

VEGETABLE CROPS HOTLINE

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

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<<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>>

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DOWNY MILDEW OF CUCURBITS - (Dan Egel) - *The following article was written as a Vegetable Crops Hotline - BULLETIN, June 15, 2006.* This disease has been confirmed in extreme southeast Michigan on slicing cucumbers. All cucurbits growers (the cucurbit family includes cucumbers, muskmelon, squash, pumpkin and zucchini) should be vigilant. For more details on this outbreak see this link <www.ipm.msu.edu/cat06veg/v06-14-06.htm#1>.

The disease was first observed on June 9, although the disease appears to have been present for some time. So far, the disease has not spread from 2 8-10 acre fields. Fields of muskmelon nearby do not show any symptoms of the disease.

The downy mildew forecast center <www.ces.ncsu.edu/depts/pp/cucurbit/> has issued a weakly moderate risk of disease in southeast Michigan and northwest Ohio. However, growers in Indiana should scout their fields of cucurbits, monitor the progress of the disease and be prepared to manage the disease.

Symptoms - Downy mildew is primarily a leaf disease. Often, the first symptoms one observes are yellow, angular or square looking spots on leaves. The underside of the leaves may be covered with a black fuzzy looking growth--this is the fungus that causes the disease. Leaves may eventually turn brown and crinkle. The leaves may turn upwards as they dry. Severe out-

breaks may result in the rapid death of vines.

Disease cycle - The fungus that causes downy mildew has not been reported to over winter in Indiana; it "blows" in from southern states. Thus, we do not usually observe downy mildew until August or September. The current situation is very unusual.

Downy mildew requires a period of leaf wetness and high humidity for successful infection. Heavy dews can provide adequate moisture to get this disease going. Although the fungal spores may land in your field, there has to be leaf wetness for the disease to cause problems. The optimum temperature for downy mildew is 59 to 68 °F. Generally warm and dry weather over the next few days should slow the progress of any disease that might arrive in Indiana.

There are 5 pathotypes of the downy mildew fungus, *Pseudoperonospora cubensis*. All 5 pathotypes affect cucumbers and muskmelon (cantaloupe). Pathotypes 4 and 5 affect watermelon and only pathotype 5 affects pumpkin. The pathotype(s) of the downy mildew fungus found in Michigan is not known.

Control - Consult the Midwest Vegetable Production Guide for Commercial Growers <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm> for control measures. Briefly, contact fungicides such as chlorothalonil (e.g., Bravo, Echo, Equus) or mancozeb (e.g., Dithane, Penncozeb) can be used against downy mildews. Strobilurin products such as Cabrio, Flint and Quadris may provide adequate control if applied before the disease appears. There have been reports of some downy mildew resistance to strobilurin products; it is recommended to tank mix these products with a contact fungicide if downy mildew threatens. Recent data indicates that Previcur Flex, Tanos and Curzate have been effective systemic fungicides against downy mildew. Please consult the label for important application and resistance management instruction. The weather-based disease-forecasting program MELCAST was not designed for down mildew. Therefore, if downy mildew threatens, apply fungicides on a regular 5 to 7-day schedule.

PASSING A THIRD PARTY FOOD SAFETY AUDIT - (Shari L. Plimpton) - Passing a third party food safety audit can be simplified to one basic concept: develop a food safety program and demonstrate that you are implementing that program. Remember as you approach a food safety

audit that the ultimate goal is to demonstrate your emphasis on growing food safely and willingness to learn new methods for improving the safety of your operation. It's easy to get caught up in trying to understand what the auditor is looking for and achieving a passing score, while losing sight of the real goal for these audits. If you keep your eye on the food safety ball, you will achieve your goal of passing.

Food Safety Programs have been developed to include all of the possible tools that growers could use to assure the safety of their produce. When a grower who is new to GAPs is confronted with all of these tools it is easy to see why they might throw their hands up and declare that what they are being asked to do is impossible. Common sense plays a large role in determining what elements of a food safety program apply in your situation.

