



**Greenhouse TPM/IPM Bi-Weekly Report**  
**University of Maryland Cooperative Extension**  
**Central Maryland Research and Education Center**

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**February 6, 2009**

**Advanced IPM Scouts' Training**  
**March 5, 2009**

Brookside Gardens  
Maryland and Pesticide Recertification Credits Available  
A brochure is posted on-line at <http://ipmnet.umd.edu/crses97.htm>

(To conduct hands-on activities, space is limited)

**Good Signs**

On a cold, wintry Saturday I stopped by one of the big box stores and wandered over to the plant section. I was surprised at the number of people purchasing tropical plant material. They were also examining seed packages and bulbs and corms. I spoke with a few of the people and asked if they were planning on a garden this spring and each enthusiastically said yes. I think people are pretty tired of winter and all of the bad economic news and are ready to purchase plants for this spring. Stay positive and keep the annuals and perennial plants coming. We are just about a month away from early sales times.

**Watch Out for Foliar Nematodes**

Your herbaceous perennials are tucked into overwintering houses in February and you may not be giving much thought to pests on your plants. We thought so also until last week when the UMD Plant Diagnostic Lab received samples of heuchera with leaf spots on the foliage. These symptoms could easily be mistaken for a fungal leaf spot disease. Turns out it was not – it was foliar nematode.

These microscopic roundworms move in films of water on plant surfaces and enter leaf tissues through stomates. Like root-attacking nematodes, foliar nematodes have a needle-like structure called a stylet that they use to pierce plant cells and feed on cell contents, resulting in cell death. Lesions caused by foliar nematodes are first chlorotic, then necrotic. Early symptoms can appear as small speckles or spots, which look very similar to fungal leaf spot diseases or chemical injury. Movement of the nematodes within leaves is restricted by larger leaf veins, resulting in necrotic lesions with an angular shape.



**Heuchera with small lesions on foliage caused by foliar nematodes**  
**Photo by Selin Balci**



**Larger lesions on the foliage of heuchera**  
**Photo by Selin Balci**

Foliar nematodes overwinter in plant debris, or on infected perennial plants. They survive for long periods of time in leaf tissues, and are spread by propagating infected plants and by splashing water (rainfall, overhead irrigation). The list of plants susceptible to foliar nematodes is quite large, and includes woody plants like azaleas as well as numerous herbaceous perennials (such as hosta, heuchera, hellebores, ferns, begonias, salvia, and anemone). The easiest way to manage foliar nematode problems is to avoid bringing them into your facility. Carefully inspect new plants for foliar nematode symptoms. If symptoms develop, remove and destroy affected plants. Pylon is registered for controlling foliar nematodes, but this treatment will only knock down populations, not completely eradicate them. Sanitation is key to keeping this pest in check.

### **Mealybugs Happen... But don't let them get established in your greenhouse**

It has been a cold January which is great for killing mealybugs outdoors. Unfortunately mealybugs sometimes manage to slip into your greenhouse. Even if you use the best insecticide material to control mealybugs you are going to have to use a variety of control methods and probably use insecticide rotation to clean up an established population. Trying to control this pest quickly and relying just on chemical control is like running with sharp scissors – someone is going to get hurt.

Cultural control of mealybugs is the best defense. Cultural control of mealybugs begins with close inspection of all incoming stock plants and propagation areas. Rejecting an infested plant will prevent a huge problem later. Certain plants are more prone to infestation such as rosemary, coleus, sage, Swedish ivy, artemesia, and gardenia. The most susceptible plants should be monitored the closest. Once you have mealybugs introduced into a greenhouse the amount of effort to get rid of them is extremely time consuming. Repeated pesticide applications will often be necessary to clean up infested plants. Taking cuttings from infested plants is the kiss of death. Young immature mealybugs prefer to move to tip growth to feed – exactly the part of the plant from you are taking cuttings. Exposing cuttings to low temperatures (33 –35 °F) for 24 –36 hours before sticking them will often help reduce mealybug survival. This is based on work by Casey Sclar at Longwood Gardens, Kenneth Square, PA. Check and make sure your plant material can survive within this lower temperature without suffering irreparable damage.

