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Floral Notes Newsletter

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MOMENTUM GOING STRONG -- KEEP UP WITH THE LATEST "AG" TRENDS IN MASSACHUSETTS!

We don't want you missing out on any of the exciting "ag" news happening across the Commonwealth right now. So stay the pace with us:

- www.mass.gov/agr -- MDAR's website lists upcoming agricultural events, news releases and alerts, Farm & Market Report, grant programs, MDAR services, and much more.
- www.mass.gov/blog/environment -- This blog site, *The Great Outdoors*, offers expertise from the Executive Office of Energy and Environmental Affairs' field specialists on topics related to agriculture, agri-tourism, culinary, environment, fishing, hiking, hunting, parks, travel, volunteer, wildlife, and more.
- **NEW!** www.twitter.com/agcommishsoares: Commissioner Scott Soares is never far from his BlackBerry and will give you *real-time* "ag" updates from the road via Twitter!

MDAR's mission is to ensure the long-term viability of local agriculture in Massachusetts. Through its four divisions – Agricultural Development, Animal Health, Crop and Pest Services, and Technical Assistance – MDAR strives to support, regulate, and enhance the Commonwealth's agricultural community, working to promote economically and environmentally sound food safety and animal health measures, and fulfill agriculture's role in energy conservation and production.

Managing Weeds in Your Greenhouse

Tina Smith
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Empty greenhouses provide the opportunity to thoroughly eliminate weeds to reduce problems for the spring crop cycle.

Weeds are a persistent problem, needing constant attention in both retail and wholesale greenhouses. Weeds create a poor impression to customers and are a primary source for pests such as whiteflies, aphids, thrips, mites, slugs and diseases. Common weeds in greenhouses such as chickweed (*Stellaria media*), creeping woodsorrel (*Oxalis corniculata*), bittercress (*Cardamine hirsuta*) and others can become infected with impatiens necrotic spot virus (INSV) and tomato spotted wilt virus (TSWV) and serve as a disease source. Weeds infested with thrips then vector the virus onto susceptible greenhouse crops.

How they arrive

Weeds and their seeds are brought into the greenhouse on infested plant material, tools, equipment, animals and people. Seeds can be moved by wind (dandelion, horseweed, groundsel), irrigation water (chickweed) and by seeds being naturally propelled (woodsorrel, bittercress). Annual weeds reproduce primarily be seed with several generations occurring per year. Once growing in the greenhouse and allowed to flower, weeds produce an enormous amount of seed and some weeds such as woodsorrel and bittercress propel seeds up to 12 feet throughout the greenhouse.

Weed management involves the integration of preventative measures, sanitation, using weed fabric, hand-weeding and using postemergence herbicides.

Prevention

Prevention and sanitation are the first steps to managing weeds. Keep weed seeds and rhizomes out of greenhouses by using clean growing media, clean plant material and controlling weeds outside and control weeds around the media storage area.

Regularly mowing around the greenhouse will keep the majority of the vegetation from flowering and producing seed. If weeds do get in, they should never be allowed to flower and produce seed.

Weed block fabric

The use of a physical barrier such as weed block fabric helps to prevent weeds from establishing on greenhouse floors. It is best to leave the fabric uncovered so it can be easily swept. Fabric that is covered with crushed stone or other material collects fallen growing media, creating a favorable environment for weed seedlings to germinate.

Tears, worn spots or edges that expose the ground should be repaired or replaced. Spilled growing media should always be cleaned up, so weed seeds don't have a place to collect and germinate.

Controlling existing weeds

Existing weeds can be controlled by hand or by using herbicides. Preemergence herbicides are applied to soil to prevent the emergence of seedlings. There are currently no preemergence herbicides labeled for greenhouse use. (Note: Surflan (oryzalin) is no longer registered for use in enclosed greenhouses).

Postemergence herbicides are applied after the weeds have emerged. Several postemergence herbicides can be used under greenhouse benches and on the floors. Contact herbicides are best applied to small seedlings. Large weeds will be burned but not killed.