Take advantage of the free consulting services we offer through the Ohio and Indiana Specialty Crop Food Safety Initiative (Initiative). Also, working with your third party auditing company, to understand their perspective and expectations prior to the audit will only make things go more smoothly. This is your food safety program, so think it through and focus on those parts that apply to your operation.

Fortunately, not all of the possible documentation is necessary in order to demonstrate that you are following Good Agricultural Practices, Good Handling Practices and Good Manufacturing Practices. For this reason I have compiled a list of issues / documentation that would be considered necessary (although not a guarantee) to passing a third party audit.

Food Safety Program - Any grower who has participated in the GAPs consults with our program has received support in developing a Food Safety Program. These programs are complete and exhaustive; however, they are not meant to imply that all of the documentation available in the program must be filled out to comply.

Water Quality - Have documentation available demonstrating the potability of your water. If you're using wells then have annual tests available for review that demonstrate Fecal Coliform and E. coli levels. Reservoirs / ponds / rivers should be tested quarterly. Water used for washing purposes should be treated to assure sanitation of the surface of the produce. Methods differ based on the type of produce and handling methods. Maintain a log for testing the treated water for sanitizer levels at least at the beginning of the day, in the middle and at the end.

Employee Training - Employee hygiene is extremely important. Training is essential. Maintain a training log signed or marked by the employees, on an annual basis. If you can't capture all workers in your pre-season training session, encourage trusted, trained workers to pass on their training to others. Also, put up the hand washing and related posters available through Mid American Ag and Hort Services in as many places as possible.

Pest Control - Rodents, insects and animals are still capable of infecting humans with disease. Effective pest control includes minimizing the opportunity for pests to enter packing and storage facilities, as well as, being set up to quickly trap and remove any rodents that do get into your buildings. Outside: keep the perimeter of the buildings free of debris which could harbor rodents and insects and set up rodent stations (preferably poison free) on either side of doorways and along the perimeter. Inside: also set up rodent stains on either side of doorways and along the perimeter (definitely poison free). Make a map of the location of all of the rodent stations and keep a log for weekly checks of the rodent stations.

Traceback/Recall - Having a printed lot code on each bag, or sale unit (i.e. bin) should be enough to get a passing score as long as you maintain a record (via the shipping log, invoice or similar documentation) that will identify to who you shipped that lot code of product.

Storage Temperatures - Maintaining cool storage temperatures is critical for reducing the potential of microbial growth on or in produce. If you aren't set up with automatic recorders that can provide you with a record of storage cooler performance, then it will be necessary to maintain a written log of cooler temperatures. Begin with a once a morning check and increase if you can.

Audit Yourself - For most buyers a passing score of 70% or greater is needed to qualify as an approved supplier. Good housekeeping and particularly maintaining clean equipment will go a long way toward achieving that passing score. Also remember that the goal is to achieve 70% or higher in each section, not just on an overall basis. In order to have a better feeling for how you would do in an audit. Download a copy of the USDA audit matrix <www.ams.usda.gov/fv/fpbgap-ghp.htm> and use it to audit your operation. That will give you an idea how you would do in a real audit and some direction regarding what you could improve to reach a passing score.

And for Indiana and Ohio fruit and vegetable producers who could use a little help with all of this, feel free to contact us at the Ohio and Indiana Specialty Crop Food Safety Initiative by calling Mid American Ag and Hort Services at (614) 246-8286 or emailing us at maahs@ofbf.org. We are funded by the United States Department of Agriculture's Risk Management Agency to provide free materials regarding GAPs, as well as free on-farm consultations through September 2006. Visit us at <www.midamservices.org> and select "Projects" from the list on the left side of the page.

