A Publication of the UMass Extension Greenhouse Crops & Floriculture Program

Floral Notes Newsletter

Volume 29, No. 4 http://extension.umass.edu/floriculture January-February 2017

In This Issue

Yes, Spring is Just Around the Corner!

Updates for EPA Worker Protection Standard for Greenhouse Growers

March 1, 2017

2:00 PM – 4:00 PM (Registration begins at 1:15)

Cavicchio's Greenhouse, 110 Codjer Lane, Sudbury, MA 01776

Join us at Cavicchio Greenhouses, where Laurie Rocco, Massachusetts Dept. of Agricultural Resources (MDAR) will walk us through the revisions for WPS.

The Environmental Protection Agency (EPA) has revised the 1992 Agricultural Worker Protection Standard (WPS) regulation.

The WPS are designed to reduce pesticide poisoning and injuries among agricultural workers and pesticide handlers. WPS contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific information about personal protective equipment and Re-entry intervals (REIs).

All horticultural employers who use pesticides (**including organic pesticides**) and who have one or more employees must comply with all of the provisions of the WPS. Owners of agricultural establishments and members of their immediate family are exempt from some WPS requirements. However, they must observe the appropriate REIs and must use the proper personal protective equipment listed on the pesticide label.

The majority of the rule revisions were effective on January 2, 2017.

2 Pesticide Credits New pesticide credit rules: Sign-in required at registration for pesticide credit, photo ID required at sign in.

Registration Form - March 1, 2017 WPS Training for Greenhouses

Names_____

Business Name_____**Email**_____

Address_____

Make check payable to & return to: Mass Flower Growers' Association, 8 Gould Rd., Bedford, MA 01730

_____No. Registrations x $25.00/person = Total _____

Email: Bob Luczai (massflowergrowers@gmail.com) or Tina Smith, (tsmith@umext.umass.edu)

Sponsored by: Massachusetts Flower Growers Association and
University of Massachusetts Extension Greenhouse Crops and Floriculture Program

Take-Home Biocontrol Messages from the Northeast Greenhouse Conference

Tina Smith
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UMass Extension Floriculture Program
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There was plenty of information to take home from our recent Northeast Greenhouse Conference. Here are a few take-home tips from the "Advanced Biocontrol Panel" with Suzanne Wainright-Evans, Buglady Consulting; Ron Valentin, Bioline Agrosciences and Jeff Marstaller, Cozy Acres Greenhouses.

Sachets are very popular for distributing predatory mites *Amblyseius Cucumeris* or *A. Swirskii* for managing thrips. They are available in different sizes for various greenhouse crops. Sachets are made up of a complex eco-system. Sachets contain either the predatory mite *A.cucumeris* or *A. swirskii*; "food mites" that the *Cucumeris/Swirskii* prey on while in the sachet; and yeasts and fungi on the bran for the food mites. Low humidity (around 40-50% RH for example) will kill the yeasts/molds and starve the food mites. When this happens, the mites in the sachets stop reproducing.

Storing Predatory Mite Sachets. It is best to distribute predatory mites the same day as you receive them. However, if this is not possible, and predatory mites need to be stored, then the second best thing to do is to **store your mite shipments in the greenhouse** where the relative humidity is high. Place the boxes under a bench (shaded area) to protect them from sun. Also, open the box to prevent CO2 from building up. Sachets are affected less by temperature than by humidity. Do not store in an office or in a refrigerator or in an area below 60% RH.

Do not tear or enlarge the tiny hole in predatory mite sachets. The tiny hole has been specially designed to be just large enough for mites to emerge, while maintaining the proper humidity inside the sachet – Really Important!

Placement of Sachets on Plants. It is best to **place mite sachets within the plant canopy** – shaded from the sun and where humidity is highest. More mites emerge and last longer (6 wks vs 1-2 weeks) when sachets are protected than when they are exposed (*i.e.* placed above the plant canopy). Both beneficial and prey mites need high humidity for their eggs to hatch.

Phytoseiulus persimilis is a predatory mite used for managing two-spotted mites. They are available in tubes containing loose vermiculite. They are not available in sachets. Since predatory mites do not fly and mobility is limited, proper distribution IS really important.

