Scale insects found in citrus orchards in Terceira Island, Azores

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Abstract: In the sweet orange orchards of Terceira Island, Azores, several insect pests cause damage, namely scale insects, mites, Mediterranean fruit fly and thrips, reducing citrus production and contributing to low quality fruits. The INTERFRUTA project was aimed at a better understanding and identification of the phytosanitary problems on sweet orange orchards in the three major citrus production areas of Terceira Island (Biscoitos, Angra do Heroísmo and São Sebastião). From January 2004 to June 2005, samples were collected every two weeks in nine citrus orchards of each production area in order to identify scale insect species and monitor their seasonal evolution. Twelve scale insect species were identified, namely six Coccidae, *Ceroplastes sinensis* (Del Guercio), *Protopulvinaria pyriformis* (Cockerell), *Parasaissetia nigra* (Nietner), *Coccus hesperidium* (Linnaeus), *Saissetia coffeae* (Walker) and *Saissetia oleae* (Olivier), three Diaspididae, *Chrysomphalus pinnulifer* (Maskell), *Lepidosaphes beckii* (Newman), *Chrysomphalus dictyospermi* (Morgan), two Pseudococcidae, *Pseudococcus longispinus* (Targioni-Tozzetti), *Planococcus citri* (Risso), and one Margarodidae, *Icerya purchasi* Maskell.

Key words: phytosanitary problems, scale insects, mealybugs, orange groves, Azores.

Introduction

This work was carried out under the auspices of INTERFRUTA Project (Lopes, 2004a; 2004b) and was aimed at identifying the scale insect pests and monitoring their seasonal evolution in citrus groves of the three major areas of citrus production in Terceira Island (Biscoitos, Angra do Heroísmo e S. Sebastião), Azores.

Materials and methods

Scale insect survey

From January 2004 to June 2005, three observations were made every two weeks in three out off five trees in each of nine sweet orange orchards, in each of the three studied areas: Angra, Biscoitos and São Sebastião. At each visit, a sample of leaves was collected for later identification in the laboratory, based on morphological observations and by comparing the collected species with those from the Interfruta reference collection and some bibliographic references (Franco *et al*., 2000).

The infestation level was determined by visual observation using a circle of wire (56 cm of diameter) that was randomly placed over the canopy of the sampled trees. The presence of each species in the branches, new leaves, old leaves and fruits inside the circle was registered, and the stage of development (juvenile or adult) recorded.

Results and discussion

A total of 990 samples were collected during the study. Twelve scale insect species belonging to the Coccidae, Diaspididae, Pseudococcidae and Margarodidae were identified.

The most representative families were Coccidae with six species and Diaspididae with three species.

Among the Coccidae, *Ceroplastes sinensis* (Del Guercio) and *Protopulvinaria pyriformis* (Cockerell) were the most frequent and important species. Occasionally, other coccids were found but they appeared to cause no damage, namely *Parasaissetia nigra* (Nietner), *Coccus hesperidum* (Linnaeus), *Saissetia coffeae* (Walker) and *Saissetia oleae* (Olivier) (Lopes & Figueiredo, 2005).

In the Diaspididae, *Chrysomphalus pinnulifer* (Maskell) was the most frequent and important species. Other armoured scale insects were also identified but not as important pests: *Lepidosaphes becki* (Newman) and *Chrysomphalus dyctiospermi* (Morgan) (Lopes & Figueiredo, 2005).

Two Pseudococcidae species were identified. *Pseudococcus longispinus* (Targioni-Tozzetti) was the most frequent species (Lopes & Figueiredo, 2005). *Planococcus citri* (Risso) was also present but less frequent and important. This situation is similar to that noted on Madeira Island but the opposite of what happens in mainland Portugal (Carvalho & Aguiar, 1997).

The Margarodidae, *Icerya purchasi* Maskell was a frequent species that occurred in all studied citrus groves (Lopes & Figueiredo, 2005).

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