Notes on a new mealybug (Hemiptera: Coccoidea: Pseudococcidae) pest in Florida and the Caribbean: the papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink

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Abstract: *Paracoccus marginatus* Williams and Granara de Willink, here called the papaya mealybug, was first detected in the United States in Hollywood, Florida in 1998. By the end of 1998 it was found in four localities in the state and has since spread to nine localities in five counties. This mealybug appears to have moved through the Caribbean area since its 1994 detection in the Dominican Republic. The pest is reported to cause serious damage to tropical fruit, especially papaya, and has been detected most frequently, in Florida, on hibiscus. It is now known from Antigua, Belize, the British Virgin Islands, Costa Rica, Guatemala, Mexico, Nevis, Puerto Rico, St. Barthélémy, St. Kitts, St. Martin, and the US Virgin Islands. Hosts include: *Acacia* sp.(Luguminosae), *Acalypha* sp.(Euphorbiaceae), *Ambrosia cumanensis* (Compositae), *Annona squamosa* (Annonaceae), *Carica papaya* (Caricaceae), *Guazuma ulmifolia* (Sterculiaceea), *Hibiscus rosa-sinensis* (Euphorbiaceae), *Hibiscus* sp. (Euphorbiaceae), *Ipomoea* sp. (Convolvulaceae), *Manihot chloristica* (Euphorbiaceae), *Manihot esculenta* (Euphorbiaceae), *Mimosa pigra* (Lugiminosae), *Parthenium hysterophorus* (Compositae), *Persea americana* (Lauraceae), *Plumeria* sp. (Apocynaceae), *Sida* sp. (Malvaceae), *Solanum melongena* (Solanaceae). The species is believed to be native to Mexico and/or Central America.

Key Words: detection, papaya, tropical fruit, hibiscus, distribution, identification

Introduction

The purpose of this paper is to draw attention to a new pest that was discovered recently in the United States. It is *Paracoccus marginatus* Williams and Granara de Willink (here called the papaya mealybug). It could pose a threat to certain ornamentals and tropical fruit crops. We present a summary of information known about the papaya mealybug to facilitate any control strategies that might be contemplated.

The papaya mealybug was described in 1992 from specimens collected in Mexico, Belize, Costa Rica, and Guatemala. It was collected many times in Mexico and Central America between 1975 and 1985 during surveys for the cassava mealybug, *Phenacoccus manihoti* Matile-Ferrero, and its natural enemies. The first known specimens of the papaya mealybug were collected in 1967 in Acapulco, Mexico, but we suspect that the species is endemic to some part of Mexico and/or Central America, but wasn't detected until 1967. When Williams and Granara de Willink (1992) examined thousands of pseudococcid specimens for their book on the mealybugs of Central and South America, they did not find any material from the Caribbean. We suspect that *P. marginatus* wasn't introduced to these islands until more recently,

perhaps 1993 or 1994 and has spread rapidly through most of the Caribbean archipelago.

In 1998, several news releases alerted home owners and nurserymen in Florida to be on the look out for the pink hibiscus mealybug, *Maconellicoccus hirsutus* (Green), on their hibiscus plants. Since this species is moving north rapidly through the Caribbean Islands, it seemed only a matter of time before it became established in the United States, most likely in Florida. Thus, the public was asked to help in the search. Within a few days, people in Boca Raton, Palm Beach County, FL, Hollywood, Broward County, FL, and Bradenton, Manatee County, FL, reported characteristic pink hibiscus mealybug leaf deformation on their hibiscus plants and submitted mealybug specimens that were associated with the damage. The surprise was that these specimens were not the pink hibiscus mealybug as surmised, but instead were the papaya mealybug, *Paracoccus marginatus*.

The pest status of this species has not been assessed. Williams (1986) reported it as a problem on cassava in some areas of Mexico, and the first author has observed fruit of papaya on St. Thomas that was so heavily infested with mealybugs that it was white in color and essentially was inedible. Similar observations have been reported by Dale Meyerdirk (APHIS-USDA, Riverdale, MD, personal communication, 1998). On hibiscus plants in Florida, the mealybug causes deformation and curling of the leaves and early leaf drop.

A detailed description and illustration were presented by Williams and Granara de Willink (1992) and we will not duplicate that information here. Diagnostic features of slide-mounted adult females are as follows: oral-rim tubular ducts dorsally restricted to marginal areas of body; translucent pores restricted to hind coxa; anal lobe with a small anal bar; with 16 or 17 pairs of cerarii, some on head and thorax indefinite; without clusters of oral-collar tubular ducts on margin of thorax; with a few oral-collars posterior of anterior spiracles.

