

A Publication of the UMass Extension Greenhouse Crops & Floriculture Program

# Floral Notes *Newsletter*

Volume 30, No. 5

<http://extension.umass.edu/floriculture>

March-April 2018

## *In This Issue*

Meet the recently named new UMass Greenhouse Crops and Floriculture Team. Take note of the naming of Tina Bemis as one of the greenhouse industry's "Greenhouse Greats" for 2018 by Greenhouse Management magazine. Learn management concepts for greenhouse disease prevention, get some tips on dealing with cloudy weather, and find out how to connect with the UMass Soil Testing and Diagnostic Labs. Finally, use the form to enroll in a "Respirator Train-the-Trainer Workshop" given on three dates in April and one in June.

Have a good spring, hopefully the snow and cold will end soon! Doug Cox



## **UMass Extension Announces Personnel Changes for Greenhouse Crops and Floriculture Team**

In light of the recent retirement of long-time Extension Specialist Tina Smith, UMass Extension has organized a new Greenhouse Crops and Floriculture Team to continue to serve the industry in Massachusetts and beyond.



**From left to right, Jason Lanier, Angela Madeiras, and Geoffrey Njue**

Some of you may recognize **Jason Lanier** from his work with the Turf and Landscape industries. Jason, who will serve as Team Leader, is an 18-year Extension veteran with extensive experience in Extension education and programming. He looks forward to leveraging these skills to assess industry needs, and to maintain and enhance the ability of greenhouse growers to access and utilize educational resources from the University. Additionally, Jason is enthusiastic about applying his existing background in plant physiology, nutrient management, and best management practices in greenhouse crop systems.

Many of you also know **Angela Madeiras**, who for four years now has had Greenhouse Crops and Floriculture responsibilities in the UMass Extension Plant Diagnostic Lab. Angie, who has previous experience in nursery and garden retail settings, as well as annual and perennial production, will take on an expanded role as an educator outside of the lab. In this new position she will call on and continue to expand her existing expertise in plant pathology, IPM, and biocontrol.

Most have crossed paths with **Geoffrey Njue**, who as a result of this re-organization will also assume increased responsibilities for Greenhouse Crops and Floriculture education. Geoffrey, a native of Kenya, has eighteen years of Extension experience since coming to the U.S., including the last five with UMass Extension. You will continue to hear from Geoffrey both in person and online, especially in the areas of sustainability, nutrient management, and greenhouse crop production practices.

**Editor's Note:** Tina Bemis, former MFGA President and co-owner of Bemis Farm Nursery, was honored as one of the greenhouse industry's 2018 "Greenhouse Greats" by Greenhouse Management magazine. The following article was reprinted from the January 2018 issue. Congratulations, Tina!!

## *Tina Bemis, Bemis Farm Nursery, Spencer, Mass.*

**WHY SHE'S GREAT:** Being a savvy businessperson in a very competitive industry is what makes Tina Bemis, co-owner of Bemis Farms Nursery in Spencer, Mass., stand out in this industry. She and her husband, Ed, have been able to compete with big box stores by thinking outside of the figurative box.

"My philosophy has always been, 'Nobody promised us business,'" says Bemis, who oversees a garden center, 15,000 square feet of undercover production space, 1 acre of outdoor production space, landscape design services and more. Bemis' philosophy has helped her put aside any groans and gripes about the big guys and to rather focus on what they can do that the big-box stores can't.



**WILLING TO WORKSHOP:** Big box stores don't do workshops, Bemis says. This might not sound like an important consideration until you realize that workshops account for 15 percent of Bemis Farms' revenue, which is what she says most garden centers make from perennial sales. The operation currently teaches 116 wreath-making workshops at its garden center and at garden clubs and schools. In the springtime, it hosts container gardening workshops: hanging baskets, porch pots, living wreaths — anything, she says, to put a plant in soil. "The workshops are what set us apart," Bemis says. "Quality and customer service are a given now."

**THE IMPORTANCE OF THE DOORKEEPER:** Bemis Farms has also helped its bottom line by adjusting how it approaches fundraisers and other events. "I've changed my tune over the years," Bemis says. "I used to do whatever I could to get people into the store thinking they'd buy something, but it doesn't pay the bills."

