



## **Biological Control of Mealybugs**

Mealybugs can be very difficult to control, so if only a few plants are heavily infested, it is best to destroy the infested plants to minimize further spread. For more information, see [Managing Mealybugs in the Greenhouse](#) on the UConn IPM website and references listed at the end of this fact sheet.

### **Biological Controls**

Host specific parasitic wasps and generalist predators are commercially available. It is important to identify the specific mealybugs species present in order to select the most appropriate biological control agent.

#### ***Anagyrus pseudococci***

The parasitic wasp, *Anagyrus pseudococci*, parasitizes citrus mealybug larvae. It has parasitized pupa that swells becoming a hard yellow-brown mummy. After 1 to 5 days (depending upon temperature), the adult parasitic wasp emerges from a hole at the posterior end of the mummy. Mummies can be seen about two to three weeks after the first release. Optimum temperature is 76° F with a minimum temperature of 51° F. *Anagyrus pseudococcus* is commercially available as mummies containing the parasitic wasp pupae mixed in inert material. Consult with supplier on recommended release rates.

#### **Tips for using *Anagyrus pseudococci***

- Identify mealybug species, only effective against citrus mealybug
- Release in mealybug colonies or hot spots
- Release in the early morning or evening
- Can be used with the mealybug destroyer
- Control ants before releasing

***Cryptolaemus montrouzieri*** An Australian ladybird beetle, commonly known as the mealybug destroyer (*Cryptolaemus montrouzieri*) is commercially available for use against the citrus mealybug. *Cryptolaemus* can also feed on soft scales and aphids but prefers mealybugs. The mealybug destroyer only reproduces on mealybugs that produce egg masses so is not effective against the longtailed mealybugs. Mealybug destroyer adults and larvae are predacious, seizing and consuming prey.

Adults are shiny black beetles with a reddish head and thorax. At first glance, the predaceous larvae resemble mealybugs. However, the mealybug destroyer larvae are longer and more mobile than mealybugs with longer wax threads than mealybug larvae.



Figure 1 & 2: Mealybug destroyer adult (left) and larvae (right). Photos by L. Pundt

Optimum temperatures are between 72 and 77° F with a relative humidity of 70 to 80 %. Mealybug destroyer eggs are deposited within the egg sac of mealybugs. They are most active during sunny days and are less active during short winter days. *Cryptolamus* are most effective when mealybug density is high and can fly off in search of new prey. *Cryptolamus montrouzieri* are commercially available as adults packed in plastic tubes with a carrier. They are also available as larvae that can be released among infected foliage or placed in a distribution box. It is helpful to release both larvae and adults, according to Sarah Jandricic, Greenhouse Floriculture IPM Specialist OMAFRA. Larvae attack all mealybug life stages so are effective in hot spots, but do not disperse very far.



Figure 3: Distribution box. Photo by L. Pundt

Ants protect mealybugs from *Cryptolamus* so should be controlled before releasing these generalist predators. Consult with supplier on recommended release rates.



Figure 4: Ants protecting mealybugs. Photo by L. Pundt

#### **Tips for using *Cryptolamus montrouzieri***

- Release adults in the evening when vents are closed
- Gently tap beetles out of container onto foliage of infested plants
- Beetles are attracted to white, so you can place white 3 by 5 cards next to mealybug hot spots
- Release larvae in the evening among infected foliage
- It is helpful to release both larvae and adults
- Control ants before releasing as they protect the mealybugs

#### **Lacewings**

Green lacewings (*Chrysoperla sp*), are better known as aphid predators, hence their common name, “aphid lion”, but they can also feed upon mealybugs, whiteflies, spider mites and thrips. Lacewings may help suppress mealybugs. Only the larval stage is predacious, adults feed upon pollen, honeydew or nectar. Repeated releases are often needed, but do not release the small larvae when the larger larvae are on the plants, as the larvae are cannibalistic.

Green lacewings are commercially available as eggs glued onto cards, or loose in an inert mixture of rice hulls or as larvae in small individual cells so they do not eat each other. They are also available as adults in a cardboard tube that is screened at both ends. Lacewings are active during a wide range of

temperatures from 54 to 95° F. Consult with supplier on recommended release rates.



Figure 5 & 6: Lacewing larvae and adults. Photos by L. Pundt

#### **Tips for using *Chrysoperla sp.***

- Release in the early morning
- Larvae are cannibalistic, so spread over a wide area
- Control ants. They will eat lacewing eggs off the cards

Ants will protect mealybugs from natural enemies, in order to feed upon honeydew, so identify the type of ant species so you can determine the best type of bait to use.

In summary, parasitic wasps, mealybug destroyers and lacewings can help suppress mealybug populations. It may be necessary to spot treat with a compatible pesticide to manage mealybugs.

**By** Leanne Pundt, Extension Educator, UConn Extension, 2014. Revised 2015, 2019.

#### **References**

Cloyd, R. 2011. Mealybug Management in Greenhouses and Interiorscapes. Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Factsheet MF3001. <http://www.ksre.ksu.edu/bookstore/pubs/MF3001.pdf>

**Greenhouse Scout™** Cornell University (iTunes)

Summarizes information on biocontrol of common greenhouse insect pests and an interactive interface for collecting, organizing, and presentation of scouting data, and product application for insect management.

Heinz, K.M., R.G. Van Driesche, and M.P. Parella (Ed). 2004. Bio Control in Protected Culture. Ball Publishing, Batavia, Ill. 522 pp

Jandricic, S. 2015. Floriculture IPM for Mealybug. Post on onfloriculture blog.  
<https://onfloriculture.wordpress.com/2015/07/31/floriculture-ipm-for-mealybug/>

Osborne, L. 2010. University of Florida. IFAS Mid-Florida Research and Education Center Mealybugs <http://mrec.ifas.ufl.edu/lso/mealybugs.htm>

Raudales, R. E. (Ed). 2019-2020. New England Greenhouse Floriculture Guide. A Management Guide for Insects, Diseases, Weeds and Growth Regulators. New England Floriculture Inc. and the New England State Universities.

Thomas, C. 2005. Greenhouse IPM with an Emphasis on Biocontrol. Publication No. AGRS-96. 89 pp. Pennsylvania Integrated Pest Management Program.

Van der Ent, S., M. Knapp, J. Kkapwijk, E. Moerman, J. van Schelt, and S. deWeert. 2017. *Knowing and recognizing the biology of glasshouse pests and their natural enemies.* K. Girard and K. Strooback (Eds). Koppert Biological Systems, The Netherlands. 443 pp.

Disclaimer for Fact Sheets:

The information in this document is for educational purposes only. The recommendations contained are based on the best available knowledge at the time of publication. Any reference to commercial products, trade or brand names is for information only, and no endorsement or approval is intended. UConn Extension does not guarantee or warrant the standard of any product referenced or imply approval of the product to the exclusion of others which also may be available. The University of Connecticut, UConn Extension, College of Agriculture, Health and Natural Resources is an equal opportunity program provider and employer.