



Mealybugs

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Mealybugs belong to the insect families collectively known as scale insects. Mealybugs are in the Family Pseudococcidae, and are the least scale-like of the group, mainly because they are soft-bodied, without the outer shell associated with insects in the other scale insect families (Diaspididae, the armored scales, and Coccidae, the soft scales). Instead, mealybugs are usually covered with a white waxy powder, and have filamentous projections around the perimeter. Some of these projections can be quite long. In addition, mealybugs retain their legs and are able to move around throughout much of their lives. A diagram of a typical mealybug life cycle is shown in [\(Photo 1\)](#).

Mealybugs are generally oval, 1-4 mm long, and usually are covered with a white cottony or mealy wax coating. Many mealybugs produce waxy filaments around the body margins that may be wedge-shaped or spine-like. The male and female immature stages are similar, but adults are very different. Seldom-observed, the adult male is fly-like, a very weak flier, and very short lived (just a few days). The female is but a larger form of the immature stage and may lay several hundred eggs, usually in a cottony ovisac (egg sac) beneath her body. The ovisacs appear as small spots of cotton on the leaf and may be particularly noticeable as a cottony mass when the female is laying eggs. This cottony mass helps protect the eggs laid within the wax filaments. Eggs hatch in 6-14 days, and the first instars, called 'crawlers', disperse for only a short distance on the same leaf. Of course, there are always exceptions to general rules. Some mealybugs, including the longtailed mealybug, do not lay eggs but bear their young as active crawlers. Because no eggs are produced, there are no cottony ovisacs associated with longtailed mealybugs. Once they insert their mouthparts, mealybugs generally remain anchored for the duration of their development but can move to a new site if disturbed. There may be as many as 8 to 12 generations per year in greenhouses and interior plantscapes.

Mealybugs have sucking mouthparts. Feeding weakens and stunts plants, causes leaf distortion, yellowing, and even total leaf loss. In some cases, plants can be killed. Mealybugs also produce large amounts of honeydew (similar to that produced by whiteflies and aphids), which can coat plants and surrounding surfaces with a sticky layer. A black sooty fungus commonly grows on the honeydew. So, at the very least, mealybugs can make plants look terrible. At worst, plants can be killed. The presence of honeydew and sooty fungus is one way to detect infestations of these insects.

Currently there are two main mealybug pest species on greenhouse and interior landscape ornamentals, the citrus mealybug, *Planococcus citri* [\(Photo 2\)](#), and the

longtailed mealybug, *Pseudococcus longispinus*. Recently, two other mealybug species, the pink hibiscus mealybug, *Maconellicoccus hirsutus*, and *Phenacoccus madeirensis*, have the potential to become widespread problems on numerous ornamental crops. Mealybugs have in common the ability to feed on a very wide range of host plants. They cause severe problems on foliage plants in greenhouses and interior plantscapes, but can also infest numerous flowering plants.

The citrus mealybug female can produce about 600 eggs, which are produced in cottony structures called ovisacs ([Photo 3](#)). Eggs may be produced with or without males. The eggs hatch in less than 10 days into small nymphs called crawlers. The crawlers move about the plants and locate feeding sites. Once the insects settle, there is not much movement. Under favorable conditions, there may be six generations per year. In reality, generations overlap, so all developmental stages will be present.

Longtailed mealybugs ([Photo 4](#)) have a different life cycle. Fewer eggs (about 200) are produced, and females need to mate in order to produce eggs (i.e. males are necessary). Females either produce live young, or the eggs hatch into crawlers very quickly. There are no cottony ovisacs. Longtailed mealybug generation time is longer than the citrus mealybug. As with citrus mealybugs, well-established infestations will have all developmental stages present.

The pink hibiscus mealybug (so-called because when crushed a red fluid comes out) is found now on many of the Caribbean Islands, and is not yet established in Florida. In contrast with other mealybugs, the body of the pink hibiscus mealybug is smooth and waxy, and only has two short projections at the rear of the body. More information on this species can be found at a [University of Florida web site](#).

Phenacoccus madeirensis was formerly included with a species known as the Mexican mealybug, but now is classified as a separate species ([Photo 5](#)) ([Photo 6](#)). This species has no common name at this time. As with citrus mealybugs, *P. madeirensis* is also purplish and covered with white bloom, but there are three rows of white tufts down the back. Females produce on average about 300 eggs which hatch in 8+ days. Adult females tend to be slightly smaller than those of the citrus mealybug, and the cottony ovisacs are generally longer and narrower. The egg to adult cycle can occur in about 30 days at 25° C (77°F), so apparently can have more generations per year than the citrus mealybug. Partly as a result of rapid reproduction and perhaps partly because of pesticide resistance, *P. madeirensis* has become extremely difficult to manage with insecticides where it occurs - so far mostly in Georgia and Florida.

