

VEGETABLE CROPS HOTLINE

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

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vegcropshotline.org

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10 USEFUL RULES FOR FUNGICIDE APPLICATIONS -

(Dan Egel, egel@purdue.edu, 812-886-0198) - Since the season of applying fungicides to vegetable crops has arrived, below I have listed 10 rules that will help vegetable growers apply fungicides effectively and safely.

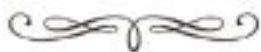
1. Apply fungicides prior to the development of disease. Although many fungicides have systemic ("kick back") action they will not completely eradicate diseases after they have started. And by the time a single disease lesion is observed in the field, many more lesions too small to observe are already working at your crop. Most systemic fungicides move less than an inch toward the tip of the plant or may just move from the upper to the lower side of the leaf.
2. Use shorter spray intervals during weather conducive to plant disease. Each plant disease has its own "personality" and thus prefers different weather. However, most plant diseases require leaf wetness. Therefore, during periods of rain and heavy dews, more frequent fungicide applications are a good idea. The normal range of spray applications is every 7 to 14 days. Muskmelon and watermelon growers have the guesswork taken out of this process with a Purdue University program known as MELCAST. Ask the author for more details by calling (812) 886-0198 or go to <http://melcast.ceris.purdue.edu/>.
3. Apply fungicides before a rain if possible. Water is necessary for most fungal spores to infect a leaf or stem and for the splash dispersal of many spores. Therefore apply fungicides before a rain if it appears that the fungicide will have a chance to dry before the rain. It is not necessary to apply fungicides again

after every rain. Most fungicides have a good sticker and will persist through rains pretty well. The MELCAST program takes into account the effect weather has on fungicides.

4. Know when to alternate fungicides. Systemic fungicides, those with a single mode of action, if applied again and again in sequence, may cause the disease fungi to mutate into a form resistant to the fungicide. Always alternate fungicide applications from one FRAC code (MOA code) number to another. Contact fungicides with a FRAC code of M like chlorothalonil and mancozeb are very unlikely to cause such mutations and therefore may be applied in sequence. Table 32 in the *Midwest Vegetable Production Guide* <http://mwveguide.org/> will help growers alternate fungicides.
5. Timing of fungicide applications is more important than nozzle type and spray pressure. Studies here in southern Indiana as well as by researchers in other areas of the country have found that nozzle type and spray pressure doesn't make as much difference as we once thought. See the article in this issue of the Hotline. In general, the more water one uses per acre, up to about 50 gallons, results in better coverage.
6. Some diseases cannot be managed by foliar sprays. Problems caused by soil borne fungi or nematodes cannot be controlled with foliar fungicides. Examples of these types of problems would be Fusarium wilt of watermelon or root-knot nematodes of tomatoes. Also, be certain that the problem you observe is really a disease. No amount of fungicide will improve a problem caused by soil fertility. Send a sample to the Purdue Plant and Pest Diagnostic Laboratory to find out the official diagnosis <http://www.ppd1.purdue.edu/ppdl/index.html>.
7. Use copper products for bacterial diseases. For the most part, copper products are more effective against bacterial diseases than they are against fungal diseases.
8. Some diseases require specialized fungicides. Diseases, such as downy mildew and Phytophthora blight may require specialized fungicides. It may be wasteful to apply specialized fungicides all season long for diseases that are not a threat. For example, downy mildew of cucurbits usually does not arrive

in Indiana until late in the season.

9. Double-check the label for details. Rates may vary widely based on label changes and different formulations. While you are checking the rate, also make sure that the crop and disease are on the label. (Can this fungicide be applied in the greenhouse?) Did you get the rate from the *Midwest Vegetable Production Guide for Commercial Growers*? <http://mwve-guide.org/> Check the label anyway.
10. Play it safe. Always adhere to the Pre-Harvest Intervals, Re-Entry Intervals and Worker Protection Standards listed in the label. No one wants an accident or lawsuit. Besides, the label is the law.



SPRAY PRESSURE AND NOZZLE TYPES - (*Dan Egel, egel@purdue.edu, 812-886-0198*) - This time of year, I receive many questions about what fungicides to apply. I get fewer questions about how to apply fungicides. Below, I will try to address how to apply fungicides.

Many years ago, I was told that to successfully use fungicides on vegetables, one must use high spray pressures and hollow cone nozzles. However, I had trouble finding any research on this topic, just rumors. So, I did my own research.

