Scale Insects (Hemiptera: Coccidae) of Pineapple in the State of Espírito Santo, Brazil

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Abstract

Pineapple is an important crop in the State of Espírito Santo, Brazil, and there is a need for increased pest management information on the crop in this state. Scale insects (Hemiptera: Coccoidea), especially mealybugs, are major pests of pineapple plants throughout the world, but very little is known of scale insects that occur in Espírito Santo. This study was done to determine what species of scale insects occur on pineapple and other plants in Espírito Santo in order to obtain a better understanding of the potential pests of pineapple (and other crops) in this State. Insects were collected on pineapples and other plants from various locations throughout the State from 2003 to 2006. Coccoidea were identified from about 200 plant samples representing at least 30 species of 20 plant families (mainly of tropical fruits and ornamentals). 11 scale insect species that are potential pests of pineapple were recorded for the first time in the State: *Aspidiotus nerii*, *Diaspis boisduvalii*, *Diaspis bromeliae*, *Melanaspis smilacis*, *Pinnaspis strachani*, *Pseudaonidia trilobitiformis*, *Unaspis citri*, *Coccus viridis*, *Phenacoccus madeirensis, Pseudococcus jackbeardsleyi*, and *Pseudococcus longispinus*. Other scale insects found that are known as potential pests of pineapple were the following: *Dysmicoccus brevipes*, *Dysmicoccus grassii*, *Ferrisia virgata*, *Planococcus citri*, *Planococcus minor*, *Pseudococcus viburni,* and *Praelongorthezia praelonga*. Although at least 18 scale insect species known as potential pineapple pests are present in Espírito Santo State, only *Diaspis boisduvalii*, *Diaspis bromeliae*, *Dysmicoccus brevipes*, and *Pseudococcus jackbeardsleyi* were collected from pineapple pants and currently only *Dysmicoccus brevipes* is known as a major pest of pineapple crops in the State. Information obtained in this study provides a basis for development of integrated pest management methods for pineapple crops in Espírito Santo State.

INTRODUCTION

Pineapple is an important crop in Espírito Santo State in Southeast Brazil, where there is a need for increased pest management information. Scale insects (Hemiptera: Coccoidea), especially mealybugs, are major pests of pineapple plants throughout the world, but very little is known on scale insects in Espírito Santo (Culik et al., 2007; Culik et al., in press). 31 species of scale insects have been recorded on pineapple plants worldwide and 25 of them are known in Brazil, but only 8 have been reported to occur in pineapple crops in this country (ScaleNet, 2005) and only *Dysmicoccus brevipes* has been recorded on pineapple plants in Espírito Santo State.

This study was done to determine what species of scale insects occur on pineapple and other plants in Espírito Santo State in order to obtain a better understanding of the potential pests of pineapple in this area and contribute to develop integrated pest management practices of pineapple and other crops in the State.

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MATERIAL AND METHODS

Scale insects were collected on pineapples and other plants from various municipalities throughout Espírito Santo State ranging from Pedro Canário in the north to Marataízes in the south and Vitória on the coast to Venda Nova do Imigrante in the interior, during the period 2003 to 2006. The insects were photographed and preserved in alcohol or in dry state. Samples of the scale insects collected were sent to specialists in taxonomy to identify or confirm identifications of the species.

RESULTS AND DISCUSSION

Scale insects were identified from about 200 plant samples collected during this study, representing at least 30 plant species from 20 families, consisting mainly of tropical fruits and ornamentals (Table 1).

11 scale insect species that are potential pests of pineapple plants were recorded for the first time in Espírito Santo State: *Aspidiotus nerii*, *Diaspis boisduvalii*, *Diaspis bromeliae*, *Melanaspis smilacis*, *Pinnaspis strachani*, *Pseudaonidia trilobitiformis*, *Unaspis citri*, *Coccus viridis*, *Phenacoccus madeirensis, Pseudococcus jackbeardsleyi*, and *Pseudococcus longispinus*. The following other scale insects known as potential pests of pineapple plants were found in Espírito Santo in this or previous studies: *Dysmicoccus brevipes*, *Dysmicoccus grassii*, *Ferrisia virgata*, *Planococcus citri*, *Planococcus minor*, *Pseudococcus viburni* and *Praelongorthezia praelonga*.

Although at least 18 scale insect species known as potential pests of pineapple plants are present in Espírito Santo State (Table1), only *Diaspis boisduvalii*, *Diaspis bromeliae*, *Melanaspis smilacis*, *Dysmicoccus brevipes* (Fig. 1A), and *Pseudococcus jackbeardsleyi* (Fig. 1B) were collected from pineapple plants and currently only *Dysmicoccus brevipes* is known as a major pest of this crop in the State. However, all of these scale insects mentioned are polyphagous and potential pests of pineapple and other plants.

One reason for just a few of these scale insects to be known on pineapple in Espírito Santo may be that there are many natural enemies (parasites and predators, etc.) of these insects commonly present in fields in this region. Therefore the results obtained in this study indicate the need to use integrated pest management methods and to minimize possible negative impacts of cultural and management practices on biological control agents and beneficial insects in pineapple crops.

