Vegetable Crops Hotline

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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IN THIS ISSUE

Downy Mildew of Basil - *(Dan Egel and Liz Maynard. Meg Mcgrath of Cornell University contributed to this article.)* - This disease has been observed in northern Indiana. The fungus that causes downy mildew of basil does not overwinter in Indiana, but must blow in from the south. The fungus that causes downy mildew of basil is not the same fungus that causes downy mildew of cucurbits.

The symptoms of downy mildew of basil may not be immediately obvious. Leaves may turn a yellow color that is restricted by veins (See Figure 1). Brown areas may develop in severe infections. Close examination of the underside of the leaf under moist conditions may reveal a gray 'fuzz' which is the spores of the causal fungus. Such leaves may not be marketable.

Since the fungus that causes downy mildew of basil does not overwinter in Indiana, fall tillage and crop rotation, although a good idea, won't help manage this disease. Pruning plants so that leaves dry out sooner may help reduce the amount of infection (many growers may want to prune pants to avoid flowering anyway).

Variety evaluations are being conducted to determine if there are inherent differences among varieties and species of basil. Sweet basil varieties 'Aroma 2', 'Genovese', 'Genoveser Martina', 'Italian Large Leaf', 'Magical Micheal', 'Mariden', 'Nufar', 'Opal Purple Variegated', 'Poppy Joe's', 'Queentette', and 'Superbo' had the most symptoms. Fewer were found on 'Amethyst Imp', 'Mrs. Burn's Lemon', 'Red Leaf', 'Red Rubin', and 'Sweet Aden'. Similar low severity of downy mildew was observed in several varieties of the other basil species examined: 'Lemon', 'Lemon Mrs. Burns', 'Lemon standard', 'Lemona', and 'Lime'. No symptoms were found on leaves of 'Spice', 'Blue Spice', and 'Blue Spice Fil'. In an evaluation conducted on Long Island in 2009, 'Cinnamon', 'Queenette', and 'Red Rubin' were less severely affected than 'Superbo'.

Applying fungicides frequently and starting before first symptoms are visible are considered necessary to control downy mildew effectively. Few fungicides are currently labeled for this new disease. Actinovate AG®, Trilogy®, and OxiDate® are fungicides listed by the Organic Materials Review Institute (OMRI) and are labeled for use on herbs and for suppressing foliar diseases including downy mildew. OxiDate® is labeled for use outdoors and in greenhouses. The Actinovate® and Trilogy® labels do not have a statement prohibiting use in greenhouses. OxiDate® has limited residual activity and thus if used should be combined with or followed by another product. There are three phosphorous acid fungicides that have downy mildew under herbs on the current label: ProPhyt®, Fosphite® and K-Phite®. This chemistry was documented to be effective in fungicide evaluation experiments. Greenhouse use is not prohibited. Quadris® is labeled for use on basil but not specifically for downy mildew; it also has been shown to be effective for this downy mildew. Greenhouse use is not permitted with Quadris®.

Figure 1: Symptoms of downy mildew on basil are indicated in yellow on the upper leaf surface; the fungus that causes downy mildew is indicated by yellow arrows on the underside of the leaf *(Photo Liz Maynard).*

Salmonella Outbreak - *(Dan Egel and Liz Maynard)* - On August 17, several public health organizations including the Kentucky Health Department **http://healthalerts.ky.gov/Pages/AlertItem.aspx?alertID=41138** and the Indiana State Department of Health **http://www.in.gov/activecalendar/EventList.aspx?view=EventDetails&eventidn=58368&information_id=117794&type=&syndicate=syndicate** reported that *Salmonella* Typhimurium has been found on cantaloupe that had been linked to a farm in southwestern Indiana. As of this writing 178 persons in 21 states had been infected, 62 had been hospitalized and 2 were reported dead as a result of this outbreak. On August 22, FDA formally announced a recall of cantaloupes from a particular farm. Federal and state agencies are still investigating to determine if there are additional sources. Growers can stay informed about the investigation by visiting the web sites at Food and Drug Administration **http://www.fda.gov/Food/FoodSafety/CORENetwork/ucm315879.htm** and the Centers for Disease Control **http://www.cdc.gov/salmonella/typhimurium-cantaloupe-08-12/index.html**. Also, Purdue has developed a short Q&A sheet about this outbreak, available at **https://ag.purdue.edu/hla/fruitveg/Documents/outbreak2012/SalmonellaQA.pdf**. It will be updated as needed. Let us know of questions you would like to see answered in the next update.

