SEASONAL FLUCTUATIONS OF NATURAL ENEMIES ASSOCIATED WITH *BEMISIA TABACI* (GENN.)AND *APHIS GOSSYPII* GLOVER IN COTTON FIELDS AT MINIA GOVERNORATE

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Abstract

This work was carried out at Mallawi Agricultural Research Station Farm, El–Minia Governorate on cotton plants during 2003 and 2004 cotton seasons . The present work aimed to shed light on the natural enemies associated with *Bemisia tabaci* (Genn.) and *Aphis gossypii* (Glover) infesting cotton fields and its role of suppression of these insects .

The obtained data showed that :

1-Two hymenopterous species *Encarsia lutea* (Masi) and *Eretmocerus mundus* Mercet (family: Aphelinidae) were identified as parasitoids of *Bemisia tabaci* .The population of *En Luta* Masi. was higher than *Eret. mundus* Mercet during the two seasons . Parasitoids on *A .gossypii* were nil during the present investigation.

2-The predators species during this survey were predacious mite *Amblyseius swirskii* , true spiders and predacious insects (*Coccienlla undecimpunctata* , *Coccienlla septempunctata* , *Cydonia vicina* , *Coccienlla tridecimpunctata* , *Scymnus syriacus* , *Scymnus interruptus* , *Chrysopela carnea* , *Orius albidipennis* , *Orius leavigatus* , *Camplyomma nicolas* put., *Peaderuis alfierii* and *Syrphus corollae*) .

INTRODUCTION

Recently *Bemisia* spp. consider a major worldwide pest of cotton, vegetable and ornamental Plants Byrne and Bellows,1991.*Bemisia* spp. are attacked by three parasitoids genera of Hymenoptera (Gerling 1990) and by many predators representing eight arthropod orders (Nordlund and Legaspi, 1995) .

Seasonal fluctuation of both *B. tabaci* and *A. gossypii* was studied during the two seasons. In Middle East , Africa and India pesticide usage reducing the role of parasitoids to control *Bemisia*_spp . The percentage of parasitism rarely exceed 70 to 80% (Hafez *et al* ., 1978 ; Abdel . Rahman , 1986 and reached 73.10 to 100% (El – Adl *et al* ., 1998) .

The present work was carried out to investigate on the natural enemies associated with whiteflies & aphids infesting cotton fields and its role of suppression of these sucking insects .

MATERIALS AND METHODS

Population dynamics of *B. tabaci* and *A. gossypii* and their natural enemies:

This work was conducted in experimental farm research station at Mallawi, El-Minia Governorate . Two feddans were chosen and planted with cotton variety Giza 83 on April 10th .

1-The role of parasitoids on *Bemisia tabaci* (Genn .)

Ten plants were chosen randomly , three leaves from three levels(Middle-Upper-Lower) .Each group from leaves put in paper bags and directly taken to the laboratory , where carefully examined by the aid of stereomicroscope. Third and fourth instars were inspected to determine parasitism of each species .

Parasitism % by each parasitoid species and total percentage of parasitism were estimated by calculating the proposition of the parasitizes third and fourth instars from the sum total of the third and fourth instars . Also parasitized nymphs were put on wetted filter paper in petri dishes till the emergence of parasitoid / adults , which were counted and identified

2-Population fluctuation of *Aphis gossypii* and its parasitoids :-

Twenty plants were selected randomly , three leaves were taken from each plant at three levels (Higher, Middle and lower) of cotton plants, number of winged and wingless aphids were counted and recorded directly in the field . Then, the leaves were put in a paper bags and directly taken to the laboratory . Mummies aphid were kept in glass jars till the possible emergence of parasitoid species . Percentage of parasitism were calculated .

3-Seasonal abundance of predators associated with *B. tabaci* and *A. gossypii* in cotton fields :-

One feddan divided into five plots each plot was 4.5 Kerates approximately one meter. The number of each predators were collected by aspirator and taken to the laboratory for identification .

RESULTS AND DISCUSSION

1-Parasitoids in cotton fields:

1.1-Parasites of *Bemisia tabaci* (Genn.)

Two hymenopterous species *Encarsia lutea* (Masi) and *Eretmocerus munds* Merect (Fam: Aphelinidae) were identified as parasitoids of *B. tabaci* at El-Minia Governorate.

