*J. Agric. Sci. Mansoura Univ., 33 (12): 8881 - 8887, 2008*

# SEASONAL ABUNDANCE *Aphis gossypii* GLOVER ON THE OKRA PLANTS AND ITS HYMENOPTEROUS PARASITOIDS IN EL- ARISH, NORTH SINAI, EGYPT

**Eid, F. M. H.; R. A. Hendi and Wafaa O. Gomaa**
**Plant Protection Research Institute, ARC, Egypt.**

## ABSTRACT

The present study was conducted to evaluate the Seasonal abundance of *Aphis gossypii* Glover and assessment the percentage of infestation on okra plant at EI-Arish, , North Sinai Govemorate . A survey of the natural enemies of aphis was conducted and the percentages of parasitism were evaluated for two successive seasons 2005 & 2006. In season 2005 data indicated that the percentage of infestation caused by *Aphis gossypii* ranged from 10.11 to 59. 21% with an average of 31.34% and the percentages of parasitism ranged from 1 to 2% with an average of 0.25%. In season 2006 data indicated that the percentage of infestation ranged from 11.59 to 76.25% with an average of 34.18% and the percentages of parasitism varied from 1 to16% with an average2.25% .

## INTRODUCTION

Okra is one of the most important vegetables in Egypt. It is well adapted to a wide range of ecological conditions. Recently, the crop was successfully planted in North Sinai in sandy soil. Numerous insects attack okras, pest management is an important aspect of okra production. Okra and its pest complex forms "Okra ecosystem" which also includes natural enemies living on these pests. Observations on parasitoids of *Earias vittella* egg were shown byTelang *et al* 2004, These pests are considered important on okras and have recently developed to rather severe pests on several crops in Egypt, this development is associated with the expansion in application of organic pesticides, presumably leading to a change in the natural balance of pests and thus associated natural enemies (Hafez& Khalifa, 1975). (Habib *et al* 1976) studied the seasonal abundance of several insect pests and their predators in cotton fields in Kalubia and Alexandria Governorates, Egypt, in 1970-71. He found many pests such as *Aphis gossypii* and many predators in cotton fields in Kaliubia and Alexandria Governorates, Egypt. The cotton or melon aphid *Aphis gossypii* is one of the most important insect pests attacking cotton and okra. (Hafez and El-Khayat 1996) found that *Aphis gossypii* was the only aphid species which infested cotton plants in Moshtohor region, Egypt, during 1994-95.They showed that there was one chrysopid species, eight coccinellids, one staphylinid, one cecidomyiid and two syrphids, attacking the *Aphis gossypii* in the field. (Hafez *et al* 1996) also investigated seasonal fluctuations of *Aphis gossypii* and associated predators and parasitoids throughout the 1994-95 growing seasons in Fayoum and Moshtohor, Egypt. (Zaki *et al 1999*) released two predators, *Chrysoperla carnea* and *Coccinella undecimpunctata* and the two parasitoids *Diaeretiella rapae* and *Eretmocerus mundus* to control *Aphis gossypii* and white flies in okra. In Egypt (Al-Eryan *et al* 2001) studied the population status of both *A. gossypii* and its predator, *Coccinella undecimpunctata* during the summer season of 1998 under field and semi-field conditions [location not given]. Results revealed that the predator, C. 11-punctata [*Coccinella undecimpunctata*] was accompanying *A. gossypii*. In

India, studied were carried out during January-March 2000 to evaluate the effectiveness of different biological control agents against the major pests of okra, such as cotton aphid (*Aphis gossypii*) and showed *Chrysoperla carnea* feeding on *Aphis gossypii*, (Praveen and Dhandapani 2001). In Brazil (Barros *et al* 2006) identified and quantified the natural enemies associated with cotton pests infesting cotton , they found that *Aphis gossypii* attacking cotton fields. In China **(**Feng-HongZu *et al* 2007) studied the population dynamics and predatory function of *Coccinella undecimpunctata* to *Aphis gossypii* in cotton fields..**(**Zarpas *et al* 2007) investigated Life histories of general predatory species (*Coccinella septempunctata* and *Chrysoperla carnea*), control agents of the cotton aphid *Aphis gossypii* (Hemiptera: Aphididae) from different regions of Greece reared on *Aphis gossypii*.

The aim of the present work is conducted to evaluate the Seasonal abundance of *Aphis gossypii* Glover and assessment the percentage of infestation on okra plant at EI-Arish, , North Sinai Govemorate .

