

SURVEY OF MEALYBUGS (HEMIPTERA: PSEUDOCOCCIDAE) INFESTING GRAPES AND ORNAMENTAL PLANTS AND THEIR PARASITOIDS

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Abstract

Mealybugs comprise some of the worst pests of fruit and shade trees in many parts of the world especially in the tropical and subtropical countries. There are numerous species of parasitoids that are associated with these pests. A field survey was conducted to determine the incidence of the mealybugs (Hemiptera: Pseudococcidae) on grapes and ornamental plants and their associated parasitoids in. Six species of mealy bugs, *Ferrisia virgata* (Cockerell), *Maconellicoccus hirsutus* (Green), *Planococcus citri* (Risso), *Planococcus ficus* (Signoret), *Pseudococcus longispinus* (Targioni-Tozzetti) and *Saccharicoccus sacchari* (Cockerell) attacking seven host plants including grape and ornamental plants and five associated parasitoids (*Blepyrus insularis* (Cameron), *Anagyrus kamali* Moursi, *Gyranusoidea indica* Shafee, Alam & Agarwal., *Leptomastidea abnormis* (Girault), *Neoplatycerus kemticus* Trjapitzin & Triapitsyn) were observed. These results contribute to the definition of diversity of mealybugs and their parasitoids in Egypt.

INTRODUCTION

Mealybugs comprise some of the worst pests of fruit and shade trees in many parts of the world especially in the tropical and subtropical countries. The application of synthetic pesticides is the tactic that is most commonly used by growers to control the mealybugs. However, although some compounds are less disruptive than others, the use of insecticides as a pest control option can have adverse effects on the beneficial organisms (Haynes, 1988). Numerous species of mealybugs and their parasitoids are recorded attacking grapes and ornamental plants (Williams *et al.*, 1992, and Güleç *et al.*, 2007). These mealybugs are found in diverse agroecosystems around the world. Several studies have been conducted on the mealybugs attacking grapes and ornamental plants in agricultural systems (Geiger and Daane, 2001, Ceballo and Walter, 2004).

In a recent survey, a new parasitoid species, *Neoplatycerus kemticus* Trjapitzin & Triapitsyn, was identified based on specimens collected from *Planococcus* in Egypt (Abd-Rabou , 2007).

Parasitoids play an important role in controlling the mealybugs (Mc Fadyen, 1979; Lohr *et al.*, 1990; Katsoyannos, 1993). Priesner & Hosny, (1940), Moursi, (1948 a,b,c), and Abd-Rabou, (2000 a, b) recorded nine parasitoids associated with mealybugs in Egypt. The natural enemies and their role in biological control have attracted many workers allover the world including Egypt (Priesner and Hosny, 1940; Moursi, 1948a; Hamed and Hassanein 1991; Abd-Rabou ,2000a; Moussa *et al.*, 2001; Gonzalez,et al., 2003; Abd-Rabou , 2005; Abd-Rabou and Hendawy , 2005).

Different climates can dramatically affect the population and distribution of mealybugs and the communities of parasitoids (Pijls and van Alphen, 1996). Moreover, populations of natural enemies and rates of parasitism by parasitoids of mealybugs can greatly vary among host plants (Souissi and Le Rü,1997).

Surveys can help identify the incidence of mealybugs and the role of parasitoids in a given region or locality, and their association with plants. Hence, they are a first and mandatory step towards development of management strategies relying on the precise knowledge of both pests and their natural enemies. The objective of this study was to determine the incidence of the mealybugs and their associated parasitoids on grapes and ornamental plants.

MATERIALS AND METHODS

Six diverse grapes and ornamental plants were established in experimental field plots in 2009. The plant species were *Acalypha wilkesiana*, *Hibiscus sabdariffa*, an unknown ornamental plant, *Citrus sp.*, *Sachrum officinarum* and *Vitis vinifera*. One planting of a given plant species and varieties was established in one of six governorate (9) regions (Alexandria, Behira, Cairo, Helwan, Giza and Qalyubiya Governorates) in Egypt. Pesticides were not used in the area under study. Samples were collected from June until October in 2009. Leaf samples were obtained from each region. The leaf samples were then detached and taken directly to the laboratory. All immature stages of mealybugs were counted through examination by using stereomicroscope. The leaves were then held in well-ventilated 0.5 liter cardboard containers , both the mealybugs and parasitoids were allowed to emerge (according to Simmons and Abd-Rabou, 2005). All adult specimens of mealybugs and their parasitoids found at the bottom of the rearing containers were then collected. The parasitoids were then identified and counted. Identification of mealybugs and

parasitoids was confirmed based on the comparison between newly collected samples mounted in Hoyer's medium (Noyes, 1982) and voucher specimens.

