Effect of Temperature and Relative Humidity on the Population Density of the Whitefly Parasitoid on Some Vegetable Crops Under Field Conditions.

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ABSTRACT

The present work throw more light on correlation between average temperature, relative humidity, and population density of the whitefly parasitoid at Khorshid region Alexandria Governorate, in different vegetables and weeds during nili plantation in two seasons of 2005 and 2006. Results were recorded and discussed.

Key words: whitefly parasitoid, Eretmocerus sp., Encarsia sp., vegetable crops.

INTRODUCTION

Whitefly Bemisia tabaci (Genn.) is known in Egypt to occur throughout the year on wide range of economic vegetable crops in temperate regions.

In Egypt during 1992-1993, B. tabaci has become a serious pest transmitting viral diseases to cotton and tomato and causing feeding damage to tomatoes (Abd-Rabou, 1994).

The parasites of whitefly (Eretmocerus and Encarsia) werea well-known biological control agent of greenhouse whitefly [Abd-Rabou (1998), Hoddle *et al.* (1996) and Hugh *et al*. (2000)]. The effect of the climatic condition on whitefly parasitoid were studied by many others [Adam *et al*. (1996), Berlinger *et al.* (1996), Lopez *et al*. (1997), Schustet *et al*. (1996) and Sharaf *et al*. (1996)].This study aims to follow up the population fluctuations of the whitefly parasitoid Eretmocerus mundus and Encarsia Formosa (Hymenoptera: Aphelinidae) in relation to the temperature and relative humidity under field conditions.

MATERIALS AND METHODS

The survey was studied during the growing season of nili plantation for two successive seasons 2005 and 2006, in a special grower field at Khorshid, Alexandria.

The survey was studied on four Governorate vegetable and also one weed, cabbage (Brassica oleracea), cucumber (Cucumis sativus), tomato (Lycopersicum esculentum), eggplant (Solanum melongena) and weed (Amarenthus peniculatus penculation scaudatus).

The population density of the parasites was studied in about five kirates, one kirate for each vegetable crop andweed, each kirate was divided into three replicates.

During the early morning, of leaves were taken from three plants, at random par each replicate (one leaf/plant) from cabbage, cucumber and eggplant or (three leaves/plant) from tomato and weeds. All the leaves were examined in laboratory by binocular (10x.2x magnification). One ($inch^2$) was checkal/small leaf i.e. tomato and weeds, three ($inch^2$) were examined/large leaf i.e. cabbage, cucumber and eggplant at weekly intervals to count the Bemisia infestation. The population density of each founded parasitoid was estimated by 100 of Bemisia pupae/weed or vegetable plants during the two nili plantation 22005 and 2006.

RESULTS AND DISCUSSION

The population density of the whitefly parasitoid on some vegetable plants (cabbage, cucumber, tomato, eggplant and weeds Amaranthus peniculatus) were studied during two nili plantation June 6 to Sep. 26, 2005 and June 3 to Sep. 23, 2006 (i.e. 17 weeks).

During season 2005, Table (1) shows the, initial infestation occurred during the third week of June, the highest population densities of the parasitoids were meantime July 4 to August 29, when highest temperature and relative humidity were (26.4 to 34.8 C^o) (70% to 73%).

Table (1) refer that, two species parasites were founded on plants and weeds during this season. The *Erertmocerus sp*. only was appeared in June, but two parasites *Eretmocerus sp.*, *Enearsia sp*. were appeared together during July, August. *Encarsia sp.* only was appeared during September. Perhaps, this refer that *Encarsia* parasites able to tolerance highest temperature and relative humidity.

In comparison the population densities of parasites on different vegetable crops, it seems obvious that cabbage was the most favorite plant for preferences by parasitoid during nili plantation. It harboured the highest population with an average of (7.4 Ere. And 8.7 Enc./9 in^2).