## MATERIALS AND METHODS

The present study was conducted at two farms in El-Arish (Each 25x25m), the Agricultural Research Station and private farm in North Sinai Governorate. The study had been carried out during two successive seasons ( 2005 & 2006 ), Sampling was carried out at weekly intervals. In season 2005 the okra seeds were sown in mid July while the seeds sown in mid-April in season 2006 and the recommended agricultural practices were followed. The percentage of infestation was evaluated and the percentage of parasitism was calculated .

The number of aphids were estimated / leaf by using inch$^2$

**Percentage of infestation with *A. gossypii* Glover in the field.**

Ten plants were chosen randomly weekly from the field. The percentage of infestation with *A. gossypii* was estimated. The number of infested leaves related to the whole number of leaves in the plant was estimated. The percentage of infestation was then calculated by applying the following formula:

$$\% \text{ Infestation} = \frac{\text{No. of infested leaves}}{\text{Total no. of examined leaves.}} \times 100$$

The average percentage of infestation was calculated.

**Percentage of parasitism:**

Some infested okra leaves were collected partiality weekly from the treatment. The collected samples were kept in paper bags and transferred to the laboratory. The percentage of parasitism by all parasitized species obtained from the collected okra leaves samples was calculated. Available *A. gossypii* nymphs obtained from the infested leaves were chosen randomly toevaluate the percentage of parasitism. They were dissected under a stereomicroscope. The average percentage of parasitism was then calculated by applying the following formula :

$$\% \text{ Parasitism} = \frac{\text{No. of parasitized nymphs}}{\text{Total no. of examined nymphs}} \times 100$$

**Common recorded natural enemies:**

The predatory species associated with okra plants recorded in the field. The collection of the infested leaves was occurred. Each aphid mummies was kept in a clean plastic tube (1 X 3 cm). The tubes were covered with a muslin cloth, kept in position by means of rubber band until the emergence of parasitoids. Emerged parasitoid species were collected and identified in Biological Control Research Department, PPRt, ARC, Giza.

## RESULTS AND DISCUSSION

**Percentage of infestation:**

Percentages of infestation with aphid on okra leaves for the successive sampling are shown in Tables(1)&(2) .

In season 2005, the percentage of infestation *A. gossypii* ranged between 10.11 in the fourth week of September and 59.21% in the third week of August with an average of 31.34%. Infestation with Aphid had three peaks, the I$^{st}$ peak (910) occurred on July 20, the 2$^{nd}$ peak (2520) on August17, and the 3$^{th}$ peak (319) on September 15 ( table1).

**Table (1): Population abundance of *A. gossypii* and the Percentages of infestation (10 plants examined per sample) in El-Arish, North Sinai during (2005).**

| Sampling date | Total no. of Infested leaves / sample | No. of aphid / leaf / inch$^2$ | Total no. of aphid | % Infestation |
|---|---|---|---|---|
| **6/7/2005** | 48 | 36 | 1728 | 54.55 |
| **13/7** | 20 | 27 | 540 | 22.22 |
| **20/7** | 35 | 26 | 910 * | 41.67 |
| **27/7** | 27 | 22 | 594 | 49.09 |
| **3/8** | 17 | 32 | 544 | 18.68 |
| **10/8** | 22 | 44 | 968 | 28.57 |
| **17/8** | 45 | 56 | 2520 * | 59.21 |
| **24/8** | 37 | 41 | 1517 | 37.37 |
| **1/9** | 30 | 29 | 870 | 29.13 |
| **8/9** | 13 | 21 | 273 | 19.12 |
| **15/9** | 11 | 29 | 319 * | 13.42 |
| **22/9** | 9 | 11 | 99 | 10.11 |
| **Total** | 314 | | 10882 | |
| **Average percentage of infestation** | | | | 31.34 |

In season 2006, the percentage of infestation *A. gossypii* ranged between 11.59 in the second week of July and 76.25% in the third week of June, with an average of 34.18%. Infestation with Aphid had five peaks. The I $^{st}$ peak (3355) occurred on June18, the 2$^{nd}$ peak (1190) on July 2, the 3$^{th}$ peak (3960) on July23, the 4$^{th}$ peak (1628) on August 6 and the the 5$^{fh}$ peak ( 1026) on August 20 ( Table 2) .

