BIONOMICS OF *BEMISIA AFER* (HEMIPTERA : ALEYRODIDIAE) A NEW PEST OF *CITRUS AURANTIUM* VAR. *AMARA* IN EGYPT

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Abstract

The sycamore whitefly, *Bemisia afer* (Priesner and Hosny) (Hemiptera : Aleyrodidiae) attacked different economic host plants and distributed all over the world. The present work is to record and study host plants, distribution, natural enemies , seasonal abundance on *Citrus aurantium* var. *amara* of the concerned species. The study of host plants, distribution and natural enemies of *B. afer* was done through collection of samples from different host plants found at different localities in Egypt. Seasonal abundance of *B. afer* and its parasitoid were carried out on *Citrus aurantium* var. *amara* in Behira Governorate during 2005 to 2006. During the present work 43 host plants were recorded as infested by *B. afer* in Egypt . This species were distributed in 19 Egyptian Governorates. This species also was recorded associated with 6 natural enemies (5 parasitoids and one predator). *B. afer* has two peaks of abundance during mid of August (7932/30 leaves) and mid of November (10296/30 leaves) in the first year. In the mean time, the second year also had two peaks during mid of August (7300/30 leaves) and mid of November (9204/30 leaves). The highest percent of parasitism by *Encarsia lutea* (Masi) (Hymenoptera : Aphelinidae) was recorded in November 2005 and 2006 (15.9 % and 23.4%, respectively). While the average parasitism rates were 5.7 and 8.9% during the two successive years, respectively.

INTRODUCTION

The sycamore whitefly, *Bemisia afer* (Priesner and Hosny) (Hemiptera : Aleyrodidiae) is one of whitefly species that exerts a lot of taxonomic confusion among the different species (Anderson *et al.* , 2001). It attacks different economic host plants e.g. citrus, guava, cotton and ornamental plants, allover the wide area of distribution (Bink-Moenen, 1983). The sycamore whitefly, *B. afer* attacks about 50 host plants in 14 countries allover the world (Evans, 2007). It is parasitized by two species of parasitoids, namely *Eretmocerus* sp. and *Encarsia lutea* (Masi) (Hymenoptera : Aphelinidae) (Abd-Rabou, 1999). Abd-Rabou and Ahmed (2007) recorded this species attacking *Citrus aurantium* var. *amara* for the first time in Egypt. Eminent workers of the world were attracted to carry on variable investigations on the species (Priesner and Hosny, 1934, Habib and Farag, 1970, Mound and Halsey, 1978, Martin, 1987 and Abd-Rabou, 1996, 1997 and 1999).

The aim of the present work is to record and study host plants, distribution, natural enemies and seasonal abundance on *Citrus aurantium* var. *amara* of the concerned species.

MATERIALS AND METHODS

The study of host plants, distribution and natural enemies of *B. afer* was done through collection of samples from different host plants found at different localities and that are liable to the insect inhabit in Egypt .

1. Host plants and distribution of *Bemisia afer* in Egypt

A survey of host plants and distribution was carried out all over Egypt during 2005-2006. Infested plants with *B. afer* were examined in the field, using a pocket lens. Leaves and stems were collected and placed separately in paper bags for further examination in the laboratory.

2. Survey of the *Bemisia afer* natural enemies in Egypt

Infested leaves with *B. afer* had been examined in the field, using a pocket lens. The parts of the plant from different crops will be collected and placed separately in paper bags for further examination in the laboratory. Materials will be kept in a well-ventilated container until the emergence adult of any natural enemies. Identification of natural enemies will be made by examining by mounted adults in Hoyers medium and on card as follows: The specimens of natural enemies are best preserved as slide mounts and card. It may not be possible to see all the characters and measure some structures in carded specimens. However, when more specimens are available, it is preferable to have both slide mounted and carded specimens. Since body colour is likely to fade during clearing process, it might be necessary to note the colour and sculpture either from dried or freshly collected specimens preserved in alcohol. The smaller size of the specimens and their soft, less sclerotized bodies, make the specimens almost useless for study if preserved in alcohol for longer periods. Dried specimens are soaked in glacial acetic acid (7 drops) mixed with chloral phenol (5 drops) in small watch glasses.

a. After 48 hours specimens should be satisfactorily cleared.
b. The cleared specimens are then mounted in Hoyer's medium.

After drying for about two weeks under 40 °C, the slide cover is ringed with a suitable sealer.

3. Seasonal abundance of *Bemisia afer* on *Citrus aurantium* var. *amara*

Seasonal abundance of *B. afer* was carried out on *Citrus aurantium* var. *amara* in Behira Governorate during 2005 to 2006. The plant area selected for these investigations received no chemical control measures for several years. About 10 trees of *citrus* sp. almost similar in age, shape, size and growth conditions were randomly chosen for sampling two times a month at biweekly intervals. On each sampling, 30 leaves were chosen at random. Thereafter, the leaves were kept in a closed paper bags and transferred to the laboratory to estimate the total number of eggs, larvae , adult per 30 leaves of each sample by the aid of binocular microscope where the number of eggs, larvae and adult of the *B. afer* were counted per one leaf .

Records of the meteorological factors, mainly the daily means of minimum (D.Min.T.), maximum (D. Max.T.) temperatures and relative humidity (D.M.R.H.), were obtained from the Meteorological Department records. The daily records of these factors were recalculated to get the daily averages within two weeks prior to sampling date.

