



# Integrated Pest Management Program

Department of Plant Science and Landscape Architecture

Department of Extension

## Managing Mealybugs in the Greenhouse

### Introduction

Mealybugs can be serious and persistent problems in greenhouses, in conservatories and interior scapes. Mealybugs are usually introduced on previously infested plant material. Well-established infestations are difficult to control because their waxy secretions help to protect the young nymphs and eggs from penetration with chemical sprays. With their piercing-sucking mouthparts, mealybugs feed in leaf and stem axils. Both nymphs (known as crawlers) and adults feed on plants and cause stunting, leaf yellowing and distortion of plant parts. While feeding, mealybugs may inject toxic saliva into plant tissue and excrete honeydew (a clear sticky liquid), that serves as a growing media for black sooty mold fungi.

There are a number of different mealybugs of concern including citrus mealybugs, and long-tailed mealybugs. There are even species that feed on plant roots. The pink hibiscus mealybug, Madeira mealybug and the Mexican mealybug have also been introduced into the US.

### Identification and Biology and Life Cycle

Mealybugs are soft-bodied, segmented oval-shaped insects. Adult females are from 1/20 to 1/5 of an inch long and are usually covered with white, powdery, waxy secretions. Mealybugs can move from plant to plant as they retain their legs throughout their development. Their life cycle consists of an egg stage (except for the longtailed mealybug that gives birth to live young), immature nymphal stages ("crawlers") and adults. The immature crawlers mature in about 6 to 9 weeks. Mature females die after egg laying. Eggs hatch in 5 to 10 days, but unhatched eggs or young nymphs sometimes remain inside the protected cottony sac during unfavorable environmental conditions. Adult males are small winged insects without functional mouthparts whose primary role is to fertilize females. In the greenhouse, continuous and overlapping generations make control difficult.



Citrus Mealybug

**Citrus mealybugs (*Planococcus citri*)** females are small (less than 1/8 of an inch long), mealybugs with a faint gray stripe running down their back. They also have short waxy filaments around the margin of their oval body with a slightly longer pair of filaments at their rear. Females produce a cotton-like egg sac containing yellow eggs and lay from 300 to 600 eggs. Eggs hatch into small, active crawlers. When the crawlers settle down to feed, they begin to secrete wax and produce honeydew. Males resemble females from the egg stage to the 3rd instar nymphal stage. After pupating,

the winged adult male emerges but only lives for 1 or 2 days and does not feed.



**Longtailed Mealybug**

**Long-tailed mealybugs (*Pseudococcus longispinus*)** have a well-defined stripe running down their back. However, long-tailed mealybugs have distinctive long tails (about  $\frac{3}{4}$  or more of their body length) hence their common name. Long-tailed mealybugs produce live young.



**Signs of Root Mealybug Infestation are shown on the right.**

**Root – feeding mealybugs (*Rhizoecus spp*)** feed on the root systems of plants so can be undetected for long periods of time. Infected plants become wilted and stunted. Look on the edge of the root ball for the white, oval shaped (1/16 to 3/16 of an inch long) mealybugs covered with a fine, powdery wax-like material. Root mealybugs are slow moving, sac-like mealybugs with pronounced crosswise grooves. They do not have filaments surrounding their body typical of other mealybugs. Once established in the greenhouse, root mealybugs may spread as crawlers from plant to plant as the water moves out of the drainage holes to nearby plants and in plant debris or on equipment. Discard all infested plants and debris immediately and disinfect containers before reusing them.

### **Feeding Damage**

With their piercing sucking mouthparts, mealybugs feed upon plant fluids. As they feed, leaves turn yellow and drop. New growth may become distorted. Plants may wilt and become stunted. Mealybugs excrete the clear sticky honeydew supports the growth of black sooty mold fungus.

### **Prevention**

Once mealybugs become established, it is difficult to achieve effective control. Adult females can live for 10 to 19 days without a host plant and crawlers can continue to emerge for up to 45 days.

Prevention is the grower's first line of defense.

- Inspect incoming plants for signs of mealybugs.

- Start with clean plant material.
- Do not hold over "pet plants" that may be infested, and keep greenhouses as weed and debris free as possible.
- Immediately dispose of heavily infested plants.
- Power wash infested benches between crops.
- Do not reuse pots without thorough cleaning before use.
- Maintain proper fertility levels.

