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Pink Hibiscus Mealybug Identification

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Common Name: Pink Hibiscus Mealybug (PHM)

Primary Economic Host(s)

Tropical hibiscus (*Hibiscus rosa-sinensis*) is the most common host of the pink hibiscus mealybug. Other hosts of significance include Beautyleaf (*Calophyllum* spp.), Schefflera (*Schefflera arboricola*), Viburnum (*Viburnum odoratissimum*), and Florida nettle (*Trema micranthum*). Literature sources also indicate that cotton (*Gossypium* sp.), citrus (*Citrus* sp.), and several vegetable crops may be severely affected by infestation (3).

Scientific Name: *Maconellicoccus hirsutus* (Green)

Taxonomy

Maconellicoccus hirsutus is classified in the mealybug or Pseudococcidae family and the order Hemiptera. More information on the taxonomy of *M. hirsutus* is available from Miller (7).

Field Identification

Although field identification is not sufficient for species confirmation of regulatory pests, it is an extremely useful tool for screening and tentatively identifying suspect mealybug samples. Slide mounting is necessary for a more definitive identification.

Several resources are available for field identification information (2,4,5,6,8). As males are rarely seen in the field and the immature or crawler stages of several mealybug species are difficult to differentiate from each other, identification focuses on the adult female. Some key features used in field identification include the following: lateral wax filaments (Fig. 1); shape and size; presence/absence of an ovisac; color of eggs (Fig. 2), and body color.

Fig. 1. Lateral wax filaments of citrus mealybug, *Planococcus citri*. (Photo by H. Glenn, University of Florida, Tropical Research and Education Center).

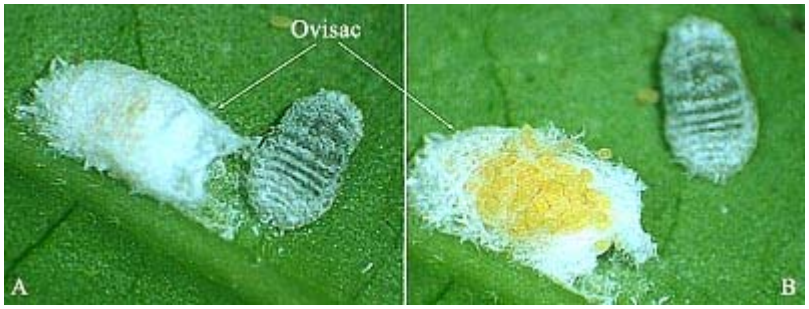

Fig. 2a-b. Ovisac and eggs produced by *Phenacoccus madeirensis*. (Photos by A. Hamon, Florida Dept. of Agriculture & Consumer Services, Division of Plant Industry).

PHM has a reddish or pinkish body, one to two pairs of lateral filaments usually occurring at the posterior end of the body, and two 'buttons' of white wax on the abdomen (Fig. 3). Additionally, its body bleeds a reddish-brown fluid when pierced. When present, eggs are a bright pink to red color (Fig. 4). Field identification characteristics may not be as apparent in specimens preserved in alcohol for an extended period of time.

Fig. 3. The pink hibiscus mealybug, *M. hirsutus,* showing two buttons of white wax. (Photo by L. Buss, University of Florida).

Fig. 4. Eggs of the pink hibiscus mealybug, *Maconellicoccus hirsutus*. (Photo by FDACS-DPI).

Signs of Damage

As with most mealybug species, high populations can result in excess production of honeydew, subsequently causing sooty mold growth. Also, since mealybugs feed on phloem tissue, heavy populations may cause wilting. Additionally, PHM injects a toxic saliva during feeding, which can cause a symptom known as bunchy top in hibiscus (10) (Fig. 5).

Fig. 5. Bunchy top symptom on hibiscus. (Photo by the Florida Department of Agriculture & Consumer Services, Division of Plant Industry).

Host Range

There are over 334 reported hosts of PHM, of which about 120 occur in Florida (3,4,8). Potential host species encompass at least 72 plant families and include numerous agriculturally important crops such as vegetables, legumes, grasses, rosaceous species, cotton, citrus, and ornamental plants. Infestation levels of PHM vary depending upon host availability and preference. In nurseries, *H. rosa-sinensis* appears to be a preferred host, while in natural areas, Florida nettle is preferred.