Simple correlation and regression values were calculated to obtain information about the relationships between the three tested weather factors and the population of *B. afer* .

4. Seasonal abundance of *Bemisia afer* parasitoid **on** *Citrus aurantium* var. *amara* **in Egypt**

The abundance of parasitoid of *B. afer* on *Citrus aurantium* var. *amara* was carried out from 2005 to 2006 on citrus trees in Behira. The location was heavily infested by *B. afer* were selected to achieve investigations and were sampled monthly. During the study, no chemical control for the pest was performed on these trees. In the location 10 trees were selected randomly for sampling. Units of sampling consisted of 30 leaves. These were detached off and brought to the laboratory for inspection. Each leave was stored in a well-ventilated emergence glass tube and monitored daily for parasitoid emergence. Rate of parasitism was determined by dividing the number of emerging parasitoid from each by the number of hosts scale existing.

Simple correlation and regression values were calculated to obtain information about the relationships between the three tested weather factors and the population of *B. afer* parasitoid. Also the same values were calculated to obtain information about the relationships between the populations of *B. afer* and its parasitoid.

RESULTS AND DISCUSSION

1. Host plants and distribution of *Bemisia afer* in Egypt

During the present work 43 host plant were recorded infested with *B. afer* in Egypt . This species distributed in 19 Egyptian governorate (Table,1).

2. Natural enemies of *Bemisia afer* in Egypt

This spices was recorded associated with 6 natural enemies (5 parasitoids and one predator) (Table, 2).

3. Seasonal abundance of the population of *Bemisia afer* on *Citrus aurantium* var. *amara* in Egypt

The seasonal abundance of *B. afer* was studied for two successive years from 2005-2006 on *Citrus aurantium* var. *amara* trees in Behira Governorate. The obtained results in Figs (1 and 2) showed that, the insect population had two peaks of abundance during mid of August (7932/30 leaves) and mid of November (10296/30 leaves) in the first year. In the mean time, the second year also had two peaks during mid of August (7300/30 leaves) and the Mid of November (9204/30 leaves). The effects of nine weather factors on the population of *B.afer* were explained below:

3.1. Effect of the biweekly maximum temperature

The simple correlation coefficient between the maximum temperature and the mean number of eggs of *B. afer* was significantly positive in the first season (2005) but this relation was highly significant in the second season (2006) (r = 0.57) and (r = 0.65) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the maximum of the biweekly temperature was significantly positive in the first season (2005) also, this relation was significant in the second season (2006) (r = 0.51) and (r = 0.61) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the maximum of the biweekly temperature was non-significantly positive in the first season (2005) but this relation was significant in the second season (2006) (r = 0.32) and (r = 0.63) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the maximum of the biweekly temperature was significantly positive in the first season (2005) also this relation was highly significant in the second season (2006) (r = 0.54) and (r = 0.65) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the maximum temperature and the counted number of eggs which was significant (b = 0.33) and (b = 0.44) in the 1st and 2nd seasons, respectively, also the maximum temperature and the counted number of immature stages was significant (b = 0.26) and (b = 0.38) in the 1st and 2nd seasons, respectively. The maximum temperature and the counted number of adult stages was non-significant in the first year, while was significant in the second season (b = 0.17) and (b = 0.41) in the 1st and 2nd seasons, respectively. The maximum temperature and the counted number of total number of *B. afer* was significant (b = 0.30) and (b = 0.44) in the 1st and 2nd years, respectively.

3.2. Effect of the biweekly minimum temperature

The simple correlation coefficient between the minimum temperature and the mean number of eggs of *B. afer* was highly significantly positive in the first season (2005) but this relation was significant in the second season (2006) (r = 0.67) and (r = 0.47) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the minimum of the biweekly temperature was significantly positive in the first season (2005) also, this relation was significant in the second season (2006) (r = 0.61) and (r = 0.48) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the minimum of the biweekly temperature was significantly positive in the first season (2005) also this relation was significant in the second season (2006) (r = 0.47) and (r = 0.59) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the minimum of the biweekly temperature was highly significantly positive in the first season (2005) also this relation was significant in the second season (2006) (r = 0.65) and (r = 0.50) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the minimum temperature and the counted number of eggs which was significant in the 1st season and highly significant in the 2nd season (b = 0.46) and (b = 0.53), respectively, also the minimum temperature and the counted number of immature stages was significant (b = 0.39) and (b = 0.47) in the 1st and 2nd seasons, respectively. The minimum temperature and the counted number of adult stages was non-significant in the first year, while was significant in the second season (b = 0.22) and (b = 0.47) in the 1st and 2nd seasons, respectively. The minimum temperature and the counted number of total number of *B. afer* was significant in the first year, while was highly significant in the second season (b = 0.44) and (b = 0.53), respectively.

