Heating Costs and Cheap Fuel

By: Stanton Gill

It is January and winter is still upon us which means turning on the heat. Fortunately, fuel costs are at record lows, and it has not been this cheap to heat a greenhouse since the 1980s. Many people are reporting that they plan on starting their greenhouse crops early this year. Last year this was a bad bet. We will see if it works out this spring with warm weather coming in March and April. Warm weather certainly did not arrive in 2014 – not until May and June. The fortunate thing in 2014 was that it stayed cool through June into early July so sales extended late in the season making up for the bad start. Greenhouse growers are eternal optimists so let’s hope for an early, warm spring and long selling season in 2015.

Oil dipped below $50 a barrel on January 5 and there is some speculation that it could drop to $40 and even dip to $30 a barrel this winter. I paid $2.09/ a gallon at a Clarksville gas station on January 5. Everyone seemed to be very pleased with this lowering of fuel prices. Many of the predictions are that this will have a positive impact on the US economy which means people should be spending money this spring. Most landscapers are reporting that customers are signing contracts for landscape installation jobs and maintenance work. These factors all translate into good news for the greenhouse industry. Of course, the price of oil could climb back up, but most business analysts do not see this coming until later in the year.

Ralstonia Alert

By: Karen Rane

Over the holidays, we learned that unrooted cuttings of osteospermum infected with *Ralstonia solanacearum*, the bacterium that causes southern bacterial wilt, were recently shipped to US greenhouse growers from a production facility in Guatemala. The parent company of the Central American facility notified USDA-APHIS, and subsequent investigations have resulted in stop-shipment of a number of cutting-propagated herbaceous ornamentals from the Guatemalan farm. USDA-APHIS has determined that the Ralstonia strain in this current outbreak is NOT the select agent strain Race 3 Biovar 2, but another common strain of the bacterium. All strains can cause significant losses to many greenhouse ornamental crops. Customers who received potentially infected cuttings have been notified and advised by the company to discard all suspect cuttings and associated materials (containers, growing media, labels, etc). State regulators have also been notified, and are contacting growers who received potentially contaminated materials. Although this Ralstonia strain is not federally regulated, diseases in the greenhouse and nursery trade come under the jurisdiction of individual state departments of agriculture. Growers who received notification from the company of this incident should contact their state nursery inspector for additional information regarding state regulations. Maryland growers should contact the Maryland Department of Agriculture Plant Protection and Weed Management section (410-841-5920).
Ralstonia solanacearum (Rs) is a bacterium that infects the vascular (water-conducting) system of a large number of herbaceous plants, including many vegetable and ornamental crops. The common name of the disease is southern bacterial wilt, and the pathogen is endemic in subtropical regions of the world. In the southern US, one strain of the pathogen (race 1) is commonly found in soil and causes southern wilt of tobacco, tomato and other vegetables in commercial production as well as home gardens. One Rs strain, called Race 3 Biovar 2, or R3B2, is not established in the US, and is listed as a select agent by USDA-APHIS. Rs R3B2 is more tolerant of cooler temperatures, and it is feared that once introduced, this strain may become established and have a devastating impact on US potato production. It was Rs R3B2 that was found in geraniums in 2003, prompting wholesale destruction of infected and potentially contaminated geraniums and other greenhouse ornamentals by federal regulators. Again – this current incident DOES NOT involve the select agent strain, so regulation is left to state agencies.

Wilting leaves, which may or may not show yellow discoloration, are symptoms of this disease. Eventually, more leaves will become flaccid until the entire plant collapses and dies. There may be a brown discoloration of the vascular system, especially at the base of the plant, and a whitish bacterial ooze may be seen when an infected stem is cut. This is a systemic disease, meaning that removal of wilted leaves does not cure plants from infection. Cuttings taken from infected stock plants are infected and may fail to root (it was poor rooting of osteospermum cuttings that was the first indication of this recent outbreak). The pathogen can be introduced to a greenhouse from infected plant material, contaminated soil or water. Unlike most bacterial pathogens, Rs can survive in the soil in the absence of plant debris as well as in potting media and in water. Spread within a greenhouse can occur from handling infected plants and from movement of irrigation water – drainage from the pot of an infected plant can carry the pathogen to adjacent pots, and infection can occur through the roots. Operations that use untreated recirculating water systems are especially vulnerable to the spread of the disease in this way. There are no chemical controls for southern bacterial wilt. Management involves discarding all infected plants (including potting medium and containers) in a sanitary landfill - do not compost infected materials. Treatment of recirculating irrigation water helps minimize spread of Rs and other plant pathogens as well. All greenhouse surfaces that may have come in contact with infected plants or soil should be cleaned of organic matter and thoroughly cleaned with a greenhouse disinfectant. If you see wilting plants or rooting problems in cuttings, contact your state nursery inspector or plant diagnostic laboratory as soon as possible. Prompt diagnosis of this disease is imperative for minimizing losses.

