

**THE ROLE OF NATURAL ENEMIES IN REDUCING
POPULATION DENSITY OF SOME DATE INSECT
PESTS IN SIWA OASIS - EGYPT**

By

ESLAM MOHAMED MOHAMED ALI EL-SAADNY

B.Sc. Agri. Sci. (Environment and Bio-Agriculture) Al-Azhar Univ.2005

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Submitted in Partial Fulfillment of the
Requirements for the Degree

Of

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In

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(Plant Protection- Economic Entomology)

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Supervision Committee:

Prof. Dr. ABD RABOU EID HUSSAIN

Prof. of Economic Entomology, Dept. of Plant Protection, Fac. of Agric. Cairo,
Al-Azhar Univ.

...A...E...Huss

Prof. Dr. FAWZY MOHAMED HASSAN EID

Chief Researcher, Biological Control Research Department, Plant Protection Research
Institute, Agricultural Research Centre, Ministry of Agriculture.

Fawzy..Eid

APPROVAL SHEET

NAME: ESLAM MOHAMED MOHAMED ALI EL-SAADNY
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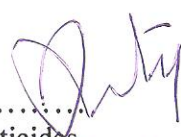
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Approved by:

Prof. Dr. SAYED ASHRAF GAMAL EL DIN EL ARNAOUTY.....
Prof. of Biological Control and Head of Dept. of Economic Entomology and Pesticides
Fac. of Agric., Cairo Univ. 

Prof. Dr. KHALED AHMED MAHMOUD HUSSEIN EL-KHAWASS.....
Prof. of Economic Entomology, Dept. of Plant Protection, Fac. of Agric. Cairo,
Al-Azhar Univ. 

Prof. Dr. ABD RABOU EID HUSSAIN ...*A. E. Hussein*
Prof. of Economic Entomology, Dept. of Plant Protection, Fac. of Agric. Cairo,
Al-Azhar Univ.

Prof. Dr. FAWZY MOHAMED HASSAN EID *Fawzy Eid*
Chief Researcher, Biological Control Research Department, Plant Protection Research
Institute, Agricultural Research Centre, Ministry of Agriculture.

Date : 23/5/2017

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SUMMARY

I- Survey of date fruit insect pests and their natural enemies in Egypt

A survey was carried out for two seasons of (2012 and 2013) (May -December) in two localities, Ireghin and Hakuk, in Siwa Oasis, Matrouh Governorate, Egypt.

The surveyed pest species were the greater date moth, *Arenipses sabella*, the lesser date moth, *Batrachedra amydraula*, the oases date moth, *Ephestia calidella*, the almond moth, *E. cautella* and the carob moth, *Ectomyelois ceratoniae*. The species of parasitoid obtained was *Bracon hebetor* (Say).

The following predators have been found to prey upon eggs and larvae of *Ephestia cautella* in the field:

Chrysoperla carnea (Stev.), *Orius albidipennis* (Reuter), *O. laevigatus* (Fieb) and *Xylocoris flavipes* (Reuter). Adult and nymphs were found among fallen date fruits under palm trees.

II. Infestation percentage:

Infestation percentage was estimated during two successive seasons, 2012-2013 (May- December) in two localities, Ireghin and Hakuk. The average percentages of infestation were 5.8% and

79.82% in Ireghin; 6.23% and 83.93% in Hakuk, in bunched and fallen dates respectively during the first season, 2012. During the second season, 2013 the average percentages of infestation were 8.27% and 88.89% in Ireghin; 8.48% and 87.86% in Hakuk, in bunched and fallen dates, respectively.

The parasitism percentages on larvae obtained from date fruits in Ireghin and Hakuk localities, in Siwa Oasis were as follows:

A. Ireghin locality:

Average 6.1% in 2012 season (1.09% - 18.42%).

Average 9.97% in 2013 season (1.33% - 29.57%).

B. Hakuk locality:

Average 6.1% in 2012 season (1.59% - 19.77%).

Average 6.93% in 2013 season (2.5% - 13.79%).

III. The present study deals mainly with the biology of *B. hebetor* in the laboratory.

***Bracon hebetor*.**

The effects of different constant temperatures on the duration of different immature stages were investigated.