Once an insect establishes itself in a state with a large ornamentals production industry that furnishes plants to other parts of the country, such as Florida or California, it is only a matter of time before it will spread elsewhere in the U.S. This will happen in spite of the best efforts of plant suppliers in those areas to control these pests.

Detection and Sampling

Female mealybugs do not fly so the only way they disperse is on plant material, on people moving from one area to another, or as crawlers floating on air currents. Check plant material susceptible to infestation before it enters a growing area to make sure mealybugs are not being brought in. Check stems and leaves for white cottony substances on a regular basis. Look for shiny and sticky areas of honeydew

on leaves. Make sure the area is clean following removal of infested plants. Mealybugs may even survive on empty benches between crops! With additional mealybug species now potentially infesting greenhouse and interior plantscape plant it is a good idea to get proper identification. If you find a mealybug infestation and you are not certain of the species, contact your county or state extension specialist(s) for instructions on how to send samples for identification.

Mealybug Management

There are both chemical and biological control options for mealybug control. The key aspect of management is to detect the infestation before it becomes too difficult and costly to deal with. The chart below includes both chemical and biological controls, and their application rates. Not all of the registered products are listed. Consult the control recommendations for your location for a complete listing. A new product, Flagship (thiamethoxam), from Novartis, is expected to be registered during the third quarter of 2000. This has provided good to excellent control of citrus mealybugs in greenhouse experiments. In addition a new imidacloprid formulation (Marathon II) should be registered soon. This is a sprayable formulation and should be effective against mealybugs. With most non-systemic insecticides, if an infestation is well-established, it will be necessary to make a series of applications at 10 to 14 day intervals for mealybug control. Do not use the same pesticide, or pesticide combination, more than three times in sequence.

There are excellent biological controls for citrus mealybugs, especially in interior plantscapes. One of the biological controls used most often is the mealybug destroyer, *Cryptolaemus montrouzieri* ([Photo 7](#)). The larvae of this ladybird beetle are very effective, especially when mealybug numbers are high. Adults also will feed on mealybugs. A parasitic wasp, *Leptomastix dactylopii*, can be used in combination with the predators. Biological controls are not yet well established for other mealybug species. Contact your supplier for more detailed information, or go to at [Biological Control News](#).

[List of pesticides to control mealybugs](#)

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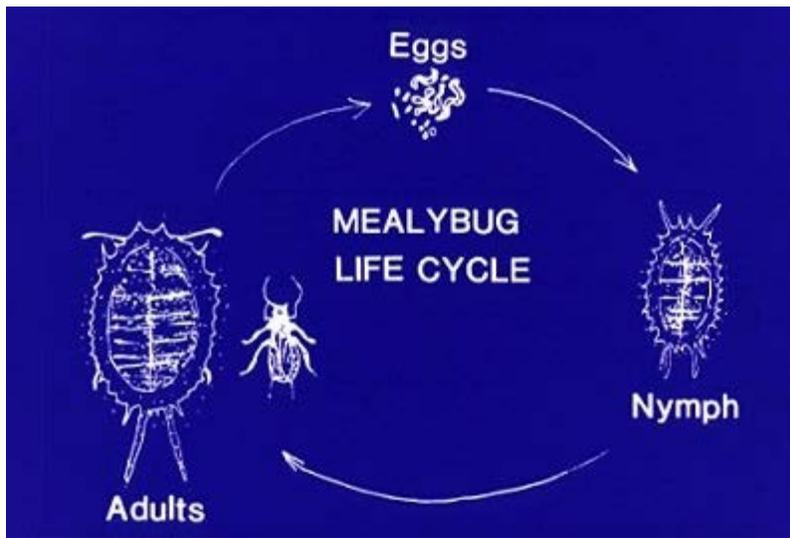


Fig. 1. Diagram of mealybug life cycle. Some mealybugs produce live young. The life cycle length ranges from about 30 to 70 days, but usually is 60 to 90 days in greenhouses and interior plantscapes.



Fig. 2. Citrus mealybug injury to ivy geraniums.



Fig.3. Citrus mealybugs. Photo shows adult females with cottony eggs sacs and nymphs.



Fig.4. Long-tailed mealybugs. This species does not produce eggs sacs.



Fig. 5. *Phenacoccus madeirensis* adult female with cottony egg sac adjacent (Photo: Ronald Oetting, University Georgia).



Fig. 6. *Phenacoccus madeirensis* egg sacs and crawlers (Photo: Ronald Oetting, University of Georgia.



Fig. 7. Mealybug predator, *Cryptolaemus montrouzieri* (center), among citrus mealybugs