The body is yellow in color and has a series of short waxy filaments around the margin that are less than 1/4 the length of the body. The ovisac is produced ventrally only, but can be two or more times the length of the body of the adult female. When specimens are placed in alcohol they turn a blue-black color that is characteristic of species in this genus (Williams, 1986). The species only has been recorded from areas of the host that are above ground, particularly the leaves and fruit.

Specimens examined. **UNITED STATES**: FLORIDA -- **Broward Co.: Hollywood**, on *Hibiscus* sp, 15-VII-1998, by M. Quintanilla. **Ft. Lauderdale**, on *Carica papaya*, 29-VII-1998, by F.W. Howard; on *Jatropha* sp., 20-VIII-1998, F.W. Howard; *Hibiscus* sp., 03-IX-1998, by W. Thiel; on *Clerodendrum paniculatum*, 06-IX-1998, F.W. Howard; on *Hibiscus rosa-sinensis*, 06-IX-1998, F.W. Howard; on *Acalypha wilkesiana*, 06-IX-1998, F.W. Howard; on *Hibiscus* sp., 05-XI-1998, by W. Thiel; on *Jatropha* sp., 16-XI-1998, by W. Thiel. **Pompano Beach**, on *Hibiscus rosa-sinensis*, 09-X-1998, by K. Harris. **Dade Co.: Miami Springs**, on Jatropha sp., 29-XII-1998, by R. Skafidas, **Miami**, on *Carica papaya*, 08-IV-1999, by R. Sanders. **Hillsborough Co.: Brandon**, on *Hibiscus* sp., 17-XI-1998, by S. Tyrala. **Manatee Co.: Bradenton**, on *Hibiscus rosa-sinensis*, 24-VII-1998, by W. Clifton; on *Hamelia cuprea*, 24-VIII-1998, by M. Runnals; on *Hibiscus rosa-sinensis*, 18-IX-1998, B. Skidmore. **Palm Beach Co.: Boca Raton**, on *Jatropha integerrima*, 11-VIII-1998, by B. L. Wilklow; on *Hibiscus rosa-sinensis*, 12-VIII-1998, E. Tannehill; on *Hibiscus rosa-sinensis*, 17-VIII-1998, by L. Hammer; on *Hibiscus rosa-sinensis*, 19-VIII-1998, by L. Ooms; on *Hibiscus rosa-sinensis*, 12-XI-1998, by M. Hoy; on *Hibiscus rosa-sinensis*, ?-?-1998, by J. Lofquist; on *Cestrum nocturum*, 24-III-1999 by L. Ooms. **Delray Beach**, on *Hibiscus rosa-sinensis*, 30-X-1998, L. Ooms. **ANTIGUA**: St. John's, on *Hibiscus* sp. and *Solanum melongena*, 19-V-1998, by M. Kairo. **BELIZE**: Cayo District -- Roaring Creek, on *Carica papaya*, 6-V-1984, by J. Mertely; Cayo, Santa Elena, on *Guazuma ulmifolia*, 30-X-1994, by J. H. Martin; Corozal District -- Corozal, on *Carica papaya*, 12-VI-1983, by R. A. Dunn. District Unknown -- Unknown locality (intercepted at unknown US port-of entry), on *Carica papaya*, 18-IX- 1992, by unknown collector. **BRITISH VIRGIN ISLANDS**: Great Camanoe Island, on *Ipomea* sp., 16-X-1996, by R. F. Denno; Tortola, on unknown host, 19-X-1997, by W. De Chi. **COSTA RICA**: Cartago, on *Manihot esculenta*, 2-V-1981, by H. R. Herren. **DOMINICAN REPUBLIC**: Locality unknown, on *Persea americana*, 19-VII-1994, by J. Sanchez. GUATEMALA: Suchitepequez, San Juan Bautista, on *Manihot esculenta*, 19-V-1981, by H. R. Herren. HAITI: Port of Prince, on *Hibiscus* sp., 30-VII-1998, by D. E. Meyerdirk. **MEXICO**: Baja California -- La Paz, on *Carica papaya*, 13-IX-1978, by G. Buxton. Colima -- Manzanillo, on *Manihot chloristica*, 29-V-1981, by H. R. Herren; Las Brisas, on *Manihot esculenta*, 21-XII-1980, by H. R. Herren. Guerrero -- Acapulco, on *Sida*