1. At $15 \pm 1^\circ\text{C}$, $25 \pm 1^\circ\text{C}$, $30 \pm 1^\circ\text{C}$ and $65 \pm 5\%$ R.H., The mean incubation periods of the parasite eggs were 5.75 ± 0.10 (5 - 6)

days, 2.30 ± 0.11 (2 - 3) days and 1.65 ± 0.11 (1 - 2) days, , respectively.

The mean duration of immature stages were 14.35 ± 0.16 (12-16) days, 11.30 ± 0.15 (9 -14) days and 6.10 ± 0.14 (4 - 10) days - 4.95 ± 0.11 (4 - 6) days , 3.05 ± 0.14 (2 - 4) days and 2.25 ± 0.10 (2 - 3) days - 5.60 ± 0.13 (5 - 7) days, 3.45 ± 0.11 (3 - 4) days and 2.35 ± 0.11 (2 - 3) days - 30.65 ± 0.26 (26 - 35) days , 20.10 ± 0.15 (16 - 25) days and 12.35 ± 0.15 (9 - 18) days for larval, pre-pupa, pupal stages and total immature stages developmental periods, respectively.

2. The parasitoid deposited several eggs on or beside the host larvae (super parasitism) and the most of them have emerged.
3. Adults in all cases are males and females.
4. All unmated females lay eggs, which give only males.
5. The process of oviposition is described. The ovipositor remains inserted within the host larvae and the female deposited its eggs on or beside the host. It has been found that the number of parasitoid deposited eggs and egg hatchability on the fourth larval instar more than that on second larval instar.
6. The number of parasitoid eggs deposited on the host larva varied according to the available host. In case of abundance of host larvae, one parasitoid egg per host larva was almost deposited. In

case of scarcity of host larvae, super parasitism did occur and the number deposited eggs per larva reached 72.7 ± 5.26 eggs (36 - 114) throughout its life, which ranged between 9 and 16 days with an average of 11.70 ± 0.48 days at $25 \pm 1^\circ\text{C}$.

7. The oviposition period and the rate of oviposition were estimated at $25 \pm 2^\circ\text{C}$. The mean pre-oviposition, oviposition and post-oviposition periods were 0.90 ± 0.18 day (0 - 2), 9.75 ± 0.45 days (7 - 14) and 1.1 ± 0.05 days (1 - 2), respectively. The daily mean number of eggs was 9.70 ± 0.44 eggs (0.0 - 16).
8. Sex ratio was estimated during two successive years, 2012-2013 in field: During 2012 season, sex ratio was 1: 1.73 ♂♂: ♀♀, while it was 1: 1.60 ♂♂: ♀♀ during season 2013 with an average of 1:1.63 ♂♂: ♀♀ for the two seasons in Ireghin locality, while in Hakuk locality during season 2012. Sex ratio was 1: 1.78 ♂♂: ♀♀, while it was 1:1.83 ♂♂: ♀♀ during season 2013 with an average of 1:1.80 ♂♂: ♀♀ for the two seasons. While sex ratio in laboratory was 1.14: 1.0 ♂♂: ♀♀.
9. The longevity of adult *B. hebetor* is affected by temperature and food, that the mean longevities were 29 days (15-40) for male and 38 days (25-48) for female, 21 days (12-28) for male and 26 days (20-35) for female, 7 days (5-9) for male, 9 days (8-12) for female and 5 days (3-7) for male and 6 days (3-9) for female at 15°C and

when fed on honey, 10% sugar, water only and without food, respectively. The respective figures for 25°C were 10 days (5-15) for male and 15 days (11-19) for female, 9 days (6-13) for male and 12 days (10-15) for female, 6 days (5-8) for male, 8 days (6-10) for female and 5 days (4-9) for male and 5 (4-8) days for female. The respective figures for 30°C were 7 days (4-10) for male and 9 days (7-12) for female, 6 days (4-9) for male and 8 days (5-11) for female, 5 days (3-8) for male, 7 days (6-9) for female and 4 days (3-6) for male and 5 days (4-6) for female.