

SEASONAL ABUNDANCE OF THE POMEGRANATE WHITEFLY, *Siphoninus phillyreae* (HALIDAY) (HOMOPTERA : ALEYRODIDAE) AND ITS NATURAL ENEMIES POPULATIONS ON OLIVE TREES IN EGYPT

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ABSTRACT

¹The seasonal abundance of the pomegranate whitefly, *Siphoninus phillyreae* (Haliday) (Homoptera : Aleyrodidae) and its natural enemies was conducted for two successive years from June, 2004 till May, 2006 on *Olea europaea* in El-Arish region (North Sinai). The results showed that, the insect population exhibited the lowest density on the 15th of February and disappeared during March and April. At the beginning of May the population increased gradually to reach maximum in 11833 during Oct.1st (first year) and 13393 during Oct.15th (second year). It is concluded that, *S. phillyreae* occurred all year round on *O. europaea* except it is disappearing during March and April during the period of study. Two parasitoids and one predators recorded attacking this pest on olive trees in El-Arish. These are the parasitoids, *Encarsia inaron* (Walker), *Eretmocerus parasiphonini* Evans and Abd-Rabou (Hymenoptera : Aphelinidae) and *Clitostethus arcuatus* (Rossi) (Coleoptera : Coccinellidae).

INTRODUCTION

Recently Abd-Rabou (2003) recorded that the pomegranate whitefly, *Siphoninus phillyreae* (Haliday) (Homoptera : Aleyrodidae) attacking the olive trees in Egypt. This pest attacking 60 host economic plant species including, apple, pear, citrus and olive. It distributed in Palaearctic region. Heavy infestation caused leaf wilt, early leaf drop and smaller fruit (Bellows *et al.* 1990). They also recorded 10 parasitoids and 3 predators associated with the pomegranate whitefly. In Egypt, the host plants, distribution, parasitoids, predators and biological control studies were carried out by Abd-Rabou, 1997, 1998, 1999, 2001a, 2002, 2003, 2006 and Abd-Rabou & Abou-Setta, 1998. This work aims to study the seasonal abundance of the pest and its natural enemies on the new host economic plant olive trees (*O. europaea*).

MATERIALS AND METHODS

1. Estimate of the pomegranate whitefly, *Siphoninus phillyreae* population on *Olea europaea* in Egypt:

Seasonal abundance of *S. phillyreae* was carried out on *O. europaea* in El-Arish region (North Sinai Governorate) during June, 2004 to May, 2006. The plant area selected for these investigations had not any received chemical control measures for several years. About 10 trees of *O. europaea*, almost similar in age, shape and size were randomly chosen for sampling two times a month (at biweekly intervals). Each sample consists of 100 leaves were chosen at random, early in the morning and examined

immediately in the field for counting the number of adults. Thereafter, the leaves were kept in a closed paper bags and transferred to the laboratory to estimate the total number of immature stages under a binocular microscope.

Records of the meteorological factors, mainly the daily mean of minimum (D. Min.T.) and Maximum (D. Max.T.) temperatures in additions to relative humidity (D.M.R.H.), were obtained from the Meteorological Department Records. Simple correlation value was calculated to obtain information about the relationships between the tested weather factors and the population of *S. phillyreae* (eggs, larvae and adults).

2. Estimates the natural enemies populations associated with *Siphoninus phillyreae* on *Olea europaea* in Egypt:

S. phillyreae second, third and fourth larval stages were sampled from *O. europaea* in El-Arish. Leaves of *O. europaea* were collected monthly during June, 2005 until May, 2006 (100 leaves per sample) and transferred to the laboratory. *S. phillyreae* eggs and first larval stages were eliminated, as well as any other insect species. The second, third and fourth larval stages were recorded per leaf. Each leaf was kept in well ventilated emergence glass tubes and monitored daily till parasitoids emergency. Percent parasitism was calculated according to Abd-Rabou, 1997. In case of predator, also monthly counts of both *S. phillyreae* and predator (100 leaves per sample).

RESULTS AND DISCUSSION

1. Seasonal abundance of the pomegranate whiteflies, *Siphoninus phillyreae* population on *Olea europaea* in Egypt:

The seasonal abundance of *S. phillyreae* was observed for two successive years from June, 2005 to May, 2006 on *O. europaea* in Giza Governorate. The obtained results in Figs (1 and 2) showed that, the insect population (eggs, larvae and adults) per 100 leaves of *O. europaea* plants was low on the 15th of February and disappeared during March and April. At the beginning of May the population increased gradually to reach maximum in 11833 / sample on the 1st of Oct. (first year) and 13393 / sample on the 1st of Oct. (second year). It is concluded that, *S. phillyreae* occurred all year round on *O. europaea* except during March and April , however it is disappear through this period of study.