In the 1st season 2003,data in Table (1) showed that the population of third and fourth instars of *Bemisia spp.* reached a maximum 13.50 individuals /leaf on 20th of July in untreated cotton field . While, in the 2nd season 2004 data in Table (2) recorded 22.50 individuals /leaf on 31st of August in cotton fields .

On the other hand, parasitism reached to 96.90% on 17th of August in the 1st season , while reached its maximum 81% on September 28th in cotton field in the 2nd season .

1.2-Population of *B. tabaci* and its parasitoids .

In 2003 and 2004 seasons, data in Table (1) cleared that the percentage of parasitism by *En . lutea* was higher than *Er . mundus* . As well as the percentage of parasitism represented by 59.5% on Sept . 21st & 56.4% on September 28th and 45.40% on August 17th & 32.50% on August 31st in cotton field at the two seasons respectively . Parasitism % was 67.5, 48.3, 39.2 and 37.4 on October 5th , Sep. 28th ,August 24th and Sep. 21st , respectively .

1.3-Parasites of *A. gossypii* :-

No parasitoids was recorded from aphids during the two seasons of this investigation

2-Predators :-

2.1-The role of predacious mite *Amblyseius swirskii* (Athias – Henriot) in suppressing the population of *B. tabaci* .

Data in Table (3&4) showed that the population dynamics of *B. tabaci* and the predacious mite *A. swirskii* (Athias – Henriot) in cotton fields at Minia Governorate . Data revealed that the mite began to appear in the early of July during two seasons with a very few number (0.30 mite / leaf) . Population oscillated until late of May then increased gradually and reached to its maximum (28.4 and 16.30 mite / leaf) on August 10th in cotton fields during two seasons , respectively . Increasing the number

of predacious mite, reduced the population of whitefly from the second week of July to the third week of August in cotton fields .

2.2-The role of insect predators associated with *B. tabaci* and *A. gossypii* in cotton fields :-

Data in tables (5) and (6) showed that the predators associated with whitefly and aphid on untreated cotton plants during two seasons . Generally total number of all predators species was higher in untreated than treated cotton plants during two seasons .

2.2.1- order : Coleoptera .

2.2.1.1-Fam. : Coccinellideae

The predator species recorded during two seasons were *Coccinella undecimpunctata L.,* C. *Septempunctat* L. and *Cydonia vicina* Muly). Coccinellid larvae and adults have been observed praying upon whitefly nymphs .

In 2003 cotton seasons, the highest number of coccinellid were (17.60 individuals / five plants) occurred on June 29th on cotton plants, when the population of whitefly and aphids reached a maximum (8.5 third and fourth instar / leaf) and (43.15 individuals / leaf) on July 27th and on June 29th , respectively.

In 2004 cotton season , data in table (6) recorded that the highest number of coccinellid (22.80 individuals / 5 plants) on July 6th in cotton plants , when the population of whitefly and aphid reached a maximum (19.20 individuals / leaf) and (35.20 individuals / leaf) on August 24th and July 7th , respectively.

2.2.1.2- S*cymnus syriacus* (Marseul) and S.*interruptus* Goeze

In the first season, in cotton field , data in table (5) showed that *Scymnus spp.* was recorded allover the season and the highest number (20.40 individuals/5plants) on July 27th , when the number of aphids was (10.00 individuals / leaf) and whitefly (8.5 third and fourth instar / leaf) at the aforementioned date. Gerling (1986) reported that *S. syriacus* was associated with *B. tabaci* .

In the second season , data in table (6) recorded the highest number (22.30 individuals / 5plants) on August 10th , when the number of aphids and whitefly were (12.80 and 7.00 individuals / leaf) at the same date in cotton plants.

2.2.1.3- Fam : Staphilinidae

In the first season 2003,the rove beetle *paederuis alfierii* koch ,data in table (5) in cotton fields recorded the highest number (15.90 individuals /5 plants) in July 27th, coincides the highest number of aphids was (43./5 aphids / leaf) on June 29 th.