Hot spot vials (30 ml or 1 oz) with a funnel applicator cap on the tip of the vial are available - designed for dosing specific areas of the crop. The mites congregate near the opening and can be distributed by touching the foliage with the applicator tip. The tip was describe as being similar to a caulking tube, where the tip is cut off.

Biopesticide dips as a first line approach to prevent pests. There was significant discussion about using dips on incoming trays of cuttings or plug trays. Dips are the use of biopesticide solutions in a tray or tub where bundles of cuttings or trays of plugs can be briefly submerged and thoroughly wetted according to label directions. Plant material is then stuck or planted. The panel expressed that effective

dips can significantly reduce the need for chemical pesticides later in the crop cycle and their resulting impact on biological control agents.

Dips are successfully being used containing a solution of Botanigard WP (formulation only) (*beauveria bassiana*) for thrips with *Steinernema feltiae* (beneficial nematodes for fungus gnats) and Root Shield (*Trichoderma harzianum*) to prevent root diseases such as *pythium.* The panel recommended mixing and using **very small batches of dip** rather than large quantities to minimize the risk of spreading diseases during the dipping process. The audience was advised to read the fact sheet by BioWorks on dipping (available under resources).

What about using lady beetles (a. k. a., ladybirds or ladybugs) for aphid control?
A question was asked about using adult lady beetles *Hippodamia convergens* (Convergent lady beetle) for managing aphids.

When just starting out using biocontrol agents, many growers first think about using the well- known and familiar "ladybug" for aphid control. Ladybird beetles are relatively inexpensive and can be stored in the fridge. It was explained that wild collected ladybeetles for sale are field collected from mountainous areas of the west coast states where the beetles migrate and aggregate in large masses. Beetles are highly dispersive and once released in greenhouses, most will leave, providing little or no control. They are also poor at searching out pests. Another concern is that harvested lady beetles may have been parasitized by a small wasp that develops as an internal parasite and kills them. And finally, *Microsporidia*, a disease of ladybugs, has also been detected in shipments.

For more information see the article: Buying Ladybugs, Why Mother Nature Wouldn't Approve (http://www.learn2grow.com/problemsolvers/insectsanimals/insectsbeneficial/BuyingLadybugs.aspx) by Suzanne Wainwright-Evans, Buglady Consulting.

There are other species of ladybird beetles that are reared in commercial insectaries: The two-spotted ladybird *Adalia bipunctata* (aphid predator); *Delphastus pusillus* (whitefly predator); *Cryptolaemus montrouzieri* (mealybug predator) and *Stethorus punctillum* (spider mite predator).

There is a need for a cost-effective rearing system for ladybird beetles, since the cost of producing them is high.

Resources

Jandricic, S. 4 Ways Your Accidentally Killing Your Predatory Mites. ONfloriculture. https://onfloriculture.wordpress.com/2016/11/15/4-ways-youre-accidentally-killing-your-predatory-mites/#more-4318

Valentin R. Biological Control Starting in Propagation. Bioline North America. http://www.mapyourshow.com/MYS_Shared/pcc16/handouts/Valentin%20-%20Biological%20Control%20Starting%20in%20Propagation.pdf

Clean Up Incoming Plant Material By Utilizing Dips, BioWorks Fact Sheet. http://www.bioworksinc.com/products/shared/Utilizing-Dips.pdf

Fact Sheets from Cornell University Biological Control Program
Hippodamia: https://biocontrol.entomology.cornell.edu/predators/Hippodamia.php

Stethorus punctillum: https://biocontrol.entomology.cornell.edu/predators/spunctillum.php

Cryptolaemus: https://biocontrol.entomology.cornell.edu/predators/Cryptolaemus.php

Soil Testing and Plant Diagnostic Laboratories

Angie Madeiras, UMass Plant Diagnostic Lab and Tina Smith, UMass Extension

Diagnosis is the first step in implementing effective and economic management practices. Identification of insects, diseases and nutritional problems saves money by reducing crop losses, improves the quality and marketability of your crops and prevents unnecessary and incorrect pesticide or fertilizer applications.

Here is an up-to-date listing of the laboratories at UMass Extension and guidelines for taking samples to send to a diagnostic lab.