These results agree with the data obtained in USA California by Gould *et al.*(1992).

The correlation between the population of different stages of *S. phillyreae* and the weather factors including (Max. Temp., Min. Temp. and relative humidity are shown in (Table 1).

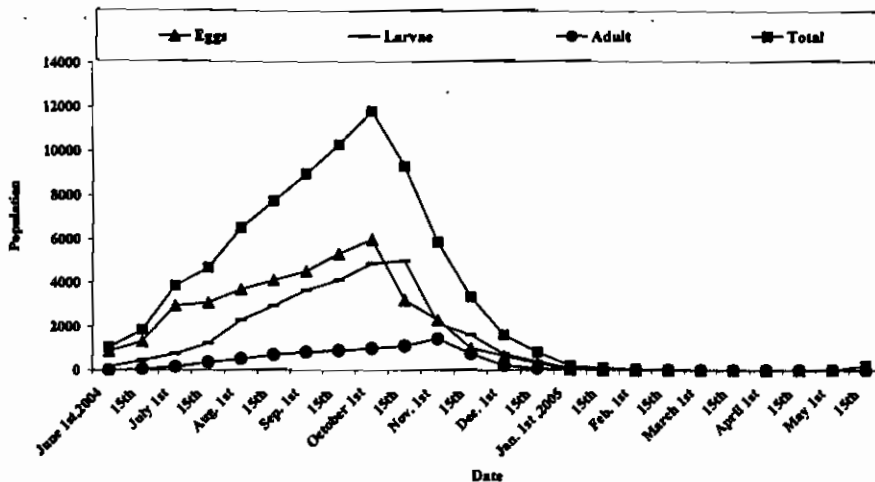


Fig.1: Half monthly mean numbers of *Siphonius phillyreae* on *Olea europaea* in El-Ariah region during June 2004 to 2005 .

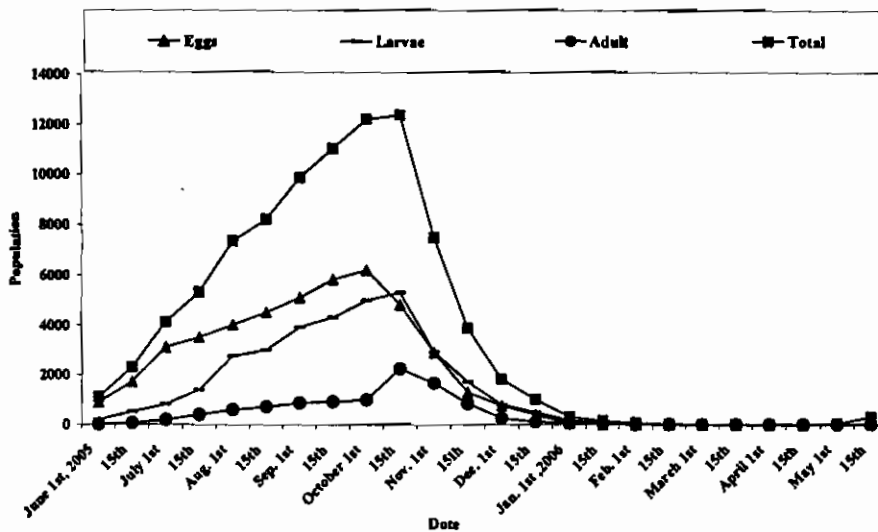


Fig.2: Half monthly mean numbers of *Siphonius phillyreae* on *Olea europaea* in El-Ariah region during June 2005 to 2006 .

Statistical analysis indicated that there was highly significant positive correlation between both eggs and total populations of *S. phillyreae* and weather factors (Min., Max. Temp. and relative humidity) during the two seasons. While, there was significant positive correlation between both host larvae and weather factors (Min., Max. Temp. and relative humidity) during the first year and non significant correlation during the second year except relative humidity was significant. The population of *S. phillyreae* adults had non significant correlation weather (Min. , Max. Temp.) during the two seasons, except with relative humidity had significant correlation.

Table (1): Correlation between the whitefly population and some weather factors on olive trees at El-Arish during two successive seasons.