Initially, the outbreak was linked to cantaloupe from southwestern Indiana; CDC had stated that retailers and food service should not serve cantaloupe from southwestern Indiana. FDA had advised consumers not to eat cantaloupe from southwestern Indiana. These cautions and advisories have been now been lifted with the announcement of a specific farm involved in a recall. For those unfamiliar with outbreaks on produce, these general warnings may have raised the concern that there is something in the air or soil across the entire region that is the cause of the outbreak. Certainly there is no reason to believe that is the case.

Usually outbreaks such as this are traced to a single source, however this isn't always possible. In contrast to other outbreaks or recalls where a specific source was rapidly confirmed, naming an entire growing region has created serious problems for many producers with no definite link to the outbreak. Growers across the state - not only those in southwestern Indiana, but also from areas around Indiana far from the southwest portion of the state - have reported problems selling cantaloupe to wholesale buyers. How this will change with the specific recall we do not know. Growers selling direct to consumers or local outlets have the opportunity to explain in person where the cantaloupes are from and how they are handled; this combined with good customer relations will undoubtedly enable many direct marketers to continue selling cantaloupe.

Salmonella and Foodborne Illness - Salmonella is a group of bacteria and is one of the most common causes of foodborne illness. There are more than 2,500 kinds (or serotypes) of Salmonella. The serotype behind this outbreak is *Salmonella* Typhimurium.

While it isn't yet clear how the Salmonella got on the affected cantalopes, there are some basic things we do know about how these bacteria can get on produce. Salmonella is common in the environment. The bacteria can live in the digestive tracts of vertebrates, including humans, wild animals, livestock, and pets. Salmonella is commonly found in feces of wild and domestic birds, and is often associated with reptiles and amphibians. Salmonella can also be found in water sources such as streams, rivers, and ponds. A cantaloupe could become contaminated in the field if it came in contact with animal feces (e.g., manure), or it could be contaminated before or after harvest through contact with a person, equipment, or water that was contaminated with Salmonella. Testing one's fields for Salmonella is not practical as a preventive measure. However, good agricultural and sanitation practices such as following strict precautions with manure, hand washing, and using clean water for irrigation and for washing produce can minimize the possibility of contamination.

Learn About Good Agricultural Practices - Purdue Extension offers workshops on food safety for growers. The workshops help growers to develop and implement food safety plans for their operations. After a food safety plan is implemented, a grower may prepare for a third party audit. These audits are designed to provide assurance to buyers that the grower has a plan to minimize the contamination of produce with any food borne pathogen and is following it. Watch this newsletter for more information about these workshops.

Additional information about Good Agricultural Practices for growing and handling cantaloupe can be found at:

- FDA Guide to Minimize Microbial Food Safety Hazards of Melons; Draft Guidance **http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/ProduceandPlanProducts/ucm174171.htm**.
- National Cantaloupe Guidance web site **http://www.cantaloupe-guidance.org/docs**:
- Key Points of Control and Management of Microbial Food Safety: Information for Producers, Handlers and Processors of Melons, Univ. of Calif. **http://anrcatalog.ucdavis.edu/pdf/8103.pdf**

The outbreak described above is likely to have a major effect on cantaloupe and perhaps other vegetable producers in Indiana, regardless of their location or connection with the outbreak. These events have placed a sad ending on a season that was already difficult due to drought and heat. If you have questions, concerns or informational needs please let a Purdue specialist or county educator know.

Bacterial Spot of Pumpkin - *(Dan Egel)* - The dry conditions that existed across much of Indiana this summer seems to have delayed the onset of this disease. However, more recent rains and dews have apparently increased the observation of bacterial spot of pumpkin. Bacterial spot of pumpkins is one of the most important diseases of pumpkins in Indiana. This disease was discussed in detail in the *Vegetable Crops Hotline* issue number 533 **http://www.btny.purdue.edu/pubs/vegcrop/VCH2011/VCH533.pdf**.

