

PEST ALERT

Florida Department of Agriculture and Consumer Services, Division of Plant Industry
Adam H. Putnam, Commissioner of Agriculture

The Passionvine Mealybug, *Planococcus minor* (Maskell), a New Exotic Mealybug in South Florida (Hemiptera: Pseudococcidae)

Ian C. Stocks, Ian.Stocks@freshfromflorida.com, Biological Scientist IV, Florida Department of Agriculture and Consumer Services, Division of Plant Industry

Amy Roda, Amy.L.Roda@aphis.usda.gov, USDA, APHIS, Plant Protection and Quarantine
Center for Plant Health Science & Technology (CPHST)

INTRODUCTION: The passionvine mealybug (*Planococcus minor*), also known less commonly in the literature as the Pacific mealybug, has been established in several Caribbean countries and Central and South America since at least the late 1980's. State and federal plant regulatory officials have suspected for several years that the arrival of this species into Florida was only a matter of time. In preparation, USDA-APHIS-PPQ-CPHST scientists in South Florida began surveying for *Planococcus* species on potentially suitable hosts. In December 2010, Dr. Greg Evans (USDA-APHIS-PPQ) with the Systematic Entomology Laboratory in Washington D.C. identified, based on morphology, female specimens of *P. minor* collected from *Mussaenda* sp. (Rubiaceae) plants in the Fairchild Botanical Gardens, Miami. This represented a U.S. Continental Record, although *P. minor* is recorded from Hawaii. A second suspect specimen was collected in Palm Beach County in June 2011, and subsequently verified as *P. minor* by Dr. Greg Evans.

BIOLOGY: The taxonomic history of the passionvine mealybug is complicated, and much of what is recorded under the name *P. minor* may pertain to the citrus mealybug, *P. citri*, and vice versa. At various times since its description in 1897, the status of the species has been doubted, and has even been synonymized with the nearly identical *P. citri*. Cox (1989) established that the variation found amongst and between populations indicated that two species were involved, but that a detailed analysis of several characters, assembled in a scoring matrix, was necessary to distinguish the two. Recently, molecular analyses (Rung *et al.* 2009, Malausa *et al.* 2010) have been conducted on specimens from various parts of the world, and results indicate that the species are valid. The problem of correctly identifying the mealybugs to species is exemplified by a 2006 North American Plant Protection Organization, Phytosanitary Alert System report that a population had been found in a California greenhouse. Subsequent molecular work indicated that the population was in fact citrus mealybug and the alert was retracted. Making identification more difficult and uncertain is the fact that female *Planococcus* specimens from South Florida often score in an intermediate range on the Cox Score, and frequently are not clearly referable to either *P. citri* or *P. minor*.

Surveys for *P. minor* began in several locations in South Florida in October 2009 by USDA-APHIS-PPQ-CPHST staff. Survey protocol also included the use of pheromone traps that were baited with a synthetic pheromone thought to be specific for *P. minor* males (Millar 2008). These traps have collected males that were positive as *P. minor* in molecular analyses, but males cannot be differentiated morphologically, and morphologically identified females are needed to establish the record. Possibly, *P. minor* has been present in Florida in very low numbers for some period of time but has remained either uncollected or unidentified based on morphological characters.

Planococcus minor can be found throughout the Caribbean, especially in cacao plantations. However, *P. minor* is not currently considered a severe pest in Caribbean agricultural systems, perhaps because populations are suppressed by natural predators and parasitoids.

DESCRIPTION: In the field, populations of *P. minor* are indistinguishable from those of *P. citri*. Females are oval, 2-3.5 mm long, generally with a light yellow body color that may be obscured by wax. They are typically covered in a light dusting of white powdery wax with elongate projections of denser wax around the circumference of the body (Fig. 1). Often, beneath or beside the female on the plant surface is a larger and more fluffy patch of wax called the ovisac, enmeshed in which can be found light yellow eggs and crawlers (Fig. 2). In heavy infestations, eggs, crawlers, immatures and adult females can be found distributed on the same scruffy-looking patch of wax (Fig. 3).