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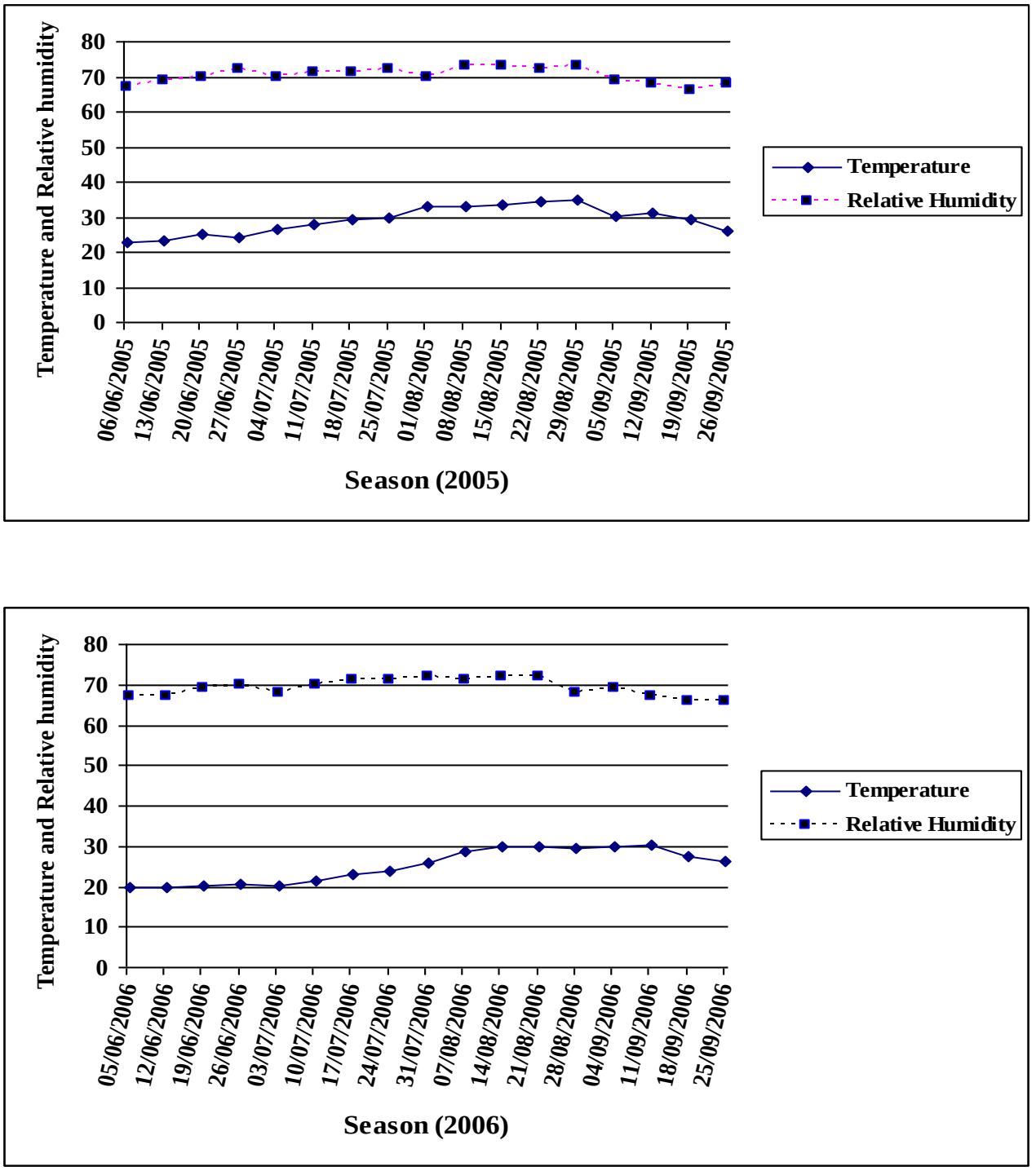

Fig. 1. Temperature and relative humidity in the field during nili plantation 2005 and 2006 seasons.

