

Coccoid Species and their Natural Enemies Associated with Eleven Fruit Trees Species in Western Northern Coast of Egypt

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ABSTRACT

Twenty one of coccoid species, i.e. armoured scales, soft scales and mealybugs associated with eleven fruit trees species (evergreen and deciduous plants) in some localities at Western Northern Coast of Egypt, represented irrigation and dry systems were found and recorded during the period of this study, which extended from December 2007 till February 2010.

In the present investigation, a total of eighteen species following nine genera belonging to five families under super family Chalcidoidae belonging to order Hymenoptera were collected. Also nine species belonging to seven genera of family Coccinellidae, Order, Coleoptera, one species of orders, Orthoptera, Hemiptera and Neuroptera were collected.

Key words: scale insects and mealybugs

INTRODUCTION

Fruit trees are very useful since it produces edible crop that anyone can eat or as ingredient of thousand of food recipes. Numerous insects and mites inhabit fruit trees orchard. Of these, scale insects and mealybugs which cause damage to the plants in different ways.

Scale insects and mealybugs are phytophagous, feeding by sucking plant juices through a set stylets. Individual species infests one or more leaves, fruit, branches, main stems, trunks or roots. They are widely distributed throughout the world with the exception of the cold extremes of the Arctic and Antarctic (Miller, 2005). They are commonly transported on plant materials and because of their small size and habit of feeding in concealed areas are frequent invasive species (Millar et al, 2005) causing billions of dollars in damage annually (Kosztarab, 1990).

Therefore, it is very important to re-establish and renew a considerable back-ground about the occurring scale insects and mealybugs as well as their natural enemies (parasitoids and predators) on both deciduous and evergreen fruit trees at western Northern coast under dry and irrigation systems.

MATERIALS AND METHODS

In order to survey scale insects and mealybugs associating with some deciduous and evergreen fruit trees as well as their natural enemies (parasitoids and predators) in the Western Northern Coast of Egypt, several locations were chosen. These locations represent different types of irrigation:

- 1- Rain-fed farms (dry system) at Burg el-Arab (50 kms west of Alexandria) and coastal ridge (30-35 kms at coast west of Alex.) and Merghem (30 kms at desert way).
- 2- Semi-arid at Ikingi-Mariut area (40 kms west of Alexandria).
- 3- Irrigated farms at Bahig (55 kms south west of Alex.) and El-Hammam (80 kms west of Alexandria).

Eleven of deciduous and evergreen fruit tree species were chosen for study they are, common fig, *Ficus carica* L.; white mulberry, *Morus alba* L.; apple guava, *Psidium guajava* L.; european olive, *Olea europea* L.; pomegranates, *Punica granatum* L.; apple, *Malus domestica* L.; pears, *Pyrus communis* L.; apricot, *Prunus armeniaca* L.; european plum, *Prunus domestica* L.; peach, *Prunus persica* L. and almond, *Prunus amygdalus* L.

Survey and inspection was started from December, 2007 till February, 2010 in different localities except El-Hammam, which started from January, 2009 till December, 2009 on fig, olive and pear trees.

From each plant five trees were chosen to survey the scale insects and mealybugs and their natural enemies. Ten leaves and five small branches (15 cm long) except fig, five leaves only were picked out at random from each direction of each tree monthly. Leaves and branches were put in clothes bags and transported directly to the laboratory for classifying the detected species using a stereoscopic binocular microscope. After leaves and branches had been examined and the sample insects were counted, the specimens were confined in glass jars and kept in the laboratory for securing any emerging parasitoids.

For classifying the collected scale insects and mealybugs species, slide preparations of mature adult females were prepared according to the method mentioned by Abdel-Razak, 2007 and examined microscopically at a power of 10-15 X and identified as well as their natural enemies by scale insects and mealybugs Division, Plant Protection Research Institute, Agricultural Research Center, Egypt.

