

VEGETABLE CROPS HOTLINE

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

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<<http://www.btny.purdue.edu/pubs/vegcrop>>

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MELCAST 2013 - (Dan Egel) - Readers of the last issue (No. 562) of the *Vegetable Crops Hotline* learned how weather can affect foliar disease. If weather can affect the amount of foliar disease, weather can also affect the frequency of fungicides that are needed for disease management.

Applying fungicides according to a weather-based system is easy for cantaloupe and watermelon growers. MELCAST was developed at Purdue University by Rick Latin to allow growers to apply foliar fungicides to control *Alternaria* leaf blight, anthracnose and gummy stem blight. When MELCAST is followed, fungicides are applied when they are most needed depending on leaf moisture and temperature. Details are listed below or in the extension bulletin, *Foliar Disease Control Using MELCAST*, BP-67-W. Download the bulletin at <http://www.extension.purdue.edu/extmedia/BP/BP-67-W.pdf> or contact Dan Egel for a copy.

The MELCAST program uses weather information from one of the 12 sites located around Indiana: Daviess County, Decker, Elkhart County, Gibson County, Jackson County, Oaktown, Richmond, Rockville, Sullivan, SW Purdue Ag Center, Vincennes, and Wanatah. MELCAST also serves growers in Kentucky, Missouri, Illinois and Arkansas. Cantaloupe and watermelon growers should farm within about 50 miles of a MELCAST site. If rain events, dew formation, and temperatures at one of the MELCAST sites are similar to your farm, MELCAST should be effective for you.

Cantaloupe and watermelon growers using MELCAST apply foliar fungicides every 14 days unless the weather thresholds described below indicate that an application should be made sooner. Read on to find more details.

1. Apply initial fungicide application at or before vines touch within a row.
2. Check the Environmental Favorability (EFI) value for the day of fungicide application.
3. Calculate the threshold for the next application by adding 20 (cantaloupe) or 35 (watermelon) to the EFI value in step 2. It is important for cantaloupe and watermelon growers to use the EFI values designed for their crop. To get a MELCAST calendar to keep track of EFI values, call Dan Egel. Alternatively, a MELCAST spreadsheet can be downloaded from <http://melcast.info>.
4. Apply the next fungicide application 14 days after the first, or sooner if the EFI threshold has been reached.
5. Check the EFI values on the day you make your next fungicide application and re-calculate the threshold for the next application.



Figure 1: Cantaloupe and watermelon growers can use MELCAST to schedule fungicide applications when the weather is favorable for *Alternaria* leaf blight, anthracnose and gummy stem blight. (Photo by Dan Egel)

A few things to remember: It is best to apply fungicides before the threshold has been reached then after. So, for example, if you are a watermelon grower, the EFI threshold has reached 33 and a rain is expected soon, then go ahead and apply a fungicide. Use the thresholds of 20 and 35 EFI values as guides. Use a lower threshold if you feel that disease pressure is high. Finally, note that fungicide applications for downy mildew and powdery mildew cannot be scheduled with MELCAST.

Keeping track of **MELCAST** values is similar to keeping track of oil changes in a car or truck. When one changes oil, the mileage is written down and the oil changed at the next threshold (3,000 miles or 35 EFI values). EFI values, like mileage of a truck, continue to increase.

Check EFI values by using the toll-free phone number (800) 939-1604 Monday through Friday; check the website 7 days a week <http://btny.agriculture.purdue.edu/melcast/> (or remember **melcast.info**); or sign up for the free **MELCAST Update** that comes once a week during the season. Please call Dan Egel with any questions.



BIOCHAR – SHOULD YOU USE IT? - (*Brett Lahner, Research Associate and Graduate Research Assistant, Dept. of Horticulture and Landscape Architecture, lahnerb@purdue.edu*) - Biochar is organic material that has been pyrolyzed - that is, heated in the absence of oxygen - and applied as a soil amendment. The organic material can be from many sources, but here in Indiana likely feedstocks for biochar are corn stover, sawdust, or swine manure. A properly prepared biochar has the potential to improve agricultural soils by raising the pH, increasing nutrient retention, improving soil tilth, and encouraging beneficial microbial activity.

The difficulty in deciding whether biochar can be helpful to a grower is that every biochar is different. Depending on the feedstock, the temperature at which it is made, and any treatments that are applied to it after pyrolysis, the biochar produced may be either helpful or harmful to the soil. Furthermore, once you have applied biochar to your soil it will stay resident there for a long time, perhaps hundreds of years. In such situations it is prudent to act cautiously.