## ***General Management Concepts for Greenhouse Disease Prevention***

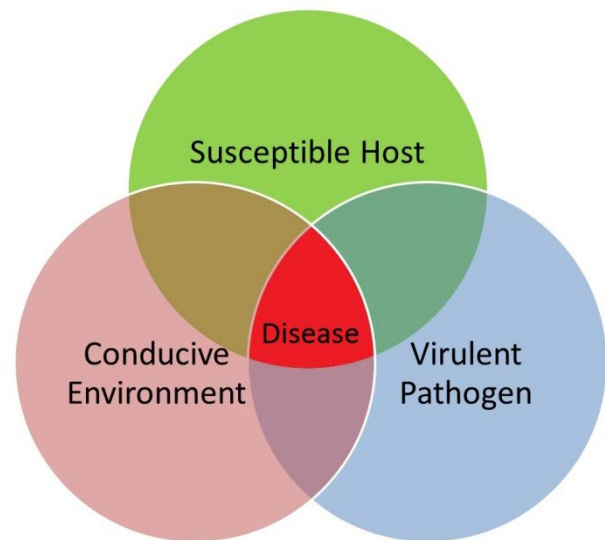
Angela Madeiras  
UMass Extension Plant Diagnostic Lab  
Amherst, MA

A thorough discussion of plant disease management always starts with what pathologists call the Plant Disease Triangle. The Disease Triangle describes the three factors that must be present in order for plant diseases to occur. These are a susceptible host plant, a virulent pathogen, and environmental conditions favorable to the pathogen. Disease occurs only when all three of these factors are present: removing one of these factors disrupts the triangle and prevents disease. In the greenhouse, good management practices focus primarily on manipulation of the greenhouse environment to make conditions less favorable to disease development.

### **Disease Management Practices**

The best way to manage disease in the greenhouse is to prevent pathogens from entering the greenhouse at all. There are several practices that can help keep pathogens at bay:

- **Exclusion.** Inspect incoming plants carefully for signs and symptoms of disease. Do not allow unhealthy plants to come into the greenhouse. Use commercial potting media, not field soil, which may contain soil-borne pathogens.
- **Sanitation, sanitation, sanitation!** Use approved greenhouse disinfectants to keep benches and work spaces clean. Sanitize transplanting benches between plug trays to prevent the spread of disease from one crop to another. Keep flats, pots, and watering nozzles off the floor, where they may come into contact with soil from outdoors. Prevent the growth of algae on floors and other surfaces as it attracts fungus gnats.
- **Discard infected plants and protect uninfected plants.** Herbaceous plants that become infected with a pathogen can rarely be cured. It is best to dispose of infected plants and implement a plan to protect uninfected plants. This may include preventive applications of pesticides.
- Add biofungicides to media before potting. Biofungicides are based on the action of beneficial microbes and may help prevent soil-borne pathogens from proliferating. Biofungicides work in one (or more) of 3 ways:
  - competition for nutrients (mainly iron) and space.
  - antibiosis- one organism produces compounds toxic to others (i.e. antibiotics).



**The Plant Disease Triangle**

- parasitism/predation- one organism preys upon another.
- Control weeds inside and immediately outside the greenhouse. Weeds can harbor pathogens and insects.
- Grow disease resistant or tolerant varieties if they are available. For instance, the geranium variety 'Martha Washington' is resistant to bacterial blight.

Crop management practices that make the greenhouse environment less conducive to disease development include:

- Manage relative humidity (RH). Fungal and bacterial pathogens require a humid environment. Many also need a minimum period of leaf wetness in order to infect a plant. Decrease RH and leaf wetness duration in the greenhouse by increasing air circulation, heating and venting, and proper plant spacing. Water in the morning so that foliage will dry as the day warms. Avoid overhead watering when possible.
- Good water management. Use well-drained potting medium. Don't over-water. Most soil-borne pathogens are happy in a wet potting medium. Chronically wet soil also impairs root function.
- Avoid overfertilizing. The succulent new growth that fertilization promotes is especially vulnerable to foliar pathogens.
- Control insect pests. Many common pest species can vector viruses. In addition, insects may also carry pathogens in their digestive tracts or on their bodies, and may contribute to the spread of disease.

