

**BIO-ETHOLOGICAL OBSERVATIONS ON *PHENACOCCLUS MADEIRENSIS*
GREEN (COCCOIDEA: PSEUDOCOCCIDAE) IN SICILY¹**

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ABSTRACT

Phenacoccus madeirensis Green was found for the first time in western Sicily in 1991. From the observations up to now, it results that although the species develops preferably on both *Erythrina viarum* Tod. and *Acanthus mollis* L., it has been found living on other 40 host plants. *P. madeirensis* accomplishes 5-6 generations per year and overwinters as both 1st- and 2nd-instar larvae; nevertheless, some female adults may also be found. The duration of the different developmental stages at 30 + 2°C is as follows: egg, 1-4 days; 1st instar, 3-4 days; 2nd instar, 7-8 days; 3rd instar, 6-7 days; adult female, 5-8 days.

KEY WORDS: *Phenacoccus madeirensis*, mealybug, bio-ethology, Sicily.

INTRODUCTION

Phenacoccus madeirensis Green has been found abundantly on Coral tree (*Erythrina viarum* Tod.) and *Acanthus mollis* L. in the garden of the Istituto di Entomologia Agraria, Palermo, in summer 1991. This mealybug is common in Africa and South America. In Italy it was found for the first time by Tranfaglia (1981) in Campania and by Marotta (1987, 1990) in Basilicata. Longo and Russo (1990) found *P. madeirensis* in eastern Sicily and Sinacori (1993) found it in western Sicily.

As the mealybug is harmful not only for ornamental plants (Longo et al., 1994; Sinacori and Tsolakis, 1994) but also for crops such as *Citrus* spp., *Manihot* sp., *Ananas comosus*, *Solatum tuberosum*, *Helianthus* sp., etc. (Williams, 1987; Williams and Granara de Willink, 1992) and as only limited information is available on its biology, it was decided to carry out the present research. Observations were done from June 1992 to February 1994.

MATERIALS AND METHODS

The phenology of the mealybug in the field was checked by collecting 20 leaves of *A. mollis* and 50 leaves of *Lantana camara* at random every 15 days; only during August samples were taken every 10 days. A surface of 3 x 3 cm per each leaf of *Acanthus* and of 2 x 2 cm per each leaf of *Lantana* was examined under a stereomicroscope, recording the different stages of the mealybug and the possible presence of natural enemies.

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Laboratory observations were carried out on potato sprouts artificially infested by first-instar larvae at a temperature of $30 \pm 2^\circ\text{C}$ and at $70 \pm 5\%$ RH. Observations were performed daily until the juveniles reached adulthood.

During May–October 1994 the fecundity of the females was checked on 72 individuals collecting 3–4 females with their ovisacs in the field every 10 days. The time necessary to complete the ovisac as well as the egg incubation period was ascertained on 42 individuals.

Every female collected in the field was kept in a plastic Petri dish (5 cm diameter, 1.5 cm height). Two holes were made on the lid and covered with tulle; wet cotton wool was put inside the Petri dishes to supply water. New females collected in the field were introduced every 10 days. Observations were performed daily.

RESULTS AND DISCUSSION

From the field observations we see that *P. madeirensis* overwintered mostly as 1st and 2nd instar and seldom in the other stages (Figs. 1 and 2). The overwintering stages were found under the main veins of *Acanthus* leaves, in the crevices of the bark of *Erythrina*, or under leaves of *Pelargonium* sp.

Adult females of the first generation appeared in the third decade of June 1992 and between the third decade of May and the first decade of June 1993 (Figs. 1 and 2).

First- and second-instar larvae originating from the above mentioned females remained around the body of the mother in small colonies; then they started to move singly or in groups of 3–4 individuals towards the most protected parts of the host plant, where they remained until they attained adulthood (first half of July in 1992, end of July in 1993). As soon as the infestation increased, the various stages of the mealybug invaded the plants entirely, forming dense colonies. The time females required to complete their ovisacs ranged from 1 day (July, August) to 4 days (June, September) with an average of 1.7 days. The incubation period ranged from 1 day (August) to 6 days (October), with an average of 2.6 days. Although the number of females taken into account was not high, from the results obtained we may state that both the time necessary to complete the ovisac and the incubation period were influenced by



Fig. 1. Phenology of different stages of *Phenacoccus madeirensis* Green in the field during 1992.