Stage	Seasons	Factors	R	T. test	Sig. T
Eggs	2004-2005	Max. Temp.	0.651	4.026	0.0006
		Min. Temp.	0.661	4.131	0.0004
		R. H. %	0.552	3.106	0.0052
Larvae		Max. Temp.	0.423	2.191	0.0393
		Min. Temp.	0.405	2.079	0.0495
		R. H. %	0.420	2.171	0.0410
Adults		Max. Temp.	0.196	0.939	0.3581
		Min. Temp.	0.174	0.830	0.4152
		R. H. %	0.503	2.730	0.0122
Total	Max. Temp.	0.529	2.922	0.0079	
	Min. Temp.	0.523	2.881	0.0087	
	R. H. %	0.512	2.797	0.0105	
Eggs	2005-2006	Max. Temp.	0.614	3.644	0.0014
		Min. Temp.	0.628	3.784	0.0010
		R. H. %	0.630	3.809	0.0010
Larvae		Max. Temp.	0.379	1.922	0.0676
		Min. Temp.	0.381	1.932	0.0663
		R. H. %	0.506	2.752	0.0116
Adults		Max. Temp.	0.118	0.559	0.5821
		Min. Temp.	0.109	0.518	0.6096
		R. H. %	0.483	2.587	0.0168
Total	Max. Temp.	0.474	2.525	0.0193	
	Min. Temp.	0.481	2.571	0.0174	
	R. H. %	0.583	3.369	0.0028	

2. Seasonal abundance of *Siphoninus phillyreae* natural enemies on *O. europaea* in Egypt:

- Parasitoids:

Two species of hymenopterous parasitoids were reared from samples of *S. phillyreae* on *O. europaea*. These parasitoids namely, *Encarsia inaron* (Walker) (Aphelinidae) and *Eretmocerus parasiphonini* Evans and Abd-Rabou (Aphelinidae)

The averages of parasitism caused by *E. inaron* were (8.3 and 9.6%), while *E. parasiphonini* caused (3.5 and 4.7%) during the first and second years, respectively. The percentage of parasitism reached its maximum of 25.4 and 12.5 by *E. inaron*, in contrary reached 29.4 and 15.6 % by *E. parasiphonini* during October in the first and second years, respectively (Figs 3 and 4).

Abd-Rabou and Abou-Setta (1998) recorded seven parasitoids attacking *S. phillyreae* these are *Encarsia davidi* Viggiani and Mazzone, *E. galilea* Rivany, *E. inaron* (Walker), *E.lutea* (Masi), *Eretmocerus corni* Haldeman, *E. diversicilatus* Silvestri and *E. mundus* Mercet. They stated that *E. inaron* is the effective parasitoid attacking this pest with maximum

parasitism percent of 78% . *E. inaron* approved to be an effective biological control agents against the pomegranate whitefly in USA, North Carolina (McDonald *et al.*, 1996 and Hackney *et al.*, 1997).

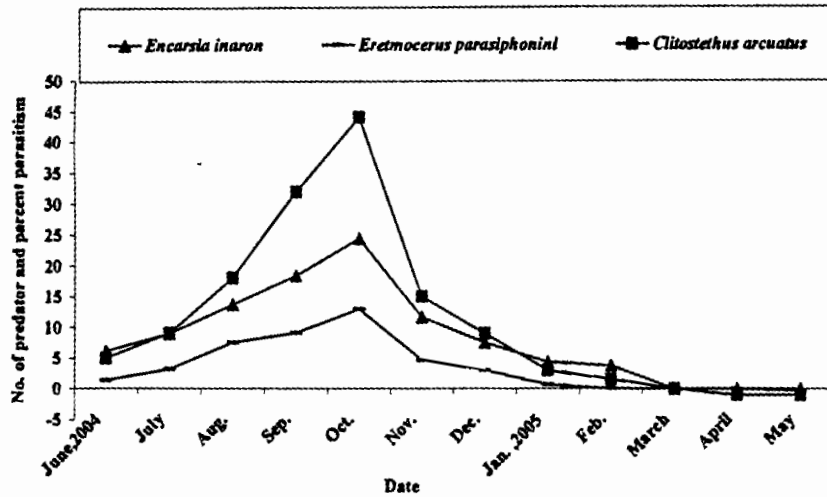


Fig. 3 : No. of predator and percent parasitism of *Siphoninus phillyreae* on *Olea europaea* by the predator *Clitostethus arcuatus* and different aphelinid parasitoids in El-Arish governorate on olive, during 2004-2005.