**Accurate diagnosis is key!** You don't want to spend your time and money applying fungicides if what you actually have is a bacterial disease or a nutrient deficiency. Be sure you know what you've got before making more specific management decisions.

### **Resources**

New England Greenhouse Floriculture Guide: [www.ag.umass.edu/greenhouse-floriculture](http://www.ag.umass.edu/greenhouse-floriculture)

Greenhouse Management Fact Sheets: [www.ag.umass.edu/greenhouse-floriculture](http://www.ag.umass.edu/greenhouse-floriculture)

UMass Extension Plant Diagnostic Lab: [www.ag.umass.edu/services/plant-diagnostics-laboratory](http://www.ag.umass.edu/services/plant-diagnostics-laboratory)

Comprehensive lists of disease resistant/ tolerant vegetable cultivars can be found at Vegetable MD Online: <http://vegetablemdonline.ppath.cornell.edu/>

## ***Cloudy Weather Greenhouse Tips***

Here are some management tips especially important for periods of cloudy, rainy weather:

**Clean Plants:** Keep plants in retail areas clean. Remove dead and injured plants and spent flowers a couple times a day even during the busy season. *Botrytis* and high ethylene concentrations from decaying plant tissue will cause premature loss of foliage and flowers.

**Water sparingly:** Let plants run on the dry side and spot water areas as needed to prevent over-watering. Avoid watering late in the day or when water will sit on leaf surfaces for long periods of time.

**Lower humidity levels in greenhouses to minimize *Botrytis*:** Heat and vent greenhouses to lower humidity levels. See: [Reducing Humidity in Greenhouses](#).

**Switch fertilizers temporarily:** To prevent ammonium toxicity, use fertilizer with 40 percent or less ammoniacal nitrogen when growing conditions are cool and wet. A common strategy used by growers is to alternate to a 15-0-15 Dark Weather Formula. This eliminates the extra ammonium input temporarily, but then allows growers to return to their normal formula when growing conditions improve.

Cool temperatures (less than 60°F average daily temperature), water-saturated (low oxygen) growing media, and low medium pH can cause ammonium to build up to toxic levels in the growing medium. Symptoms of ammonium toxicity include upward or downward curling of lower leaves depending on plant species; and yellowing between the veins of older leaves which can progress to necrosis. Reference: [Nitrogen: Not All Forms are Equal](#), by Cornell University.

**Be aware of pesticide phytotoxicity and activity:** Some pesticides such as horticultural oil and neem oil will cause phytotoxicity if it remains wet on the foliage. Read pesticide label precautions.

Fungicides (for root disease) will work more slowly in cool media. It may take longer to see results of an application or an application may be less effective.

**Apply beneficial nematodes:** A cloudy or rainy day is an ideal time to apply beneficial nematodes (*Steinernema feltiae*) for fungus gnats and thrips as nematodes are very sensitive to UV light and desiccation. Consider adding a compatible biofungicide such as Cease to the nematode application to prevent *Botrytis*. Note that Decree (fenhexamid) is not listed on compatibility charts. Nematode pesticide compatibility charts can be obtained from these links:

Compatibility charts: [Nemasys](#), [NemaShield](#), [Entonem](#), [Biobest Pesticide Side Effects Database](#)

**Late season fungicides for *Botrytis*:** Decree (fenhexamid) with capsil is still many grower's first choice in terms of plant safety based on past grower experiences. Note that Decree resistance has been reported. To prevent resistance, the label recommends not making more than two consecutive applications and after the second application, using an alternative fungicide effective in controlling *Botrytis* for two applications before reapplying the active ingredient in Decree. The label also states not to use lower rates than is recommended.

Decree will perform better with a surfactant such as CapSil added (8 oz per 100 gallons or ½ teaspoon per gallon) to increase coverage and reduce visible residue. Considering plant safety and residue as of primary concern, other possible alternatives that growers are using are CEASE (*Bacillus subtilis* QST 713 strain) and Affirm (previously Veranda O) (polyoxin D zinc salt).