Many growers will first observe bacterial spot of pumpkin when the blister like lesions show up on mature or nearly mature pumpkins. However, growers may notice the light brown lesions on older leaves of pumpkin plants (See Figure 2). Although these lesions do not cause economic damage, the lesions may serve as sources of bacteria for possible fruit infection. Plus the lesions should alert growers that the disease is in the field and corrective measures should be taken. If growers are not familiar with the lesions of bacterial spot of pumpkins, a sample should be sent to the Plant and Pest Diagnostic Laboratory at Purdue University **http://www.ppdl.purdue.edu/PPDL/** or call Dan Egel. Bacterial spot of tomato is caused by a related but different organism.

Corrective measures include applications of products with copper as an active ingredient as Copper hydroxide, copper sulfate or some other source of copper. Some mancozeb products are labeled for use on pumpkin. Mancozeb products may help in the control of bacterial spot of pumpkin when applied with a copper product (see issue number 538 for more details **http://www.btny.purdue.edu/pubs/vegcrop/VCH2011/VCH538.pdf**).

Actigard® is now labeled for bacterial spot of pumpkins. While some researchers report that Actigard® may reduce the severity of bacterial spot of pumpkin, other researchers disagree. More research on this product needs to be conducted. Growers should avoid applying Actigard® to pumpkin plants that have been stressed by extremes of temperatures/moisture or other factors.

Crop rotation continues to be an important management option. It has been reported in scientific literature that is it possible for the bacterial spot pathogen to be transmitted on seed.

Figure 2: Pumpkin leaves with irregular necrotic lesions of bacterial spot may produce inoculum that splashes on pumpkin fruit leading to lesions such as shown here. *(Photo by Dan Egel)*

Will that Little Pumpkin be Ready for Halloween? - (*Liz Maynard, adapted from article in Vegetable Crops Hotline issue 529, Sept. 2010.*) - This time of year pumpkin growers are checking fields to see what the harvest will be like. For some fields, fruit set in August will provide the main yield, due to late crop establishment and/or unfavorable conditions for flowering and fruit set. Under good conditions, pumpkins may begin to turn orange 3 to 4 weeks after fruit is set, by 4 to 5 weeks after fruit set they may appear mostly orange, and by 6 to 7 weeks all traces of green can be gone. September and October do not always bring good weather for pumpkins, so fruit set in August does not always make it to market.

We collected data on fruit set in 2003 in a planting date trial at the Pinney Purdue Ag Center in Wanatah. Varieties were Magic Lantern and Gold Medal. We tagged a number of open or past-bloom flowers/young fruit every 1 to 2 weeks. At harvest the color of all tagged fruit that was at least beginning to turn was noted. For pumpkins planted June 16 or June 25, out of 88 flowers that opened between Aug. 10 and Aug. 21, at least 70% produced pumpkins that were either turning or fully orange by Oct. 2 and 10, respectively. The remaining 20 to 30% either never set a fruit, or the fruit was still immature at the time of harvest. Of 14 flowers that bloomed between Aug. 22 and Sept. 3, 43% produced turning fruit by October 10, and none produced fully orange fruit by that date. September 2003 had an average temperature of 61°F, and 2.75 in. of rain, slightly cooler and dryer than the 30-year normal (1981-2010) of 65°F and 3.61 in. of rain at that location.

If we have a warm and dry fall and pumpkin vines are kept healthy, pumpkins set in the middle of August should be ready for market by mid October.

Cover Crops for Fall and Winter - (*Liz Maynard*) - Benefits of cover crops are many, including protecting soil from erosion, adding fresh organic matter to build the soil, and taking up nitrogen to reduce leaching during winter and early spring. After the drought this year, leftover soil nitrogen may be unusually high, especially in un-irrigated fields, making cover crops that scavenge nitrogen particularly useful. The drought is also a good reminder that anything we can do to improve the ability of soil to absorb and hold plant-available water will reduce troubles in dry years. Cover crops can do this. The article 'Fall Planted Cover Crops' in issue 444 of this newsletter **http://www.btny.purdue.edu/pubs/vegcrop/VCH2011/VCH544.pdf**, provides information about a variety of cover crops that can be planted at this time. Additional resources are available from the Midwest Cover Crops Council **http://www.mccc.msu.edu/**.