3.3. Effect of the biweekly mean temperature

The simple correlation coefficient between the mean temperature and the mean number of eggs of *B. afer* was highly significantly positive in the first season (2005) but this relation was significant in the second season (2006) (r = 0.63) and (r = 0.57) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly temperature was significantly positive in the first season (2005) also, this relation was significant in the second season (2006) (r = 0.57) and (r = 0.55) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly temperature was non-significantly in the first season (2005) while this relation was highly significant in the second season (2006) (r = 0.40) and (r = 0.63) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the mean of the biweekly temperature was significantly positive in the first season (2005) also this relation was significant in the second season (2006) (r = 0.60) and (r = 0.58) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the mean temperature and the counted number of eggs which was significant in the 1st season and highly significant in the 2nd season (b = 0.39) and (b = 0.48), respectively, also the mean temperature and the counted number of immature stages was significant (b = 0.32) and (b = 0.42) in the 1st and 2nd seasons, respectively. The mean temperature and the counted number of adult stages was non-significant in the first year, while was significant in the second season (b = 0.18) and (b = 0.42) in the 1st and 2nd seasons, respectively. The mean temperature and the counted number of total number of *B. afer* was significant in the first and in the second seasons (b = 0.37) and (b = 0.48), respectively.

3.4. Effect of the biweekly maximum R.H.

The simple correlation coefficient between the maximum R.H. and the mean number of eggs of *B. afer* was non-significantly positive in the first season (2005) but this relation was negative highly significant in the second season (2006) (r = 0.35) and (r = -0.71) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly maximum R.H. was non-significantly in the first season (2005) also, this relation was negative highly-significant in the second season (2006) (r = 0.33) and (r = -0.66) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly maximum R.H. was non-significantly positive in the first season (2005) but this relation was negative significant in the second season (2006) (r = 0.44) and (r = -0.51) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the mean of the biweekly maximum R.H. was non-significantly positive in the first season (2005) also this relation was negative non=significant in the second season (2006) (r = 0.36) and (r = -0.69) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the maximum R.H. and the counted number of eggs which was non-significant in the 1st season and highly significant in the 2nd season (b = 0.21) and (b = 0.51), respectively, also the maximum R.H. and the counted number of immature stages was non-significant in the 1st season, while was significant in the 2nd season (b = 0.22) and (b = 0.44), respectively. The maximum R.H. and the counted number of adult stages was significant in the first and in the second season (b = 0.26) and (b = 0.26) in the 1st and 2nd seasons, respectively. The maximum R.H. and the counted number of total number of *B. afer* was non-significant in the first and highly significant in the second seasons (b = 0.23) and (b = 0.48), respectively.

3.5. Effect of the biweekly minimum R.H.

The simple correlation coefficient between the minimum R.H. and the mean number of eggs of *B. afer* was highly significantly positive in the first season (2005) but this relation was negative non-significant in the second season (2006) (r = 0.55) and (r = -0.019) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly minimum R.H. was significantly positive in the first season (2005) also, this relation was non-significant in the second season (2006) (r = 0.56) and (r = 0.07) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly minimum R.H. was significantly positive in the first season (2005) also this relation was non-significant in the second season (2006) (r = 0.67) and (r = 0.13) in 2005 and 2006 seasons, respectively. Finally, the biweekly number of total numbers of stages and the mean of the biweekly minimum R.H. was significantly positive in the first season (2005) also this relation was non-significant in the second season (2006) (r = 0.58) and (r = 0.026) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the minimum R.H. and the counted number of eggs which was significant in the 1st season and non-significant in the 2nd season (b = 0.47) and (b = 0.001), respectively, also the minimum R.H. and the counted number of immature stages was significant in the 1st season, while was non-significant in the 2nd season (b = 0.45) and (b = 0.012), respectively. The minimum R.H. and the counted number of adult stages was significant in the first and non-significant in the second season (b = 0.45) and (b = 0.10) in the 1st and 2nd seasons, respectively. The minimum R.H. and the counted number of total number of *B. afer* was significant in the first and highly non-significant in the second seasons (b = 0.48) and (b = 0.05), respectively.

3.6. Effect of the biweekly mean R.H.

The simple correlation coefficient between the mean R.H. and the mean number of eggs of *B. afer* was highly significantly positive in the first season (2005) but this relation was negative non-significant in the second season (2006) (r = 0.61) and (r = -0.17) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly R.H. was significantly positive in the first season (2005) also, this relation was non-significant in the second season (2006) (r = 0.61) and (r = -0.06) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly R.H. was significantly in the first season (2005) while this relation was non-significant in the second season (2006) (r = 0.75) and (r = 0.021) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the mean of the biweekly R.H. was significantly positive in the first season (2005) also this relation was non-significant in the second season (2006) (r = 0.65) and (r = -0.12) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the mean R.H. and the counted number of eggs which was significant in the 1st season and non-significant in the 2nd season (b = 0.47) and (b = 0.042), respectively, also the mean R.H. and the counted number of immature stages was significant in the 1st season, while was non-significant in the 2nd season (b = 0.46) and (b = 0.019), respectively. The mean R.H. and the counted number of adult stages was significant in the first and non-significant in the second season (b = 0.57) and (b = 0.001) in the 1st and 2nd seasons, respectively. The mean R.H. and the counted number of total number of *B. afer* was highly significant in the first and in the second seasons (b = 0.51) and (b = 0.66), respectively.

