing of the predatory mites

For mass rearing of the predatory mites**,** *Phaseolus. vulgaris* was served as host plant which reared in a small glasshouse divided into three isolated parts (a) Clean bean Plants, (b) Clean plants at stage of 12 leaves infested with *T. urticae* (c) bean plants infested of five gravid females of the predatory mites for every plant (El-Saiedy, 2003 andEl- Saiedy and Romeih, 2007). Temperature in the glasshouse ranged from 18 to 25°C and relative humidity from 50 – 60% R.H.

Releasing of the Predatory mites

Mites releasing started as the population density of *Thrips tabaci* and *Aphis gossypii* build upon eggplant i.e at the beginning of invasion. Samples averages from 20-25 individuals / leaf. The ratio between predator and prey ranged between 1: 7 to 1:5, respectively. The required population size of the predatory mite individuals were calculated according to the following formula.

Released number = Total number of *Thrips* and *Aphis* /experimental area
Proposed predator /prey percentage

Bean leaves with predator mites were transferred in ice - box (10 ± 3 °c) to eggplant fields. Distribution was carried out on infested eggplant plants. Repetition of releasing samples were taken weekly, *Thrips tabaci* and *Aphis gossypii* stages were calculated as well as the predatory mites .

Biocide vertimec

Active Constituent: 18g/L abamectin.
Formulation Type: Emulsifiable concentrate.

Statistical analysis

The obtained data of mite numbers and yield quantity were subjected to the analysis of variance test (ANOVA) with mean separation at 5% level of significance according to the method o (Snedecor and Cocharn, 1967). Percentage reduction of the mite population were calculated according to the equation of (Henderson and Tilton, 1955) and (Fleming and Retnakaran, 1985)

$$\text{Reduction} = 1 - \frac{\text{Treatment after x control before}}{\text{Treatmernt before x control after}} x100$$

RESULTS AND DISCUSSION

Data presented in tables 1 and 2 show that the release of three predatory mites *Phytoseiulus persimilis*, *Neoseiulus cucumeris* and *Neoseiulus californicus* and spraying of vertimec on two eggplant cultivars on the 14th may when the main plant sucking insects *Thrips tabaci* number ranged from 45.14 to 46.40 and 29.98 to 31.0 individual / leaf (Table 1) on Black baity and Baldi eggplant cultivars, respectively. While none *Aphis gossypii* individual / leaf (Table 2) on the two eggplant cultivars, Black baity and Baldi, respectively.

From obtained results obtained, it is generally noticed that T2 (*Neoseiulus cucumeris*) obviously redcued the population density of *T. tabaci* and *A. gossypii* on both eggplant cultivars and the total average of *T. tabaci* and *A. gossypii* / leaf were 5.15 & 4.57 and 0.78 & 1.02, respectively, (Tables 1 and 2) on Black baity and Baldi cultivars, respectively, followed by T4 (vertimec) where the total average of *T. tabaci* and *A. gossypii* / leaf were 6.85 & 4.61 and 1.60 & 1.93, respectively, (Tables 1 and 2) on Black baity and Baldi cultivars, respectively. Statistical analysis showed that there was no significant differences between treatments, but there are significant between treatment and control.

Also data presented in Tables 3 and 4 show percentage reduction as a result of releasing the three predatory mites and spraying biocide vertimec. T2 (*Neoseiulus cucumeris*) gave the highest percentage reduction of *T. tabaci* (86. 80 and 90.65) on the two cultivars, Black baity and Baldi, respectively, followed by T4 (vertimec), T3 (*Neoseiulus californicus* and T1 (*Phytoseiulus persimilis*) on Black baity Cultivar as well as Baldi cultivar, where percentages reduction were (82.22, 65.89 and 56. 35) and (88.54, 58.14 and 56.70), respectively, Table 3. Here again with respect to the

Aphis gossypii Glover, as the same T2= *Neoseiulus cucumeris* gave the highest percentage reduction (95.09 and 97.64) on the two cultivars, Black baity and Baldi, respectively, followed by T4 Vertimec , (93.83 & 87.66), T1= *Phytoseiulus persimilis* (47.67 & 56.73) and T3 = *Neoseiulus californicus* (40.04 & 49.17), respectively, Table 4. These results agree with those of Gillespie (1989); Hansen (1989); Ader (1990); Castagnoli *et al*. (1990); Jarosik and Pliva (1995); Courcy – Williams (2001) and Sengonca *et al.* (2004).

