

VEGETABLE CROPS HOTLINE

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

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LATE BLIGHT OF TOMATO - (Tom Creswell, Dan Egel, and Gail Ruhl) - Late blight, a plant disease caused by the fungal-like organism *Phytophthora infestans* was confirmed on several tomato samples submitted to the PPDL recently. As of this writing, all the samples have been from Tippecanoe County.

Symptoms include olive green to brown spots on leaves with slightly fuzzy white fungal growth on the underside when conditions have been humid (early morning or after rain). Sometimes the lesion border is yellow or has a water-soaked appearance. Brown to blackish lesions also develop on upper stems and brown spots develop on tomato fruit (see Figure 1).

When conditions are cool and wet, this extremely destructive disease can quickly spread in tomato and potato plantings, but disease spread will be slowed by hot sunny weather. All growers should assume their crops may eventually be affected and thus should be on a weekly schedule to both thoroughly inspect their potato and tomato plantings and apply fungicides if the weather remains cool and cloudy. See our publication on late blight for more information: **BP-80-W: Late Blight on Tomato and Potato** (pdf file).

Since there are many look-alike diseases on tomato leaves identification requires microscopic examination, not visual determination. Suspect samples may be submitted to the **Purdue Plant and Pest Diagnostic Lab** for confirmation.



Figure 1: A late blight lesion shows a line of white 'fuzz' on the underside of the tomato leaf near the edge of the lesion. (Photo by Dan Egel)



DOWNY MILDEW OF BASIL - (Dan Egel) - This disease has been observed in northern Indiana on basil sold as a fresh herb. 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 or soybeans.

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 2). 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 plants to avoid flowering

anyway). Few products are labeled for downy mildew of basil. If applied to all leaf surfaces, Oxidate® should kill the fungus on contact. However, there will be no residue left on the leaf. Therefore, frequent applications may be advisable. Products with the active ingredient phosphorus acid (e.g., Agri-phos®, Phosphite®, Rampart®) are labeled for downy mildew of basil. The fungicides Amistar® Quadris® and Switch® are labeled for basil, but not for downy mildew. Applying these fungicides will help reduce the amount of other foliar diseases on basil and may provide some protection for downy mildew.



Figure 2: Downy mildew of basil can be recognized by the light yellow region between veins and, if conditions are right, grey 'fuzz' on the leaf underside. (Photo by Liz Maynard)



DOWNY MILDEW UPDATE - (Dan Egel) - In the last issue of the Vegetable Crops Hotline, we reported that downy mildew of pumpkin had been confirmed in Washington County Indiana. Since that announcement, downy mildew has been confirmed on cucumbers in Wayne County Indiana. In surrounding states, downy mildew of cucurbits has been found in southern Wisconsin and continues to spread in Ohio, Michigan and Kentucky.

In a clarification, the downy mildew observed frequently on soybeans around Indiana, does not affect cucurbits. Similarly, cucurbit downy mildew will not affect soybeans.



WATERMELON RIND NECROSIS - (Dan Egel) - This noninfectious disease, which seems to affect only watermelon, is also known as internal rind necrosis or bacterial rind necrosis. However, the role that bacteria play in rind necrosis is not well understood and not agreed upon by all investigators. Symptoms of this malady include a corky, red-brown layer of tissue that occurs in the rind of affected fruit (see Figure 3). In almost all cases, the flesh of the watermelon fruit is not affected. However, it is possible to sometimes detect a subtle knobiness by running one's hands across the exterior of the fruit. It may be that watermelon fruit that are sunburned are more likely to have rind necrosis than other fruit. Minor symptoms of rind necrosis may go undetected by the grower or consumer. However, severe cases may cause the rejection of loads of watermelon fruit.

Not much is known about the cause of rind necrosis. There is some evidence that drought stress during fruit set favors rind necrosis. However, rind necrosis occurred this year during wet conditions. Some researchers have found that some varieties are more prone to rind necrosis than others. However, since rind necrosis is relatively rare and hard to predict, it may be hard to justify variety choices based solely on rind necrosis. It has been observed that the initial harvest of watermelon has a higher incidence of rind necrosis than subsequent harvests. It appears clear that there are no pesticide applications or cultural treatments that can be recommended for this malady.