3.7. Effect of the biweekly maximum soil temperature

The simple correlation coefficient between the maximum soil temperature and the mean number of eggs of *B. afer* was significantly positive in the first season (2005) but this relation was negative highly significant in the second season (2006) (r = 0.56) and (r = 0.61) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the maximum of the biweekly soil temperature was significantly in the first season (2005) also, this relation was significant in the second season (2006) (r = 0.50) and (r = 0.58) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the maximum of the biweekly soil temperature was non-significantly positive in the first season (2005) but this relation was significant in the second season (2006) (r = 0.27) and (r = 0.62) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the maximum of the biweekly soil temperature was significantly positive in the first season (2005) also this relation was negative significant in the second season (2006) (r = 0.53) and (r = 0.62) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the maximum soil temperature and the counted number of eggs which was significant in the 1st season and highly significant in the 2nd season (b = 0.32) and (b = 0.77), respectively, also the maximum soil temperature and the counted number of immature stages was significant in the 1st season, while was highly significant in the 2nd season (b = 0.27) and (b = 0.75), respectively. The maximum soil temperature and the counted number of adult stages was significant in the first and highly significant in the second season (b = 0.24) and (b = 0.84) in the 1st and 2nd seasons, respectively. The maximum soil temperature and the counted number of total number of *B. afer* was significant in the first and highly significant in the second seasons (b = 0.30) and (b = 0.79), respectively.

3.8. Effect of the biweekly minimum soil temperature

The simple correlation coefficient between the minimum soil temperature and the mean number of eggs of *B. afer* was significantly positive in the first season (2005) but this relation was highly significant in the second season (2006) (r = 0.58) and (r = 0.74) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly minimum soil temperature was significantly positive in the first season (2005) also, this relation was highly significant in the second season (2006) (r = 0.52) and (r = 0.72) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly minimum soil temperature was non-significantly positive in the first season (2005) also this relation was significant in the second season (2006) (r = 0.29) and (r = 0.69) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the mean of the biweekly minimum soil temperature was significantly positive in the first season (2005) also this relation was highly significant in the second season (2006) (r = 0.55) and (r = 0.75) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the minimum soil temperature and the counted number of eggs which was significant in the 1st season and highly significant in the 2nd season (b = 0.35) and (b = 0.83), respectively, also the minimum soil temperature and the counted number of immature stages was significant in the 1st season, while was highly significant in the 2nd season (b = 0.30) and (b = 0.82), respectively. The minimum soil temperature and the counted number of adult stages was significant in the first and highly significant in the second season (b = 0.27) and (b = 0.86) in the 1st and 2nd seasons, respectively. The minimum soil temperature and the counted number of total number of *B. afer* was significant in the first and highly significant in the second seasons (b = 0.33) and (b = 0.85), respectively.

3.9. Effect of the biweekly mean soil temperature

The simple correlation coefficient between the mean soil temperature and the mean number of eggs of *B. afer* was significantly positive in the first season (2005) also this relation was highly significant in the second season (2006) (r = 0.57) and (r = 0.63) in 2005 and 2006 seasons, respectively. While biweekly mean number of immature stages and the mean of the biweekly soil temperature was significantly positive in the first season (2005) also, this relation was highly significant in the second season (2006) (r = 0.51) and (r = 0.65) in 2005 and 2006 seasons, respectively. On the other hand, the biweekly mean number of adult stages and the mean of the biweekly soil temperature was non-significantly in the first season (2005) while this relation was highly significant in the second season (2006) (r = 0.28) and (r = 0.66) in 2005 and 2006 seasons, respectively. Finally, the biweekly mean number of total numbers of stages and the mean of the biweekly soil temperature was significantly positive in the first season (2005) also this relation was highly significant in the second season (2006) (r = 0.54) and (r = 0.68) in 2005 and 2006 seasons, respectively.

In addition, the partial regression between the mean soil temperature and the counted number of eggs which was significant in the 1st season and highly significant in the 2nd season (b = 0.34) and (b = 0.80), respectively, also the mean soil temperature and the counted number of immature stages was significant in the 1st season, while was highly significant in the 2nd season (b = 0.28) and (b = 0.78), respectively. The mean soil temperature and the counted number of adult stages was significant in the first and highly significant in the second season (b = 0.27) and (b = 0.84) in the 1st and 2nd seasons, respectively. The mean soil temperature and the counted number of total number of *B. afer* was significant in the first and highly significant in the second seasons (b = 0.32) and (b = 0.81), respectively.

4. Seasonal abundance of *natural enemy Encarsia lutea* ***of Bemisia afer*** **recorded on *Citrus aurantium* var. *amara* in Egypt**

Bemisia *afer* on *Citrus aurantium* var. *amara* in Behira governorate was parasitized by the only aphelinid parasitoid (natural enemy) , *Encarsia lutea* (Masi) (Hymenoptera : Aphelinidae). The highest percent parasitism was recorded in November 2005 and 2006 (15.9 % and 23.4% respectively). While the average parasitism rates was 5.7 and 8.9% during the two successive years, respectively.

The partial regression between the mean number of aphelinid parasitoid, *E. lutea* and the mean number of immature stages was significant in the 1st and seasons of this study [(b = 0.77) and (b = 0.75), respectively]. Similarly this relation was highly significant with the number of immature stages.

The simple correlation coefficient between the mean number of aphelinid parasitoid, *E. lutea* the mean number of immature stages was highly significantly positive in the first season (2005) also this relation was highly significant in the second season (2006) (r = 0.86) and (r = 0.78) in 2005 and 2006 seasons, respectively.