SOYBEAN APHID SUCTION TRAP NETWORK FOR VEGETABLE AND FIELD CROP GROWERS - (Chris DiFonzo) - Why should vegetable growers care about this network? In previous years, large numbers of soybean aphids taking flight from soybean fields in late July and early August are thought to have spread viruses to a variety of vegetable crops (including vine crops, snap beans and peppers). Soybean aphids, like other aphid species, find

new fields by flying, landing and “tasting” plants with their mouthparts and then flying on if the plant is not to their liking. During this “tasting” behavior, plant viruses are both acquired and spread. The “tasting” (and consequent virus spread) occurs so quickly that insecticides have no impact on virus transmission. But, by being aware of the timing and size of the aphid flight in late July and August, growers can avoid planting virus susceptible varieties when aphid flight is high. The web site given in the article <www.ncipmc.org/traps/> shows up-to-date aphid trap catch numbers for the (soon to be) five locations in Michigan.

Northcentral Regional Aphid Suction Trap Network was turned on last week in at least eight states. As in 2005, Michigan has three trapping locations that cover a north-south transect: MSUs Saginaw Valley Bean and Beet Research Farm in Saginaw County; the MSU Entomology Farm in Ingham County; and the Kellogg Biological Station in Kalamazoo County. By the end of June, we will set up two new locations, one at the MSU Extension Office in Monroe County to cover southeast Michigan and another in western Michigan in Oceana County. Monroe County has a high population of buckthorn, the overwintering host for soybean aphid; it experienced heavy, early aphid infestation in 2005, and thus may benefit from trapping information. The location in Oceana County is specifically targeted to provide information to vegetable growers in Western Michigan, where soybean aphid is implicated in virus spread

The traps suck in migrating insects, including winged aphids, flying over 20 feet above the ground. The insects end up in a jar of antifreeze just above the fan in the base of the trap. Sample bottles are changed weekly, and mailed to the University of Illinois where aphids are removed, identified and counted. The soybean aphid counts are posted on a web site, <www.ncipmc.org/traps/>, where you can view individual traps from each of the eight states. There are currently 33 traps on the network, plus five to six more that will come on line in June

How can you use the suction trap data? In early to mid-July, increasing flight tells you that winged soybean aphids are being produced in early-infested fields and are now dispersing across the landscape. These infested fields could be local, in another part of the state or even in a neighboring state. This means that previously uninfested, low-infested fields or seed-treated fields may get an influx of landing aphids that leave babies behind. This is how fields in areas that lack buckthorn (for example, many locations in southwest Michigan) get infested in July.

Later in the season, in late July and early August, increases in flight often time with peak infestations in soybean fields. For example, last season (see the 2005 data at <www.ncipmc.org/traps/>, tremendous numbers of soybean aphid were trapped in early to mid-August, when aphid populations peaked in nearby fields. Such heavy aphid flights increase the risk of reinfestation in

previously-sprayed fields we certainly experienced that frustrating situation in 2005

In the last four years, heavy aphid flights in late July to early August coincided with virus infection in vegetable crops in Michigan. The suction traps can alert growers to a potential virus threat and may eventually help vegetable growers make decisions about late-plantings, for example, variety selection.

At the end of the season, the suction traps play their most important role, potentially predicting next year’s soybean population. Suction traps catch the winged males and females that leave soybean and go back to buckthorn, where soybean aphid overwinters.

In Illinois, the number of fall migrants caught in suction traps correctly predicted the next year’s aphid population (outbreak versus no outbreak) in four out of four seasons, including 2005. The 2005 season was the first year for the Regional network, across eight states. At the end of 2005, some areas (such as Michigan) had low fall trap catches; others (for example Minnesota) had high fall flights. June 2006 is a critical test for the predictability of the traps in theory, Michigan should have low colonization this spring, and Minnesota should have early, heavier colonization. Stayed tuned!

CORN EARWORMS - (*Rick Foster and Frankie Lam*) - First generation corn earworm moths (Figure 1) are being caught in blacklight and pheromone traps now. The numbers of moths collected are relatively low in central Indiana (less than 5 per night); however, the numbers collected by the pheromone trap at Southwest Purdue Agricultural Center were already above the economic threshold (more than 10 per night). Early sweet corn that has fresh green silks present is vulnerable to damage. Since your early sweet corn is the only corn that is currently silking, you can expect that a large percentage of moths in your area will be attracted to that sweet corn field. Thus, we would recommend treating at a lower threshold than the 10 moths per night that we normally use.



