

VEGETABLE CROPS HOTLINE

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

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No. 525
July 09, 2010

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

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LATE BLIGHT OF TOMATO CONFIRMED IN INDIANA - (Dan Egel) - *The following article was written as a Vegetable Crops Hotline - BULLETIN, July 01, 2010.* Late blight was confirmed on a tomato plant in Dearborn County, Indiana on June 30. Dearborn County borders Boone County, Kentucky where late blight of tomato was reported earlier (*Vegetable Crops Hotline* issue No. 523). Late blight of potato has been confirmed in southern Michigan (*Hotline* issue no. 524.) <<http://www.btny.purdue.edu/pubs/vegcrop/index2010.html>>.

Late blight of tomato is a very damaging disease of tomato and potato. This disease can spread very rapidly under cool, moist conditions. This latest outbreak may have spread during recent rainy weather. Growers close to the outbreaks described above should pay particular attention to the management methods described below. All growers should scout their fields carefully for symptoms.

Tomato and potato growers should be on a fungicide schedule of about every 7 days. Contact fungicides with the active ingredient chlorothalonil (e.g., Bravo[®], Echo[®], Equus[®]) or mancozeb (e.g., Dithane[®], Manzate[®], Penncozeb[®]) should slow the spread of late blight. The products Gavel[®], Revus Top[®] and Tanos[®] offer systemic protection against late blight as well as anthracnose, early blight and Septoria leaf blight. The latter products offer a higher level of protection than the contact fungicides. The products Curzate[®], Previcur Flex[®] and Ranman[®] offer a still higher level of protection, but do not control most other common tomato diseases. Organic growers should use copper products (always check with your certifying agency). Please see the *Midwest Vegetable Production Guide for Commercial Growers 2010* <<http://www.btny.purdue.edu/Pubs/ID/ID-56/>> and the fungicide label for detailed information (see Table 1 on next page).

Additional sources of information about late blight can be found at the following websites: Purdue Plant and Pest Diagnostic Laboratory <<http://www.ppd.purdue.edu/PPDL/lateblight.html>> and an extension bulletin about late blight including photographs <<http://www.extension.purdue.edu/extmedia/BP/BP-80-W.pdf>>.

Please contact Dan Egel (812) 886-0198, egel@purdue.edu with questions.



WHAT TO DO ABOUT LATE BLIGHT- (Dan Egel) - First, don't panic. Late blight has been confirmed in the southern most part of Indiana and exists also on potatoes in southern Michigan. Growers with valuable crops in close proximity to those locations should consider one of the fungicide protocols mentioned in the article above. Keep in mind that the weather has been warm and dry lately, unlike last year's cool, wet weather which favored late blight. Another difference between last year's late blight epidemic and this year's is that there doesn't appear to be multiple introductions of the fungus-like organism all over the state.

The table below should help growers decide what if any fungicide to use (Table 1, next page). Some comments on the table:

- The package size for the products available and the pricing represents approximate averages on what I could find available this week. Your search results may vary!
- Some of the products come in different formulations (such as Bravo WeatherStik[®] and Penncozeb 75 W[®]).
- Bravo WeatherStik[®] and Penncozeb 75 W[®] are contact fungicides. Gavel[®] has two active ingredients, one contact and one systemic. The remaining fungicides listed are systemic.
- The prices given do not include the cost of tank mixing the product (required by some labels) or the cost of including fungicides for diseases other than late blight if one chooses a product such as Curzate[®] or Ranman[®].
- Additional products to consider are Presidio[®] or Forum[®].

Scout your fields for symptoms of late blight, send samples in for diagnosis to the Plant and Pest Diagnostic Laboratory and contact Dan Egel for more information.

Table 1: A list of products labeled for late blight of tomato including information on other tomato diseases, formulations and approximate pricing information. The label of some of these products requires tank mixes. See label for this and other important details.

Product	Diseases labeled for use in addition to late blight		Package Size	Approximate price per unit (\$)	Approximate price per acre (\$)
	Early Blight/Septoria leaf blight	Anthracnose			
Bravo WS®	X	X	2 x 2.5 gal	62/gal	15
Penncozeb 75W®	X	X	30 lb bag	4.60/lb	14
Gavel®	X	--	30 lb bag	8.70/gal	17
Revus Top®	X	X	2 x 2.5 gal	342/gal	19
Tanos 50WP®	X	X	7.5 lb container	45/lb	23
Curzate®	--	--	4 lb bag	58/lb	18
Previcur Flex®	Early blight only	--	2 x 2.5 gal	114/lb	18
Ranman®	--	--	4 x 1 gal	1076/gal	23

SPIDER MITES ON MUSKMELON AND WATERMELON
 - (Rick Foster and Dan Egel) - Spider mites have been observed in southwestern Indiana on muskmelon and watermelon. Somewhat dryer weather has made conditions favorable for this pest. This article will review management recommendations for spider mites.