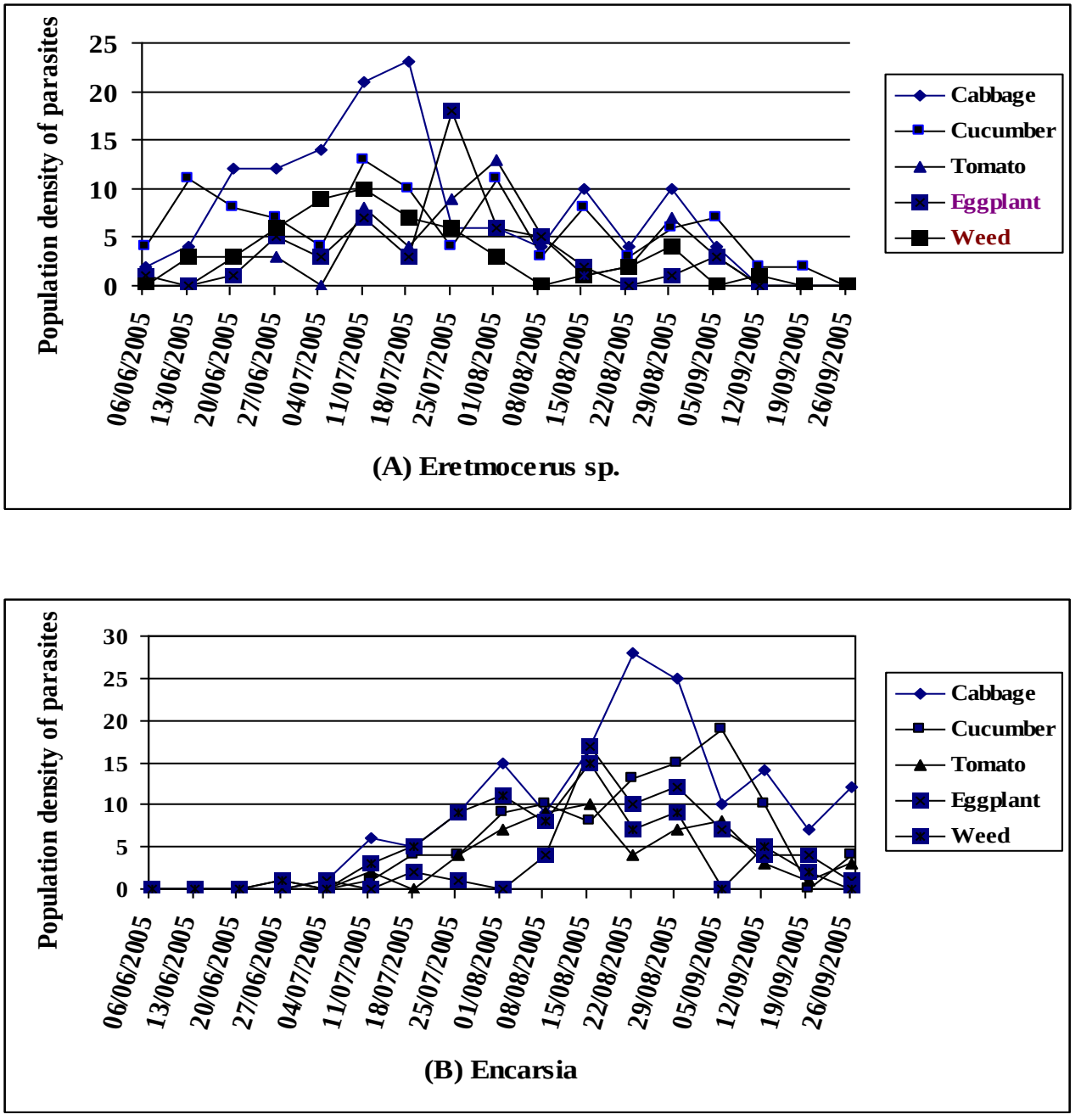

Fig. 2. Population density of parasites: A-Eretmocerus sp. B-Encarsia sp. (2005 season)

