

Common pests of psyllids and whiteflies (Hemiptera: Psylloidea: Aleyrodoidea) infesting orchard trees in Egypt.

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ABSTRACT

The present review includes psyllids infested orchards trees in Egypt. Six species was recorded. These species are olive psyllid, *Euphyllura straminea* Loginova (Psyllidae), Saycamora fig psyllid, *Pauropsylla trichaeta* Petty (Triozidae), Eucalyptus psyllid, *Blastopsylla occidentalis* (Taylor) (Psyllidae) *Craspedolepta heslopharrisoni* (Samy) (Psyllidae) and two citrus psyllids, *Diaphorina aegyptiaca* Puton (Psyllidae) and *Triozza sp.* (Triozidae). This review also includes three species of whiteflies which infest orchards trees in Egypt. They are pomegranat whitefly, *Siphoninus phillyreae* (Haliday), citrus whitefly, *Dialeurodes citri* (Ashmead) and bayberry whitefly, *Parabemisia myricae* (Kuwana) (Hemiptera: Aleyrodidae).

Keywords: psyllids, whiteflies, orchard trees, Egypt.

INTRODUCTION

Psyllids or jumping plant lice found in Egypt tend to be very host specific. They feed only on one plant species (monophagous) or closely related group of plants. Together with aphids, scale insects and whiteflies form the group called Sternorrhyncha, which is considered to be the most "primitive" group within the true bugs (Hemiptera). The generally accepted system of classification divided the Psylloidea into six families. Only three families are known to occur in Egypt (i.e. Aphalaridae, Psyllidae and Triozidae) (Mohammed, 1998). Several psyllid species are pests of fruit trees such as olive trees, citrus trees and sycamore fig trees. Psyllids suck plant sap. Some psyllids build a protective covering made from wax and secreted large amounts of honeydew which encouraged the growth of sooty mould fungus. The infested trees become dirty black appearance which affects photosynthesis and respiration processes. High psyllid populations reduce plant growth. A few species cause galls on leaves or buds. For example when psyllid feeding causes the plant to form a pit around where each nymph settles. Early damage typically occurs on young foliage where most eggs are laid. Psyllids are responsible for different kinds of damages to their host plants, for example, citrus psyllid, *Diaphorina aegyptiaca* Puton causes citrus greening, known as "Huanglongbing" is associated with the presence of a bacterium *Liberibacter asiaticum* and kills the trees. Olive Psyllid, *Euphyllura straminea* Loginova caused considerable losses of fruit yield.

Whiteflies (Hemiptera: Aleyrodoidea) injure orchard trees by consuming large quantities of plant sap, which they obtain with their sucking mouth parts. Further indirect injury is caused by sooty mold fungus which grows over fruits and foliage in the copious amount of honeydew excreted by the whitefly. This black fungus may cover the leaves and fruits so completely that it interferes with the proper physiological activities of the trees. Heavily-infested trees become weak and produce small crops of insipid fruits.