**Table (2): Population abundance of *A. gossypii* and the Percentages of infestation (10 plants examined per sample) in El-Arish, North Sinai during (2006).**

| Sampling date | Total no. of Infested leaves / sample | No. of aphid / leaf / inch$^2$ | Total no. of aphid | % Infestation |
|---|---|---|---|---|
| **28/5/2006** | 29 | 24 | 692 | 31.18 |
| **4/6** | 22 | 35 | 770 | 17.32 |
| **11/6** | 31 | 28 | 868 | 38.27 |
| **18/6** | 61 | 55 | 3355 * | 76.25 |
| **25/6** | 41 | 26 | 1066 | 45.05 |
| **2/7** | 35 | 34 | 1190 * | 53.85 |
| **9/7** | 16 | 22 | 352 | 11.59 |
| **16/7** | 30 | 41 | 1230 | 37.97 |
| **23/7** | 66 | 60 | 3960 * | 46.81 |
| **30/7** | 16 | 21 | 336 | 19.75 |
| **6/8** | 44 | 37 | 1628 * | 35.77 |
| **13/8** | 56 | 29 | 1624 | 61.54 |
| **20/8** | 38 | 27 | 1026 * | 31.67 |
| **27/8** | 26 | 19 | 494 | 20.16 |
| **3/9** | 15 | 17 | 255 | 15 |
| **Total** | 526 | | `18846 | |
| **Average percentage of infestation** | | | | 34.18 |

*** = peak**

**Percentage of parasitism:**

One hundred of aphid nymphs (obtained from aphid infested leaves chosen randomly to evaluate the percentage of parasitism) were dissected under a stereomicroscope to determine the parasitised numph. Data are shown in Tables (3) & (4).The percentage of parasitism caused by hymenopterous parasitoids varied from 1% in the first week of July to 2 % in the fourth week of July with an average of 0.25% during the first season 2005.

On the other hand, the percentage of parasitism ranged between 1% in the first week of July to 16 % in the fourth week of May with an average of 2.25% during the second season (2006) (Table4).In conclusion, data presented in (Table 3 and 4) indicated that, the average percentage of parasitism in aphids caused by the hymenopterous parasitoids at treatment and control were 0.25 % and 2.25 % during the first season (2005) and the second season (2006), respectively.

**Hymenopterous parasitoids attacking *A. gossypii* Glover in okra cultivars:-**

Species were recorded from *A. gossypii*. The secured parasitoid species from two successive seasons, 2005 and 2006 were; *Aphidius matricariae* Haliday and *Ephedrus persicae* Froggatt.

**Table (3): Percentages of parasitism in samples of *A. gossypii* (10 leaves examined per sample) in treatment, El-Arish, North Sinai during (2005) season.**

| Sampling date | No. of insects in the sample | | % Parasitism |
|---|---|---|---|
| | Parasitized insects | Non-Parasitized insects | |
| **6/7/2005** | 1 | 99 | 1 |
| **13/7** | 0 | 100 | 0 |
| **20/7** | 0 | 100 | 0 |
| **27/7** | 2 | 98 | 2 |
| **3/8** | 0 | 100 | 0 |
| **10/8** | 0 | 100 | 0 |
| **17/8** | 0 | 100 | 0 |
| **25/8** | 0 | 100 | 0 |
| **1/9** | 0 | 100 | 0 |
| **7/9** | 0 | 100 | 0 |
| **15/9** | 0 | 100 | 0 |
| **23/9** | 0 | 100 | 0 |
| **Total** | 3 | 1197 | |
| **Average percentage of parasitism** | | | 0.25 |

**Table (4): Percentages of parasitism in samples of *A. gossypii* Glover (10 leaf examined per sample) in treatment, El-Arish, North Sinai during (2006) season.**

| Sampling date | No. of insects in the sample | | % Parasitism |
|---|---|---|---|
| | Parasitized insects | Non-Parasitized insects | |
| **28/5/2006** | 16 | 84 | 16 |
| **4/6** | 9 | 91 | 9 |
| **11/6** | 6 | 94 | 6 |
| **18/6** | 2 | 98 | 2 |
| **24/6** | 0 | 100 | 0 |
| **2/7** | 1 | 99 | 1 |
| **9/7** | 2 | 98 | 2 |
| **16/7** | 0 | 100 | 0 |
| **23/7** | 0 | 100 | 0 |
| **30/7** | 0 | 100 | 0 |
| **6/8** | 0 | 100 | 0 |
| **13/8** | 0 | 100 | 0 |
| **20/8** | 0 | 100 | 0 |
| **27/8** | 0 | 100 | 0 |
| **3/9** | 0 | 100 | 0 |
| **Total** | 36 | 1564 | |
| **Average percentage of infestation** | | | 2.25 |

**Common Predator:**

The most common predators observed in okra cultivars during the two successive seasons, 2005 and 2006 are: -

*Chrysoperla carnea* Steph., *Chrysopa* spp , *Orius albidipennis* ,*Coccinella undecimpunctata* and *Scymnus deserticola*. Zaki *et al* (1999 ), Praveen,P.M; N. Dhandapani(2001) and Al-Eryan *et al* (2001 )recorded the same results (Table 5).