Do Your Customers Know How to Clean Produce? - (*Liz Maynard*) - Food safety begins on the farm and continues all the way to the kitchen and table of the final consumer. Many people don't know whether or how to wash fresh produce. Growers who direct market can help customers stay healthy by providing information about how to wash and store produce once it is in the home.

The Food and Drug Administration recommends the following to consumers:

- **Store Properly:** Store perishable fruits and vegetables in a clean refrigerator at 40°F or below. Ask the vendor if you're not sure whether refrigeration is needed.
- **Separate for Safety:** Keep fruits and vegetables that will be eaten raw separate from raw meat, poultry, or seafood – and from utensils used for those products. Avoid cross contamination by washing cutting boards, dishes, utensils, and counter tops with soap and hot water between preparation of raw meat, poultry, or seafood, and fruits and vegetables that will not be cooked. If you use plastic or other non-porous cutting boards, run them through the dishwasher after use.
- **Prepare Safely:** Begin with clean hands. Wash your hands for at least 20 seconds with soap and warm water before and after preparation. Cut away damaged or bruised areas on fresh fruits and vegetables. Discard produce that looks rotten. Wash produce thoroughly under running water before eating, cutting, or cooking. Washing with soap or detergent or using commercial produce washes is not recommended. Even if produce has a rind, like a melon, or will be peeled before eating, it is still important to wash it first so dirt and bacteria aren't transferred from the knife onto the edible part of the fruit or vegetable. Scrub firm produce such as cucumbers and melons with a clean produce brush. Dry produce with a clean cloth or paper towel to further reduce bacteria that may be present.

For a pdf of these and additional recommendations about produce, visit **http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm114299.htm**.

USDA Disaster Declaration Now Includes all 92 Counties in Indiana - *(Liz Maynard)* - On August 15 the USDA Farm Service Agency Indiana state office reported that all 92 counties in Indiana have been declared either primary or contiguous natural disaster areas due to drought. This means that farmers in all counties may apply for low interest emergency loans from FSA. Farmers have eight months from the date their county was declared a natural disaster area to apply for the emergency loans. Contact your local FSA office for more information. **http://www.fsa.usda.gov/FSA/printapp?fileName=stnr_in_20120815_rel_29.html&newsType=stnewsrel**

Farm Family Incentive Grants for Safety - (*National Institute for Farm Safety, via Dee Jepsen*) - Expense is often given by farmers as a reason for not implementing safety initiatives. Successful Farming and Farm Safety 4 Just Kids have teamed up to help eliminate this excuse. For seventeen years the program has awarded small grants to farmers to seek out new ways of making positive changes on their farm. Ten grants of up to $250 will be awarded again this year and are open to all farmers. Read about past grant recipients at **http://www.agriculture.com/family/farm-safety/families-step-up-safety-efft_328-ar23954**.

The application process is simple and the deadline is September 3rd. To apply, write one page explaining your farm safety improvement project, how it impacts the lives of those in your family, and an estimated budget. Send it to: Farm Safety 4 Just Kids, 11304 Aurora Ave., Urbandale, IA 50322, OR **fs4jk@fs4jk.org**.

Upcoming Events

Funding Opportunities for Indiana Agriculture: A webinar series for farmers and others to learn of current funding opportunities to support farm enterprise development and sustainable research and education. The series is free and open to the public. See the schedule of topics below. A full agenda for the series can be found at **http://www3.ag.purdue.edu/counties/hancock/**. The series will be recorded. Register by contacting Roy Ballard at 317-462-1113 or **rballard@purdue.edu**. Participants can access sessions at **https://gomeet.itap.purdue.edu/fff2012/** and are advised to test the link several days in advance.

Session 1*
Tues., August 21, 2012, 10 a.m.-Noon EDT
Welcome and Introduction
Funding Opportunities from USDA Farm Service Agency: Beginner farmer, youth, guarantee and direct loan programs, plus more
NRCS Initiatives and Partner Opportunities
NRCS Farm Bill Programs and opportunities for specialty crop, organic, etc.
Tips for Grant Writing Success

Session 2*
Tues., September 4, 2012, 10 a.m.-Noon EDT
Funding Possibilities from USDA Rural Development: Value Added Producer Grant (VAPG), Rural Energy for America Program (REAP), Small Socially-Disadvantaged Producer Grant (SSDPG)