Table 1. Host plants and distribution of *Bemisia afer* in Egypt

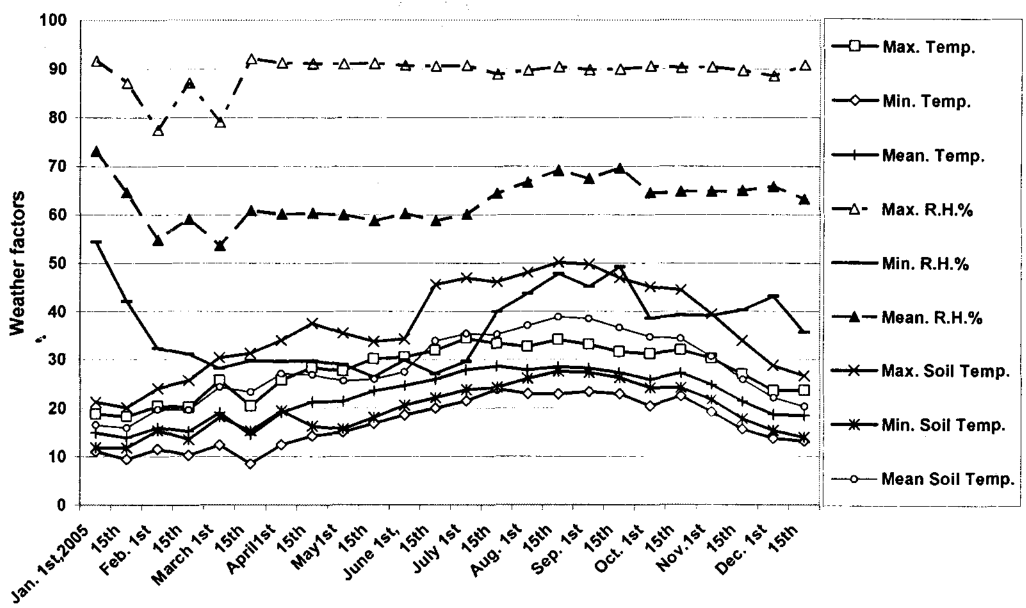
Host Plant	Distribution[	Date of record
Acacia nilotica	Aswan	Jan.2005
Adenodolichos paniculatus	Behira	Nov.2006
Albizia sp.	Aswan	August, 2006
Allophylus africanus	Qalyubiya	September, 2005
Annona senegalensis	Assiut	January, 2006
Anogeissus leiocarpus	Kafer El-Shikh	Jan.2005
Antidesma venosum	El-Minya	Nov.2006
Bridelia ferruginea	Demyata	August, 2006
Bombax costatum	Behira	September, 2005
Burkea Africana	Qalyubiya	January, 2006
Cassia siamea	Kafer El-Shikh	Jan.2005
Citrus limon	Qalyubiya	Nov.2006
C. senensis	El-Minya	August, 2006
Cochlospermum tintorium	Assiut	September, 2005
Combretum confertum	Giza	January, 2006
C. glutinosum	Ismailia	Jan.2005
C. hypopilinum	Kafer El-Shikh	Nov.2006
C. hypopilinum x micranthum	Behira	August, 2006
C. molle	Assiut	September, 2005
Commiphora pedunculata	Ismailia	January, 2006
Crossopteryx febrifuga	Qalyubiya	August, 2005
Daniellia olivera	Giza	December, 2005
Detarium microcarpum	Assiut	August, 2006
Dichrostachys glomerata	Behira	September, 2005
Entada Africana	Kafer El-Shikh	May, 2006
Ficus nitida	Qalyubiya	April,2005
F. sycamorus	Sharqiya	May, 2006
Gardenia tricantha	Alexandria	August, 2006
Gossypium hirsutum	Behira	March, 2005
Hexalobus monopetalus	Beni-Suif	October, 2006
Hibiscus asper	Daqhilya	March, 2005
Hymenocardia acida	Demyata	August, 2006
Isoberlinia doka	Giza	October, 2006
Lannea schimperi	Ismailia	November, 2005
Lantana camara	Behira	March, 2006
Lawsonia inermis	Assiut	April, 2005
Lawsonia alba	El-Minya	May, 2005
Lichos paniculatus	Menofia	April,2005
Manihot esculenta	Cairo	October, 2006
Maytenus senegalensis	Faiyum	March, 2006
Nauclea latifolia	Gharbiya	November, 2006
Paullinia pinnata	Matruh	March, 2006
Piliostigma thonningii	Sharqiya	March, 2006
Pseudopachyrhiza sp.	Port –Said	October, 2005

Table 1. Cont.

Host Plant	Distribution	Date of record
Psidium guajava	Matruh	October, 2006
Pterocarpus lucens	Faiyum	March, 2006
Ricinus communis	Beni-Suif	August, 2006
Salix subserrata	Assuit	October, 2006
Stereospermum kunthianum	Sharqiya	August, 2005
Strychnos spinosa	Sharqiya	March, 2005
Terminalia laxiflora	Behira	August, 2005
Zizyphus spinachristi	El-Minya	October, 2006

Table 2. Natuarl enemies :Natural enemies of *Bemisia afer* in Egypt

Parasitoids		
Family	species	Date
phelindae	*Encarsia lutea* (Masi)	Nov.2006
	Encarsia sofia Girault	August, 2006
	Eretmocerus sp.	September, 2005
	Eretmocerus mundus (Mercet)	September, 2005
	Eretmocerus roseni Gerling	October, 2006
Predators		
Family	species	Date
Coccinellidae	*Serangium* sp.	August, 2006