Soil Testing http://www.umass.edu/soiltest/index.htm

University of Massachusetts-Amherst Soil and Plant Nutrient Testing Laboratory
Soil Testing Fact Sheet: https://ag.umass.edu/greenhouse-floriculture/fact-sheets/soil-testing

$15 Saturated Media Extraction (complete soil test for soilless media)
$10 Electrical conductivity and pH Test

Forms (to accompany samples for the lab): https://soiltest.umass.edu/ordering-information

Plant Disease Diagnostics

- Extension Plant Diagnostic Laboratory, University of Massachusetts-Amherst
  http://ag.umass.edu/diagnostics Be sure include form and payment with sample.
- Angela Madeiras, Ph.D.
  UMass Extension Plant Diagnostic Laboratory
  French Hall, 230 Stockbridge Road, Amherst, MA 01003
  (413)545-3209

Guidelines for Taking Samples for Plant Disease Diagnostics

- Submit as much of the plant as possible. Ideally, this would be the entire plant. The accuracy of a disease diagnosis is only as good as the sample provided. A good sample contains the right part of the plant. Symptoms may appear in parts of the plant that are not infected with the pathogen.
- Send several plants with a range of symptoms.
- Dead plants tell no tales. The samples must be fresh and in good condition. Due to secondary infections in extremely decayed plants, it is difficult to determine which organism may have created the problem in the first place. If possible, send in several plants with a range of symptoms from moderate to severe.
- Keep leaves dry and free of soil. Soil on the leaves promotes the growth of secondary pathogens and creates problems that did not exist when the sample was originally collected.
- Never add water or wet paper towels to your sample. Moisture encourages decay and the growth of secondary organisms like soft rot bacteria that completely obscure the actual pathogens that may be present.
- Hand deliver or ship overnight. Rapid delivery is critical for an accurate diagnosis. Samples that take a long time to get to the diagnostic lab have a greater chance of decaying or drying up

making diagnosis impossible. Consider hand delivering samples to the lab. If you are too far away from the lab, then ship the sample overnight. Please do not mail samples on Fridays.

Selecting Samples from Plants

Leaf spots and Blights
Select leaves which show a range of symptom development. Place leaves between paper towels or sheets of paper to keep leaves dry. Place the package in a plastic bag, and then into the envelope for mailing. Never wrap leaves in wet paper towels. If possible, include an entire plant because foliar symptoms often result from root/crown issues.

Stem Cankers
When a canker occurs on a large plant, cut a section of the stem with the symptoms, wrap in newspaper and place in a plastic bag for mailing. If the plants are small, shake the soil from the roots, place the root ball into a plastic bag and tie off at the crown to keep media off the specimen, wrap in newspaper and put into a plastic bag for mailing.

Wilt, Crown rot or Root rots
If the plants are small include the entire plant with the root system and the growing media on the roots. Place the root ball into a plastic bag and tie off at the crown to keep the media off the foliage. If the plants are large, send a portion of the plant that includes the infected tissue. Include the lower stem tissue and roots.

Poor Growth, Defoliation, Scorch
These symptoms can be caused by nutritional or environmental factors or be the result of root rot or vascular disease. Collect a specimen as for wilt (see above); be sure to also submit a soil sample to a soil test laboratory.

Case History/Sample Submission Form
The laboratory may require that each plant specimen be accompanied by a sample submission form that includes information about the problem critical for accurate diagnosis. Forms provide information on cultural practices, environmental conditions, pesticide applications and symptom distribution. Case-history information is as important to a diagnosis as the plant specimen itself.

On-site Test Kits

Growers may also consider purchasing on-site disease testing kits. Not every company carries kits for all diseases. Note: Kits need to be refrigerated and expiration dates observed.

ImmunoStrips from Agdia Inc. http:www.agdia.com, Phone 1-800-622-4342

For more information see the fact sheet: "Diagnostic Test Kits",
http://ag.umass.edu/greenhouse-floriculture/fact-sheets/diagnostic-test-kits

Conserve Energy to Reduce Heating Costs This Winter

Geoffrey Njue
Extension Educator
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Waltham, MA

The OPEC's (Organization of Petroleum Exporting Countries) December 10th 2016, landmark deal with non-OPEC oil producers to curb production has sent prices of crude oil on the rise. The rising prices of crude oil has lead into the rising costs of heating oil and propane.