### **Monitoring**

Early detection and isolation of infested plants is important to avoid outbreaks. Mealybugs can be difficult to find if populations are low. Early infestations can be easily overlooked due to the mealybug's tendency to hide in protected locations. Look for white flecks or cottony residues along the leaf midribs, on leaf or stem axils and on the underside of leaves and near the base of plants. If larger plants are staked, mealybugs can hide beneath the tape on the stake that is used to secure the plant. Adult females may crawl off plants and be found on or in brick crevices and under benches where they lay eggs. Honeydew, sooty mold and the presence of ants may also be an indication of a mealybug infestation.

Mealybugs feed on a wide range of plants such as citrus, coleus, croton, dracaena, hoyo, English ivy, ficus, fuchsia, stephanotis, schefflera, hibiscus, mandevilla, strawberry plant (houseplant), jade plants, orchids, palms, prayer plants, gardenia, as well as many other foliage plants. The Mexican mealybug has been found feeding on marigolds, gerbera daisies, poinsettias, begonias and chrysanthemums.

### **Management Options**

Mealybugs are one of the most difficult greenhouse and interiorscape pests to control. Mealybugs are best treated if detected early, when populations are low. If only a few plants are heavily infested, it is best to destroy the infested plants to minimize further spread.

### **Biological Control**

#### **Parasitoids**

The parasitic wasp, *Anagyrus pseudococci*, is effective against the citrus mealybug. Eggs and larvae develop inside the host. Adult females parasitize the citrus mealybug, and it swells becoming a hard yellow brown mummy. Adults' wasps emerge from a round hole in this mummy.

#### **Predators**

A ladybird beetle, commonly known, as the mealybug destroyer (*Cryptolamus montrouzieri*) is a commercially available biological control agent for the citrus mealybug. Both adults and larvae are predacious.

Adults are shiny black beetles with a reddish head and thorax. Larvae resemble mealybugs. But, unlike mealybugs, the mealybug destroyer larvae will have chewing mouthparts. The mealybug destroyer larva

is also longer, and more mobile than mealybugs. A temperature between 72- 77° F and a relative humidity of 70 to 80% are optimal for egg laying. Mealybug destroyers are most active during sunny conditions.

Green lacewings (*Chrysoperla sp*), are better known as a aphid predator, hence their common name, “aphid lion, “ but they can also feed upon mealybugs as well as whiteflies, spider mites and thrips. Only the larvae stage is predacious, adults feed upon pollen, honeydew or nectar. They may be released as eggs or larvae. Repeated releases are often needed.

Brown lacewings (Hemerobiidae) are predacious as larvae and adults. They can tolerate lower temperatures than the green lacewings.

Ants will protect mealybugs from natural enemies, in order to feed upon the sweet honeydew, so it is important to manage ants.

### **Chemical control**

If only a few plants are heavily infested, growers often destroy the infested plants to minimize further spread.

Control is difficult because of the mealybug’s tendency to hide in protected locations and form dense colonies. The mealybug’s waxy covering also helps protect mealybugs from chemical exposure. Use of a spreader sticker may help penetrate mealybug’s waxy covering. The young crawlers are not covered by this wax so are the most susceptible life stage. Repeated applications of insecticides are often needed to manage mealybugs. Space plants to ensure good coverage. Through coverage is necessary when using contact insecticides. Use a forceful jet of water to dislodge the older instars and then apply the contact materials. Contact insecticides such as insect growth regulators, insecticidal soap and horticultural oil will kill young nymphs (provided there is good coverage); however, as eggs hatch through the growing season, additional applications are needed.

Systemic insecticides must be applied preventively so that enough active ingredient is present at the mealybug’s feeding site. Recent research has discovered that mealybugs feed on plant stems where less of the material is taken up by the mealybugs. In addition, because systemic insecticides do not control eggs, repeated applications may be needed. Systemic materials are often used as a drench against root mealybugs. Rotate among insecticides with different modes of action to help delay the development of resistance. Acceptable control is often difficult to achieve. Consult the most recent edition of [New England Greenhouse Floriculture Guide - A Management Guide for Insects, Diseases, Weeds and Growth Regulators](#) for more specific guidelines. Available from: Northeast Greenhouse Conference and Expo [www.negreenhouse.org](http://www.negreenhouse.org) and the UCONN CANR Communications Resource Center [www.store.uconn.edu](http://www.store.uconn.edu).

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