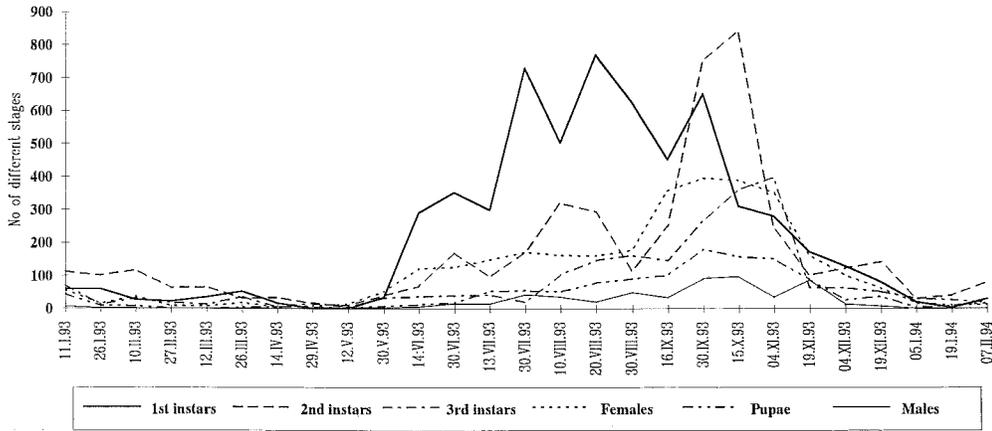


Fig. 2. Phenology of different stages of *Phenacoccus madeirensis* Green in the field during 1993–1994.

temperature. The average length of oviposition was 4.4 days, with a range of 2–7 days. We also noted some hatchings the day after oviposition, often even before females completed their ovisacs.

As far as oviposition is concerned, we see from Fig. 3 that it increased from May onward, reaching a peak during the third decade of August, and started decreasing soon afterwards. From the same figure we can also notice that the mean number of eggs laid in May was almost one third of the mean number of eggs laid during the second decade of October. Such data show that the reduced fecundity of the females was most probably linked to nutrition; as a matter of fact, females found in May derived from overwintering instars. The minimum and maximum number of eggs per female was 95 and 664.

The duration of the different stages was as follows: 1st instar, 3–4 days; 2nd instar, 7–8 days; 3rd instar, 6–7 days; female, 5–8 days (Table 1). The life cycle ranged from 22 to 31 days.

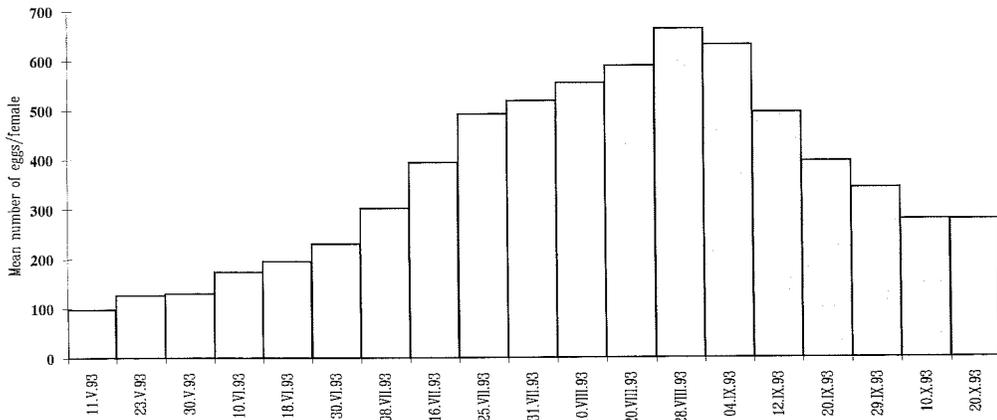


Fig. 3. Oviposition trend of *Phenacoccus madeirensis* Green.

TABLE 1
Postembryonic development of *Phenacoccus madeirensis* Green:
duration of the different stages

Stages	Average duration (days)	Range (days)
Egg	2.6	1–4
1st instar	3.3	3–4
2nd instar	7.2	7–8
3rd instar	6.3	6–7
Adult (female)	7.0	5–8
Total	26.4	22–31

From our observations we may say that *P. madeirensis* in western Sicily accomplished 5–6 generations per year, as was also observed by Marotta (1990) in Basilicata. However, unlike him, we found very few females laying eggs in winter.

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