NATURAL ENEMIES: None of the species listed on ScaleNet (Ben-Dov 2011) are known to occur in Florida. However, numerous predators and parasitoids that attack *P. citri* do occur in Florida, and are likely also to find *P. minor* as suitable hosts or prey. At least one population being monitored in South Florida was eradicated in a two-week period by the dipteran predator *Diadiplosis coccidarum* Cockerell (Cecidomyiidae) (unpublished data). Other predators, as yet unidentified, have also been collected from these populations, but whether these species will result in effective widespread control is currently under study through continuous survey of suspected populations in South Florida and the Caribbean. In Trinidad, scientists with APHIS-PPQ and Florida Agricultural and Mechanical University have collected the following species in association with *P. minor*:

Predators: *Cryptognatha nodiceps* Marshall, *Diomus* sp., *Tenuisvalvae bisquinquepustulata* (Fabricius) (Coleoptera: Coccinellidae); *Calliodis* sp. (Hemiptera: Anthocoridae); *Ocyrtamus stenogaster* species group (Dipteran: Syrphidae). Parasitoids: *Leptomastix dactylopii* Howard, and *Coccidoxenoides perminutus* (Planopar) (Hymenoptera: Encyrtidae). Both species of parasitoids are commercially available for the biological control of *P. citri*.

HOSTS: The host list for *P. minor* is extensive, exceeding 250 species in 80 families (Bastos *et al* 2007). Throughout the range of *P. minor*, cocoa (*Theobroma cacao*; Sterculiaceae) is a common host, but coffee (*Coffea* sp.; Rubiaceae) is also a favored host; neither of these are widely cultivated in Florida. However, an incomplete list of other recorded hosts of relevance for Florida agriculture and horticulture include:

Anacardiaceae (*Mangifera indica*); Annonaceae (*Annona* spp.); Araceae; Arecaceae; Cucurbitaceae (*Cucumis* spp., *Cucurbita* spp.); Euphorbiaceae; Fabaceae; Malvaceae (*Gossypium hirsutum*, *Hibiscus* spp.); Moraceae; Musaceae; Rutaceae (*Citrus* spp.); Solanaceae (*Solanum* spp., *Lycopersicon esculentum*, *Capsicum frutescens*); Verbenaceae (*Clerodendrum* spp.); Zingiberaceae

DISTRIBUTION: Global in distribution in suitable climate zones. Recorded from Florida and Hawaii in the U.S, and Mexico.

REFERENCES:

- Bastos C.S., R.P. de Almeida, F. das C. Vidal Neto, and G.P. de Araújo. 2007.** Ocorrência de *Planococcus minor* Maskell (Hemiptera: Pseudococcidae) em algodoeiro no Nordeste do Brasil. Neotropical. Entomology. 36(4): 625-628.
- Cox, J.M. 1989.** The mealybug genus *Planococcus* (Homoptera: Pseudococcidae). Bulletin of the British Museum of Natural History (Entomology). 58(1):1-78.
- Ben Dov, Y. 2011.** ScaleNet, *Planococcus minor*. Accessed 3 January 2011. <http://www.sel.barc.usda.gov/catalogs/Pseudoco/Planococcusminor.htm#Planococcusminor>
- Kairo, M.T.K., A. Francis and A. Roda. 2008.** Developing a strategic research for biological control of a new pest threat: The passion vine mealybug, *Planococcus minor* as a case study. Proceeding of the Caribbean Food Crops Society. 44(1): 118-123.
- Malausa, T., A. Fenis, S. Warot, J.-F. Germain, N. Ris, E. Prado, M. Botton, F. Vanlerberghe-Masutti, R. Sforza, C. Cruaud, A. Couloux and P. Kreiter. 2010.** DNA markers to disentangle complexes of cryptic taxa in mealybugs (Hemiptera: Pseudococcidae). Journal of Applied Entomology. 135: 142-155.
- Millar, J.G. 2008.** Stereospecific synthesis of the sex pheromone of the passionvine mealybug, *Planococcus minor*. Tetrahedron Letters. 49: 315-317
- Rung, A., D.R. Millerand S.J. Scheffer. 2009.** Polymerase chain reaction-restriction fragment length polymorphism method to distinguish three mealybug groups within the *Planococcus citri*-*P. minor* species complex (Hemiptera: Coccoidea: Pseudococcidae). Journal of Economic Entomology. 102(1):8-12.
- Williams, D.J. and M.C. Granara de Willink. 1992.** Mealybugs of Central and South America. C. A. B. International, Oxford. United Kingdom. 635 pp.



Figure 1. Adult female *Planococcus citri* without an ovisac.
Photograph credit: Lyle Buss, University of Florida, Department of Entomology and Nematology.



Figure 2. Adult female *Planococcus citri* with an ovisac.
Photograph credit: Lyle Buss, University of Florida, Department of Entomology and Nematology.



Figure 3. Adult females, eggs and crawlers of *Planococcus citri* surrounded by wax. Photograph credit: Lyle Buss, University of Florida, Department of Entomology and Nematology.