The result of an application of biochar depends not only on the biochar, but also on the soil. A poor soil is more likely to be improved both short term and long term from amending with biochar. Most of the soils in Indiana have less potential for improvement than the sandy soils often found in the southeastern United States, or the arid soils found in the southwestern United States, both of which are low in organic matter.

Before deciding to amend a field with biochar, it is a good idea to first run a trial in the field. Set up the trial by identifying and marking at least four relatively small areas in the field with similar soil characteristics (the size will depend on the size of the farm operation, and may vary from a few hundred square feet to one acre). Then, flip a coin to determine which two of the areas will receive biochar. Apply biochar to those two areas. The other two areas will be untreated 'controls', and will not receive biochar. Except for biochar application, the four areas should be treated similarly (e.g. same tillage, same seeds and fertilization, same irrigation). Biochar in research trials has often been applied at a rate of 3 to 5 percent by volume. For an application six

inches deep on an acre of land, this is about 12 to 20 tons of a typical biochar. In order to benefit from a field trial, it is necessary to make frequent observations and keep good notes about differences between the biochar plots and the control plots. Any differences, including not only the obvious crop growth and productivity, but also things like weed emergence and changes in tilth should be noted. Biochar only needs to be applied once, but the fields should be observed for at least two years before drawing a conclusion, and the more years of observation, the better.

The cost of biochar varies widely, with prices ranging from free (besides the transportation cost) from a manufacturer for whom the biochar is a waste product, to over \$50 per cubic foot for a highly processed biochar. A lot of the push behind biochar is due to its potential for carbon sequestration. Selling carbon credits could make biochar usage profitable even with marginal agricultural benefits.

In conclusion, biochar has the potential to greatly help agriculture, but we are not yet in a position to recommend it in most situations. If you do want to try a biochar application, run a field trial first, take good notes, and share the information with the rest of us.



FDA TO INSPECT CANTALOUPE PACKINGHOUSES - (*Dan Egel and Liz Maynard*) - Cantaloupe growers should be ready for a possible inspection for food safety practices this summer. In a February 25, 2013 letter to the cantaloupe industry, The Food and Drug Administration (FDA) announced that in the growing season of 2013, "a subset of the cantaloupe houses in the U.S." would be subjected to "inspections with a sampling component." Growers are warned that "in the event of adverse findings" the FDA will "take action...to protect public health." In the past, after inspections have found human pathogens on produce or in a packinghouse, the FDA has issued warnings to consumers not to eat the affected produce, and firms have recalled the product.

The stated reasons behind the inspections are the recent outbreaks of foodborne illness across the U.S. including the outbreak in Indiana in 2012. Investigations by FDA at multiple facilities have revealed "insanitary production, handling conditions, and practices in packinghouses." In addition to inspecting domestic cantaloupe packinghouses, the FDA plans to "continue to target imported cantaloupe at the border" for inspection.

The FDA inspections would be in addition to any inspections conducted by the Indiana Department of Health (ISDH) or any food safety audits that growers may have arranged.

FDA has made specific recommendations related to packinghouses after investigations of recent outbreaks. These include:

- Ensure that surfaces in packinghouses can be adequately cleaned.

- Eliminate opportunities for introduction, growth, and spread of pathogens in the packinghouse.
- Ensure that water is of sufficient microbial quality for its intended use.
- If a dump tank is used, use dump tank water with sufficient water disinfectant to reduce potential risk of cross-contamination. Monitor level of disinfectant in the water.
- Implement regular cleaning and sanitizing procedures.
- Verify efficacy of cleaning and sanitizing procedures.
- Periodically evaluate the packinghouse operations to assure they do not contribute to contamination of produce.
- Minimize melon surface moisture to reduce potential plant and human pathogen growth.
- Cool and cold store melons as soon as possible after harvest, if melons are to be air-cooled.
- Develop a written food safety plan and standard operating procedures.
- Maintain records for significant activities, such as monitoring water sources and use; testing water quality; treating water, monitoring for signs of animal intrusion; cleaning and sanitation of equipment, containers, and vehicles; employee training; and corrective actions taken.
- Record information such as date and time, name of person who completed the record, location of activity, and activity being monitored.

In addition, the FDA recommends that growers consider the FDA guidance documents listed at the end of this article, and other guidance provided by industry or state and local governments. For example, The National Cantaloupe Guidance (<http://www.cantaloupe-guidance.org/>) and the Commodity-Specific Food Safety Guidelines for the Eastern Cantaloupe Growers Association (<http://www.ecga-usa.org/food-safety-matrix.html>) have both recently been published and include detailed recommendations for both field and packinghouse practices.