Figure 3: A severe case of watermelon rind necrosis. (Photo by Dan Egel)



BROWN MARMORATED STINK BUGS - (*Rick Foster*) - We first discovered the brown marmorated stink bug in Indiana in 2010. So far, it has not built up to damaging levels in crop situations. Just this week, we had a confirmed case of brown marmorated stink bugs causing damage to sweet corn in a home garden in Clark County. Kudos to Clark County Extension Educator Dave Hynes for correctly diagnosing the problem. The damage to sweet corn is done just prior to harvest and the stink bugs feed right through the husks. Obviously, the way to prevent the damage is to have a residual insecticide spray present on the husks right up to harvest. Since we generally put on our last earworm spray about 10 days or so before harvest, this means that most growers would need one additional spray, probably with a pyrethroid insecticide (Warrior®, Brigade®, Mustang Max®, Hero®, Baythroid®), even if they are not using pyrethroids for earworm control because of resistance concerns. However, don't assume that just because it caused damage in Clark County that you will have it. Look for the distinctive damage shown in the photo (see Figure 4) or for the presence of the brown marmorated stink bug (see Figures 5 and 6). Other species of stink bugs don't feed like this so it is not necessary to spray for them.



Figure 4: Feeding by brown marmorated stink bug causes sunken, brown areas on sweet corn kernels. (*Photo by David Hynes*)



Figures 5 and 6: Brown marmorated stink bug nymph, top and bottom views. (*Photo by David Hynes*)



HOLLOW HEART OF WATERMELON - (*Liz Maynard and Shubin Saha*) - Hollow heart in watermelon has been unusually common this year. Fruit with this disorder show a crack or empty area in the center of the ripe fruit when it is cut open. The 'hollow heart' may be small—1/4 an inch wide—or large—4 to 5 inches wide. (see Figure 7) Sometimes the flesh is of poor eating quality, other times it is fine and frequently has higher soluble solid content than melons without hollow heart. USDA grade standards for watermelon (www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5050334) list hollow heart as a defect that reduces the fruit quality.

This disorder has been attributed to various causes. Rapid fruit growth seems to be the underlying cause, combined with conditions that prevent the flesh from expanding as quickly as the rind. Both environmental conditions and genetics of the plant will affect the development of the problem. High nitrogen fertilization

has been implicated in the past, but research conducted at the Southwest Purdue Ag Center (SWPAC) after one season, showed no variation in hollow heart with nitrogen rates varying from 80 lbs/acre N all the way up to 320 lbs/acre N. Researchers in Delaware have recently suggested that in seedless varieties poor pollination could be a factor, but that has not been confirmed.

Because the problem has been so widespread this year, environmental conditions seem to be the most likely explanation for the unusually high incidence. That leaves little one can do to reduce the risk for the next year. Because varieties do differ in susceptibility, results from trials at SWPAC, or on-farm comparisons, may be useful in identifying those less likely to show the problem. Keep in mind that if environmental conditions have been the important factor this year, the stage of development of the fruit in relation to the weather could influence whether the problem shows up. When comparing varieties, compare fruit maturing at the same time.



Figure 7: Pictured here is an example of the physiological disorder known as hollow heart in watermelon. (Photo by Dan Egel)

CORN EARWORMS - (Rick Foster) - Corn earworm moth catches in pheromone traps have been incredibly low. Usually at this time of the season, we are catching large numbers of moths on a daily basis and I am recommending that sweet corn growers begin an all-out assault on the earworms. Not so this year. Sweet corn growers can be saving a lot of time and money by not spraying their silking sweet corn. I see no reason to spray at this point. However, the situation could literally change overnight. Look for tropical disturbances in

the Gulf of Mexico. A tropical storm or hurricane that hits the Gulf Coast is likely to carry large numbers of moth up to us. Likewise, a storm front coming up from the South will bring a lot of moths as well. If you have a pheromone trap, be sure to change the lure every two weeks and check it daily. If not, you can follow our trap catches at extension.entm.purdue.edu/cornearworm/index.php.

NEW SAFETY MEASURES FOR SOIL FUMIGANTS - (Dave Scott) - As most of you are probably already aware, the U.S. Environmental Protection Agency (EPA) has required changes to soil fumigant pesticide labels to increase protections for agricultural workers and bystanders. These measures are for the soil fumigants chloropicrin, dazomet, metam sodium, metam potassium, and methyl bromide. Other (non-soil) fumigants are not impacted.