*Tina Smith, UMass Extension and Leanne Pundt, UConn Extension*

## ***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 rot**

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>





Delaney Meeting & Event Management  
802-865-5202  
Email: [info@delaneymeetingevent.com](mailto:info@delaneymeetingevent.com)  
<http://www.negreenhouse.org>

Save these dates for the Northeast's premier horticultural event! Don't miss this great opportunity to learn, share and connect with other industry professionals!

Educational sessions focusing on advanced biocontrol, disease management, business and marketing, back to the basics, emerging technologies and trends, alternative crops, greenhouse vegetables, perennials, hands on training and sessions in Spanish language will be offered. Come visit vendors at the trade show with three dedicated hours in each day of the program.

The biennial Northeast Greenhouse Conference & Expo is co-sponsored by New England Floriculture, Inc. - a group of grower representatives from the Northeast, augmented by University and Cooperative Extension staff in each state who specialize in greenhouse crops and management. **Attendee registration will open in August.**

Exhibit space and sponsorship opportunities are available. Contact Karen Forbes at [karen@delaneymeetingevent.com](mailto:karen@delaneymeetingevent.com).

### *UMass Greenhouse Crops and Floriculture Extension Program*

Douglas Cox Floral Notes Editor [dcox@umass.edu](mailto:dcox@umass.edu)  
Six monthly issues of *Floral Notes* by email are published yearly.

Subscription (2 years) is \$5. Contact Doug Cox for more information.

*Use of trade names in this publication does not imply endorsement of products named or criticism of those not mentioned. The user bears sole responsibility for correct and legal product use.*



## 2018 Respirator Train-The-Trainer Workshop

Farmers, beekeepers and other who need to wear respirators, required by pesticide labels, can benefit from the workshop. Participants will learn how to fit test a respirator and select, use, clean, maintain and replace respirators. All handlers must be trained under the EPA Worker Protection Standard (WPS) Respirator Requirement if your farm uses any pesticide that requires a respirator. Several organic approved (OMRI) pesticides and some miticides used by beekeepers require respirators. This is a hand-on (in part) workshop – **bring your respirator or use one of ours.**

### Time

1:30pm-3:40pm (check-in 1:15pm). Latecomers not admitted.

### Registration Fee

\$30.00/person. Pre-registration is required.

### Special Accommodations

Please contact the office at 413-545-1044 as soon as possible if you require any special accommodations (ADA)..

### Refunds

There will be no refunds in the event that an individual cannot attend a workshop. Instead, another individual may take his/her place, or he/she can attend another respirator workshop.

If you have any questions about this workshop call: **(413) 545-1044** (M-F 10am-4pm) or email [nclifton@umass.edu](mailto:nclifton@umass.edu)

### ✉ Mail Form to:

Natalia Clifton  
French hall  
230 Stockbridge Road  
University of Massachusetts  
Amherst, MA 01003-9316

**Your Name:** \_\_\_\_\_

**Company/Farm Name:**  
\_\_\_\_\_

**Address:**

\_\_\_\_\_  
*No. Street*

\_\_\_\_\_  
*Town State Zip code*

\_\_\_\_\_  
*Daytime/work phone number*

\_\_\_\_\_  
*email*

Check or money order payable to **University of Massachusetts.**

Registration Fee is \$30.00 per person.

Or Register online at [www.umass.edu/pested](http://www.umass.edu/pested) using a credit card (for extra service fee of \$5/person)

### Please check the workshop that you want to attend:

Wednesday April 4<sup>th</sup> (1:30pm-3:40pm) Best Western, Marlborough, MA (181 Boston Post Road Route 20 West).

Friday April 6<sup>th</sup> (1:30pm-3:40pm) Holiday Inn, Taunton, MA (700 Myles Standish Blvd., 508-823-0430)

Monday April 9<sup>th</sup> (1:30pm-3:40pm) Hadley Farms Meeting House, Hadley, MA (41 Russell St, Route 9, 413-387-0534.)

Tuesday June 19<sup>th</sup> (1:30pm-3:40pm) Best Western, Marlborough, MA (181 Boston Post Road Route 20 West).