In the second season 2004, data table (6) showed that the highest number of *P. alfierii* in cotton plants was (23-80 individuals /5 plants) in Aug . 3rd. , when the highest number of aphids was (35.20 individuals /leaf) in July 6th and whitefly was (19.20 individuals /leaf) in August 24th

2.2.2-Order : Neuroptera

Fam : Chrysopidae *chrysoperla carnea* (stephens)

In This investigate in treated cotton field *C. carnea* appeared with a few scattered number from the first inspection until the end of June . After that the population increased gradually .Data in table (5) recorded that the highest number (42.6 individuals /5 plants) in early of July . Increasing aphids and whitefly at the end of June and the beginning of July reached a highest number of aphids and whitefly were (43.15 & 7.90 individuals / leaf) and whitefly was in June 29th respectively .

In the 2nd season 2004, data in table (6) in cotton fields showed that the highest number of *C. carnea* (37.6 individuals /5 plants) in August 3rd , while the highest number of aphid and whitefly were (35.20 19.20 individuals / leaf) in July 6th and in August 24th, respectively.

2.2.3- Order : Hempitera

2.2.3.1-Fam.: Anthocoridae (*Orius albidipennis* (Reuter) and *O. laevigatus* (fieber)

Data in table (5) during the 2nd season , in untreated cotton field , this predator appeared three peaks represented by (18.70 , 27.60 and 27.40 individually / 5 plants) in June 1st , July 6th and September 7th , respectively . When the highest number of aphid and whitefly were (43.15 & 8.50 individuals /leaf) in June 29th and July 27th , respectively.

In the 2nd season , in cotton fields , data in table (6) cleared that 3 peaks of this predator 19.00 , 26.60 and 25.40 individuals / 5 plants on July 6th, August 3rd and September 9th, respectively , while the highest number of aphid and whitefly were (35.20 and19.2 individuals / leaf) in July 6th and August 24th.

2.2.3.2- Family : Miridae : *Campylomma nicolas* put

This predator was noticed feed on egg , first and second nymphs of *B tabaci* in 1st season , Data in table (5) showed that two peaks 22.20 and 23.40 individuals /5 plants on July 27th and August 31st , respectively . While the highest number of Aphid and whitefly were (43.15 and 8.50 individuals / leaf) on June 29th and July 27th, respectively .

In the 2nd season , data in table (6) showed that the highest number was (13.60 individuals /5 plants) in August 17th , when the highest number of aphid and whitefly were (35.20 and 19.20 individuals/ leaf) on July 6th and in August 24th in cotton fields, respectively . On the other hand , data in table (6) showed that the highest number of *C. nicolas* was (13.60 individuals / 5 plants) in August 17th , when the highest number of Aphid and whitefly were (35.2 and 19.20 intervals / leaf) on July 6th and August 24th , respectively .

2.2.4-*.order :* Diptera

Family : Syrphidae : Hover flies*: Syrphus corollae* fabricius

Cotton season 2003 , data in table (5) showed that *S. corollae* began to appear in late June when the population of aphids and whitefly began to increased , in cotton field , the highest number of *C. Nicolas* was recorded 17.60 intervals /5 plants on July 27th coincides the highest number of aphid and white were (43.15 and 8.5)in June 29th and July 27th, respectively .

In the 2nd season , data in table (6) in untreated cotton field recorded that the highest number of *S. corollae* 18.40 individuals /5 plants in August 10th , when the highest number of aphid and whitefly (35.2 and 19.20 individuals / leaf) on July 6th and August 24th , respectively .

2.2.5-Order : Araneae , spiders

Families : Theridiidae (*steatoda spp*) ; Thomisidae (*Thomisus citrinellus*) ; Corinnidae (*Castianeira antinorii*); Lycosidae (*Paradosa spp);Linyhidae (Erigone spp*) . Gnaphosidae (*zelotes spp*) ; clubiondae (*Chircanthum spp)* and salticidae *(Neathe oculata*) .

In the 1st season , data in table (5) showed that the mean number of true spider in cotton field , was recorded allover the season and the highest number 19.60 individuals /5 plants on August 17th . While the highest number of aphid and whitefly were (43.15 and 8.50 individuals / leaf) on June 29th and July 27th ., respectively . Richert and Bishop (1990) ; Breene *et al* (1993 , 1994)and Provencher and Richert (1994) they reported that the spiders are known to cause considerable mortality to *Bemisia* spp . adults .

In 2004 cotton season, data in table (6) showed that the cotton field recorded the highest number of true spider 23.80 individuals/ 5 plants on August 3rd .

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Table (1) Population fluctuation of *B. tabaci* and its parasitoids in untreated cotton fields at El Minia Governorate, season 2003 .