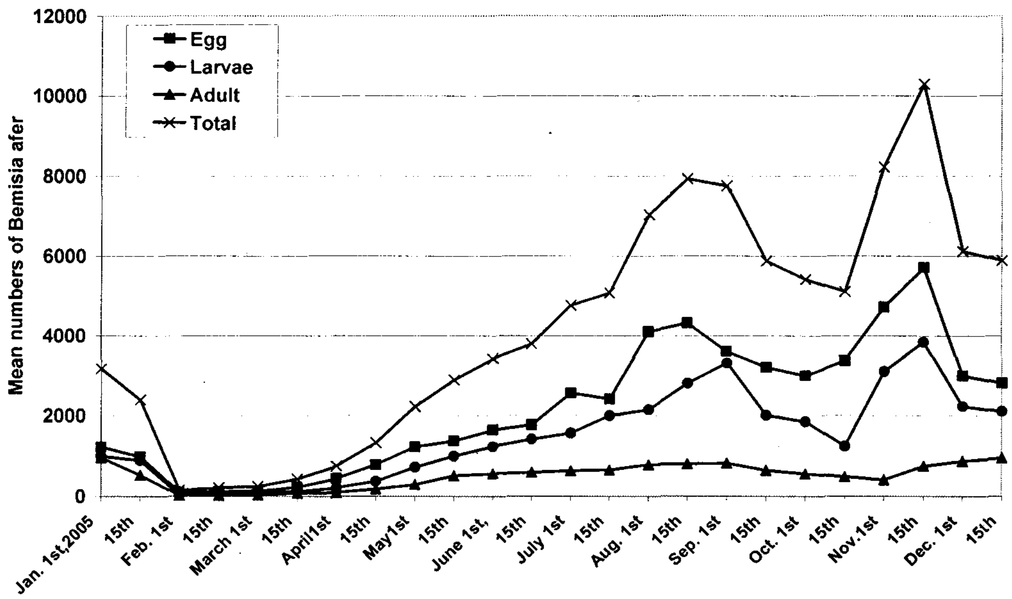
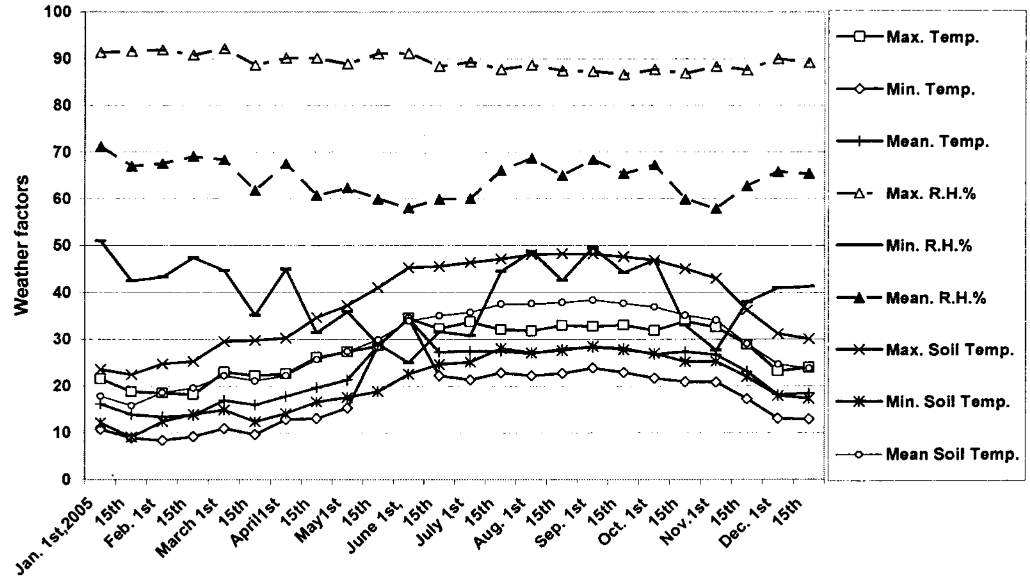


Fig. 1. Half monthly mean numbers of *Bemisia afer* on *Citrus aurantium* var. *amara* in Behira Governorate during 2005 year.