Dennis Nowaskie, Superintendent at the Southwest Purdue Agricultural Center (SWPAC) built a single row sprayer that could be used to vary nozzle types between flat fans and hollow cones and spray pressures from 30 to 150 PSI. We used the sprayer to conduct experiments on *Alternaria* leaf blight of muskmelon during three years of field tests. The fungicide we used to try to manage this disease was the contact product chlorothalonil (trade names include Agronil[®], Bravo[®], Echo[®] and Teranil[®]). Phillip Harmon, now a professor at the University of Florida, was my co-author on this paper.

Try as we might, we could not find any statistical differences in disease severity or yield between any of the nozzle type or spray pressure treatments. We also used water sensitive paper to measure coverage at each treatment. Regardless of the nozzle type or spray pressure there was no statistical difference in coverage.

Surprisingly little research has been done by other researchers on this subject (there just isn't much money to support such research). However, the little research that has been done has resulted in similar findings. University of Florida researchers lead by Tom Kucharek found that regardless of whether flat fan or hollow cone nozzles were used, no difference in disease severity was observed in the following diseases: early or late leaf spot of peanut, bacterial spot of pepper and blast or purple blotch of onions. Kucharek also found that spray pressures ranging from 50 to 250 psi made no differences in disease control in early or late leaf spot of peanut.

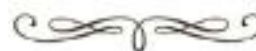
I was not able to obtain funding for the question of how much water per acre to use for fungicide applica-

tions. My observations are that one should use between 20 and 50 gallons per acre. My personal opinion is that the more the better, within this range.

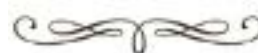
The timing of fungicide applications is usually more important than nozzles and pressures. Some of my thoughts on fungicide timing are given in the issue on fungicide application hints in this issue of the Hotline.



ROOT AND SEED MAGGOTS - (*Rick Foster, foster@purdue.edu, 765-494-9572*) - The cool, wet weather we have been having is perfect for the root and seed maggots in early planted vegetables. I have already received calls about onion maggots. If you are planting early vegetables, check out the article in the March 19 issue of the Hotline for 2015. So, how do we define early planted vegetables? With regard to root and seed maggots, anything that you plant before the soil temperatures reach about 70°F is subject to attack from the flies. Of course, not every field will suffer damage but the potential is there. The use of black plastic mulch will heat up the soil more quickly and may help to reduce root and seed maggot damage.



ORGANIC CONTROL OF STRIPED CUCUMBER BEETLES - (*Rick Foster, foster@purdue.edu, 765-494-9572*) - For most insect pests, we have some viable options to manage them organically. For years we have been looking for an organic solution for striped cucumber beetle and bacterial wilt on melons and cucumbers. It appears that we now have a viable option. There is a relatively new product, Cidetrak D[®], manufactured by Trece, which is sold as a gustatory stimulant. The active ingredient is buffalo gourd root powder, which contains a high percentage of cucurbitacin, which causes cucumber beetle to compulsively feed once they have tasted it. Years ago, there was a product available called SLAM[®], which contained buffalo root gourd and carbaryl, which we tested extensively and found to be quite effective. There were difficulties in applications, so the product never really took off with growers. More recently, my colleague in Kentucky, Dr. Ric Bessin, has tested Cidetrak D[®] in conjunction with Entrust[®], which contains the active ingredient spinosad. Entrust[®] is an OMRI approved product of Dow Agrosiences. Spinosad is not particularly toxic to striped cucumber beetles, and we have never had good control with Entrust[®] alone. However, when used in combination with Cidetrak D[®], the beetles will feed on enough spinosad to be fatal. Dr. Bessin reports good success in Kentucky and we will have several trials this summer to test it in Indiana.



FINDING A SPECIAL LOCAL NEEDS PESTICIDE LABEL

ONLINE - (Liz Maynard, emaynard@purdue.edu, 219-531-4200) - Some of the herbicides available for use on vegetables in Indiana are registered under a supplemental label or under a special local needs (SLN, 24(c)) registration. In these cases the instructions for use on vegetables are not on the main label that comes with the purchased product. For instance, in the *Midwest Vegetable Production Guide*, Dual Magnum® is listed as an option for watermelon, cantaloupe, and cucumber in Indiana and Ohio. The label on the herbicide container doesn't list those crops. Neither does the main label available from a common online label site,

<http://www.cdms.net>. This is because the product is registered for use on these crops under a special local needs (24(c)) registration.