Geographical Distribution

PHM is native to Asia, but has subsequently spread to Africa, Australia, Central America, South America, and North America (2,6). In the continental U.S., PHM was introduced into California in 1999 and Florida in 2002. PHM has been accidentally shipped to other states through the nursery trade, and its exact established distribution in uncertain.

Preparation of Slide Mounted Specimens

Slide-mounting is necessary to confirm species-level identification. Numerous references for preparing slides are available (1,8,9). If properly prepared, a slide-mounted mealybug specimen is indefinitely preserved.

Key Identification Characters

Identification of the mealybug is based on the morphology of its exoskeleton. Key characters in mealybug identification may include body shape, antennal segmentation, leg morphology, anal bar, ducts and pores, cerarii, and the circulus. It should be noted that all of these characteristics are not present in every mealybug species. Mealybug body shape may be oval (Fig. 6), elongate (Fig. 7), or round (Fig. 8). Antennal segmentation generally ranges from two to nine segments (Fig. 9), but species-specific and life-stage variation occurs. Immature stages will have few antennal segments than adults. Mealybugs with well-developed legs exhibit typical insect leg morphology with a coxa, trochanter, femur, tibia, tarsus, and tarsal claw (Fig. 10). Some species may have reduced or absent legs. Presence or absence of translucent pores on the coxa, trochanter, femur, tibia and tarsus is often a key character for identification. In particular, two pores present on the dorsum of each trochanter is a common feature in taxonomic keys. A presence of a denticle (tooth-like structure) on the tarsal claw is distinctive for some genera (Fig. 11). Small fine, translucent pores on the derm above the metathoracic leg may also be an important characteristic for identification (Fig. 12).

The anal bar, a sclerotized structure found within the anal lobe, may be strongly pronounced (Fig. 13), poorly pronounced or inconspicuous (Fig. 14), or lacking (Fig. 15).

Fig. 6. Citrus mealybug, *P. citri,* an example of an oval body shape. (Photo by L. Buss, University of Florida, Entomology & Nematology Department).

Fig. 7. *Rhizocoeus* spp., an example of an elongate body shape (Photo by L. Buss, University of Florida, Entomology & Nematology).

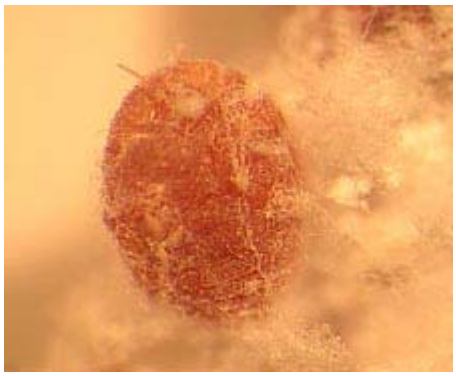

Fig. 8. *Hypogeococcus pungens*, an example of a round body shape. (Photo by the Florida Dept. of Agriculture, Division of Plant Industry).

Fig. 9. The 8-segmented antennae of a striped mealybug, *Ferrisia virgata*.(Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

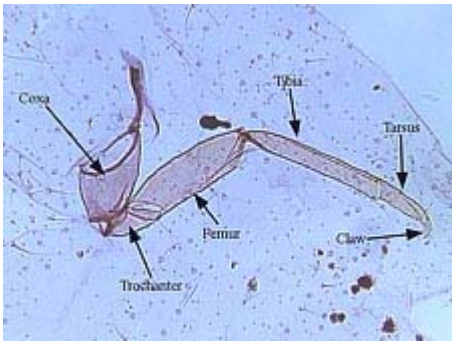

Fig. 10. The well-developed leg of the pink hibiscus mealybug, *M. hirsutus*. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

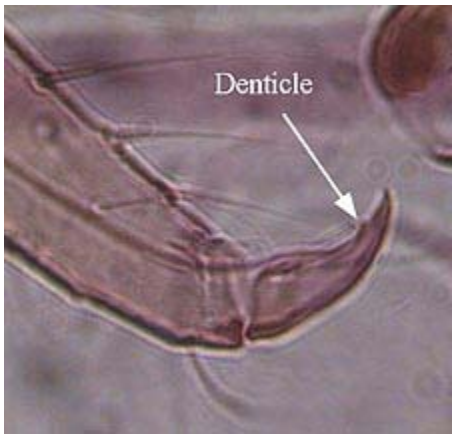

Fig. 11. The presence of a denticle, or tooth-like structure, on the tarsal claw of Madeira mealybug, *P. madeirensis*. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

Fig. 12. Small, fine translucent pores on the derm above the metathoracic leg. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