MANTS
The horticulture industry’s premier trade show runs from January 14 through 2:00 p.m. on January 16 at the Baltimore Conference Center. I (Stanton) will be helping staff the MNLA educational booth. Please stop by and give me some ideas on what type of greenhouse seminars you would like us (Karen, Andrew and myself) to organize for 2015. We are considering a program on hydroponic plant production after the bedding plant season. Let me know what you think or what other topics would be of interest. Another potential topic is on insecticide and fungicide impact on pollinators – what do we know. Call me on my cell at 410-868-9400 with suggestions.

European Pepper Moth
The European pepper moth showed up in Maryland greenhouses in 2013. We have pheromone traps we can supply to you if you are a Maryland greenhouse operation and are willing to work with us in monitoring for this pest. This caterpillar feeds on foliage close to the soil surface. The caterpillar will feed at the base of the stems and girdle stems. The larvae will also bore into the base of plants causing them to collapse.

Look for damage at base of stems like on this geranium
Winter Production Problems: Ammonium Toxicity
By: Andrew Ristvey

One of the most problematic issues in winter/early spring greenhouse production is managing temperature. While the cost of fuel this year is lower than in the past, heating remains one of the largest expenditures. Last year, heating houses really took a toll on profits and it was difficult to keep houses warm. When temperatures fall below 60, plant growth slows, and that is a potential hit on profits, especially if another cycle is planned for the greenhouse space.

Another problem exists with nature-imposed cooler temperatures and low light during the winter cycle. Not only does plant growth slow, but a host of other issues develop. These include lower water uptake and lower micro-organism activity. Decreased plant-water use generally increases the likelihood that substrates remain wet. This tends to create low oxygen, acidic environments which do not favor the bacteria that convert ammonium nitrogen to nitrate. Thus, a build-up of ammonium in the substrate ensues. If that's not bad enough, ammonium is a cation and cannot be easily leached from organic substrates (remember that organic materials, i.e. substrates, have relatively high cation exchange capacities).

But the issue does not stop there. Not only do winter conditions create substrate-based ammonium problems, but the way in which plants utilize nitrogen also lends to the difficulties. Plants take up both nitrate and ammonium nitrogen. Nitrate can be “safely” stored for later use by plants but ammonium cannot. During the process of ammonium uptake, the substrate becomes more acidic, further amplifying the pH problem. Once inside the plant, ammonium nitrogen turns into ammonia. The ammonia needs to be immediately utilized through amino acid production or it becomes toxic. Photosynthesis is necessary to create carbon molecules used to sequester ammonia and make amino acids. Lower light levels and colder temperatures all contribute to slow growth and lower than normal levels of photosynthesis. This creates a deficit of carbon molecules for amino acid production, and no place for the ammonia to go, which eventually disrupts metabolism and respiration resulting in cell death.

Be on the lookout for collapsing plants. If you find the plant has been girdled and there is webbing at the base of the plant give me a call at 410-868-9400 or email me at Sgilll@umd.edu. You can control this caterpillar but with closely packed greenhouses it will be difficult to get applications onto plant material where the caterpillars are feeding. If you want to work with us and place out baited pheromone traps give me a call.

More details are available at
http://extension.umd.edu/ipm/commercial-greenhouse-production/greenhouse-pest-alert-european-pepper-moth

Winter Production Problems: Ammonium Toxicity
By: Andrew Ristvey

One of the most problematic issues in winter/early spring greenhouse production is managing temperature. While the cost of fuel this year is lower than in the past, heating remains one of the largest expenditures. Last year, heating houses really took a toll on profits and it was difficult to keep houses warm. When temperatures fall below 60, plant growth slows, and that is a potential hit on profits, especially if another cycle is planned for the greenhouse space.

Another problem exists with nature-imposed cooler temperatures and low light during the winter cycle. Not only does plant growth slow, but a host of other issues develop. These include lower water uptake and lower micro-organism activity. Decreased plant-water use generally increases the likelihood that substrates remain wet. This tends to create low oxygen, acidic environments which do not favor the bacteria that convert ammonium nitrogen to nitrate. Thus, a build-up of ammonium in the substrate ensues. If that's not bad enough, ammonium is a cation and cannot be easily leached from organic substrates (remember that organic materials, i.e. substrates, have relatively high cation exchange capacities).

But the issue does not stop there. Not only do winter conditions create substrate-based ammonium problems, but the way in which plants utilize nitrogen also lends to the difficulties. Plants take up both nitrate and ammonium nitrogen. Nitrate can be “safely” stored for later use by plants but ammonium cannot. During the process of ammonium uptake, the substrate becomes more acidic, further amplifying the pH problem. Once inside the plant, ammonium nitrogen turns into ammonia. The ammonia needs to be immediately utilized through amino acid production or it becomes toxic. Photosynthesis is necessary to create carbon molecules used to sequester ammonia and make amino acids. Lower light levels and colder temperatures all contribute to slow growth and lower than normal levels of photosynthesis. This creates a deficit of carbon molecules for amino acid production, and no place for the ammonia to go, which eventually disrupts metabolism and respiration resulting in cell death.
So with higher concentrations and availability of ammonium, and cool greenhouse conditions, a perfect storm exists for ammonium toxicity. An excellent article about ammonium toxicity was written by Dr. Neil Mattson in the October 2011 edition of GrowerTalks. Dr. Mattson is an Associate Professor in Cornell’s Department of Horticulture. In this article, he discusses ammonium toxicity during the winter growing cycle and gives suggestions on prevention before it is a problem. He recommends keeping fertilization inputs low and especially making sure that the fertilizer’s ammonium-nitrogen content is also low (no more than 40%). Also, keep irrigation at a minimum to maintain adequate substrate oxygen levels, which helps promote microbe activity as well as prevent development of acidic conditions. Monitor substrate pH level often and keep the pH levels on the high side of your plant’s tolerances. Pay special attention when daily light levels are low.