Natural-based Herbicides

In addition to chemical herbicides, there are a few bioherbicides, natural-based herbicides that can be used by organic growers. Specific

natural-based herbicides include acetic acid, citric acid, citrus oil, and clove oil (eugenol). These materials are postemergence, non-selective, contact herbicides that work in various ways, but basically disrupt cell membranes and cause plants to desiccate. They work best on young plants and multiple applications are usually needed to control reemerging or perennial weeds. Products are sold under several trade names and some are OMRI (Organic materials review institute) listed. Growers who are seeking organic certification should consult with their local certifying agent to confirm that a particular product is permitted. Although bioherbicides are natural-based, they are not without risks. They may burn skin and eyes or cause nausea or other health affects. All label directions and precautions should be followed.

Chemical Herbicides

Few chemical herbicides are labeled for use in greenhouses due to the potential for crop injury or death. Injury can occur from spray drift if fans are operating at the time of application. Injury can also occur from herbicides that are volatile (change from liquid to gas). Auxin-type herbicides such as turf herbicides containing 2,4D dicamba, and MCPP are very volatile and vapors can easily buildup within an enclosed greenhouse and injure desirable plants. These herbicides can cause very distinguishable injury symptoms that include cupping and strapping of plant foliage. Always be sure the chosen herbicide is labeled for use in the greenhouse and carefully follow label instructions and precautions. Use a dedicated sprayer that is clearly labeled for herbicide use only. If using herbicides outside, around a greenhouse, avoid using volatile herbicides that can easily enter the greenhouse ventilation system.

Herbicide Injury

Symptoms of herbicide injury include discolored, thickened or stunted leaves. Sometimes the growing point of young seedlings is injured. Some herbicides may cause foliage to turn white, while others caused leaves to become distorted, cupped or strapped. The possibility of herbicide injured plants recovering depends on the sensitivity of the plants to the contaminating herbicide and the dose of herbicide the plant received. In most cases, injured plants will not grow out in time for sale, or symptoms may be so severe that they cannot be sold.

Herbicide injury on tomato plant: A broadleaf brush killer drifted into an empty greenhouse. Vapors caused damage when plants were brought into the greenhouse in the spring.

Depending on the nature of the herbicide and amount of herbicide that entered the house, activated charcoal might be able to be used to neutralize herbicide activity in soil when mistakes occur. The efficiency of deactivation depends on the soil's organic matter content and physical condition, the herbicide's activity, and

Herbicide injury on geranium: A herbicide containing the active ingredient, clomazone, drifted into the greenhouse

the crop's sensitivity. According to the label, D•TOX Flowable Charcoal (20% activated carbon) can be applied for spills at a rate of 1-2 gal/150 sq ft. The product can be applied undiluted or diluted up to 1 gallon in 3 gallons water, or as required for proper spraying. Using

activated carbon is a poor substitute for a well-planned weed control program.

Herbicides

Herbicides for an empty greenhouse. Roundup ProDry, Roundup Pro, Roundup Pro Concentrate, Touchdown Pro (Glyphosate). Non-selective, systemic, postemergence herbicides. Do not have residual control or pre-emergence activity.

Herbicides for use when crops are present. Envoy, Envoy Plus (Clethodim). Selective, postemergence herbicide, for the control of grasses only, works by contact.

Finale (Glufosinate-ammonium). Non-selective, postemergence, systemic herbicide.

Fusilade II (Fluazifop-P-butyl). Selective, postemergence, systemic herbicide, for the control of grasses only.

Reward (Diquat dibromide). Non-selective contact herbicide

Scythe (Pelargonic acid). Non-selective, postemergence, contact herbicide.

Outside Weed Control

In addition to mowing, herbicides may also be used outside of greenhouses. Before spraying weeds around the greenhouse with any herbicide, close windows and vents to prevent spray drift from entering the greenhouse. Avoid using auxin-type herbicides, such as those labeled for broadleaf weed control in turf or brushkillers, or herbicides with high volatility near greenhouses. Effective preemergence herbicides with low volatility include orzyzalin (Surflan), flumiozazin (SureGuard), prodiamine (Barricade) and pendimethlin (Pendulum). They can be tank-mixed with postemergence herbicides listed above.