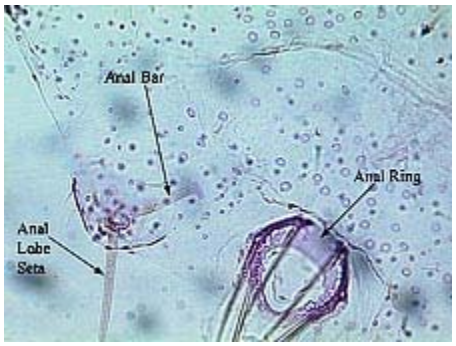

Fig. 13. The strongly pronounced anal bar of citrus mealybug, *P. citri*.(Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

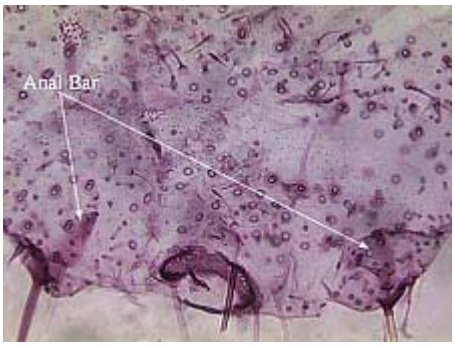

Fig. 14. The inconspicuously pronounced anal bar of the pink hibiscus mealybug, *M. hirsutus*. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

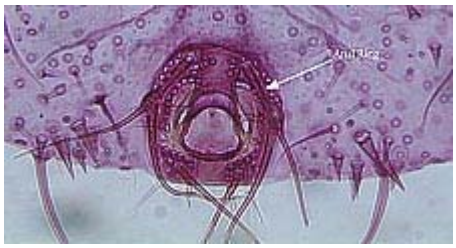

Fig. 15. The absence of an anal bar in *H. pungens*. (Florida Dept. of Agriculture, Division of Plant Industry).

Distribution and types of pores and ducts occurring on the ventral and dorsal derm are important in generic and species level identifications. The types of pores are bilocular, multilocular, quinquelocular, and trilocular. The trilocular pores (three locules or openings) are the most common pores found on the body and occur in most of the species. The trilocular pores are believed to produce the wax that covers the insect's body. Quinquelocular pores (five locules) are most commonly associated with mealybugs in the genus *Phenacoccus*. The multilocular pores (six or more locules) are generally located around the vulva on the ventral abdominal segments. Multilocular pores produce the wax associated with the protection of the eggs.

The clusters of pores and setae arranged around the margin of the body are termed cerarii (Fig. 16). The lateral and posterior wax filaments that are commonly observed in the field are produced by these structures. A cluster or plate of trilocular pores with two short conical setae present in the center is a

typical cerarri structure. The number of pairs of cerarri around the body can be an important taxonomic feature, and 17 pairs is the most common arrangement. Occasionally, filamentous or hair-like setae associated with the cerarii, known as 'auxiliary setae', are present (i.e., *Pseudococcus* and *Dysmicoccus* species).

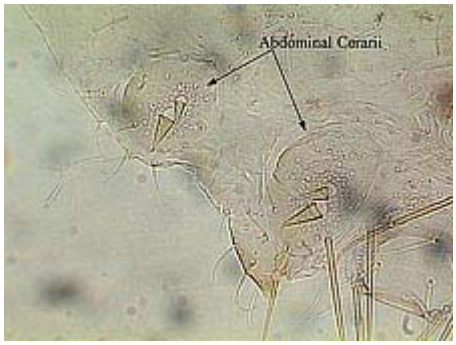

Fig. 16. Abdominal cerarii of longtailed mealybug, *P. longispinus*. (Florida Dept. of Agriculture, Division of Plant Industry).

The circulus, believed to assist in adhesion to plant material, is a simple area of variable size that lacks setae and pores. The shape and number of circuli is a useful character for distinguishing generic and species level identifications (Figs. 17, 18, 19, and 20).

The circulus may project from the body and is usually located between the fourth and fifth abdominal segments.