RESULTS AND DISCUSSION

1. Taxonomical list of scale insects and mealy bugs collected during the period of study infested eleven fruit trees:

The exhibited data in Table (1) asserted that a total of twenty-one scale insect and mealy bug species following eighteen genera belonging to six families of super family Coccoidea and Order Hemiptera infesting eleven fruit trees species were obtained and identified during the period of study. The collected species could be listed taxonomically as follows:

1.1. Family: Asterolecaniidae

Represented by one species only

1. The fig pit scale, *Russellaspis pustulans pustulans* (Cockerell)

1.2. Family: Cerococcidae

Represented by one species only

2. The ornate pit olive scale, *Pollinia pollini* (Costa)

1.3. Family: Coccidae

Represented by five species

3. Fig wax scale, *Ceroplastes rusci* (Linn.)
4. Long brown soft scale, *Coccus longulus* (Douglas)
5. Green shield scale, *Pulvinaria psidii* (Mask.)
6. Hemispherical soft scale, *Saissetia coffeae* (Walker)
7. Mediterranean soft scale, *Saissetia oleae* (Olivier)

1.4. Family: Diaspididae

Represented by nine species.

8. California red scale, *Aonidiella aurantii* (Maskell)
9. Oleander scale, *Aspidiotus nerii* Bouche
10. Latania scale, *Hemiberlesia lataniae* (Signoret)
11. Greedy scale, *Hemiberlesia rapax* (Comstock)
12. San Jose scale, *Diaspidiotus perniciosus* (Comstock)
13. Mediterranean fig scale, *Lepidosaphes conchiformis* (Gmelin)
14. White olive scale, *Leucaspis riccae* (Targ-Tozzit)

15. Hall scale, *Mercetaspis halli* (Green)
16. Olive parlatoria scale, *Parlatoria oleae* (Cloveé)

1.5. Family: Monophlebidae

Represented by two species of *Icerya*.

It is worth to mention here that the genus *Icerya* belongs to the family Monophlebidae instead of Margarodidae according to the studies of Culik *et al*, 2007; Foldi, 2009 and Unruh & Gullan, 2008.

17. Egyptian mealy bug, *Icerya aegyptiaca* (Douglas).
18. Seychellarum mealy bug, *Icerya seychellarum seychellarum* (Westwood).

1.6. Family: Pseudococcidae

Represented by three species.

19. Hibiscus mealy bug, *Maconellicoccus hirsutus* (Green)
20. Citrus mealy bug, *Planococcus citri* (Risso)
21. Long tailed mealy bug, *Pseudococcus longispinus* (Targ-Tozzit)

2. Natural beneficial enemies associated with scale insects infesting some fruit trees species in the northern western coast of Egypt.

2.1. The taxonomical list of the parasitoids.

The data asserted that a total of eighteen species following nine genera belonging to five families under superfamily chalcidoidea belonging to order Hymenoptera were collected during the period of study. These species are as follows:

2.1.1 Family Aphelinidae

1. *Aphytis aonidae* Mercet
2. *Aphytis coheni* De Bach
3. *Aphytis lepidosaphes* Compere
4. *Aphytis maculicornis* Masi
5. *Aphytis paramaculicornis* DeBach & Rosen
6. *Aphytis* species
7. *Habrolepis aspidiotii* Comp. et Anne.
8. *Merietta leopardina* Motschulsky
9. *Coccophaga* sp.

2.1.2. Family: Encyrtidae

10. *Diversinervus elegans* Silvestri
11. *Metaphycus flaveus* (Howard)
12. *Metaphycus lounsburyi* (Howard)
13. *Metaphycus* sp.

2.1.3. Family Eulophidae

14. *Tetrasticus ceroplastae* (Giroult)
15. *Tetrasticus* sp.