Table (1): Number of *Thrips tabaci* / leaf on two cultivars of eggplant affected by releasing three predatory mites and sprying with vertimec at Behaira Governorate during 2008 season

Cultivars	Sampling date	Mean numbers of *Thrips tabaci* / leaf				
		T1	T2	T3	T4	Control
Black baity	14/5/2008*	46.40	45.14	46.00	46.09	45.18
	21	37.30	10.54	32.00	5.80	45.00
	28	38.00	12.65	33.0	4.66	44.18
	5/6/2008	23.10	2.10	38.00	3.22	38.17
	12	16.20	0.53	19.50	9.58	31.22
	19	13.88	1.20	15.00	26.60	26.12
	24	9.35	0.00	1.80	0.00	11.00
	3/7/2008	2.08	0.00	3.20	0.00	4.83
	10	0.00	0.00	0.00	0.00	0.00
	17	0.00	0.00	0.00	0.00	0.00
	24	0.00	0.00	0.00	0.00	0.00
	31	0.00	0.00	0.00	0.00	0.00
	8/8/2008	0.00	0.00	0.00	0.00	0.00
	15	0.00	0.00	0.00	0.00	0.00
	Mean**	13.31 a	5.15 a	13.46 a	6.85 a	17.55 a
Baldi	14/5/2008*	30.90	29.98	30.00	31.00	30.06
	21	37.58	10.66	27.75	1.71	41.92
	28	36.14	12.00	28.14	0.00	40.19
	5/6/2008	30.00	9.22	30.00	22.00	38.00
	12	10.53	2.13	14.50	3.00	21.16
	19	12.55	0.00	9.30	7.19	19.25
	24	3.30	0.00	3.70	0.00	5.85
	3/7/2008	1.00	0.00	2.56	0.00	1.35
	10	0.00	0.00	0.00	0.00	0.00
	17	0.00	0.00	0.00	0.00	0.00
	24	0.00	0.00	0.00	0.00	0.00
	31	0.00	0.00	0.00	0.00	0.00
	8/8/2008	0.00	0.00	0.00	0.00	0.00
	15	0.00	0.00	0.00	0.00	0.00
	Mean**	11.57 a	4.57 a	10.43 a	4.61 a	14.13 a

*Pretreatment sample. ** No significant between all treatments with F.test. T1 = *Phytoseiulus persimilis*; T2 = *Neoseiulus cucumeris*; T3 = *Neoseiulus californicus* and T4 = Vertimec.

Table (2): Number of *Aphis gossypii* / leaf on two cultivars of eggplant affected by releasing three predatory mites and sprying with vertimec at Behaira Governorate during 2008 season

Cultivars	Sampling date	Mean numbers of *Aphis gossypii* / leaf				
		T1	T2	T3	T4	Control
Black baity	14/5/2008*	0.00	0.00	0.00	0.00	0.00
	21	0.00	0.00	0.00	0.00	0.00
	28	0.00	0.00	0.00	0.00	0.00
	5/6/2008	0.90	1.40	1.10	2.00	1.30
	12	16.60	4.20	22.83	4.50	31.40
	19	10.90	1.20	23.80	9.40	12.31
	24	3.00	1.10	12.89	0.00	7.10
	3/7/2008	2.30	0.00	5.00	0.00	10.00
	10	6.41	0.00	14.20	0.00	10.00
	17	27.00	0.00	28.36	0.00	27.80
	24	4.00	0.00	7.55	0.00	11.53
	31	6.80	0.00	13.75	0.00	22.16
	8/8/2008	11.56	0.00	10.53	0.00	21.18
	15	7.42	3.04	8.73	6.53	20.17
	Mean**	7.49 a	0.78 b	10.62 a	1.60 b	12.50 a
Baldi	14/5/2008*	0.00	0.00	0.00	0.00	0.00
	21	0.00	0.00	0.00	0.00	0.00
	28	0.00	0.00	0.00	0.00	10.0
	5/6/2008	1.50	4.33	1.70	2.30	1.70
	12	9.20	1.30	16.33	2.30	18.53
	19	3.20	1.09	9.60	14.50	11.58
	24	2.00	0.00	2.10	0.00	13.60
	3/7/2008	1.30	0.00	2.00	0.00	4.40
	10	6.80	0.00	3.30	0.00	10.00
	17	14.00	0.00	26.50	0.00	18.32
	24	3.26	0.00	4.52	3.80	11.90
	31	1.83	0.00	8.45	0.00	8.72
	8/8/2008	10.33	6.56	5.32	2.14	10.32
	15	0.00	0.00	0.00	0.00	0.00
	Mean***	4.11 bc	1.02 c	6.14 ab	1.93 c	9.08 a

*Pretreatment sample. ** L.S.D.= 5.51. *** L.S.D. 4.13. T1= *Phytoseiulus persimilis*; T2= *Neoseiulus cucumeris*; T3 = *Neoseiulus californicus* and T4 = Vertimec. There is no significant between the same letters.