Figure 1. Corn Earworm moth. (*Photo by Frankie Lam*)

As most of you know from previous articles in the Hotline, we may be detecting some resistance in corn earworms to pyrethroid insecticides. Our concerns are

based on small plot trials and laboratory tests, not on a large number of failures in the field. We will continue to monitor the resistance situation, but for now we still recommend pyrethroid insecticides (Capture, Warrior, Mustang Max, Baythroid, etc.) for earworm control. These materials will also control European corn borers and, a little later in the season, will control corn rootworm adults that feed on silks and reduce pollination. For tomato and pepper growers, corn earworm (tomato fruitworm) is only important when fruit are present so unless you have very early crops, don't worry about this first generation.

PRIVATE APPLICATOR CHANGES - (*Fred Whitford*) - The Indiana General Assembly changed the definition of private applicator this past session. The bill is the House Enrolled Act 1065. It can be found at <www.IN.gov/legislative/ic_ia/>. Click on Bills and Resolutions. Put in 1065 in GO TO BILL. The bill becomes law on July 1, 2006.

There have been a few questions raised about the change in the definition of Private Applicator. The change in definition basically took out "other than trading of personnel services between producers of agricultural commodities".

The new definition now reads: Private applicator means a certified applicator who uses or supervises the use of pesticides for purposes of producing any agricultural commodity on property owned, rented, or managed by the employer or the applicator, if applied without compensation, on the property of another person.

There are very little changes with the definition. It means that a farmer can still spray a neighbor's field as long as he is not paid for it. If he accepts cash, then he is commercial. If he is doing the spraying to help a neighbor in need, then it is also allowed as long as no compensation is involved.

The term compensation in the definition is dependent on the specifics of the work being done. It is best to have the client call the State Chemist when they want to make sure that the arrangements they have with someone else falls under a private or commercial category.

Please let me know if you have questions. I will send out the questions and answers after consulting with the state chemist so that everyone can get on the same page when answering questions from growers. Phone (765) 494-1284, email fwhitford@purdue.edu, <www.btny.purdue.edu/PPP>.

BARLEY YELLOW DWARF OF SWEET CORN - (*Dan Egel*) - This disease has been observed in sweet corn in south-west Indiana.

The symptoms of barley yellow dwarf virus on sweet corn include a purple and yellow coloring on the margins of leaves (Figure 1). Infection may result in shorter ears and/or the tips of the ears may not be filled out. In severe infections, the plants may be stunted.

Barley yellow dwarf virus is transmitted by several species of aphids. Often the aphid will transmit the disease from small grains such as wheat or rye to sweet corn.



Figure 1. Typical symptoms of barley yellow dwarf virus of sweet corn include a purpling and or yellowing of the leaf margins. (Photo by Dan Egel)

Avoid planting sweet corn near fields of maturing small grains. Completely plow down any cover crop of small grains before planting sweet corn. It may be necessary to scout for aphids in early-planted sweet corn fields. If aphids are found, an appropriate insecticide application may slow the secondary spread of the virus in sweet corn.

More information and photos can be found at: <<http://vegetablemdonline.ppath.cornell.edu/NewsArticles/CornVirus/Sweet%20Corn%20Virus%202001.pdf>>.

WHEN PUMPKINS EMERGE BEFORE HERBICIDE CAN BE APPLIED - (*Liz Maynard*) - When rainy weather coincides with pumpkin planting some fields may get planted and then emerge before the preemergence herbicide can be applied. When this happens it will be necessary to modify the weed management plan. More cultivation and hand weeding are likely. A herbicide applied between rows after the final cultivation is an option and may be worthwhile if weed pressure is expected to be high. The preemergence active ingredients trifluralin and DCPA are labeled for this use. Sandea, which has both pre and postemergence activity on some broadleaves, can also be applied at a final cultivation. If applied over the top of pumpkins it should be applied when pumpkins have 4 to 5 true leaves but before bloom to minimize potential for injury. Note that it will not kill emerged lambsquarters. If grass weeds are not controlled by other means, one of the post emergence grass herbicides labeled for pumpkins can be used. Other postemergence herbicides available for pumpkins should be applied using a hooded sprayer between crop rows to avoid injury to the crop. These include Aim, which is active on many broadleaves, and the nonselective materials glyphosate, paraquat, and Scythe. Always follow herbicide label instructions.