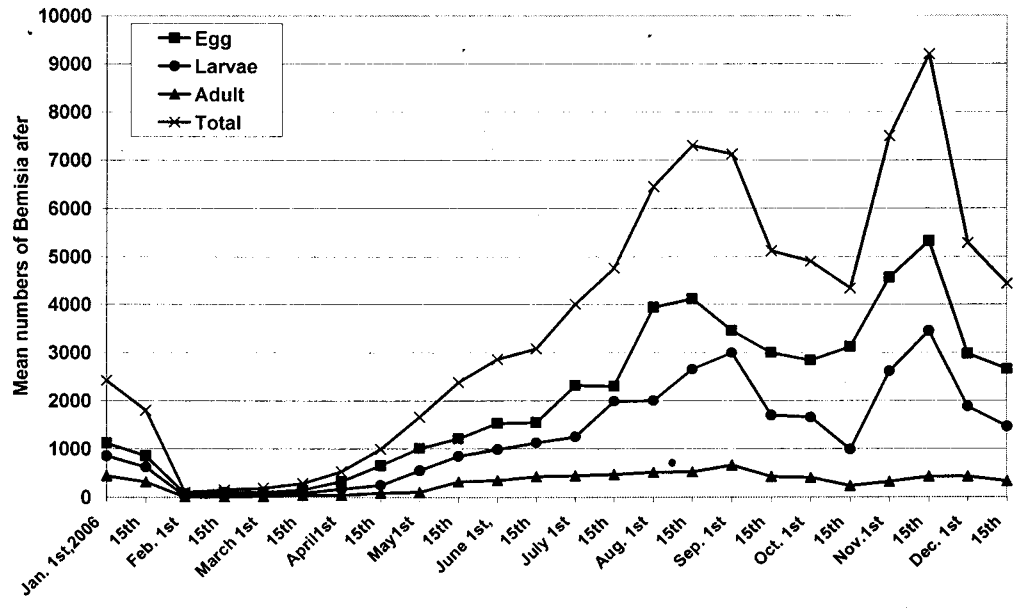


Fig. 2. Half monthly mean numbers of *Bemisia afer* on *Citrus aurantium* var. *amara* in Behira Governorate during 2006 year.

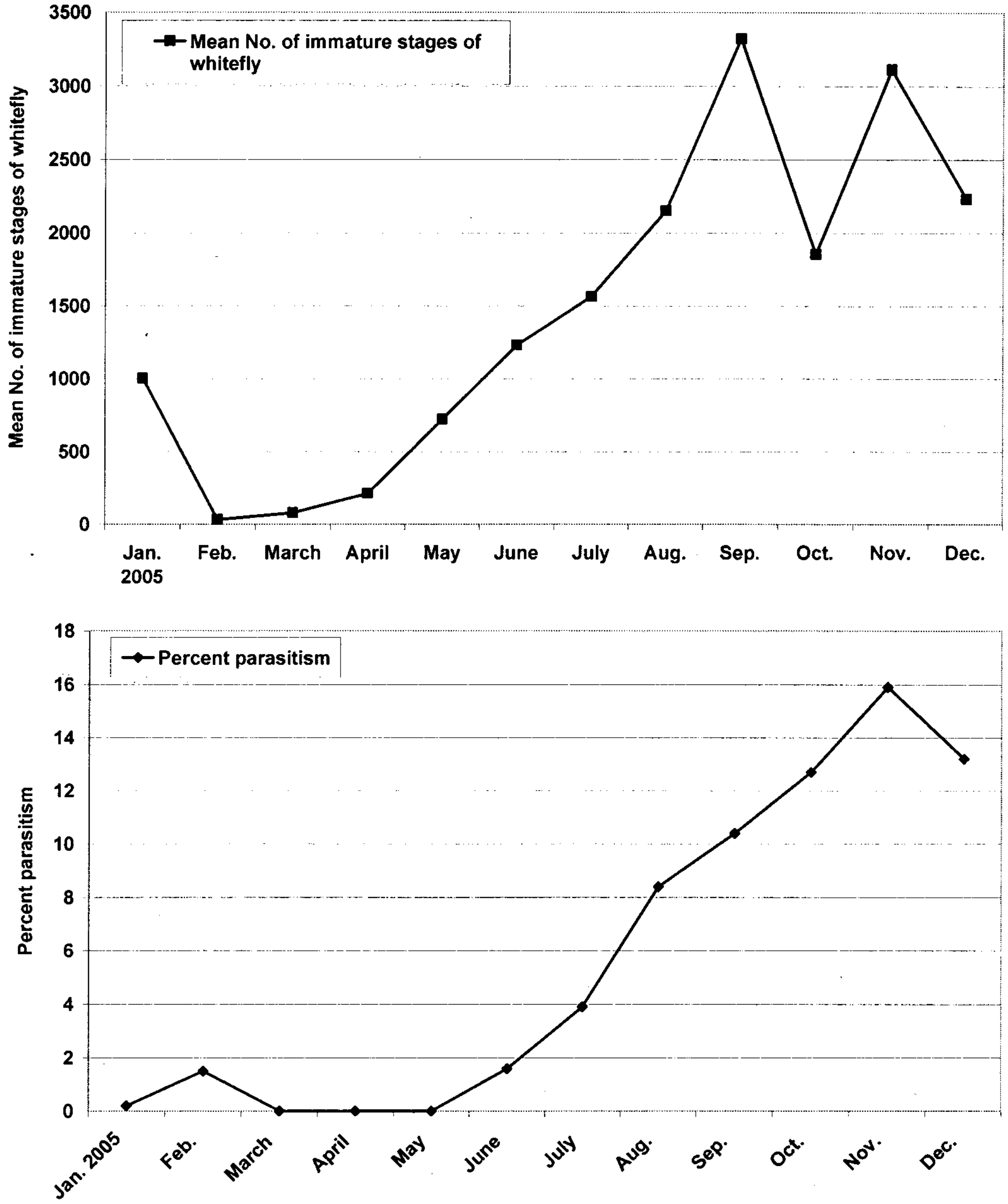


Fig. 3. Percent parasitism of *Bemisia afer* on *Citrus aurántium* var. *amara* in Behira governorate by aphelinid parasitoid, *Encarsia lutea* in relation to the weather factors during.2005 year.