Table (3): percentage reduction of *Thrips tabaci* Lind / leaf on two cultivars of eggplant affected by releasing three predacious mites species spraying with vetimec at Behaira Governorate during 2008 season

Cultivars	Sampling date	% Reduction percentage of *Thrips tabaci* Lind / leaf			
		T1	T2	T3	T4
Black baity	21/5/2008	20.00	76.65	30.43	87.42
	28	16.14	71.42	26.83	89.69
	5/6/2008	40.82	94.51	2.52	91.76
	12	14.44	69.21	37.39	-
	19	12.27	16.57	42.37	-
	24	0.00	100	83.56	100
	3/7/2008	28.87	100	33.47	100
	10	100	100	100	100
	17	100	100	100	100
	24	100	100	100	100
	31	100	100	100	100
	8/8/2008	100	100	100	100
	15	100	100	100	100
	Mean	56.35	86.80	65.89	82.22
Baldi	21/5/2008	12.43	74.40	33.40	96.03
	28	12.28	69.98	29.65	100
	5/6/2008	23.30	75.70	21.00	43.94
	12	36.82	58.42	13.00	75.45
	19	17.54	100	38.93	35.62
	24	28.50	100	19.83	100
	3/7/2008	6.17	100	-	100
	10	100	100	100	100
	17	100	100	100	100
	24	100	100	100	100
	31	100	100	100	100
	8/8/2008	100	100	100	100
	15	100	100	100	100
	Mean	56.70	90.65	58.14	88.54

T1= *Phytoseiulus persimilis*; T2= *Neoseiulus cucumeris*; T3 = *Neoseiulus californicus* and T4 = Vertimec.

Table (4): percentage reduction of *Aphis gossypii* Glover / leaf on two cultivars of eggplant affected by releasing three predacious mites species sprying with vertimec at Behaira Governorate during 2008 season.

Cultivars	Sampling date	% Reduction percentage of *Aphis gossypii* / leaf			
		T1	T2	T3	T4
Black baity	21/5/2008	100	100	100	100
	28	100	100	100	100
	5/6/2008	100	100	100	100
	12	26.22	88.00	16.98	91.00
	19	-	90.57	-	48.38
	24	40.00	85.86	-	100
	3/7/2008	66.78	100	59.09	100
	10	7.41-	100	-	100
	17	-	100	-	100
	24	51.11	100	24.50	100
	31	54.67	100	25.00	100
	8/8/2008	22.93	100	42.56	100
	15	50.53	71.77	52.38	80.41
	Mean	47.67	95.09	40.04	93.83
Baldi	21/5/2008	100	100	100	100
	28	100	100	100	100
	5/6/2008	100	100	100	100
	12	44.80	97.30	13.55	91.00
	19	68.00	96.22	15.29	-
	24	82.67	100	83.94	100
	3/7/2008	56.67	100	41.18	100
	10	22.93	100	67.00	100
	17	16.00	100	-	100
	24	69.57	100	62.78	68.71
	31	76.82	100	5.56	100
	8/8/2008	-	75.76	49.93	79.86
	15	-	100	-	100
	Mean	56.73	97.64	49.17	87.66

T1= *Phytoseiulus persimilis*; T2= *Neoseiulus cucumeris*; T3 = *Neoseiulus californicus* and T4 = Vertimec.

Regarding weekly mean number of three predatory mites after their release in the field, Table 5 showed that the total average numbers of the three released predators on Black baity cultivar were 1.80, 2.29 and 2.19 individulas / leaf for *Phytoseiulus persimilis*, *Neoseiulus cucumeris* and *Neoseiulus californicus*, respectively. On the other hand, Baldi cultivar, reached the highest number at the 3rd. and 4th. weeks after release the three predatory mites. Three weeks after release the *P. persimilis and N. californicus* gave the highest recorded (4.13 & 8.33 individuals / leaf for two above mentioned predators, receptivity, the over all mean of *Phytoseiulus persimilis* , *Neoseiulus cucumeris* and *Neoseiulus* were 1.21, 2.26 and 1.70 individual / leaf, respectively.