Prior to mowing or using an herbicide around greenhouses, use a knockdown insecticide such as horticulture oil on the weeds to kill insects and prevent them from leaving the weeds and entering the greenhouse through vents. Then use a postemergence, non-selective herbicide to kill existing vegetation.

References

2009-2010 New England Greenhouse Floricultural Recommendations. www.negreenhouse.org/index.html

Pundt, Leanne. 2008. Managing Weeds In and Around Greenhouses. Fact sheet University of Connecticut. www.umass.edu/umext/floriculture/fact_sheets/pest_management/ghweeds_LP.htm

UMass & UConn Extension Photo Library http://www.negreenhouseupdate.info/index.php/weeds-and-algae

Thanks to Randall G. Prostak, Extension Weed Specialist, University of Massachusetts for reviewing this article.

2010 Northeast Greenhouse Conference

New England Floriculture, Inc is excited to announce the name change of the New England Greenhouse Conference to the Northeast Greenhouse Conference. "The name change reflects the formal inclusion of New York State on our Board of Directors, and our conference committee, as well as welcoming attendees from outside New England with similar growing and market conditions." said Tina Bemis, President of the Northeast Greenhouse Conference.

The conference will be held on November 3 and 4, 2010 in Worcester, MA. Each day will feature consecutive tracks of educational programs. These educational sessions will focus on greenhouse production, business management, pest management and greenhouse engineering. A trade show will be held on both days. Visit our web site: http://www.negreenhouse.org

Preparing and Sending Samples to the UMass Diagnostic Lab

Tina Smith, Greenhouse Crops and Floriculture Program
Bess Dicklow, UMass Extension Plant Diagnostic Laboratory

Submit as much of the plant as possible. The accuracy of a disease diagnosis can only be as good as the sample provided. To provide a good sample, be sure that the sample contains the right part of the plant. Symptoms may appear in parts of the plant that are not infected with the pathogen. For this reason, if possible, submit as much of the plant as possible. Ideally, this would be an intact plant.

Send several plants with a range of symptoms. Secondly, the samples must be fresh and in good condition. Dead plants tell no tales. 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. Wet samples with soil on the leaves promote the growth of secondary pathogens and create problems that did not exist when the sample was originally collected. Do not ever add water to your sample.

Send detailed information and payment with the sample. Complete the required form to be sent with the sample or make sure to include detailed information including: host plant, date collected, plant history (planting date, approximate age, cultural practices), when symptoms occurred, description of the problem, pesticide treatments, and your contact information. Keep accompanying paperwork separate and do not include in the bags with the sample. Ideally, paperwork could be placed in its own Ziploc bag. Download the form: http://www.umass.edu/umext/floriculture/pdf/veg_flor_form_new.pdf

The cost for diagnosis is $50 per sample. Include a check payable to: *University of Massachusetts* with the sample.

Hand deliver or ship overnight. Rapid delivery may be 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 difficult. You may want to hand deliver the sample to the lab. If you are too far away from the lab, then ship the sample overnight. The diagnostic laboratory is closed over the weekend and you may not want to ship the sample on Friday or during a holiday. Call Bess at the UMass diagnostic lab prior to shipping to make arrangements for receiving the package.

How to select samples from plants with these symptoms

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.

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 (1 foot or less), shake the soil from the roots, wrap in newspaper and put into a plastic bag for mailing.

Wilt, crown rot or root rot. If the plants are 1 foot or less, include the entire plant. Include the root system with the plant, leaving 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. For wilt diseases, include the lower stem tissue and roots.

Poor growth, defoliation, or scorch. These symptoms are usually caused by nutritional or environmental factors. They may also 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.