RESULTS

I. Psyllids infest orchards trees in Egypt:

1. *Euphyllura straminea* Loginova

The olive psyllid, *E. straminea* was first recorded in March, 1988 on olive trees in El Arish-Rafah, Egypt (Nada, 1994). Radwan (1996) recorded one annual generation for this species extended from March to May. The population fluctuations of olive psyllid in Fayoum governorate had two generations per year under field conditions (Soliman, 1997). Mohammed (1998) described the five nymphal instars of olive psyllid in Egypt. She constructed a key to differentiate between the five nymphal instars. The occurrence of different stages on unsprayed olive trees at Ismailia Governorate was studied during 1997-1998 (Sharaf El Din and Hashem, 1999). The population trends of different stages were broadly similar in both years. This species had two generations per year in spring and autumn. The effect of main weather factors (temperature and relative humidity) on olive psyllid on olive trees during two successive years in El Arish, Egypt were negatively correlated with the changes in adults and nymphs population during the two seasons (Elwan, 2001). Moursi *et al.* (2002) studied the population dynamic and seasonal abundance of *E. straminea* in untreated olive trees in two orchards one of them under irrigation system and the other under rain-fall at Borg El Arab area (50 Km west of Alexandria). Hamza (2007) studied the seasonal fluctuation of olive psyllid on olive trees in Giza, Egypt throughout two successive years. He investigated the effects of certain weather factors on the population dynamics of both nymph and adults during spring and autumn seasons. Seasonal abundance of the olive psyllid, *E. straminea* was studied for two successive years from 2009 to 2010 on olive trees. The obtained results showed that, the insect population reached maximum during March (1350 and 1488/60 leaves and 15 twigs) in the first and second years, respectively. The predator *Orius sp.* reached maximum during March in the first and second years (20 and 33 individuals/60 leaves and 15 twigs, respectively) (Abd-Rabou and Ahmed, 2011).

Youssef (2011) studied the ecological and biological of olive psyllid in three different ecosystems in Egypt. Obtained results revealed that population was more abundant at desert ecosystem than agricultural ecosystem, while it was less abundant at coastal ecosystem. He mentioned that the activity was coinciding with olive trees phenology.

Also, results revealed that this species passed through one annual generation. Life table parameters showed that 25°C was optimum degree, where female fecundity and net reproductive rate, intrinsic rate of increase and finite rate of increase recorded their maximum values, while population doubling time recorded its minimum values

2. *Pauropsylla trichaeta* Petty

Swailam and Awadallah (1972) studied the bionomics of the sycamore fig Psyllid, *P. auropsylla trichaeta*.

3. *Craspedolepta heslopharrisoni* (Samy)

Samy (1972) stated that few psyllids were collected from the cotton fields at Giza and Gemmeza by sweeping were identified to the British Museum as *Diaphorina sp.* and *Trioza sp.* He described the adult males and females of thirteen species of Psylloidea from Egypt. He classified these species under family Psyllidae and recorded *C. heslopharrisoni* as new species on *Trifolium alexandrium* in Alexandria.

4. *Diaphorina* sp. and *Trioza* sp.

Psyllid species were collected from fields at Giza and Gemmeza by sweeping and were sending to British Museum to identify them as *Diaphorina* sp, and *Trioza* sp. (Samy, 1972).

5. *Blastopsylla occidentalis* (Taylor)

Hemmet and Ibrahim (2007) mentioned that gall-forming psyllid, *B. occidentalis* gall forming psyllid kills million of eucalypts trees in many areas of Egypt. They reported that young leaf tissues and meristems are most susceptible to this species during young stages of phonological development. Gall-forming psyllid specific pathological symptoms and thereby induced structural changes in the vascular vessels of the infested plants. Bump-shaped galls were formed on the lower surface of leaf midribs, petioles and stems of young *Eucalypt* sp. branches.

II. Whiteflies infested orchards trees in Egypt:

1. *Siphoninus phillyreae* (Haliday)