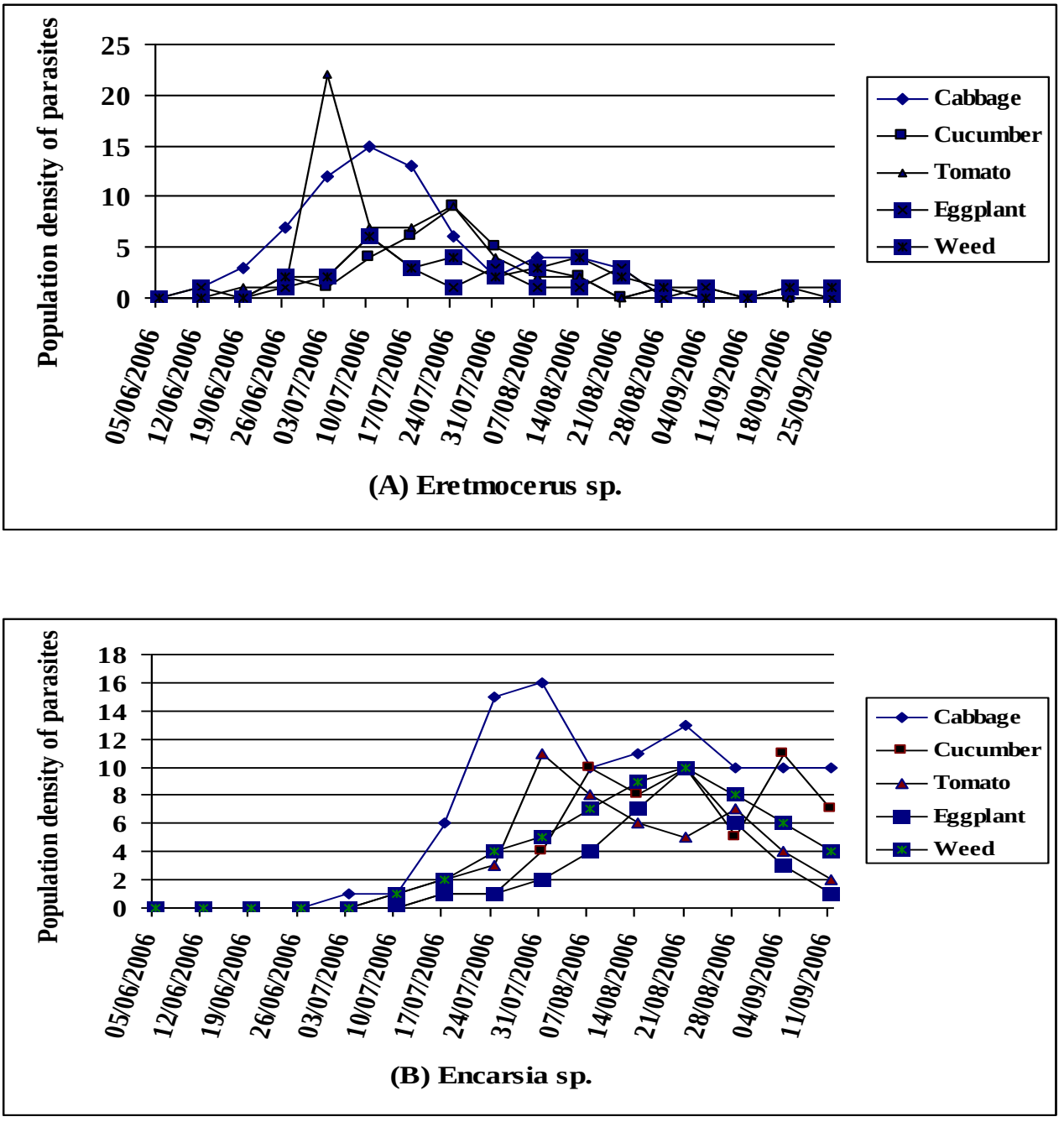

Fig. 3. Population density of parasites: A-Eretmocerus sp. B-Encarsia sp. (2006 season)

While, both the tomato and eggplant received the least population with an average of (3.3 Ere., 3.2 Enc. and 3.2 Ere., 3.4 Enc./9 in^2, respectively). During nile plantation 2006, the temperature and relative humidity were relatively low, that causes an efficient population density of the parasites which were higher than those of season 2005.

The highest population density of parasites occurred during the period from July, 3 to August, 21 while the highest temperature degree and relative humidity were (20.3-30.1C^o), (68%-72%).

Parasites species found on all plants and weed were Eretmocerus sp., only during June, while during July and August the two parasites, *Eretmocerus* sp., and *Encarsia* sp., appeared, but during September *Encarsia sp.*, appeared only, relatively.

The average numbers of parasites increased gradually until reached the highest peak with the highest temperature and relative humidity (30.1C^o and 72%) an August 21.

Table (2) shows the highest month's preferences for *Eretmocerus sp.*, was July, while for Encarsia sp., was August an all plant and weed.

The data revealed that, the highest plant for preference to parasites was cabbage (3.8 Ere. and 6.7 Enc.) grand average/100 Bemisia pupae.

These facts suggest that the most favorable conditions at which to liberate the parasites for pest control is probably Just under (34 C^o and 73% R.H.).

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الملخص العربي

تأثير كل من درجات الحرارة والرطوبة النسبية علي الكثافة العددية لطفيليات الذبابة البيضاء علي بعض محاصيل الخضر الحقلية

إيفلين جوده إبراهيم ، سوسن غالي إبراهيم

عند دراسة العلاقة بين درجات الحرارة والرطوبة النسبية وبين الكثافة العددية للطفيليات الخاصة بذبابة القطن البيضاء علي بعض محاصيل الخضر (الكرنب–الخيار–الطماطم–الباذنجان) وأيضا علي حشيشة عرف الديك المتواجدة معها.وذلك خلال الموسم النيلي لعامين متتاليين 2005، 2006م

وجد خلال الموسم النيلي لعام 2005م أن درجات الحرارة والرطوبة النسبية أعلي منها للموسم النيلي لعام 2006م كما وجد أن أعداد الطفيليات تزداد تدريجيا بإلاتفاع درجات الحرارة والرطوبة حتي تصل لقمتها عند شهر أغسطس ثم تقل أعداد الطفيليات بإنخفاض الحرارة والرطوبة خلال شهر سبتمبر.

كذلك وجد أن طفيل .Eretmocerus sp يبدأ في الظهور أولا خلال شهر يونيو ثم يظهر معه طفيل .Encarsia sp خلال شهري يوليو وأغسطس بينما يقل جدا طفيل Eretmocerus خلال شهري سبتمبر ويبقي طفيل Encarsia بمفرده فقط.

كذلك أوضحت النتائج أن أكثر محاصيل الخضر المفضلة لتكاثر الطفيل كان محصول الكرنب– كما أظهرت النتائج أنه من المحتمل لزيادة أعداد هذه الطفيليات واستخدامها في المقاومة الحيوية للذبابة البيضاء أن تكون في درجات حرارة ورطوبة 34^{5}م ، 73%).