Spider mites typically cause damage in hot, dry weather. Often this pest shows up after a grower has mowed the rye strips. Spider mites often move from a fencerow or rye strip into a field (Figure 1).



Figure 1: The watermelon plants in the row next to this roadway are yellow as a result of spider mite damage. Spider mites often move from a roadway or fencerow into a crop. (Photo by Dan Egel)

Two-spotted spider mites sometimes will affect muskmelons or cucumbers, but are most commonly a problem on watermelons. Mites cause damage by sucking sap from the underside of leaves. Affected leaves often have a chlorotic (yellow) appearance between the veins (Figure 2). In hot, dry weather, mites can rapidly increase in numbers, as much as 70X in a week. In addition, hot, dry weather causes the mites to eat more and dry soil conditions provide the mites with more concentrated food, resulting in more rapid reproduction.



Figure 2: Spider mite feeding often results in a chlorotic, interveinal appearance on leaves. (Photo by Dan Egel)

Watermelon plants that are not irrigated are particularly susceptible to mites because the mites increase faster and eat more and the plants may already be drought stressed.

Mite feeding can cause plants to be defoliated within a couple of weeks or can cause fruit to be of such poor quality that they are unmarketable. In some cases, mites will also feed on the rind, giving it a sandpaper-like texture.

To monitor for mites, you can either use a 10X hand lens and look for the mites on the underside of leaves or shake leaves over a white sheet of paper and watch the mites crawl on the paper. Look first on the edges of fields. If there is a gravel road next to the field that produces dust that lands on the plants, look there first since dust increases mite populations. Be aware that mite populations are frequently localized, so you may not need to treat the entire field. If you don't treat the whole field, be sure to spray at least 100 feet beyond the existing infestation to make sure that you contain the mites. We don't have a specific threshold for spraying mites on

watermelons. Stressed plants on non-irrigated land will be able to tolerate far fewer mites than healthy plants on irrigated land.

There are several miticide choices listed in the *Midwest Vegetable Production Guide for Commercial Growers (ID-56)* <<http://www.btny.purdue.edu/Pubs/ID/ID-56/>>. I believe that the best choice if you have a serious infestation is Agri-Mek®. It has consistently given good-to-excellent control. We have seen excellent results with one of our newer miticides, Oberon®.



PUMPKIN FRUIT SET - (*Liz Maynard*) - Pumpkin fruit set can be reduced by a variety of stresses. The recent high temperatures are an example. Under high temperatures female flower buds may die before they open. Figure 1 shows a healthy female bud and Figure 2 shows a female bud that has aborted. Figure 3 shows male flowers for



Figure 1: A healthy female flower bud on a pumpkin plant. (*Photo by Liz Maynard*)



Figure 2: Female flower buds aborted before bloom can appear yellow and shriveled. (*Photo by Liz Maynard*)



Figure 3: Male pumpkin flower after bloom (left), before bloom (middle), and just opening (right). (*Photo by Liz Maynard*)

comparison. If temperatures are moderate a later female bud will likely survive to open and set fruit. That next bud may be one or more weeks away from opening, depending on the variety and growth habit. Restricted vine or bush varieties may have female flowers fairly close together on the main stem, and may already have female flower buds on branches. Other varieties may have more nodes between female flowers on the main stem, and may not produce flowers on branches until later in the season. Figure 4. shows a vine with 3 nodes between female flowers.



Figure 4: Pumpkin vine with fruit shortly after fruit set (left) and female flower just opening (right), and 3 leaves (nodes) in between. (*Photo by Liz Maynard*)

In 2002 we observed pumpkin flowering closely at the Pinney Purdue Ag Center in Wanatah. The following excerpt published in this newsletter that summer provides an example of differences between cultivars: “The first female flower buds usually formed at the 9th to 13th node on the main stem. On a large-vined cultivar, the first two female buds on the main stem stopped growing and dried up before the flowers opened. By July 15, no more than three-quarters of the plants had a pumpkin developing, and nearly half of the visible female flower buds had aborted prior to opening. It is likely that the high temperatures of the past month caused the abortion of female buds. On a short-vined, bushier cultivar also growing at Pinney-Purdue, most of the plants had more than one fruit developing on the main stem by July 15. On this cultivar, less than one quarter of the visible female buds on the main stem had aborted before opening. This bushy cultivar also developed flowers on branches; by July 15 most plants had more than one pumpkin developing on a branch.”

If the first female flower bud dies, it’s especially important to provide conditions that will help later buds flower and set fruit. If possible, irrigate to minimize drought stress. Manage pesticide applications to minimize dangers to pollinating bees.