Date of inspection	Untreated				Date of inspection	Untreated			
	Third instar pupae / leaf *	% parasitism				Third instar pupae / leaf *	% parasitism		
		En. Lutea	Er. Mundus	Total			En. Lutea	Er. Mundus	Total
11/05/03	1.9	25	17.5	42.5	27	12.1	49.3	32.7	82
18	2.5	28.3	21.8	50.1	3/8	9.5	53.4	35.4	88.8
25	2.8	30	16.6	46.6	10	7.4	54.8	38.4	93.2
1/6	3.7	33.3	18.4	51.7	17	6.9	51.5	45.4	96.9
8	4.9	38.6	11.3	49.9	24	5.8	52	26.8	78.8
15	7.9	40.5	34.3	74.8	31	4.7	48.2	42.1	90.3
22	8.5	44.8	35.1	79.9	7/9	3.8	46.3	31.9	78.2
29	11.4	45.9	28.5	74.4	14	7.3	55.2	33.9	89.1
6/7	8.7	43.5	24.7	68.2	21	6.5	59.4	29.3	88.7
13	6.1	47.5	33.3	80.8	28	4.2	34.9	26.1	61
20	13.5	50	29.8	79.8	5/0	3.6	36.5	24.8	61.3

*Mean number /leaf

Table (2) Population fluctuation of *B. tabaci* and its parasitoids in untreated cotton fields at El Minia Governorate, season 2004

Date of inspection	Untreated				Date of inspection	Untreated			
	Third instar pupae / leaf *	% parasitism				Third instar pupae / leaf *	% parasitism		
		En. Lutea	Er. Mundus	Total			En. Lutea	Er. Mundus	Total
11/05/04	0.9	18.6	21.7	40.3	27	16.2	21.9	26.4	48.3
18	1.6	22.5	15.9	38.4	3/8	18.3	24.5	21.7	46.3
25	1.9	16.8	24.5	41.3	10	14.5	25.3	24.3	49.6
1/6	3.8	19.4	15.1	34.5	17	9.6	16.2	18.6	34.8
8	4.3	17.5	26	43.5	24	12.3	14.5	16.4	30.9
15	4.6	15.3	19.2	34.5	31	22.5	36.7	32.5	69.2
22	4.5	16.4	27.4	43.8	7/9	19.2	29.8	25.8	55.6
29	5.6	19.7	18.9	38.6	14	18.5	23.4	22.2	45.6
6/7	6.2	22.6	20.5	43.1	21	21.3	45.3	23.1	68.4
13	8.4	24.3	21.3	45.6	28	17.7	56.4	24.6	81
20	7.3	18.7	22.5	41.2	5/0	15.3	19.2	17.3	36.5

*Mean number /leaf

Table (3) Population dynamics of *B. tabaci* , *A. gossypii* and the predator mite *A. Swirskii* in untreated cotton fields at El -Minia Governorate, season 2003 .

Date of inspection	Untreated			Date of inspection	Untreated		
	Third instar pupae / leaf *	Aphids / leaf*	Mites / leaf *		Third instar pupae / leaf *	Aphids / leaf*	Mites / leaf *
11/05/03	0.4	0.25	0.3	27	7.4	10	8.5
18	0.6	0.35	0.5	3/8	7.6	12.5	11
25	1	1.7	0.9	10	8.5	14.5	28.4
1/6	1.2	1.9	2.1	17	9.4	16.7	21.7
8	1.4	2.8	2.7	24	11.6	15.6	24.5
15	2.8	5.3	5.1	31	8.2	17	23.9
22	3.2	3.6	5.8	7/9	7.4	43.1	18.3
29	3.7	4.9	5.2	14	6.3	30	15.8
6/7	4.1	7.1	6.9	21	5.5	20.5	13.2
13	5.3	9.3	7.5	28	4.8	18.6	9.5
20	7.9	9.6	7.8	5/10	3.4	11.4	7.3

*mean number / leaf

Table (4) Population dynamics of *B. tabaci* , *A.* gossypii and the predator mite *A. Swirskii* in untreated cotton fields, at El- Minia Governorate, season 2004 .