Funds for Farmers from The Indiana State Department of Agriculture: Farmers' Market Promotion Grant, Specialty Crop Block Grant, Organic Certification Cost Share
The 2013 Sustainable Agriculture Research and Education Farmer Rancher and Youth Educator Grant Programs

Session 3*
Tues., September 11, 2012, 10 a.m.-Noon EDT
The 2013 North Central Region SARE (NCR-SARE) Research and Education Grant
Tips for Grant Writing Success

*Sessions 1 and 2 are primarily designed for farmers who wish to start, improve or expand a farm or farm enterprise. Session 3 is primarily for those researchers or educators (and possibly others) who wish to learn about the 2013 SARE Research and Education Grant and how it applies to sustainable agriculture.

Ohio State Pumpkin Field Day, Western Agricultural Research Station, 7721 South Charleston Pike, South Charleston, OH. Wed., September 5, 2012, 5:30 to 8:00 p.m. EDT. Registration fee of $5 includes refreshments. Tour includes:

- Powdery mildew trial: compare conventional, experimental and newly labeled fungicide
- Bacterial leaf spot trial: 6 hybrids treated with Actigard®
- Spray technology trial: air-assist sprayer demonstration and comparison of flat-fan nozzles, twinjet nozzles, hollow-cone nozzles, and air-assisted flat-fan nozzles
- Variety evaluation: 15 experimental and newly released pumpkin varieties

For more details, contact Jim Jasinski at **jasinski.4@osu.edu**, 937-484-1526 or 937-462-8016. **http://www.agriculture.purdue.edu/aganswers/story.asp?storyID=6840**

Illinois Pumpkin Day, Vegetable Crops Research Farm, First St. between Windsor Rd. and Curtis Rd., Champaign, IL. Thursday, September 6, 2012, 10:00 a.m. to 2:00 p.m. CDT, lunch included with free registration. Presentations at research plots include: varieties, production systems, herbicides and weed control, mustard cover crop for bio-fumigation, insect pests, diseases, spray equipment, post-harvest issues, and marketing. To register, send names, address, phone, fax, email, and occupation to **babadoos@illinois.edu**, or fax to Sandy Osterbur 217-333-5299, or mail to Sandy Osterbur, N-305 Turner Hall, Department of Crop Sciences, 1102 S. Goodwin Ave., Urbana, IL 61801. For more information contact M. Babadoost by phone at 217-333-1523 or email at **babadoos@illinois.edu**. **http://news.aces.illinois.edu/news/illinois-pumpkin-field-day-2012**.

Webinar: USDA's Good Agricultural Practices & Good Handling Practices (GAP&GHP) Program & the Produce GAPs Harmonized Standard. Thurs, September 20, 2012 2:00 to 3:00 pm. This webinar will introduce you to USDA's GAP&GHP audit program. The session will include a practical discussion of the various elements of an audit, including: verification of water testing, field sanitation practices, and traceability and recall procedures. We also will discuss the Produce GAPs Harmonized Food Safety audit. The webinar will conclude with a live, interactive questions and answer session. Registration is required, and space is limited. Find a link to registration at **http://bit.ly/MZsbbb.** For more information, contact **Christopher.Purdy@ams.usda.gov**, 202-720-3209.

Webinar: Top FAQs about Produce Wash Water Management for Small-Scale and Direct Market Farms. Friday, September 21,2012 1:00 p.m. to 2:15 p.m. EDT. Sponsored by the Produce Marketing Association. Recent recalls and outbreaks involving fresh produce, and evolving risk management expectations at all farming and marketing scales, are driving attention to water quality management during pre-shipment washing and cooling. This webinar will focus on the most common Frequently Asked Questions from small-scale and direct marketing farm operations seeking to install or improve their wash system. Participants will hear "plain-language" science-based responses to these FAQs, as well as peer-to-peer experiences of growers working through the challenges of designing and managing a wash system that fits their resources and meets their food safety goals. Following brief informational presentations a question and answer session will provide the opportunity to further explore system management and monitoring options and focus on key needs in this important aspect of an overall farm safety plan. Speaker: Trevor V. Suslow, Ph.D., University of California, Davis; Moderator: Robert Whitaker, Produce Marketing Association.
Register at **http://bit.ly/OdEkf1.**