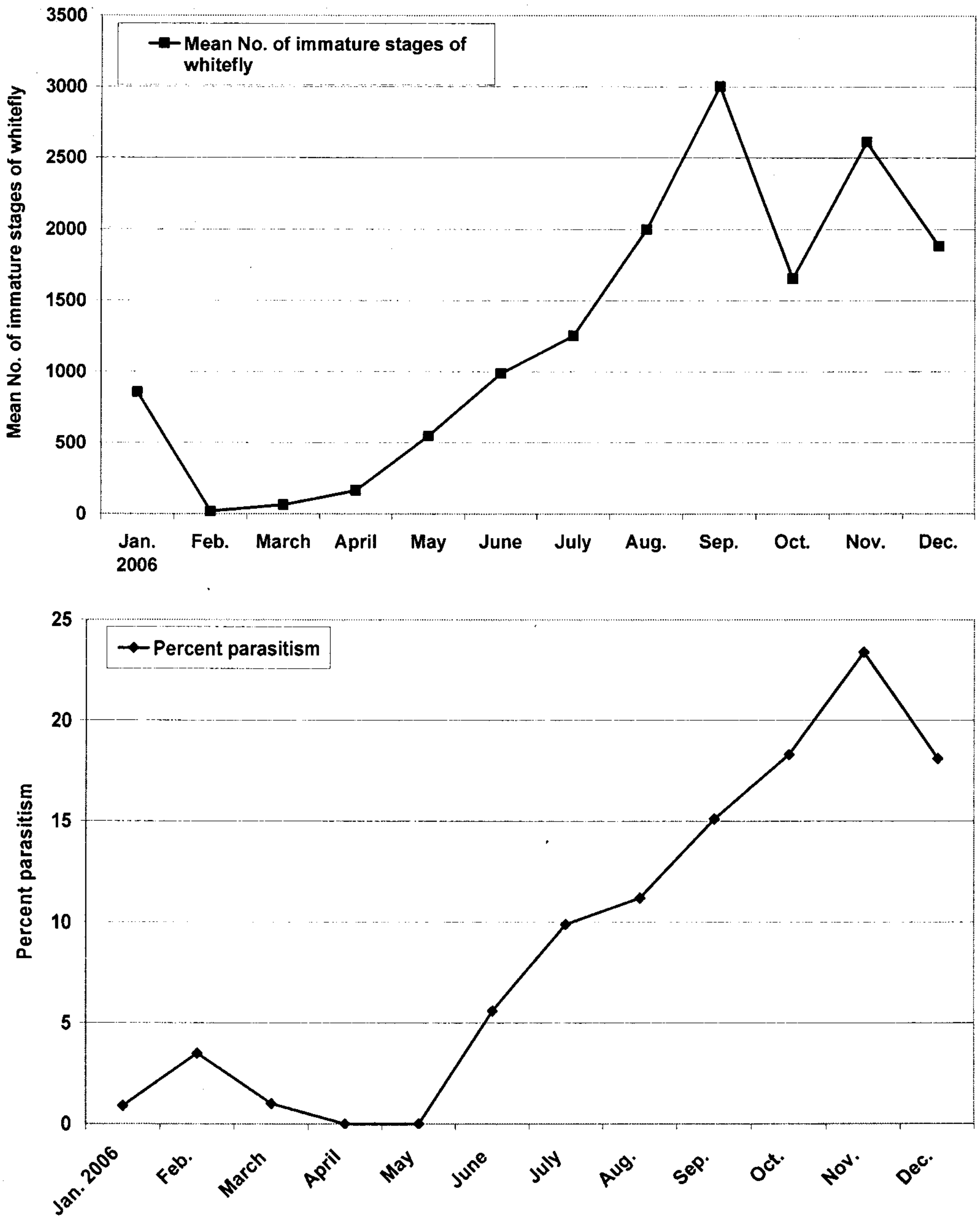


Fig. 4. Percent parasitism of *Bemisia afer* on citrus in Behira governorate by aphelinid parasitoid, *Encarsia lutea* in relation to the weather factors during 2006 year.

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دراسات حيوية على ذبابة الجميز البيضاء كآفة جديدة على الموالح فى مصر

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تصيب ذبابة الجميز البيضاء العديد من المحاصيل الأقتصادية حيث تنتشر فى العديد من دول العالم المختلفة . وفى مصر تم فى هذا البحث عمل حصر للعوائل النباتية و التوزيع الجغرافى و الأعداء الحيوية لهذه الآفة. الى جانب هذا تم عمل دراسات موسمية على تعداد ذبابة الجميز البيضاء واعدائها الحيوية فى محافظة البحيرة على الموالح أثناء موسمى ٢٠٠٥-٢٠٠٦. وكذلك تشير النتائج المتحصل عليها أن هذه الآفة تصيب ٤٣ عائلا نباتيا منتشرة فى١٩ محافظة فى مصر. ولوحظ أن هذه الآفة تهاجم بخمسة طفيليات و مفترسا واحدا. ولها قمتان فى التعداد خلال نصف اغسطس و نصف نوفمبر من كل عام على التوالى. أما بالنسبة للأعداء الحيوية فقد وجد أن طفيل *Encarsia lutea* (Masi) هو الطفيل الحيوى الوحيد الذى يتطفل على هذه الآفة فى الموالح وقد سجل اعلى نسب تطفل (١٥,٩ و ٢٣,٤) فى شهر نوفمبر خلال عامى الدراسة (٢٠٠٥ -٢٠٠٦) وان متوسط نسب التطفل كان ٥,٧ و ٨,٩ على الترتيب .