It’s also important to control weeds. Weeds compete with pumpkins for nutrients, water and light. Low light levels can promote death of female flower buds. Shade from tall weeds may be enough to cause flower buds to die. The wet conditions have made weed control espe-

cially difficult in some fields this year. Grass weeds may be controlled using broadcast applications of products containing sethoxydim (e.g. Poast®) or clethodim (e.g. Select Max®). Other than the row middle application discussed in the last issue of this newsletter there are no good options for chemical control of broadleaf weeds once the pumpkins are setting fruit. I would suggest cultivation if possible, plus hand weeding and hoeing. As a last resort, mowing or cutting tall weeds so they don't shade the pumpkins may be helpful. Any weeds starting to produce seed should be removed from the field to reduce weed problems in future years.



DOWNY MILDEW OF CUCURBITS UPDATE - (Dan Egel)
 - Since the last *Vegetable Crops Hotline* (issue no. 524), downy mildew has been reported in 6 counties in Michigan, 3 counties in Ohio and 1 county in Wisconsin. All of the reports of downy mildew listed above have been on cucumber. Since all pathotypes of the downy mildew fungus affect cucumber, it is impossible to know whether the reports above represent a threat for other cucurbits such as muskmelon, pumpkin and watermelon. Therefore, all cucurbit growers should follow the progress of the epidemic at this website <<http://cdm.ipmpipe.org/>> (Figure 1) or by reading the *Vegetable Crops Hotline*. All cucurbit growers should scout their fields for symptoms of this disease and contact Dan Egel if symptoms are suspected or send a sample to the Plant Pest and Diagnostic Laboratory at Purdue University. Please see *Hotline* issue no. 524 for more details about downy mildew <<http://www.btny.purdue.edu/pubs/vegcrop/VCH2010/VCH524.pdf>>.

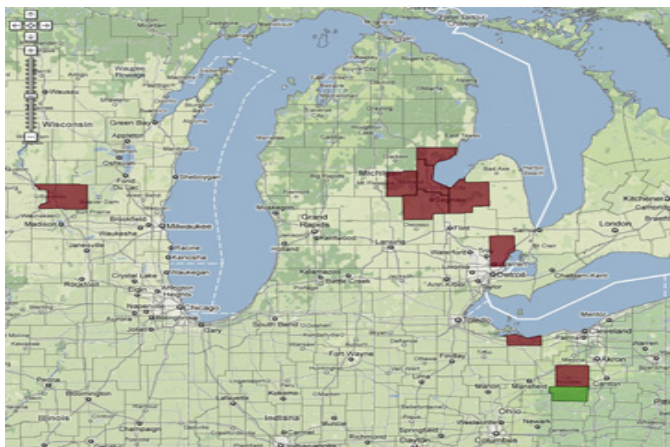


Figure 1: Current status of downy mildew of cucurbits. All outbreaks on this map are of cucumber. Counties in red are recent reports. Counties in green are older than 7 days.
 <<http://cdm.ipmpipe.org/scripts/map.php>>



BRENDA NOWASKIE RETIREMENT - (Dan Egel) - Anyone who calls up the Southwest Purdue Agriculture Center in Vincennes these days might have to let the phone ring for awhile or leave a message. Our long time secretary, Brenda Nowaskie, has retired. For 10 years Brenda answered the phone, published newsletters, worked on extension bulletins, planned grower meetings and did whatever was needed-often before we knew it was needed. We will miss Brenda's hard work and dedication as well as her smile. The process of hiring a new secretary has started, but regardless of who becomes secretary we will still miss Brenda. Meanwhile, we would like to leave a message for Brenda-enjoy retirement and don't be a stranger!



FOOD AND DRUG ADMINISTRATION WANTS TO LEARN ABOUT FRESH PRODUCE PRODUCTION - (Liz Maynard) - The FDA wants to learn more about vegetable and fruit production to inform the development of food safety standards for farms, and strategies to ensure compliance. Many readers of this article have attended workshops about Good Agricultural Practices (GAPs) and Good Handling Practices (GHPs), and have read about food safety guidelines in this publication and others. In the near future regulations will mandate certain practices. This is your opportunity for input. Comments provided to FDA will help them to develop workable regulations.

The official request for comments, (Docket No. FDA-2010-N-0085, CFSAN 20105) was published in the Federal Register on February 23, 2010, and is available at <<http://edocket.access.gpo.gov/2010/pdf/2010-3409.pdf>>. The deadline for comments is July 23, 2010.

Additional information and excerpts from comments already made are available at <<http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/FruitsVegetablesJuices/FDAProduceSafetyActivities/default.htm>>. Take a look and see what other producers, large and small, and other members of the produce industry are saying.

Submit electronic or written comments by July 23, 2010. Submit electronic comments to <<http://www.regulations.gov/>>. Submit written comments to the Division of Dockets Management (HFA-305), Food and Drug Administration, 5630 Fishers Lane, rm. 1061, Rockville, MD 20852. Additional information about submitting comments is available here <<http://www.fda.gov/RegulatoryInformation/Dockets/Comments/default.htm>> and in the Feb. 23rd Federal Register document mentioned above.