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An adult female mealybug can lay 500 – 600 eggs, usually in a cottony-like ovisac beneath her body. Citrus mealybug and Madeira mealybug are two mealybugs that lay ovisacs. The eggs hatch in 7 –14 days and the 1<sup>st</sup> instar nymphs disperse, usually on wind currents in the greenhouse, attached to workers clothing, or by natural bridges created by close plant material. Some mealybugs are slightly different, like the longtailed mealybug, which does not lay eggs but rather live birth nymphs.

Once mealybug is in your greenhouse you will need to clean benches and greenhouses before incoming plants are placed, and removing debris on a regular basis. Casey Sclar at Longwood Gardens found that female mealybugs lived on pots and flats without a host plant for an average of 10 to 19 days, with crawlers still being produced up to 45 days afterward. The mealybugs can wander onto containers, flats, walls and benches.

**Citrus mealybug** is recognized by a thin purple stripe that runs down the middle of the back. These mealybugs are densely covered with white wax and have very short tails.

**Longtailed mealybug** have seventeen pairs of white waxy filaments, if you care to count them, around the periphery of the body. In mature females there are two long tail-like projections on the rear of the insect that are longer than the length of the body of the insect.

**Madeira mealybug** looks a lot like citrus mealybug. They are generally a dull gray color under the white wax and lack the single purple stripe on their back that citrus mealybug possesses. Their egg sacs are longer and denser than citrus mealybug and male pupal cases may be found in equal numbers to the females. This is a very hard to control mealybug.

**Photo credit: United States National Collection of Scale Insects Photographs Archive, USDA Agricultural Research Service, Bugwood.org**



**Citrus mealybug**



**Longtailed mealybug**



**Madeira mealybug**

**Photo credit: Sally Tucker, , Bugwood.org**

### Chemical Control

Mealybug control using chemicals often involves rotating though 2 or 3 classes of chemistry. Some of the materials you can try are: Aria, imidacloprid (Marathon), Acetamaprid (TriStar), kinoprene (Enstar II), Acephate (Orthene), horticultural oil, and insecticidal soap.

### Biological Control

Biological control works best in conservatories or greenhouse operations producing herbs which have a limited number of labeled chemicals available. The predatory ladybird beetle *Cryptolaemus montrouzieri*, (mealybug destroyer) can be released. It is most effective against mealybugs producing cottony egg masses (e.g. citrus mealybug and Madeira mealybug). Make 3-4 releases at 2-3 week intervals. Predators do best in warm, humid conditions. Release at 2-8/10 sq ft., or infested plant. A good citrus mealybug parasite is *Leptomastix dactylopii*. These are tiny wasps that lay eggs in mealybugs. Make 2 - 4 releases at 2 - 4 week intervals. Parasites do best in warm, humid conditions. Release at 2-5/10 sq. ft., or infested plant.

### Aphids and Biological Control

We found a good example of biological control in action last week. One site had a large population of aphids being effectively controlled by parasitic wasps (*Aphidius* spp.) that came in from outside the greenhouse. No releases had been made. *Aphidius* wasp females sting the aphids to paralyze it in order to lay eggs. The wasp hatches and feeds on the aphid host. Look closely and you can see the wasp emergence hole on the dried up aphid “mummies”.



**Aphid mummies on foliage**



**Adult *Aphidius* wasp**

### Easter Lilies

Keep fertility up on Easter lilies in early February. Calcium nitrate is applied at 200 – 400 ppm at each watering. If you do not keep the nitrogen fertility up at this point then expect to see lower leaves turn yellow in March. Many growers top dress Easter lilies in February with a slow release fertilizer such as Nitroform, Osmocote or Nutricote. Keep the fertility between 1.5 – 2.0 micromhos in February. Phosphorus at 20 ppm will provide adequate phosphorus without causing leaf scorching.

**Southern Maryland Greenhouse Conference**

March 10, 2009

Location: Forrest Hall Farm, Mechanicsville, MD

For more information 301-475-4484