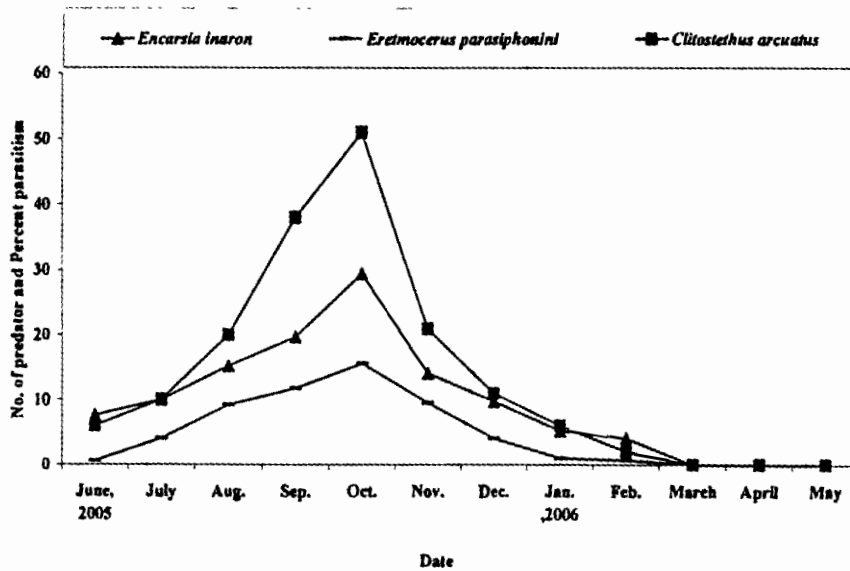


Fig.4 : No. of predator and percent parasitism of *Siphoninus phillyreae* on *Olea europaea* by the predator *Clitostethus arcuatus* and different aphelinid parasitoids in El-Arish governorate on olive, during 2005-2006

Predators:

One species of coccinellid predators was reared from samples of *S. phillyreae* on *O. europaea*. This predator namely *Clitostethus arcuatus* (Rossi).

The average numbers of the predator were 11.4 and 13.8 individuals/100 leaves, while maximum numbers of the predator were 45 and 51 individuals /100 leaves during Oct. in the first and second years, respectively (Figs3 and 4). Mesbah (1999) reported the effective role of *C. arcuatus* in controlling the citrus whitefly in Delta region in Egypt.

The synchronization between the whitefly and its natural enemy's populations was relatively high; however, correlation analysis showed that changes in the populations of natural enemies coincided with the changes of pest population. The correlation coefficient values were highly positive significant (Table, 2) during the two seasons of study.

Table (2): Correlation between populations of whitefly and its natural enemies on olive trees at El-Arish during two successive seasons.

Natural enemy	Seasons	Factors	R	T. test	Sig. T
<i>Encarsia inaron</i>	2004-2005	Whitefly	0.953	9.897	0.0001
<i>Eretmocerus parasiphonini</i>			0.997	37.674	0.0001
<i>Clitostethus arcuatus</i>			0.971	12.763	0.0001
<i>Encarsia inaron</i>	2005-2006	Whitefly	0.963	11.336	0.0001
<i>Eretmocerus parasiphonini</i>			0.987	19.160	0.0001
<i>Clitostethus arcuatus</i>			0.983	16.702	0.0001

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**الوفرة الموسمية لتعداد ذبابة الرمان البيضاء (*Siphoninus phillyreae*)
(HALIDAY) (HOMOPTERA : ALEYRODIDAE) و أعدائها الحيوية
على أشجار الزيتون في مصر
شعبان عبد ربه و نها أحمد
الدقي - جيزة معهد بحوث وقاية النباتات - مركز البحوث الزراعية -**

تضمن هذا العمل الوفرة الموسمية لتعداد ذبابة الرمان البيضاء وأعدائها الحيوية على أشجار الزيتون في مصر وذلك خلال عامين متتاليين اثناء الفترة من مايو ٢٠٠٤ - مايو ٢٠٠٦ في منطقة العريش. وقد أظهرت النتائج أن هذه الآفة بدأ تعدادها بأعداد قليلة في شهر فبراير ثم أختفت في شهرى مارس وأبريل . وفي بدايات شهر مايو زاد التعداد تدريجيا حتى وصل أعلى تعداد لهذه الآفة في النصف الأول من أكتوبر في السنة الأولى (١١٨٣٣) و النصف الثاني من أكتوبر في السنة الثانية (١٣٣٣٩٣) على الترتيب. أما بالنسبة للطفيليات فقد تم دراستها في نفس الفترة وقد أتضح من النتائج أن طفيل (*Encarsia inaron* (Walker) من الطفيليات المؤثرة في مكافحة هذه الآفة.

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