In these experiments *Neoseiulus cucumeris* has proved to be a promising candidate for biological control of *Thrips tabaci* and *Aphis gossypii* compared with of *Phytoseiulus persimilis* and *Neoseiulus californicus*

Table (5): Weekly mean number of three predatory mites; *Phytoseiulus persimilis*; *Neoseiulus cucumeris* and *Neoseiulus californicus* after their release on two eggplant cultivers in open field at Behaira Governoreate during 2008 season

Cultivars	Weeks after treatment	Mean numbers of predatory mites / leaf		
		Phytoseiulus persimilis	*Neoseiulus cucumeris*	*Neoseiulus californicus*
Black baity	After 1 W	1.90	0.70	3.80
	2W.	2.30	0.95	3.99
	3W.	5.20	3.56	7.91
	4W.	7.90	3.70	6.60
	5W.	1.10	1.20	1.80
	6W.	0.50	2.30	0.00
	7W.	0.91	1.90	0.00
	8W.	0.00	3.09	0.00
	9W.	0.00	2.40	0.00
	10W.	0.00	2.72	0.00
	11W.	0.00	2.65	0.00
	Mean	1.80	2.29	2.19
Baldi	After 1 W	1.50	0.50	2.60
	2W.	1.90	0.99	2.80
	3W.	4.13	2.98	8.33
	4W.	4.72	4.00	3.58
	5W.	0.00	1.50	1.40
	6W.	0.40	1.40	0.00
	7W.	0.70	1.20	0.00
	8W.	0.00	3.35	0.00
	9W.	0.00	4.45	0.00
	10W.	0.00	2.01	0.00
	11W.	0.00	2.43	0.00
	Mean	1.21	2.26	1.70

REFERENCES

Ader, E.P. (1990). Bio – method in Estonian hot houses. Zashchita- Rastenii- Moskva, 1: 24- 27.

Castagnoli, M; Del- Bene, G.; Gargani, E. and Simoni,S. (1990). Possibilities of the biological control of *Thrips tabaci* Lind. and Fyankliniella occidentalis (Pergande) (Thys. Thripidae) using *Amblyseius cucumeris* (Oud.) (Acarina Phytoseiidae). Redia, 73 (1): 53- 61.

Courcy- Williams, M.E. (2001). Biological control of *Thrips* on ornamental crops: interactions between the predatory mite *Neoseiulus cucumeris* (Acari: Phytoseiidae) and Western flower thrips, *Frankliniella occidentalis* (Thysanoptera- Thripidae), on cyclamen. Biocontrol- Science and Technology., 11 (1): 41-55.

El-Khawas, M.A.M. (2005). Survey of predators associated with major insect pests on okra plants in Qalubia Governorate. J. Agric. Mansoura Unvi., 30(2): 1105-1116.

El-saiedy, E.M.A.(2003). Integrated control of red spider mite *Tetranychus urticae* Koch on strawberry plants. Ph.D.Thesis, Fac. Agri., Cairo Univ., PP:171

El-saiedy, E.M.A. and Romeih, H.M. (2007). Comparative studies between predatory mites and pesticides in controlling *Tetranychus urticae* Koch on strawberry plants at Qualubyia Governorate. J. Agrc.Sci., Mansoura Univ.,32 (4): 2601- 2608.

Etienne, J.; Guyot, J. and Van Waetermeulen, X. (1990), Effect of insecticides, predation, and precipitation on populations of *Thrips palmi* on aubergine (eggplant) in Guadeloupe. *Fla. Entomol.*, 73, 339-342.

Filgueira, F. A. R. (2000), *Novo Manual de Olericultura*. Universidade Federal de Viçosa, Viçosa. 402 pp.

Fleming, R. and Retnakaran, A. (1985). Evaluating single treatment data using Abbott's formula with reference to insecticides. J. Econ. Ento., 78: 1179-1181.

Fuchsberg, J.R., Yong, T.H., Losey,J.E., Carter M.E. and Hoffmann, M.P. (2007). Evaluation of corn leaf aphid (*Rhopalosiphum maidis*; Homoptera: Aphididae) honeydew as a food source for the egg parasitoid *Trichogramma ostriniae* (Hymenoptera: Trichogrammatidae). Biological Control., 40: 230-236.