Date of inspection	Untreated			Date of inspection	Untreated		
	Third instar pupae / leaf *	Aphids / leaf*	Mites / leaf *		Third instar pupae / leaf *	Aphids / leaf*	Mites / leaf *
11/05/2004	0.9	0.6	1.4	27	7	14.9	12.3
18	1.6	1.7	1.6	3/8	7.5	12.7	14.2
25	1.9	1.6	1.7	10	7.6	10.8	16.3
1/6	3.8	1.8	2.3	17	8.5	9.4	10.4
8	4.2	4.3	2.5	24	9.6	15.3	8.5
15	4.3	4.5	3.9	31	7.9	19.7	9.2
22	4.5	5.8	4.3	7/9	19.2	22.4	7.8
29	4.6	6.3	4.5	14	15.3	27.3	5.6
6/7	4.3	8	4.8	21	10.7	23.4	4.7
13	8.2	9.4	13.7	28	6.4	18.3	4.9
20	6.1	11.5	15.9	5/10	8.9	12.6	3.2

*Mean number

Table (5) Population fluctuation of *B. tabaci* , *A. gossypii* and their predators in untreated cotton field at El-Minia Governorate, season 2003

Inspection Date	Third instar pupae leaf	Aphid Leaf *	Mean number of predators / five plants -row							
			Lady bird	Lacewing	Rove beetle	Orius	True Spider	Scymnus	Hover Flies	c. nicolas
11/5/2003	0.40	0.15	2.80	17.60	2.20	3.80	1.20	0.80	1.80	0.50
18	0.60	0.35	3.40	18.00	2.80	7.20	2.00	2.20	2.00	1.00
25	1.00	1.70	4.00	20.20	4.00	10.0	2.40	3.20	2.60	1.40
1/6	1.20	2.50	4.20	20.80	6.80	10.8	3.80	3.80	4.60	2.00
8	1.10	5.30	4.40	24.00	6.40	11.6	4.80	7.20	6.80	3.00
15	3.20	7.10	7.80	33.60	7.50	18.7	4.20	7.40	7.60	4.00
22	3.90	17.00	8.20	35.20	8.30	19.4	6.60	8.20	8.80	5.40
29	7.90	43.15	17.6	37.40	10.00	23.6	10.00	9.40	9.40	5.60
6/7	4.60	30.00	13.4	42.20	11.20	27.6	11.20	14.80	10.80	14.00
13	5.70	20.55	14.0	40.20	14.20	25.8	13.40	15.40	11.20	16.80
20	3.10	15.60	11.8	34.80	15.00	18.2	11.60	16.00	13.20	19.70
27	8.50	10.00	11.4	33.40	15.90	14.8	7.40	20.40	17.60	22.20
3/8	6.10	9.60	10.8	28.00	11.50	15.4	6.00	13.60	15.80	13.40
10	1.60	4.95	10.8	25.60	9.70	13.0	9.00	12.60	13.80	14.60
17	2.60	3.65	5.80	27.80	11.20	9.40	19.60	10.00	12.20	12.60
24	3.00	2.75	4.30	30.40	10.30	23.4	4.80	9.80	10.60	17.00
31	3.10	9.30	3.70	27.40	12.40	24.8	5.30	12.60	10.20	23.40
7/9	4.10	18.60	2.60	22.50	8.70	27.4	3.20	13.70	7.80	21.50
14	5.30	16.70	2.00	25.30	6.50	10.6	4.10	12.20	7.50	18.60
21	8.20	14.50	1.80	22.10	5.80	9.40	2.50	8.40	6.40	13.20
28	7.90	12.80	2.30	11.60	5.60	8.60	1.90	3.00	3.40	9.30
5/10	7.60	11.50	1.55	9.70	4.50	7.50	1.30	2.30	2.90	5.70

Table (6) Population fluctuation of *B. tabaci* , *A. gossypii* and their predators in untreated cotton field at El-Minia Governorate ,season 2004.