VEGETABLE TRIALS AT PINNEY PURDUE AG CENTER - (Liz Maynard) - Sweet corn, pumpkin and tomato trials fill the vegetable research area at Pinney Purdue this year. Over 35 sweet corn and 20 pumpkin varieties will be evaluated for yield and quality. The tassels are just visible in the whorl on the earliest corn; the largest pumpkins are almost ready to topple over and vine. Tomato trials include a comparison of plastic and straw mulch culture under conventional and organic practices, and a preliminary trial of a transitional organic system with strips of mowed clover between tomato rows. The tomatoes have been blooming for about a week and are at the second or third 'string' on the stake and weave trellis system. A twilight meeting will be planned for the first half of September at the time of pumpkin harvest, but if individuals are interested in seeing plots before then, that can be arranged. Call (219) 785-5673 or email emaynard@purdue.edu.

ISDA PROMOTES INDIANA FARMERS' MARKETS - (Announcement) - Agriculture Director Andy Miller encourages Hoosiers to visit one of Indiana's Farmers' Markets to purchase locally-grown, farm-fresh foods. Farmer's Markets also allow non-rural residents the opportunity to interact with Indiana's farmers.

"Farmers' Markets not only produce high-quality, great-tasting produce, but they are good for our local economy, by encouraging growth in small business, promoting direct marketing and providing consumers access to locally grown foods," said Miller. "With Farmers' Markets in almost every county in our State, all Hoosiers have an opportunity to take home fresh and affordable produce that tastes great."

A Farmers' Market may sell anything from apples, asparagus, vine-ripened tomatoes, blueberries, strawberries, cantaloupe, watermelons and sweet corn to various varieties of flowers, soaps, honey and maple syrup. A Farmers' Market is considered any public market at which farmers and other vendors can sell produce to local consumers.

For a list of Farmers' Markets, visit ISDA's website at www.in.gov/isda/market/index.html. Farm markets or u-pick operations open to the public can be listed on ISDA's website by completing a form found at the link above.

NRCS OFFERS ENERGY-SAVING TOOLS FOR FARMERS - (Announcement) - Energy and efficiency are important to agricultural producers, just as they are to most business operators. The Natural Resources Conservation Service (NRCS) is offering several on-line tools and services to help producers calculate reductions in energy use, increase efficiency in their operations, and make their business transactions with USDA easier and faster.

"Energy is an issue in every part of a farm operation," says NRCS State Conservationist Jane Hardisty. "We have developed several energy calculators and put them on-line so producers can see where they might reduce energy costs with conservation practice decisions.

Our calculators consider the energy costs in the fuel to run machinery, dry grain and irrigate, and the energy savings available by considering fertilizer types, timing, and placement."

The energy cost calculators and energy-saving links are available on-line on the NRCS national web site at www.nrcs.usda.gov. Click on the "Save Energy, Save Money" link on the right side of the page to view energy estimators for Tillage, Nitrogen, Irrigation (coming soon), and Agricultural Propane.

In addition to the calculators, the "Save Energy, Save Money" site shows how conservation practices can add to energy efficiency and lower costs in the farm operation, and it has other links to help farmers with cost reductions.

Another on-line tool offers producers "eAuthentication accounts." With eAuthentication farmers have the convenience of transacting business with USDA on-line, anytime, from anywhere. Producers can access their own, specific Customer Statement, which puts a whole range of USDA services and programs into a single report at their fingertips. The Customer Statement allows USDA customers to view:

- their participation, application and payment status in various conservation and commodity programs,
- information on farm loans, and
- conservation plan and land unit information.

"Farmers can go on-line to monitor the payments that NRCS makes to them for installing conservation practices under their conservation program contracts," says Hardisty. "These on-line services are making it easier and faster for producers to do business with NRCS and the rest of USDA. That's our goal, to help them make their operations more efficient through conservation."