Another source of information for Indiana producers are the two Food Safety Farm Consultants recently hired by the Indiana State Department of Health to work with produce farmers. The consultants will be available to assist with food safety, and will conduct environmental assessments. Jennifer Coleman (JenColeman@isdh.IN.gov) is assigned to Northern Indiana and Jennifer Parker (JeParker1@isdh.IN.gov) is assigned to Southern Indiana.

Growers who have questions about food safety should contact Purdue produce safety team members Liz Maynard at (219) 531-4200 ext. 4206 or emaynard@purdue.edu or Scott Monroe at (812) 254-8668 or jsmonroe@purdue.edu.

For more information: FDA 2013. Letter to Cantaloupe Industry on Produce Safety. <http://www.fda.gov/AboutFDA/CentersOffices/OfficeofFoods/CFSAN/CF-SANFOIAElectronicReadingRoom/ucm341029.htm>

FDA 2013. Environmental Assessment: Factors Potentially Contributing to the Contamination of Fresh Whole Cantaloupe Implicated in a Multi-State Outbreak of Salmonellosis. <http://www.fda.gov/Food/FoodSafety/FoodborneIllness/ucm341476.htm>

FDA 2011. Letter to Firms that Grow, Harvest, Sort, Pack, Process, or Ship Fresh Cantaloupe. <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ProducePlantProducts/ucm278456.htm>

FDA 2009. Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards of Melons. <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/default.htm>

FDA 1998. Guide to Minimize Microbial Food Safety Hazards for Fruits and Vegetables. <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/default.htm>



PRODUCE SAFETY ALLIANCE AND FDA OFFER Q&A SESSIONS ON PROPOSED PRODUCE SAFETY RULE - (Liz Maynard) -

The proposed Produce Safety Rule is open for public comment until May 16. This rule will form the basis for federal regulations about food safety on produce farms. Whether or not you plan to comment on the proposed rule, these Q&A sessions provide an opportunity to better understand what is in the proposed rule. FDA staff Dr. Jim Gorny, Senior Advisor for Produce Safety, and Dr. Erick Snellman, Policy Analyst, will be available to answer questions.

Teleconferences are scheduled for 11:00 AM Eastern Time on March 25 (topic: Agricultural Water), April 22 (topic: Soil Amendments), and April 25 (topic: Domestic and Wild Animals). Future teleconferences are planned for Growing, Harvesting, Packing, & Holding Activities; Equipment, Tools, Buildings, & Sanitation; Health, Hygiene, and Training of Workers; and Recordkeeping, Compliance, & Enforcement, but dates have not been set. The recording of the first teleconference, on the topic of exemptions, is available from the Produce Safety Alliance at <http://producesafetyalliance.cornell.edu/>.

To participate in a teleconference, dial toll-free: 866-906-9888 and enter passcode: 8140591. Dial 5 minutes before the scheduled time, i.e. 10:55 AM for the 11:00 AM calls. Instructions about how to ask questions will be provided to everyone on the call.

To get the most out of the teleconference, review the appropriate section of the proposed rule beforehand. For a summary, see the Proposed Produce Safety Rule at a Glance:

<http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334554.htm> or the Proposed Produce Rule Subpart Fact Sheets: <http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm>.

Find the entire proposed rule under the 'view document' link at <http://www.regulations.gov/#!documentDetail;D=FDA-2011-N-0921-0001>.

PLANNING FOR SUCCESSFUL VEGETABLE TRANSPLANT

PRODUCTION - (*Liz Maynard*) - Many Indiana vegetable crops begin life as transplants. If lack of nutrients, lack of light, disease, or other problems slow growth during this stage it may reduce establishment success and/or growth and yield in the field or high tunnel. Manage the following factors for healthy transplants.

1. Time: Don't seed transplants too early. Overgrown transplants are difficult to manage. If they get so root bound and shaded by other plants in the same flat that growth stops it will take them longer to resume growth in the field. They may become weakened and more susceptible to disease in the transplant tray and field. The ideal time depends on the crop and cell size, as well as the growing temperature. For ease of transplanting the finished transplant should have a well-developed root system that holds the root ball together, a sturdy stem, and be of a size that minimizes injury during the transplant process. Typical growing times are: cucurbits: 2-4 weeks, lettuce 4 weeks, tomatoes, peppers, eggplants, and cole crops 5-7 weeks, and onions 10-12 weeks.