2.1.4. Family Pteromalidae

16. *Scutellista caerulea* Fonscolombe

2.1.5. Family: Signiphoridae

17. *Singnophora* sp.
18. *Singnophora* sp

2.2. The taxonomical list of the predators.

Nine species belonging to seven genera of Family Coccinellidae, Order Coleoptera; one species from Order, Orthoptera, Hemiptera and Neuroptera were collected. These species listed as follows:

Order: Orthoptera

Family Mantidae

1. *Sphodromantis bioculata* (Burmeister)

Order: Hemiptera

Family: Reduviidae

2. *Reduvius* sp

Order: Neuroptera

Family Chrysopidae

3. *Chrysopa* sp

Order: Coleoptera

Family: Coccinellidae

4. *Chilocorus bipustulatus* L.
5. *Exochomus flavipes nigripennis* Korschevsky
6. *Rodalia cardinalis* (Mulsant)
7. *Coccinella undecimpunctata* L.
8. *Coccinella septempunctata* L.
9. *Scymnus subvillosus* (Goeze)
10. *Scymnus* sp
11. *Hyperaspis* sp
12. *Cydonia vicina* var. *nilotica* (Mulsant)

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Table (1): Distribution of Coccoid species associated with eleven fruit trees species during the period of December, 2007 till February, 2010 in the Western North Coast of Egypt.

Coccoid species	Host	locations	Almond	Apple	Apricot	Fig	Guava	Mulberry	Olive	Peach	Pear	Plum	Pomegranate
<i>Russellaspis pustulans pustulans</i>		B,H				*							
<i>Pollinia pollini</i>		B							*				
<i>Ceroplastes rusci</i>		B,H,M,C,r			*	*	*	*			*	*	
<i>Coccus longulus</i>		B,M					*						
<i>Pulvinaria psidii</i>		B					*						
<i>Saissetia coffeae</i>		B,H,C,r				*	*		*				
<i>S. oleae</i>		B,H,I,M,Bah				*	*		*		*		
<i>Aonidiella aurantii</i>		H							*				
<i>Aspidiotus nerii</i>		B,H,M				*	*		*				
<i>Hemiberlesia lataniae</i>		B,H,C,r,Bah				*	*	*	*				*
<i>H. rapax</i>		B,H		*	*						*		
<i>Diaspidiotus perniciosus</i>		B,H		*	*					*	*	*	
<i>Lepidosaphes conchiformis</i>		B,M,C,r,Bah				*							
<i>Leucaspis riccae</i>		B,M,C,r,I.M							*				
<i>Mercetaspis halli</i>		B	*										
<i>Parlatoria oleae</i>		B	*	*					*	*	*	*	
<i>Icerya aegyptiaca</i>		M,C,r					*						
<i>I. seychellarum seychellarum</i>		B,M,C,r,I.M		*		*	*	*			*		
<i>Planococcus citri</i>		B,H,M,C,r				*	*					*	
<i>Pseudococcus longispinus</i>		B							*				
<i>Maconellicoccus hirsutus</i>		B					*						
Total detected species/host plant			2	4	3	9	11	3	9	2	6	4	1

B = Burg el-Arab.
H = Hammam
C.r = Coastal ridge.
M = Merghem.
Ba = Bahig.
I.M = Iking-Mariut

المُلخَص العَرَبِي

الانواع المختلفة للحشرات القشرية والبق الدقيقى واعدائها الطبيعيه المرتبطه باحدى عشر نوع من اشجار الفاكهه فى الساحل الشمالى الغربى بمصر.

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تم تسجيل احدى وعشرون نوع من انواع الحشرات القشريه المدرعه و الرخوة و البق الدقيقى مرتبطين باحدى عشر نوع من اشجار الفاكهه المتساقطه والمستديمه الاوراق فى بعض المناطق بالساحل الشمالى الغربى لمصر ممثلين للمزارع المرويه و المزارع المعتمده على المطر (الجافه) فى خلال مدة الدراسه التى امتدت منذ ديسمبر 2007 حتى فبراير 2010.

فى خلال هذه الدراسه تم تسجيل عدد 18 طفيل تحت رتبه متشابهة الاجنحه يتبعوا عشر اجناس تحت خمس عائلات يندرجوا تحت فوق عائله Chalcidoidea. كذلك عدد تسعه انواع يندرجوا تحت سبع اجناس يتبعوا عائله Coccinellidae تحت رتبه غمديه الاجنحه وكذلك نوع واحد من عائلات مستديمه الاجنحه و نصفيه الاجنحه و شبكيه الاجنحه.