If ammonium toxicity occurs, you will note problems in the younger leaves with chlorosis between the veins in bedding and plug plants. These symptoms will evolve into necrotic spots. In older plants, more mature leaves will show these signs. Leaf tips may curl and root growth slows with tip die-back, creating vulnerable points for pathogens.

If you suspect ammonium toxicity, Dr. Mattson advises that greenhouse temperatures should be increased, present fertilizer use should be stopped, leach what you can and fertilize with a nitrate-based fertilizer until conditions improve. Further suggestions are given in this article, which is an excellent resource for information about ammonium toxicity.

A link to this article which has a photo of the plant damage can be found at the Cornell Greenhouse Horticulture webpage: (http://www.greenhouse.cornell.edu/crops/nfmanagement.htm)

**Neonicotinoid labels**
This is an example of the new label that Home Depot will require it suppliers to put on plants treated with neonicotinoid in 2015.

**Miscanthus Mealybug Trials**
Brian Kunkel, University of Delaware Extension, Suzanne Klick and I have been conducting trials this fall and winter to evaluate several new insecticides for control of miscanthus mealybugs. We finished the trial before the holiday break and hope to have some results to report this spring in time for the growing season.

**Thrips Trials**
Brian Kunkel and I will be working on evaluating some of the newly labeled products for thrips control this spring. If you have a population of thrips please give me a call at 410-868-9400 or send an email at Sgill@umd.edu. We will happily haul out any thrips infested plants and move them to our experimental greenhouses.

**Biological Control for Thrips**
In August of 2014 we held a Greenhouse Biological Control Conference. At the meetings we covered several methods to integrate biological control into greenhouse production. One of the methods is to use minute pirate bugs (Orius sp). The best way to use this predator is to start pepper plants in January. The pepper plants serve as a pollen source for the Orius that you release in March and April. Researchers in Canada found that the pepper
The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by University of Maryland Extension is implied. Read labels carefully before applying any pesticides. Photographs are by Suzanne Klick and Stanton Gill unless stated otherwise.

The University of Maryland Extension programs are open to any person and will not discriminate against anyone because of race, age, sex, color, sexual orientation, physical or mental disability, religion, ancestry, national origin, marital status, genetic information, political affiliation, and gender identity or expression.

cultivar ‘Purple Flash’ is one of the most copious producers of pollen and Orius will lay their eggs on this plant and the nymphs will feed on the pollen. The adults migrate off the plant to search for thrips on which to feed. Orius will feed on the 1st and 2nd instar thrips nymphs and on adults. Peppers take awhile to grow so you Need to start the seeds now. We will continue on how to use this predator later in the season but for now you should get on the starter line and get those peppers going.

e-Gro Greenhouse Webinar

Virginia Polytechnic University is conducting webinars for the greenhouse industry in early 2015. There is no charge for these programs and they will be available to view on-line after the program. Go to http://e-gro.org/webinars.php to find out what is coming in 2015.

A Webinar on Biological Control Will Be On January 30, 2015:
This webinar will introduce you to the scope and benefits of establishing a biological control program in your greenhouse as part of your pest management program. They will follow a strict schedule to allow you to join the webinar based on your interest in the individual seminars.

10:15 – 10:25 Introduction
Brian Krug, University of New Hampshire

10:30 – 11:25 Are you ready to start a BioControl Program?
Suzanne Wainwright-Evans, Buglady Consulting

11:30 – 11:55 Insect pest identification
Nancy Rechcigl, Syngenta Lawn and Garden

12:00 – 12:25 Biological Control on Herbs
Stanton Gill, Extension Specialist, IPM and Entomology for Nurseries/Greenhouses, University of Maryland Extension

12:30 – 1:00 Lunch

1:00 – 1:25 Importance of a Proactive Approach with a Biological Control Strategy
Ron Valentin, Biocontrol Specialist

1:30 – 1:55 Grower Experience with Banker Plants for Aphid Control
Rich Densel, Grower, Van Vugt Greenhouses, Pompton Plains, NJ

2:00 – 2:25 Pesticides- Are They Ever Compatible with a Biocontrol Program?
Rick Yates, GGSPro Technical Services Manager, Griffin Greenhouse Supplies

2:30 – 2:55 The Fundamentals of Biocontrol of Fungal and Bacterial Diseases
Margery Daughtrey, Senior Extension Associate, Plant Pathology and Plant-Microbe Biology Section, Cornell University

3:00 – 3:25 Case Studies of Using Biocontrol for Disease Control in Greenhouse Crops

3:30 – 3:45 Wrap up