Date of inspection	Third instar pupae leaf	Aphids Leaf *	Mean number of predators / five plants -row							
			Lady bird	Lacewing	Rove beetle	Orius	True Spider	Scymnus	Hover Flies	C. nicolas
11/5/004	0.90	0.60	5.40	9.30	2.20	9.20	2.40	2.60	3.40	1.80
18	1.90	1.70	6.00	11.20	5.20	9.80	2.80	4.20	3.80	2.00
25	1.60	1.65	7.00	13.40	9.40	11.6	3.40	4.60	3.60	2.90
1/6	4.20	4.30	7.80	14.70	9.60	12.5	4.00	4.80	4.00	3.80
8	3.80	5.90	8.20	15.60	10.60	13.6	4.20	5.10	4.80	5.00
15	4.50	7.50	8.6	19.80	11.40	16.0	5.00	5.60	6.20	5.40
22	4.30	9.30	10.4	22.00	11.20	16.4	5.80	7.40	6.80	6.00
29	4.60	11.60	14.4	28.20	14.80	17.5	6.20	7.80	7.00	7.40
6/7	8.20	35.20	22.8	28.80	17.20	19.0	9.00	7.20	7.50	7.60
13	4.60	27.40	18.7	28.60	18.20	20.0	9.00	8.60	10.60	8.00
20	4.50	22.50	16.3	31.60	15.30	22.4	8.60	9.40	16.40	8.20
27	4.90	16.70	13.9	32.00	12.20	25.0	9.00	9.80	13.50	10.20
3/8	6.10	14.60	12.4	37.60	23.80	26.6	23.80	20.60	12.30	10.80
10	7.00	12.80	12.7	33.80	20.70	25.4	16.50	22.30	18.00	12.40
17	7.80	10.50	9.40	26.80	18.90	23.6	12.70	18.60	15.20	13.60
24	19.20	11.90	8.60	21.20	17.20	24.0	13.20	13.40	12.10	12.00
31	17.50	15.70	6.20	17.80	15.40	24.4	11.70	13.60	10.70	9.60
7/9	13.80	12.50	5.80	16.80	13.50	25.4	9.60	11.40	8.80	8.40
14	11.50	10.70	4.60	15.90	12.70	23.8	8.50	10.20	7.70	8.70
21	9.70	8.80	8.80	14.60	10.30	15.7	7.30	8.80	6.90	7.20
28	8.30	6.50	8.90	11.80	8.70	11.5	6.50	8.3	5.70	6.70
5/10	7.50	4.70	9.60	10.50	5.40	9.80	3.90	6.90	4.30	5.80

*mean number /leaf

التغيرات الموسمية للأعداء الطبيعية المرتبطة بذبابه القطن البيضاء *Bemisia tabaci* (Genn.) ومن القطن *Aphis gossypii* (Glover) في حقول القطن.

حمدي محمد إسماعيل ــ إدريس سلام عبد الوهاب – حسن فرج ضاحي

معهد بحوث وقاية النباتات – دقي – جيزة

أجريت هذا التجربة في مزرعة محطة البحوث الزراعية بملوي – محافظة المنيا لدراسة الأعداء الطبيعية المرتبطة بذبابة القطن البيضاء ومن القطن ومعرفة مدى الخفض الذي تسببه الطفيليات لتلك الحشرات ، وأسفرت النتائج المتحصل عليها على ما يلي:

١-تهاجم ذبابه القطن البيضاء بنوعين من طفيليات رتبه غشائية الأجنحة *Eretmocerus mundus Mercet , Encarsia lutea* وكانت نسبة التطفل بالطفيل الأول أعلى من الطفيل الثاني ولم تسجل طفيليات على من القطن خلال موسمي الدراسة . وفى الموسم الأول وصل تعداد ذبابه القطن البيضاء ومن القطن إلى الذروة فى نهاية يونيو وآخر يوليو فى النباتات غير المعاملة ، أما فى الموسم الثانى وصل التعداد الى ذروته فى النصف الأول من يوليو ، وآخر اغسطس فى النباتات غير المعاملة . ومن ناحية أخرى وصلت نسبة التطفل على العمر الثالث والرابع لذبابه القطن البيضاء الى أقصاها ٩٦,٩٠% فى النصف الثانى من أغسطس للنباتات غير المعاملة . أما فى الموسم الثانى وصلت الى ٨١% للنباتات الغير معاملة .

٢-المفترسات التى تم تسجيلها خلال هذه الدراسة هى الحلم المفترس *Amblyseius swirskii* ، العناكب الحقيقية والمفترسات الحشرية

(Coccienlla undecimpunctata , Coccienlla septempunctata , Cydonia vicina , Coccienlla tridecimpunctata , Scymnus syriacus , Scymnus interruptus , Chrysopela carnea , Orius albidipennis , Orius laevigatus , Camplyomma nicolas Put. *, Peaderuis alfierii, Surphis corallae)*