CONCLUSIONS

Information obtained in this study on scale insects as potential and actual pests provides a basis to develop integrated pest management practices for pineapple and other crops in Espírito Santo State.

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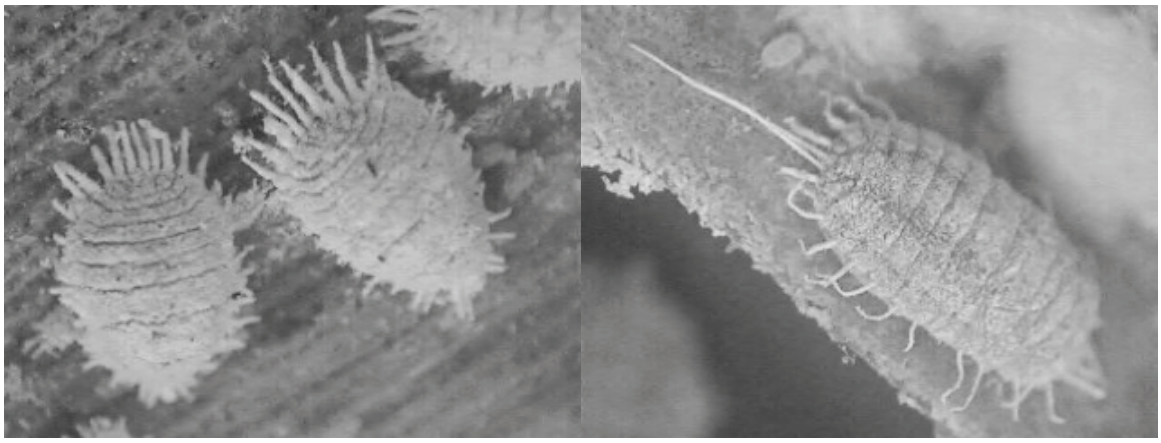
Tables

Table 1. Scale insects (Hemiptera: Coccoidea) of pineapple found in the State of Espírito Santo, Brazil.

Scale insect species	Host plants in Espírito Santo (local name)	Geographic distribution
DIASPIDIDAE		
Aspidiotus nerii Bouche	*Rosa* sp.	Cosmopolitan
Diaspis boisduvalii Signoret	*Ananas comosus* (pineapple)	Cosmopolitan
Diaspis bromeliae (Kerner)	*Ananas comosus* (pineapple)	Widespread
Melanaspis smilacis (Comstock)	*Ananas comosus* (pineapple)	Widespread
Pinnaspis strachani (Cooley)	*Artocarpus heterophyllus* (jackfruit), *Chamaedorea erumpens* *Citrus sinensis* *Mangifera indica* unidentified weed (gramineae)	Cosmopolitan
Pseudaonidia trilobitiformis (Green)	*Coffea canephora* (Conilon coffee), *Ixora coccinea* *Laurus nobilis* *Murraya paniculata,* *Nerium oleander*	Widespread
Unaspis citri (Comstock)	*Citrus sinensis* *Citrus reticulata*	Widespread
COCCIDAE		
Coccus hesperidum Linnaeus	*Carica papaya* *Dietes bicolor* *Solanum americanum*	Cosmopolitan
PSEUDOCOCCIDAE		
Dysmicoccus brevipes (Cockerell)	*Ananas comosus* (pineapple) *Coffea canephora* *Cucurbita pepo* *Psidium guajava*	
Dysmicoccus grassii (Leonardi)	*Carica papaya* *Coffea canephora*	Neotropical and few other areas
Ferrisia virgata (Cockerell)	*Citrus* sp. weed cf. *Spermacoce* sp. *Ranunculus repens*	Cosmopolitan
Phenacoccus madeirensis Green	weed cf. *Spermacoce* sp.	Cosmopolitan
Planococcus citri (Risso)	*Bidens pilosa*, *Citrus* sp. *Coffea canephora* *Leea rubra* *Lepidium virginicum*	Cosmopolitan
Planococcus minor (Maskell)[1]	*Bidens pilosa* *Coffea canephora*	Widespread
Pseudococcus jackbeardsleyi Gimpel & Miller	*Ananas comosus* (pineapple) *Coffea canephora* *Cucurbita pepo* *Manihot esculenta* weed cf. *Spermacoce* sp.	Widespread
Pseudococcus longispinus (Targioni Tozzetti)	*Dioscorea* sp.	Cosmopolitan
Pseudococcus viburni (Signoret)[1]	*Solanum tuberosum*	Cosmopolitan
ORTHEZIIDAE		
Praelongorthezia praelonga (Douglas)	*Coffea canephora* *Citrus* sp., *Schefflera* sp., *Tabebuia* sp.	Neotropical and Mexico

[1]The species *Planococcus minor* and *Pseudococcus viburni* were not collected in the present study.

Figures



A B

Fig. 1. Female scale insects A) *Dysmicoccus brevipes* and B) *Pseudococcus jackbeardsleyi* (Photos by M.P. Culik).