Gallo, D.; Nakano, O.; Silveira Neto, S.; Carvalho, R. P. L.; Batista, G. C.; Berti Filho, E.; Parra, J. R. P.; Zucchi, R. A.; Alves, S. B.; Vendramim, J. D.; Marchini, L. C.; Lopes, J. R. S. and Omoto, C. (2002), *Manual de entomologia agrícola*. Piracicaba: FEALQ. 920 pp.

Gillspie. D.R. (1989). Biological control of thrips (Thysanoptera : Thripidae) on greenhouse cucumber by *Amblyseius cucumeris*. Entomophaga, 34 (2): 185-192

Hansen, L.S. (1989). The effect of initial thrips density (*Thrips tabaci*) Lind. (Thysanoptera, Thripidae) on the control exerted by *Amblyseius barkeri* (Hughes) (Acarina, Phytoseiidae) on glasshouse cucumber. J.Appl. Entomol., 107 (2): 130-135

Henderson, C.E. and Tilton, E.W. (1955). Tests with acaricides against the brown wheat mites. J. Econ. Entomol., 84: 157-161.

Hosoda, A.; Hama, H.; Susuki, K. and Ando, Y. (1993), Insecticide resistance of the cotton aphid, *Aphis gossypii* Glover. III. Host preference andorganophosphorus susceptibility. *J. Appl. Entomol.Zoo.*, 37, 83-90.

Jarosik, V. and Pliva, J. (1995). Assessment of *Amblyseius barkeri* (Acarina : Phytoseiidae) as a control agent for thrips on greenhouse cucumbers. Acta-Societatis- Zoologicae- Bohemicae, 59 (3): 177 – 186.

Kajita, H.; Hirose, Y.; Takagi, M.; Okajima, S.; Napompeth, B. and Buranapanichpan, S. (1996), Host plants and abundance of *Thrips palmi* Karny (Thysanoptera: Thripidae), an importante pest of vegetables in Southeast Asia. *J. Appl. Entomol. Zoo.*, 31, 87-94.

Kawai, A. (1986), Studies on population ecology of *Thrips palmi* Karny. XII. Analyses of damage to eggplant and sweet pepper. *J. Appl. Entomol. Zoo.*,30, 179-187.

McMurtry, J.A. and Scriven, G.J. (1965). Insectory production of *Phytoseiulus persmilis*. J. Econ. Entomol., 58, 282- 284.

Nagai, K. (1990), Suppression effect of *Orius* sp. (Hemiptera: Anthocoridae) on the population density of *Thrips palmi* Karny (Thysanoptera: Thripidae) in eggplant in an open field. *J. Appl. Entomol. Zoo.*, 34, 109-114.

Sakimura, K.; Nakahara, L. M. and Denmark, H. A. (1986), A thrips: *Thrips palmi* Karny (Thysanoptera: Thripidae). *Entomol. Circ. Fl. Dept. Agric. Consum. Serv. Div. Pl. Indus*., 280, 4 pp.

Sengonca, C; Zegula, T. and Blaeser, P. (2004). The suitability of twelve different predatory mite species for the biological control of *Frankliniella occidentalis* (Pergande) Thysanoptera: Thripidae). Zeitschrift fur Pflanzenkrankheiten und pflanzenschutz, 111(4): 388- 399.

Snedecor, G.W. and Cochran, G. (1967). Statically methods 6th. ed, lowa state Univ., Press lowa, USA, 560 pp.

ARABIC SUMMARY

المكافحة البيولوجية للتربس والمن على نبات الباذنجان فى محافظة البحيرة باستخدام المفترسات الأكاروسية والمبيد الحيوى فيرتمك

مجدى يوسف الخولى - السيد محمد أحمد كمال الصعيدى
المركز القومى للبحوث – قسم أفات ووقاية النبات –الجيزة- **الدقى- مصر**

تـم اطـلاق المفترسـات الاكاروسـية *Phytoseiulus persimilis* (Athias-Henriot), وكذلك *Neoseiulus cucumeris* (Oudemans) and *Neoseiulus californicus* (McGregor) المبيد الحشري فيرتمك ضد حشرة التربيس والمن على نوعين من الباذنجان الرومي والبلدي في محافظة البحيرة مركز شبرا خيت وأوضحت النتائج أن أفضل المعاملات هو المفترس الأكاروسي*Neoseiulus cucumeris* حيث أدى إلـى خفض تعداد حشرة التربيس والمن علـى كلا الصـنفين يليـه الفيرتمك واقل المعـاملات كانـت. *Phytoseiulus persimilis* and *Neoseiulus californicu*s