The pomegranate whitefly, *S. phillyreae* is the most important pest to pomegranate trees in Egypt. Elwan (1982) reported that the maximum abundance of all stages of *S. phillyreae* took place between mid August and mid November. Four to five successive overlapping generations were of possible occurrence annually. The relative sizes of the different generations were approximated. Immature and mature stages occurred on the leaves located at any part of the pomegranate tree. All stages were mainly concentrated on the lower third of the tree (47-52%), while the middle and upper third of the tree received 32-35% and 14-19%, respectively. Also the same author studied the life history of *S. phillyreae* under laboratory conditions for three successive generations. He mentioned that eggs were laid in small batches on the under surfaces of the leaves. Incubation period ranged 5-11 days, the larva has 3 instars that lasted for 1-2, 3-8, and 3-9 days, respectively; the total larval period varied from 8-17 days; the pupal period occupied 5-12 days; the preoviposition, oviposition and postoviposition periods were 1-3, 1-5 and 1-2 days, respectively and adult longevity ranged 5-9 days; egg laying capacity ranged 3-26 eggs, with a mean of 15.8 eggs/female and the total life cycle was completed in 24-48 days. Abd-Rabou and Abou-Setta (1998) recorded also 7 parasitoid species associated with *S. phillyreae*. They mentioned that the parasitoid *E. inaron* was the dominant parasitoid of *S. phillyreae* in Giza and Assiut with average parasitism rates of 38 and 36.5%, respectively. Abd-Rabou (1998a) studied the efficacy of indigenous parasitoids in the biological control of *S. phillyreae* on pomegranate. He released more than 182,000 parasitoids for controlling this species. *S. phillyreae* has been recorded attacking olive trees in Egypt (Abd-Rabou, 2003). Abd-Rabou (2006) used the predator *Clitostethus arcuatus* (Rossi) (Coleoptera: Coccinellidae) as a biological control agent *S. phillyreae*. A survey of host plants, distribution and natural enemies of *S. phillyreae* was studied (Abd-Rabou and Ahmed, 2007). Abd-Rabou and Simmons (2010) augmented and evaluated of a parasitoid, *E. inaron*, and the predator, *Clitostethus arcuatus*, for biological control *S. phillyreae*. Abd-Rabou (2001) tested the Effect of Neemazal on *S. phillyreae* and its parasitoid *Encarsia inaron* (Hymenoptera: Aphelinidae). Later, Abd-Rabou and Ahmed (2011) recorded the seasonal incidence of whiteflies infested olive in Egypt.

2. *Dialeurodes citri* (Ashmead)

On citrus plants, *D. citri* had 3 generations a year, the first during February/May, the second June/August, the third during September/ December (Hussin, 1992). The same author studied the life-history of *D. citri* under controlled laboratory conditions

for two successive generations. Eggs were laid singly at random on the lower surface of the citrus leaves. Incubation period was ranged 14 - 18 and 14 - 22 days at 22 and 26 °C, respectively. The larvae has four instars that lasted for 8-16, 8-10, 8-12 and 30-56 days at 22 °C. Relative values were 8-16, 6-12, 6-10 and 28-52 days at 26 °C. The total larval period lasted 54-94 days at 22 °C and 48-90 days at 26 °C. Longevity of adult female was 19.1 and male 9.13 at 22°C. This period was for female as 15.6 and male 4.22 at 26 °C. The total life-cycle was completed in 91-158 and 71-137 days at 22 and, 26 °C, respectively. Abd-Rabou (1999) introduced and reared of *Encarsia lahorensis* Howard (Hymenoptera : Aphelinidae) for the control of *D. citri* in Egypt.

3. *Parabemisia myricae* (Kuwana):

P. myricae was discovered on citrus in Egypt in 1988. This species has two generations, the first at the end of April and the second between July and September (Abd-Rabou, 1996). Abd-Rabou (1998b) studied the efficacy of indigenous parasitoids in the biological control of *P. myricae* on citrus plants. He released about 18,000 individuals for controlling this species. Maximum parasitism rate reached 60%. The same author (1998 c,d) studied the role of environmental factors on the occurrence of whitefly species and their parasitoids in Egypt.

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ARABIC SUMMARY

البسليد والذباب الأبيض الذى يصيب بساتين الفاكهة فى مصر

**عباس سيف النصر و شعبان عبدربه
معهد بحوث وقاية النباتات- مركز البحوث الزراعية - الدقى- جيزة - مصر**

هذا المقال تضمن البسليد التى تصيب بساتين الفاكهة فى مصر. وقد تم تسجيل 6 أنواع وهى بسليد الزيتون و بسليد الجميز و بسليد الموالح بنوعيه بسليد الكافور وقد تضمن أيضا ثلاثة أنواع من الذباب الأبيض وهم ذبابة الرمان البيضاء و ذبابة الموالح البيضاء و ذبابة الباي برى البيضاء.