Energy cost is one of the largest overhead cost in the production of greenhouse crops in cold climates only second to labor expenses. Growers can reduce the cost of production by increasing energy efficiency and reducing heat loss in the greenhouse.

Increase energy efficiency

Increase energy efficiency by maintaining the heating equipment and installing horizontal air flow fans.

Properly maintain heating equipment: check boiler, burner and back systems to make sure they are operating at peak efficiency.

- Have furnaces cleaned and adjusted and efficiency test run before heating season
- Clean heating pipes and other radiation surfaces frequently
- Insulate distribution pipes in areas where heat is not required
- Check and repair leaks in valves, steam traps and pipes.
- Check accuracy of thermostats. Install electronic thermostats with a 1ºF accuracy.
- Aspirate thermostats or sensors for more uniform temperature control

Install horizontal air flow (HAF) fans for more uniform temperature in the growing area. Horizontal air flow fans help mix the air to improve uniform temperature and humidity in the greenhouse.

Reduce heat loss from greenhouses

Reduce air leaks: air can escape in many different areas. Identify air leaks by inspecting greenhouse glazing, walls, doors, fans and vents.

- Patch holes in the plastic covering and side walls and replace cracked glass panes.
- Keep doors closed and make sure they close completely.
- Weather strip doors, vents and fan openings
- Ensure louvers are sufficiently lubricated so that they close tightly
- Cover exhaust fan openings to reduce air infiltration.

Insulate side and end walls:

- Insulate the opaque sections of the house which will have minimum impact on light transmission. Insulate the north end wall if it will not affect light transmission. Use bubble wrap to allow in diffuse light.
- Ensure double poly greenhouses are properly inflated with outside air. Inflating the double poly creates a dead space that acts as an insulation layer. It is important to use outside air

because inside air is humid and causes condensation in between the layers which reduces light transmission.

- Install a wind break such as a plastic snow fence on the north and northwest sides of the greenhouse.

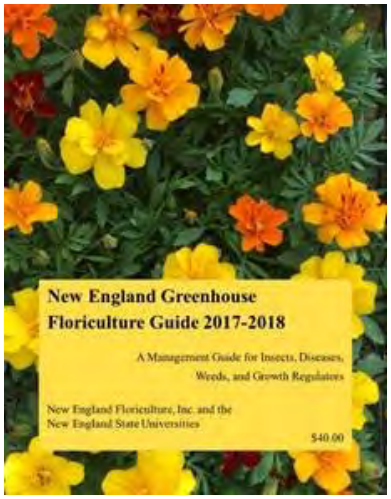
References

- E. Runkle (Michigan State University) and A.J. Both (Rutgers University). 2013. Greenhouse Energy Conservation Strategies. http://flor.hrt.msu.edu/assets/EnergyConservationforGreenhouses.pdf

- J.W. Bartok, Jr. University of Connecticut. 2013. Greenhouse Energy Conservation Checklist.

  http://www.ipm.uconn.edu/documents/raw2/Greenhouse%20Energy%20Conservation%20Checklist/Greenhouse%20Energy%20Conservation%20Checklist.php?aid=225

2017-2018 New England Floriculture Guide



The 2017-18 edition of the New England Greenhouse Floriculture Guide (Insects, Diseases, Weeds and Growth Regulators) is now available for $40 per copy from our UMass Extension Bookstore.

New England greenhouse growers have long relied on the ***New England Greenhouse Floriculture Guide,*** for its unbiased, detailed information about insect and mite management, disease prevention and management, weed control, and plant growth regulation.

You can access it online at: http://negreenhouseupdate.info/photo-library

The *Guide* is updated every two years by floriculture faculty and staff from the six New England State Universities, and is published by New England Floriculture, Inc.

UMass Greenhouse Crops and Floriculture Extension Program

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Six monthly issues of *Floral Notes* by *email* are published yearly.
Subscription (2 years) is $5. Contact Doug Cox for more information.