Anyone using the product should have on hand a copy of the label that provides specific instructions for use on the crop in question, in addition to the main label. The 24(c) label in this example is available from the Indiana section of the National Pesticide Information Retrieval System (NPIRS) http://npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=IN. To find it from the main search page for Indiana, search for the product 'Dual Magnum', which produces 9 results. One of those results includes 'transplanted peppers' in the title. The linked label <http://npirspublic.ceris.purdue.edu/state/log/1902094400042950.PDF> includes not only transplanted peppers, but also the cucurbits above, and many greens, carrots, okra, and more.

NPIRS is a handy site for finding state-specific label information. If a product is labeled in Indiana, it should be listed on the Indiana portion of that site. Sometimes it is a little difficult to find the special or supplemental labels with instructions for vegetables. Just call or email if you can't find the label you need and we can help you track it down.



FOOD SAFETY AUDIT COST-SHARE AND CONSULTING PROGRAM

- (Scott Monroe, jmonroe@purdue.edu, 812-886-0198) - Purdue University and the Illiana Watermelon Association (IWA) are offering food safety audit cost-share programs to Indiana fruit and vegetable growers this year. Funds for the programs come from a grant from the Indiana State Department of Agriculture through the USDA Specialty Crops Block Grant program.

Through the Purdue program, Indiana fruit or vegetable growers who receive passing scores on their third party food safety audits are eligible for reimbursement of 40% of their audit cost, up to a maximum of \$400 per farm. Through the Illiana Watermelon Association program IWA members may receive reimbursement for 75% of an audit cost (up to \$1,500) if a preferred audit-provider is used, or 60% (up to \$1,200) if a non-preferred provider is used. Producers of any fruit or vegetable wishing to take advantage of the IWA program may join the IWA.

To apply for cost-sharing, complete and return the appropriate application by **July 1**. Applications for both cost-share programs are included in the hard copy of this newsletter, The Purdue application may be downloaded from <https://ag.purdue.edu/hla/foodsafety/documents/PurdueFoodSafetyCostshareConsultApp.pdf>, or filled out online at <http://tinyurl.com/audit-cost-share>. The IWA application is available at <http://www.illianawatermelon.org/Documents/2015/Audit%20reimb%20application.pdf>. Producers may receive reimbursement from only one of the programs. To receive reimbursement, documentation of audit results and cost must be submitted to Purdue or IWA after the audit is complete.

The program also provides the opportunity for growers to have a walk-through of their farm with a private food safety consultant contracted by Purdue. The private food safety consultant may also address specific farm and packinghouse food safety questions and issues. This opportunity is open to any grower, whether or not they participate in either audit cost-share program. To request a consultant visit, use the application for the Purdue cost-share program and return by **July 1**.

For more information, contact Scott Monroe at 812-886-0198 (office) or 765-427-9910 (cell).



Food Safety Audit Cost-share and Consulting Program

Purdue University is offering an audit cost-sharing program for Indiana fruit and vegetable growers who receive passing scores on their third party food safety audits. Funds for the program come from a grant from the Indiana State Department of Agriculture through the USDA Specialty Crops Block Grant Program. The grant also provides the opportunity for a farm walk-through with a private food safety consultant.

What is the program?

- Cost-sharing: The program will reimburse 40% of the cost of a third party food safety audit up to a maximum reimbursement of \$400 per farm.
- On-farm consulting: A private food safety consultant contracted by Purdue will visit your farm to do a pre-audit walk-through or address specific farm and packing house food safety questions.

What do you need to do?

- Complete the attached application and submit to arrive no later than July 1, 2015.
- We will contact you within two weeks of receipt to confirm your eligibility for cost-sharing and/or consultant visit.
- For audit cost-sharing: Make your own arrangements for a food safety audit. Go through the audit process. After the audit is complete, submit the following documents by Nov. 15, 2015, to receive cost-sharing funds:
 - A copy of the food safety certificate received from the audit provider.
 - Proof of payment for the audit, for instance a paid receipt or a copy of a cancelled check.
 - If payment is to an individual: Payee Certification form (attached).
 - If payment is to a business: an invoice **and** a W-9 form (attached).