Visit the Save Energy, Save Money site above to get more details and reduce energy costs.

OUTREACH PROGRAM INFORMATION - Purdue University, Department of Food Science, (765) 494-8256. Registration and brochures for the following workshops are available at www.foodsci.purdue.edu/outreach/.

Wine and Grape Workshops, September 2006 - The Purdue Wine Grape Task Force is a cooperation between the Indiana Wine Grape Council and Purdue University to serve the State's existing and prospective vintners and growers and to help propel the local wine/ grape industry into world-class competitiveness. On the web at www.indianawines.org.

Year-round workshops across Indiana cover topics ranging from vineyard establishment, grape and wine quality assessment and analysis, to commercial winemaking techniques and recent issues in wine sales and marketing. For more information contact Christian Butzke at butzke@purdue.edu.

Development and Implementation of HACCP Programs, October 24-26, 2006 - This course provides instruction for developing Hazard Analysis Critical Control Point (HACCP) programs for meat/poultry/egg and fruit/vegetable industries. This workshop

includes an overview of foodborne hazards and prevention strategies, an understanding of HACCP principles, and an awareness of the regulatory requirements for HACCP programs. For more information contact Kiya Smith at kiya@purdue.edu.

An Introduction to Starting a Specialty Food Business in Indiana, October 30, 2006 - Developing and selling specialty foods and ingredients is one alternative for homemakers and farmers to add value to Indiana commodities. This workshop was developed to serve as a comprehensive overview of the issues association with starting a specialty food business. For more information contact De Bush at djbush@purdue.edu.

Introduction to Food Processing Plant Sanitation, November 8, 2006 - This course is recommended for meat, poultry, and egg processing plant personnel involved in sanitation under USDA-FSIS. In this course, participants will learn about sanitation requirements, selection of cleaners and sanitizers, how to train sanitation crews, and how to validate sanitation programs. For more information contact Kevin Keener at kkeener@purdue.edu.

Retail Food Safety: Retail Food Manager's Certification Courses - As of January 2005, Indiana requires at least one manager from each retail food establishment be certified in retail food safety and pass a nationally recognized exam. Our program focus is to prepare retail food managers for this requirement and teach sound food handling procedures. The 3 programs are offered in Indiana to address these needs. Each program has been developed as a nationally recognized curriculum and certification program for retail food handlers. Our website provides information about current programs offered.

The topics for the courses are:

- Essentials of Food Safety and Sanitation
- SuperSafeMark™
- ServSafe

For more information contact Kiya Smith at kiya@purdue.edu.

CLIMATE RIGHT TO LEARN ABOUT WEATHER - (*Announcement*) - The Indiana State Climate Office, located in Purdue's Agronomy Department, recently formed a partnership with the National Climatic Data Center and Midwest and other U.S. regional climate centers in an effort to consolidate climate data and to better understand the intricacies of weather. Indiana residents can access this improved source of weather-related information online at www.iclimate.org or by e-mailing questions to iclimate@purdue.edu.

Dev Niyogi, Indiana state climatologist and Purdue agronomy and earth and atmospheric sciences assistant professor, said that access to this new information will help both the state's public and private sectors. "It's an excellent source for students, teachers and businesses alike," he said. The information could be used for class projects or lessons plans, he said, or may help construction companies factor weather into building plans. He also said that farmers could use the information to get a better idea of possible rainfall totals, changes in frost days and to monitor drought conditions. The information also has other less obvious beneficiaries.

"This is really as much Purdue's success as it is ours," Niyogi said. "Improving our services is something Purdue wanted to achieve as a part of the university's Extension and outreach mission, and we are stepping it up."

It is the policy of the Purdue University Cooperative Extension Service, David C. Petritz, Director, that all persons shall have equal opportunity and access to the programs and facilities without regard to race, color, sex, religion, national origin, age, marital status, parental status, sexual orientation, or disability. Purdue University is an Affirmative Action employer. 1-888-EXT-INFO <<http://www.ces.purdue.edu/marketing>> Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.

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