## REFERENCES

Al-Eryan,.M.A.S; A.A.Zaitoon,; H.A. Rezk(2001).The use of Coccinella 11-punctata (Coleoptera: Coccinellidae) against Aphis gossypii (Homoptera: Aphididae) on okra plants. Alexandria Journal of Agricultural Research. 46(1): 107-114 .

Barros,-R; Degrande, P.E; Ribeiro, J.F; Rodrigues, A.L.L; Nogueira, R.F; Fernandes, M.G.( 2006): Population fluctuation of beneficial insects associated to cotton pests. Arquivos do Instituto Biologico Sao Paulo. 73(1): 57-64.

Habib, A; Rezk, G.N; Farghaly, H.T; Ragab, Z.A.( 1976): Seasonal abundance of some predators in cotton fields and its relation to certain pests. Bulletin of the Entomological Society of Egypt. Publ 1980;(60):191-196.

Feng-HongZu; Wang. Lan; Dong-Hong Qiang; Ma-Chang Yun(2007): Population dynamics and predatory function of *Coccinella undecimpunctata* to *Aphis gossypii*.Chinese Journal of Biological Control; 23(3): 209-212.

Hafez, A.A; El-Khayat, E.F.(1996): Predators of Aphis gossypii Glover in Qalyoubia Governorate including first record of a coccinellid in Egypt. Annals of Agricultural Science, Moshtohor. 34(2): 749-756.

Hafez,M.& A. Khalifa (1975). Report on cotton culture and cotton pest control in Egypt. ( FAO/UNER. Consulation on pest management systems for the control of cotton pests, Karachi. 13-16 October, 1975).

Hafez, A.A; El-Dakroury, M.S; Shalaby, F.F; Kandil, M.A, (1996): Seasonal abundance of Aphis gossypii Glov. on cotton plants and their aphidivorous associations Annals of Agricultural Science, Moshtohor. 34 (3): 1247-1261.

Praveen,P.M; N. Dhandapani(2001). Eco-friendly management of major pests of okra (Abelmoschus esculentus (L.) Moench).Journal of Vegetable Crop Production 7(2): 3-12.

Telang, S.M; Rathod, K.S. and Rathod, R.M.(2004). Parasitization by different parasites of *E. vitella* in okra Journal of Soils and Crops. 14(2): 335-339 .

Zaki,-F-N;, M.F. El-Shaarawy; N.A. Farag (1999). Release of two predators and two parasitoids to control aphids and whiteflies. Anzeiger fur- Schadlingskunde. 72(1): 19-20.

Zarpas, K.D; Margaritopoulos, J.T; Tsitsipis, J.A (2007): Life histories of generalist predatory species, control agents of the cotton aphid *Aphis gossypii* (Hemiptera: Aphididae). Entomologia Generalis. 30(1): 85-102

## الوفرة الموسمية لمن القطن ( افيس جوسيبيي ) علي نباتات البامية وطفيلياتها التابعة لرتبة حشرات غشائية الأجنحة في منطقة العريش بشمال سيناء - مصر

**فوزي محمد حسن عيد ، رضا عبد السميع هندي و وفاء عثمان جمعة**
**معهد بحوث وقاية النباتات – مركز البحوث الزراعية**

تختص الدراسة الحالية بتقييم التذبذب الموسمي لمن القطن ( افيس جوسيبيي ) وتقييم نسب الإصابة به علي نباتات البامية في العريش في محافظة شمال سيناء وكذلك عمل تقدير للأعداء الحيوية للمن , وتقدير نسب التطفل علي مدار موسمين تاليين ٢٠٠٥ و ٢٠٠٦ . ففي موسم ٢٠٠٥ تشير النتائج المتحصل عليها أن نسبة الإصابة بمن القطن تراوحت ما بين ١٠,١١% إلى ٥٩,٢١% بمتوسط عام ٣١,٣٤% , وتراوحت نسبة التطفل ما بين ١% إلي ٢% بمتوسط عام ٠,٢٥% . وفي موسم ٢٠٠٦ تشير النتائج المتحصل عليها أن نسبة الإصابة بمن القطن تراوحت ما بين ١١,٥٩% ٧٦,٢٥ % بمتوسط عام ٣٤,١٨%, وتراوحت نسبة التطفل ما بين ١% إلي ١٦% بمتوسط عام ٢,٢٥%.