RESULTS AND DISCUSSION

Five parasitoids associated with six species of mealybugs attacking seven host plants were detected among seven host plants including grapes (Table, 1). Because sampling time and locations were not standard, and leaves among plants displayed different sizes, no direct comparisons can be made on quantification of insect species among the different plants. However, information on parasitoids is presumed to be independent of leaf size. Grapes was attacked only here by *Planococcus ficus* (Signoret) and recorded associated with *N. kempticus*. Walton and Pringle, (2004) stated that *Planococcus ficus* (Signoret) was the dominant mealybug and was found for the first time on roots of grapevines. *Saccharicoccus sacchari* (Cockerell) was the only taxon found on sugar cane and no parasitoid was associated with it. This species is widespread in upper Egypt (Abd-Rabou, 2000a). A temperature range of 28–40 °C is optimal for biological process and feeding behavior of *S. sacchari* (Hafez and Salama, 1967), and such temperatures are common during the summer growing season in the regions of our study. In the present work, *Ferrisia virgata* (Cockerell) was collected from *Acalypha wilkesiana* and associated with the parasitoid *Blepyrus insularis* (Cameron) (Hymenoptera-Encyrtidae). *Pseudococcus longispinus* (Targioni-Tozzetti) was also collected without any parasitoids. The survey conducted here also recorded *Maconellicoccus hirsutus* (Green) on *Hibiscus sabdariffa*, associated with *Anagyrus kamali* Moursi, *Gyranusoidea indica* Shafee, Alam & Agarwal. While *Planococcus citri* (Risso) on *Citrus* sp. recorded associated with, *Leptomastidea abnormis* (Girault).

Table 1. Mealybugs attacking grapes and ornamental plants and their associated parasitoids collected in Egypt during the 2009 year.

Mealybug species	Host plants	Location	Parasitoids	No. of Mealybugs		No. of Mummies	Date
				Pre-adult	Adult		
<i>Ferrisia virgata</i> (Cockerell)	<i>Acalypha wilkesiana</i>	Giza	<i>Blepyrus insularis</i> (Cameron)	350	32	9	15/6/2009
<i>Maconellicoccus hirsutus</i> (Green)	<i>Hibiscus sabdariffa</i>	Helwan	<i>Anagyrus kamali</i> Moursi,	230	100	14	2/10/2009
<i>Maconellicoccus hirsutus</i> (Green)	<i>Hibiscus sabdariffa</i>	Alexandria Desert Road	<i>Gyranusoidea indica</i> Shafee, Alam & Agarwal.	189	61	22	2/10/2009
<i>Planococcus citri</i> (Risso)	Ornamental plants	Cairo	<i>Leptomastidea abnormis</i> (Girault).	150	33	5	2/10/2009
<i>Planococcus citri</i> (Risso)	<i>Citrus</i> sp.	Qalyubiya	-	75	12	-	8/6/2009
<i>Planococcus ficus</i> (Signoret)	<i>Vitis vinifera</i>	Nobaria (Behira)	<i>Neoplatycerus kemticus</i> Trjapitzin & Triapitsyn,	115	18	7	2/10/2009
<i>Planococcus ficus</i> (Signoret)	<i>Vitis vinifera</i>	Nobaria (Behira)	<i>Neoplatycerus kemticus</i> Trjapitzin & Triapitsyn,	210	10	5	3/6/2009
<i>Pseudococcus longispinus</i> (Targioni-Tozzetti)	<i>Acalypha wilkesiana</i>	Helwan	-	315	112	-	30/9/2009
<i>Saccharicoccus sacchari</i> (Cockerell)	<i>Sachrum officinarum</i>	Helwan	-	20	3	-	30/9/2009

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حصر للبق الدقيقى و طفيلياته على العنب و نباتات الزينة

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البق الدقيقى من الآفات التى تسبب خطورة فادحة لبساتين الفاكهة و نباتات الزينة و ينتشر فى المناطق الحارة و شبه الحارة . تم إجراء حصر للبق الدقيقى و طفيلياته على محصول العنب و نباتات الزينة حيث تم حصر ست أنواع من البق الدقيقى وهى بق الفرجاتس الدقيقى و بق الهيسكس الدقيقى و بق الموالح الدقيقى و بق العنب الدقيقى و بق ذو الذيل الطويل و بق القصب الدقيقى تصيب ٧ عوائل نباتية منهم العنب و ترتبط أنواع البق الدقيقى التى تم حصرها به أنواع من الطفيليات وهى :

Blepyrus insularis (Cameron), *Anagyrus kamali* Moursi, *Gyranusoidea indica* Shafee, Alam & Agarwal, *Leptomastidea abnormis* (Girault), *Neoplatycerus kemticus* Trjapitzin & Triapitsyn.