2. Cell size: Vegetables are commonly grown in trays with cell diameters of ½ inch to 2 inches, and sometimes in pots up to 4 inches. Larger cells or pots usually lead to greater early yield in fruiting crops like tomatoes, peppers, and muskmelons. Larger cells are also easier to manage because the greater soil volume holds more water and nutrients. The ideal cell size for a particular operation will depend on space available for transplant production, crop harvest schedule, and management available for transplant production.

3. Growing media: Growing media should be free of plant diseases, have pH in desired range, and have enough pore space to allow good drainage and aeration. A laboratory test of the media for pH, electrical conductivity, and major nutrients is useful to avoid any unexpected problems, whether media is purchased or made on the farm. Take care when flats are filled to avoid packing media into cells because that will reduce the pore space.

4. Temperature: Maintaining temperature in the growing medium at the optimum for germination means seeds will germinate and emerge quickly, reducing the chance that pathogens will kill the germinating plant. During production, air and growing medium temperature can be used to control speed of crop development, with faster development at higher temperatures up to the optimum for the crop. Avoid chilling temperatures (below 45-50°F) for warm-season crops. Be aware that cold irrigation water reduces the temperature of the growing media and may chill sensitive crops.

5. Light: Once seeds have emerged the brightness and duration of light directly influence how quickly the plants develop. With low light levels, seedlings will develop new leaves slowly, root development will be poor, stems will be thin, and plants will get tall and spindly, or 'stretch.' In a greenhouse natural light can

be maximized by eliminating shade from objects in and outside the greenhouse, painting surfaces white to reflect light, minimizing condensation on the glazing, and orienting the roof or sidewall of the house perpendicular to the sun's rays. In a growth room, artificial light sources that provide photosynthetically active light (wavelengths between 400 and 700 nanometers) may be used. A solid bank of cool white fluorescent lights provides an inexpensive light source for transplant production. Lights should be placed as close to the seedlings as possible without injuring them to maximize the light they receive.

6. Water: An annual laboratory test of irrigation water is recommended to document alkalinity, electrical conductivity, pH, and mineral content. A separate test for microbial quality is also needed for food safety purposes. Watering seedlings is a critical aspect of production. Watering too frequently reduces air available to plant roots and promotes a weak root system. Infrequent watering that leads to crop wilting will over-stress plants leading to long-term growth reduction. Also, when growing media gets too dry, fertilizer salts can become concentrated enough so that roots are injured and become more susceptible to diseases like pythium root rot. Transplant growth can be managed by judicious watering: keeping plants on the dry side will keep growth in check. Uneven distribution of water translates quickly into uneven growth of transplants. The person in charge of watering should understand the importance of the job, know how to determine when irrigation is needed, and use proper technique when hand watering to evenly supply water. If an automated system is used, check it for even distribution and plan for touch up watering in areas that dry out more quickly.

7. Mineral nutrition: The need for fertilization during transplant production depends largely on the nutrient content in the growing media and how long it takes to produce the transplant. In addition, judicious restriction of nutrients, particular nitrogen and phosphorus, can be used to manage transplant growth. A media soil test (item 3) will provide information about what nutrients are in the media. Most commercial soilless growing media designed for transplants contains a small amount of 'starter fertilizer' to supply nitrogen (N), phosphorus (P), and potassium (K). Seedlings grown for more than two or three weeks in this media will usually benefit from additional nutrients. Growing media that contains a significant amount of compost may have enough nutrients that no more fertilization is needed during production. A transplant production system should include a plan to supply mineral nutrients that takes into account nutrients supplied by the growing media and water. (A slightly modified version of this article was previously published in VCH 534.)





GOOD AGRICULTURAL PRACTICES EDUCATION

OPPORTUNITIES - (*Liz Maynard*) - For those who didn't make it to one of the GAPs A to Z program Purdue offered around the state and who are looking for a basic GAPs course, here are two opportunities to learn online.

The University of Illinois Extension is offering a series of four, two-hour webinars, on Mondays, April 8 to April 29, 2013, from 6:00 p.m. to 8:00 p.m. Central Time. Webinar topics will include water quality and testing, soil management, recordkeeping, traceback, and more. To attend the webinars you will need to have a computer with high-speed Internet access and a way to listen to the presentation via your computer (headsets are best, but speakers will work). The registration fee is \$10 per participant and covers all four webinars. Pre-registration along with pre-payment is required by April 1, 2013. Each registered participant will be sent webinar instructions, handouts, and a GAPs manual prior to the first webinar. Register at <https://webs.extension.uiuc.edu/registration/?RegistrationID=6085>. For more information contact University of Illinois Extension, Kankakee County at (815) 933-8337.