Submit all materials to

Scott Monroe, Food Safety Educator
Purdue Extension
Southwest Purdue Ag Center
4369 N. Purdue Rd.
Vincennes, IN 47591

or

Submit application online at: tinyurl.com/audit-cost-share **and**
For cost-sharing, mail required documents to above address by Nov. 15, 2015, to receive reimbursement.

Questions? Contact Scott Monroe at 812-886-0198.

Application for Food Safety Audit Cost-share or Consulting

Date: _____

Name(s) _____

Farm/ Organization Name _____

US Mail Address _____

Location of Farm to be audited (if different from above) _____

Primary phone _____ Secondary phone _____

Email _____ Website _____

Preferred method of contact: _____

For audit cost-sharing, complete the following

What audit certifications do you plan for 2015?

In 2015, are you planning to obtain audit services that are new in any way—i.e., first time audit, different scope, different crop, different level, different provider?

To request on-farm consulting, complete the following

Acreage of fruits _____ Acreage of vegetables _____

Crop(s) for which consulting is requested: _____

Harvest period for these crops: _____

Please check the item that best describes the level of food safety education and activity at your operation:

Attended GAPs Training

Completed Self-Audit

Completed Farm Self-Assessment

Completed Third Party Audit

Drafted Food Safety Plan

Form must be complete and received no later than July 1, 2015. Return to: Scott Monroe, Food Safety Educator Purdue Extension, Southwest Purdue Ag Center, 4369 N. Purdue Rd., Vincennes, IN 47591

Illiana Watermelon Association
PO Box 618
Vincennes IN 47591

Food Safety Audit Cost-share Application

The Illiana Watermelon Association, as a sub-grantee under Purdue University, through an Indiana Specialty Crops Grant, is offering an Audit Cost-Sharing program for IWA members who receive passing scores on their third party audits. All members whose packing houses, crews, or ranches are located in Indiana are eligible. For members with operations in multiple states, audit costs will not be reimbursed for any activity taking place outside the state of Indiana.

What is the program?

This program is two-fold. First, IWA has solicited bids from third party audit providers for a reduced-cost audit program for its members. Once an agreement has been reached, IWA will announce the selected provider and distribute contact information to its members. It is expected that through collective bargaining we will be able to realize a substantial savings on audit cost for our membership.

Second, for members choosing to engage the services of the third party auditor selected above, the program will reimburse 75% of the audit cost with a maximum dollar amount of \$1500 per farmer. For members choosing to engage the services of any other third party auditor, the program will reimburse 60% of the audit cost with a maximum dollar amount of \$1200 per farmer.

What do you need to apply?

- Complete the attached application and submit on a timely basis (by July 1, 2015).
- Make arrangements for a food safety audit. This can be a GAPs audit, GHPs audit, or Global Food Safety Initiative audit.
- Be an IWA member in good standing (dues paid & no monies owing to IWA over 30 days past due).
- If you are a broker/shipper, you must be willing to pass along this savings to the grower(s) by signing a release form acknowledging that grower(s) has been given credit for monies received under this grant.

Selection Criteria

- The IWA member must meet the above criteria.
- Money is limited and will be distributed on a first come, first serve basis.

How to receive your Cost-Share after being notified of official acceptance in program

1. Each applicant will need to complete a W-9 form.
2. A copy of the food safety certificate and audit invoice must be submitted to IWA.
3. Proof of payment for the audit must be included, either a paid receipt or a copy of the cancelled check.

Food Safety Audit Cost Share Application

IWA, PO BOX 618, VINCENNES IN 47591

Date: _____

Name(s) _____

Farm/ Organization Name _____

Indiana Address _____

Telephone _____ Cell Phone _____

Email _____

Website: _____

Please check the line that best describes your operation in Indiana:

Grower Shipper/broker Packing House Other (please describe in attachment)

If you are a broker coordinating and paying for audit services, please complete one form for each farm you represent in the state of Indiana and provide the address of its owner or location above. Your cost reimbursement must be passed along to your growers in full. A release form acknowledging this will be provided to you if your application is pre-qualified. Release forms will require a notary's signature.

What is the approximate total cost of audit services you paid for in 2014?

What is the estimated total cost of audit services you will pay for in 2015?

What audit certifications are planned for 2015?

In 2015, are you planning to obtain audit services that are new in any way—i.e., different scope, different crop, different level, different provider?

SEND TO IWA at address above. Form must be complete and received no later than July 1, 2015.

Funds are limited by the grant and will be disbursed on a first-come-first-served basis.