These label changes have been phased in starting in December, 2010, extending through December, 2012, and are now final. These revisions include such protective measures and requirements as Restricted Use Pesticide classification, handler training, good agricultural practices, lower maximum application rates, written site-specific fumigant management plans, buffer zones, field posting, advance community outreach to first responders in the area, and specialized applicator training from the product manufacturer / registrant.

The purpose of this notice is to insure that all Indiana applicators that currently use or plan to use any of these soil fumigants are aware of the new requirements. We ask that anyone who needs assistance in interpreting or complying with these label changes contact the Office of the Indiana State Chemist at (800) 893-6637. OISC staff will be happy to provide whatever assistance we can in assuring the safe use of these soil fumigants. Details are available at www.epa.gov/oppsrrd1/reregistration/soil_fumigants/. Thank you for complying with these new safety measures!

Following is a list of soil fumigants registered in Indiana in 2013 and their EPA registration numbers to help you identify impacted products:

Vapam HL (EPA Reg. # 5481-468)
K-Pam HL (EPA Reg. # 5481-483)
Terr-O-Gas 98 Preplant (EPA Reg. # 5785-22)
Terr-O-Gas 67 Preplant (EPA Reg. # 5785-24)
Brom-O-Gas 2% Preplant (EPA Reg. # 5785-42)
Tri Pic Plus (EPA Reg. # 8536-6-87994)
Pic Clor 60 (EPA Reg. # 8536-8-87994)
Tri Brom 98 (EPA Reg. # 8536-19-87994)
Pic-Clor 60 EC (EPA Reg. # 8536-43-87994)
Metam CLR 42% (EPA Reg. # 45728-16)

Metam KLR 54% (EPA Reg. # 45728-27)
Tri-Brom 80 Preplant (EPA Reg. # 58266-1-87994)
Sectagon 42 (EPA Reg. # 61842-6)
Telone C-17 (EPA Reg. # 62719-12)
Telone C-35 (EPA Reg. # 62719-302)
Inline Soil Fungicide and Insecticide (EPA Reg. # 62719-348)



VEGETABLE TWILIGHT MEETING AT MEIGS HORTICULTURE RESEARCH FARM - (*Keith Robinson*) - Vegetable growers and others interested in organic and sustainable production will learn about trials underway to improve productivity of these systems and see demonstrations of specialized equipment for small and mid-scale operations when they attend a tour of a Purdue University research farm Sept. 9.

The Vegetable Crops Research Twilight Tour will be 5:30-7:30 P.M. at Purdue's Meigs Horticulture Research Farm on S. County Road 100 East, about nine miles south of Lafayette.

The tour is free and open to the public.

Target audiences are vegetable growers, including experienced growers looking for ways to increase the productivity and sustainability of their operations, and beginning vegetable growers seeking basic insight on equipment needs, developing crop rotation and pest management plans, and sourcing adapted crop varieties.

The program also will benefit Purdue Extension educators and representatives of the U.S. Department of Agriculture's Natural Resources Conservation Service interested in learning more about how to manage these systems.

"Members of the general community interested in organic and sustainable vegetable production also will find this program informative, helping them to better

understand what goes into vegetable farming," said Lori Hoagland, a Purdue Department of Horticulture and Landscape Architecture assistant professor who will be among presenters. The department is hosting the event.

Other presenters include Rick Foster and Ian Kaplan of the entomology department and Kevin Gibson of botany and plant pathology department.

Topics to be covered:

- Vegetable breeding.
- Weed suppression by rodents and beneficial insects.
- Biodegradable mulches.
- Soil quality in high tunnels.
- Sorghum sudangrass as a method of summer weed suppression.
- Insecticide impacts on pollinating insects.
- Equipment demonstrations.
- Future research needs for vegetable crops in Indiana.

For more information and to register, contact Jessica Garvert at jgarvert@purdue.edu.



WHAT DO YOU WANT TO HEAR AT WINTER MEETINGS? - (*Liz Maynard*) - Plans for winter vegetable programs are getting underway. Let us know what you'd like to hear about and who you'd like to hear from. Send email to emaynard@purdue.edu or call (219) 531-4200 ext. 4206 and leave me a message. Thanks!



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