Contact Information
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Ornamental Peppers to Brighten Garden Palette

Rosalie Marion Bliss
Agricultural Research Service Information Staff

Two new pepper cultivars developed by ARS scientists promise to provide striking color contrasts in the summer and fall garden. Unique fruit shapes and orange fruit color provide compelling seasonal interest, especially for fall gardens during Halloween and Thanksgiving.

The pepper cultivars are trademarked Lil' Pumpkin™ and Pepper Jack™. ARS plant geneticists John Stommel and Robert Griesbach, both with the Henry A. Wallace Beltsville Agricultural Research Center in Beltsville, Maryland, bred the peppers. Stommel is with the Genetic Improvement of Fruits and Vegetables Laboratory. Griesbach was with the Floral and Nursery Plants Research Unit and is now the ARS technology transfer coordinator for the Beltsville area.

The patented Lil' Pumpkin plants produce unique black foliage and orange pumpkin-like fruit, and the patent-pending Pepper Jack bears greenish-black foliage and a mix of both orange and black, small, cone-shaped fruit, similar to the ever-popular Halloween treat, candy corn.

"These ornamental garden vegetables have been trialed extensively, and they perform well in diverse environments," says Stommel. "They are well suited for use as bedding and container plants."

The breeders developed Lil' Pumpkin and Pepper Jack with both ornamental and culinary markets in mind. The peppers' vibrant colors and unique shapes provide enticing ornamental interest, and their spicy flavor may be of culinary interest to hot-pepper lovers.

When introduced into Europe in the 15th century, some widely grown vegetable crops, such as peppers, were prized more for their ornamental value than as food sources, says Stommel. Decorative kitchen gardens, called "potagers," were an important element of elaborate European gardens like those found at Versailles during the 1600s.

With renewed interest in ornamental and vegetable gardening, using vegetables as a focal element in the garden has become popular again.

Lil' Pumpkin and Pepper Jack join a long list of popular ornamental vegetables that includes kales, lettuces, sweetpotatoes, and eggplants, as well as culinary counterparts such as multicolored swiss chard, orange watermelons, purple snap beans, and purple asparagus.

Greenhouse growers have added ornamental vegetables to their annual production cycle because they are easy to produce and are extremely profitable compared to their culinary counterparts. The new peppers will be marketed in pots as annuals. "Similar to culinary peppers, ornamental peppers perform best in high light and warm temperatures," says Stommel.

Lil' Pumpkin and Pepper Jack have been licensed for retail sale by McCorkle Nurseries, Inc., in Dearing, Georgia. The plants are scheduled to become available in various garden centers and retail stores nationwide in 2010.

This research is part of Plant Genetic Resources, Genomics, and Genetic Improvement (#301), an ARS national program described on the World Wide Web at www.nps.ars.usda.gov.

This article was originally published in the October 2009 issue of *Agricultural Research* magazine.

Garden Retailers and Late Blight

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Late blight, caused by the fungus *Phytophthora infestans,* is a very destructive and very infectious disease that killed tomato and potato plants in gardens and on commercial farms throughout the eastern U.S. during 2009. As a result, many farmers across Massachusetts lost their tomato crops and incurred extra fungicide and labor expenses. While late blight is a problem on farms each year, the occurrence of late blight in 2009 was different compared to most seasons.

In 2009 it was the earliest the disease was reported over such a broad region of the country. More problematic for the Northeast, was that infected plants were distributed through large local retail stores throughout the region (Ohio to Maine). Never before has such an extensive distribution of infected plants occurred. This distribution, the exceptionally contagious nature of the disease and the cool, wet growing season all contributed to a disastrous year for farmers.

Garden retailers can help prevent the spread of late blight in gardens and on farms this growing season and provide customers with the facts about this disease.