sp., 15-IV-1984, by J. Gillet & H. Miranda; Acapulco, on *Hibiscus* sp., 13-XII-1981, R. F. Wilkey; El Carrizal, on *Manihot esculenta*, 27-XII-1980, by H. R. Herren. Jalisco -- Puerto Vallata, on *Hibiscus* sp., 13-XII-1981, by E. L. Paddock. Nayarit -- Playa los Cocos, on unknown host, 19-XII-1980, H. R. Herren. Quintana Roo -- Cozumel, on *Parthenium hysterophorus*, 18-VI-1976, F. D. Bennett. San Luis Potosi -- Tamazunchale, on *Manihot esculenta*, 14-XII-1980, by H. R. Herren; Centla, on *Manihot esculenta*, *Ambrosia cumanensis*, 11-V-1985, by A. Bellotti. Tobasco -- Benito Juarez, on *Manihot esculenta*, 17-IV-1980, by H. R. Herren; Benito Juarez, on Fabaceae, 16-IV-1981, by H. R. Herren; Huimenguillo, on *Manihot esculenta*, 22-V-1981, by H. R. Herren; Villahermosa, on *Mimosa pigra*, 18-III-1985, by J. Gillet. Vera Cruz -- La Capella, on *Parthenium hysterophorus*, 30-V-1980, by F. D. Bennett; Paso del Torro, on *P. hysterophorus*, 1-IV-1980, by F. D. Bennett; Las Puentas, on *P. hysterophorus*, 11-IV-1980, by F. D. Bennett; Latinaja, on *Sida* sp., *Parthenium hysterophorus*, 4-IV-1981, by F. D. Bennett; Tamarindo, on *Carica papaya*, date unknown, by Y. Dominguez; Vera Cruz, on *Acalypha* sp., 24-IV-1981, by H. R. Herren; Vera Cruz, on *Manihot esculenta*, 16-IV-1980, by H. R. Herren; Vera Cruz (intercepted at El Paso, Texas), on *Carica papaya*, 25-IV-1983, collector unknown. Yucatan: Progresso, on *Parthenium hysterophorus*, 15-IV-1976, by F. D. Bennett; Tenaba, on *Manihot esculenta*, 22-IV-1980, collector unknown. Unknown State -- locality unknown (intercepted at Nogales, Arizona), host unknown, 5-IX-1991, by T. Giles; locality unknown (intercepted at El Paso, Texas), on *Zea mays*, 20-XI-1992, by H. Grieb. **NEVIS**: Bellevue, on *Acacia* sp., 17-IX-1998, by M. Kairo & R. Hector; Prospect, on *Carica papaya*, 17-IX-1998, by M. Kairo & R. Hector. **PUERTO RICO**: Fajardo, on *Hibiscus* sp., 12-II-1999, by J. P. Michaud; Locality unknown, on *Hibiscus* sp., 24-II-1994, by J. Morales; Locality unknown, on *Carica papaya*, 16-X-1995, by unknown collector. **ST. KITTS**: Fahies, Phipps Farm, on *Hibiscus* sp., 15-IX-1998, by M. Kairo & R. Hector; Molineux, on *Annona squamosa*, 14-IX-1998, by M. Kairo & R. Hector; East Basseterre, Taylors Range, on *Carica papaya*, 14-IX-1998, by M. Kairo & R. Hector. **US VIRGIN ISLANDS**: St. Croix, on *Plumeria* sp., 16-VIII-1994, by K. Jenkins; St. Thomas -- Botany Bay, on *Carica papaya*, 2-VI-1998, by M. E. Schauff & D. R. Miller; near Dorothea Bay, on shrub, 3-VI-1998, by M. E. Schauff & D. R. Miller; John Brew's Bay, on *Acacia* sp., 3-VI-1998, by D. R. Miller; Magens Bay, on *Coccoloba* sp., 4-VI-1998, by M. E. Schauff & D. R. Miller; near Redhook Ferry, Smith Bay, on unknown host, 4-VI-1998, by M. E. Schauff & D. R. Miller; Smith Bay, on leguminose tree, 4-VI-1998, by M. E. Schauff & D. R. Miller.

The species also has been collected on the Islands of St. Barthélémy and Guadeloupe (Matile-Ferrero and Étienne, 1998).

Summary

New pests are too frequently introduced into the United States. Scale insects are notorious in this regard since they are small, frequently concealed, and difficult to locate. This paper draws attention to a species of scale (the papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink) that has recently been discovered in the United States for the first time. It has been collected at nine different locations in Florida and is considered to be a potential pest of certain ornamental plants and tropical fruits crops. Information is provided on hosts, distribution, and identification of this species. This information is important to US and state quarantine programs so that inspectors and identifiers will be able to determine the correct name of the species and will be able to make informed decisions on actions to be taken against this pest.

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