The National GAPs Program is offering *Implementing Good Agricultural Practices* beginning March 27 and ending April 16, 2013. This is a 3-week web-based course. Participants read course materials online on their own schedule, turn in four assignments, take two self-tests, and contribute to online discussion boards. An instructor is available for questions by email. Most students spend 15 to 20 hours on the course over the three-week time period. The cost of the course is \$190. For more information about this course, visit <http://www.ecornell.com/gaps>. While this course is suitable for someone with no knowledge of GAPs, it would also be useful for someone who has a basic understanding of GAPs but wants more in-depth knowledge, or to solidify understanding by doing assignments and discussing with others and the instructor.



USDA INITIATIVE PLANTS GARDENS AND KNOWLEDGE

- (*Natural Resources Conservation Service*) - When Abraham Lincoln founded the United State Department of Agriculture (USDA) in 1862, he referred to it as "The People's Department." It's a description that is as true today as it was then. USDA continues to honor President Lincoln's vision for a Department that serves the American people every day through The People's Garden Initiative.

The People's Garden Initiative was designed to provide a sampling of USDA's efforts as well as teach others how to nurture, maintain and protect a healthy landscape. The initiative challenges its employees to

establish gardens at USDA facilities worldwide or help communities create gardens. People's Gardens may vary in size and type, but all have a common purpose – to demonstrate sustainable conservation practices and educate and engage the public. With each garden we plant and every sustainable practice we implement, USDA demonstrates how easy it is to green our communities, take better care of our natural resources, and produce healthy fruits and vegetables.

People's Gardens are required to have three components in common. They must benefit the community, in some cases by creating recreational spaces and in others by providing a harvest for a local food bank or shelter. They must be collaborative - that is, the garden must be created and maintained by a partnership of local individuals, groups, or organizations. Third, they should incorporate sustainable practices. The gardens might use compost or mulch made by participants. They might contain native plants or encourage beneficial insects. They also might exemplify water conservation by capturing rain in a barrel to water the garden.

Consider creating gardens in vacant lots, schools, or churches and become part of the People's Garden movement. Reach out to USDA employees in your community for their help and expertise or ask them to lend a hand in planting, harvesting, and maintaining a People's Garden. The possibilities are limitless.



AG CENSUS 2012: IT'S NOT TOO LATE! - (*Liz Maynard*)

- It's not too late to send in your forms for the 2012 Census of Agriculture. I encourage all vegetable farmers to fill out the form and send it in. The Ag Census is one of the only sources of systematically collected information about what vegetables are grown in Indiana and on how many acres. The information is used in decision-making in many areas at the local, state, and national level. Examples include Extension and research efforts, location and staffing of farm service centers, availability of operational loans and other funding, farm programs and policies, and more. Farms of all sizes count for the Census: any place that produced and sold, or normally would have sold, \$1,000 or more of agricultural products during the Census year counts as a farm. Make sure your operation is counted by filling out and returning the form.

For more information, see the Ag Census web site at <http://www.agcensus.usda.gov/>. The information below is from the FAQ page at that site:

- If you received a Census form in the mail and lost it, need to request a replacement, need help completing your form, or need more information, call toll-free (888) 424-7828.
- If you did not receive a form you may request one by signing up before March 31, 2013 at <https://www.agcounts.usda.gov/cgi-bin/counts/>.

- Respondents are guaranteed by law (Title 7, U.S. Code, and CIPSEA, Public Law 107-347) that their individual information will be kept confidential. NASS uses the information only for statistical purposes and publishes data only in tabulated totals. The report cannot be used for purposes of taxation, investigation or regulation. The privacy of individual Census records is also protected from disclosure through Freedom of Information Act requests.



DON'T FORGET TO RENEW YOUR SUBSCRIPTION: If you are receiving a paper copy of the *Hotline*, this is the last issue you will receive unless you have paid the \$15 subscription fee. Online subscriptions are free. Also, if you join the Indiana Vegetable Growers Association (IVGA) you will automatically receive the *Hotline*. The IVGA membership form was in the last issue of the *Hotline* and is also available at <http://ivga.org>. Please call the Southwest Purdue Agriculture Program at (812) 886-0198 if you have any questions about your subscription.



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