Tomatoes. Late blight is not seedborne (however, it is tuber-borne in potato), so tomato plants started from seed locally (in the Northeast) would be free of the disease. Growing your own transplants from seed or purchasing from a reputable local grower will ensure a healthy start to the season for your customers and local farms. Disease-resistant or tolerant varieties of tomatoes exist, however seed is in limited supply this year. 'Mountain Magic', 'Plum Regal', and 'Legend' are three varieties with resistance or tolerance to late blight. Note that the variety 'Legend' has been grown primarily in the western U.S., where conditions are different than here. In addition to late blight, each year tomatoes become infected with early blight and *Septoria* leaf spot, which look very similar. If possible, also provide your customers with tomato plant varieties that are resistant or tolerant of early blight; these include 'Mountain Fresh', 'Mountain Supreme', and 'Plum Dandy' and others.

If you purchase plants to sell, inspect all transplants for stem, petiole cankers or leaf blight as long as plants are on the shelf. Teach your staff what to look for, using the web-links below.

Potatoes. Purchase certified, disease-free potato seed from a reputable source, and ask your supplier about their source of seed and if it was inspected in the field for late blight. Potato seed from the northeast are less likely to carry the disease.

Know the FACTS for staff and customers

Train employees about this important disease and provide information to your home gardening customers.

Potatoes that freeze or fully decompose will not carry the pathogen over winter. Tomatoes will not carry late blight over the winter, because freezing kills the whole plant. Tomato seed, even from fruit that was infected with late blight, will not carry the pathogen, so no need to worry about the tomatoes left behind in the garden or compost pile. Certain perennial weeds can become infected with late blight, but none of their above-ground tissues live through the winter. Late blight will not survive on tomato stakes and cages.

The biggest threat for overwintered disease is on potatoes. In the spring, advise home gardeners to inspect last year's potato plot and any compost or cull piles for volunteer potato plants that might come up. If potato plants are found, pull

them out and put them in the trash or destroy them. If tubers were infected and survive, then the late blight could grow upward from the tuber, infecting the stem and producing spores when weather conditions are favorable. These spores could then disperse to other tomato and potato plants.

During the growing season, pay attention to pest alerts to learn about whether late blight has been observed in New England, and what actions you need to advise to customers. If you or a customer suspect a problem, or wish to confirm a diagnosis, contact the UMass Plant Diagnostic Laboratory.

Photo galleries and other web resources

http://www.hort.cornell.edu/department/Facilities/lihrec/vegpath/photos/lateblight_tomato.htm

http://blogs.cornell.edu/hort/2009/06/26/late-blight-a-serious-disease-killing-tomatoes-and-potatoes-this-year/

Instructions for the UMass Soil & Plant Tissue Testing Laboratory

Tina Smith, Greenhouse Crops and Floriculture Program

A soil test can aid in the diagnosis of plant problems and in quality plant production. To have your growing medium analyzed, take several samples of soil at root depth from several containers, or from several areas of a bed (cut flowers) and mix it together in a clean container. Take about one cup of soil mixture dried at room temperature. Put the dry soil in a sandwich size zip-type bag and close it tightly. Identify each sample on the outside of the bag for your use. Complete and attach the "Greenhouse Media Submittal Form" available from: www.umass.edu/umext/floriculture/pdf/Greenhouse_Media_Submittal_Form.pdf

Soilless Media Test $12.00
Provides pH of Water Saturated Media, Electrical Conductivity and Nutrient Content (NO_3-N, NH_4-N, P, K, Ca, Mg, Fe, Mn, Zn, Cu, B, S) of the SME. Recommendations are written on the report by Dr. Doug Cox and mailed to you.

Media pH and Soluble Salts $ 6.00
Provides pH of Water Saturated Media and Electrical Conductivity (Soluble Salts) of the Saturated Media Extract (SME).

Standard Soil Test for (Outdoor) Field Grown Crops
$9.00 pH, available plant nutrients and several micronutrients. **$13.00** standard test and organic matter.

Send soil samples, with a check payable to University of Massachusetts to Soil Testing Lab, West Experiment Station, North Pleasant St, UMass, Amherst, MA 01003.

For more information on soil testing services www.umass.edu/umext/floriculture/grower services/soil_testing.html

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