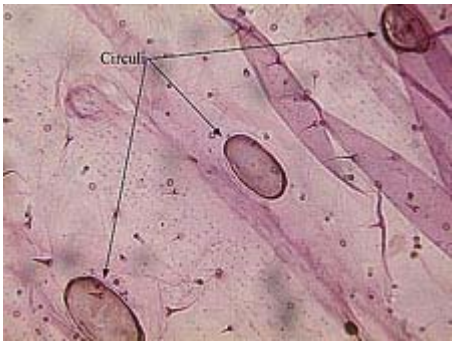

Fig. 17. *Hypogeococcus pungens* with three circuli. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

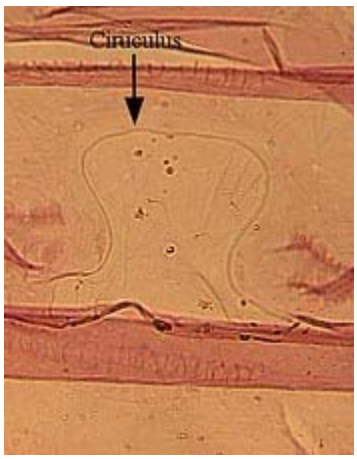

Fig. 18. Hourglass shaped circulus of the pink sugarcane mealybug, *S. sacchari*. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

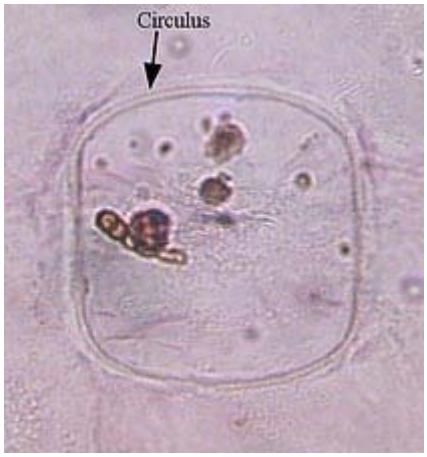

Fig. 19. Rectangular shaped circulus of the *Palmicultor* mealybugs (*Palmicultor* spp.) (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

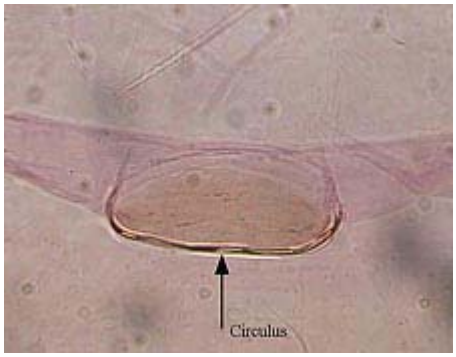

Fig. 20. Oval shaped circulus of the papaya mealybug, *P. marginatus*. (Photo by G. Hodges, Florida Dept. of Agriculture, Division of Plant Industry).

Key to Slide-Mounted Specimens of Common Scales Confused With Pink Hibiscus Mealybug in Florida

1.	One or more dorsal ostioles, circuli, and cerarii present	Pseudococcidae (3)
	Dorsal ostioles, circuli, and cerarii absent	Eriococcidae (2)
2.	With 5 setae present on hind tibia; only found on oaks (Quercus species);	*Eriococcus quercus*
	With 4 or fewer setae present on hind tibia; common on Azalea, Rhododendron, and *Vaccinium*	*Eriococcus azaleae*
3.	Anal bar present; cerarii numbering only 4-6 pairs; oral rim tubular ducts numerous	*Maconellicoccus hirsutus*
	Anal bar absent; number of cerarii variable; oral rim tubular ducts absent	4
4.	Minute disc pores present on venter just above level of metathoracic coxae	5
	Circulus other than above; minute disc pores absent on venter above level of metathoracic coxae	8
5.	Circulus hour glass shaped	*Saccharicoccus sacchari*
	Circulus not hour glass shaped	6
6.	Oral collar tubular ducts of two sizes (large, small) numerous on dorsum; large ducts numerous on ventral margins; present on bamboo (Poaceae)	*Palmicultor lumpurensis*
	Oral collar tubular ducts absent from dorsum;present on palms (Palmae)	7
7.	Anal lobe cerarii with 3-9 conical setae; antennae normally 6 segmented;	*Palmicultor palmarum*
	Anal lobe cerarii with 2 conical setae; antennae 7-8 segmented;	*Palmicultor browni*

8. With three circuli present; trilocular pores absent; only anal lobe cerarii present ..... *Hypogeococcus pungens*

   With one circulus; trilocular pores present; 17 pairs of cerarii present ..... *Nipaecoccus nipae*

More specific information concerning *M. hirsutus* identification can be found in Miller 1999 (7). Also, the Pseudococcidae section of the ScaleNet database website (3) may provide additional resources and information on *M. hirsutus* and other mealybug species.

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