Vegetable Crops Hotline

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

Liz Maynard, Editor
600 Vale Park Road
Valparaiso, IN 46383
(219) 531-4200
emaynard@purdue.edu

No. 557
August 10, 2012

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

IN THIS ISSUE

Fall Armyworm - *(Rick Foster)* - Fall armyworms have arrived in Indiana, as they do almost every year about this time (see Figure 1). This pest does whorl feeding damage like European corn borers, but a lot more serious, and will also damage the ears of sweet corn as well. Usually the problem is not widespread within a field but can be serious in spots. The control strategy is similar to that for European corn borers, treatment over the top during the late whorl stage. We normally don't recommend treatment at this stage because corn borers have diminished in importance but it may be necessary if fall armyworm damage is serious. Pyrethroid insecticides such as Brigade®, Hero®, Mustang Max®, and Warrior® will provide excellent control.

Figure 1: The fall armyworm may be identified by the upside-down white 'Y' on the head capsule and four dark spots on the eighth abdominal segment. *(Photo by John Obermeyer)*

Spider Mites - *(Rick Foster)* - The hot, dry weather has resulted in some very high populations of twospotted spider mites this summer. As expected, we have seen problems on crops such as watermelons and beans, but spider mites have also shown up in large numbers on cantaloupes and sweet corn, where we don't often see them. As you know, spider mites are a sporadic problem, so it's generally not something we plan to do research on since we don't know if they will be here or not. This year I happened to have a watermelon planting that I was planning to use to evaluate control of striped cucumber beetles, but the beetles didn't show up in any numbers so it wasn't being used. When the spider mites infested the field, I decided to take advantage of the situation and compare some miticides. Given the short time frame I had, I was only able to obtain three miticides. I sampled the plot on July 24 and determined that the population was fairly uniform across the plot. The treatments were applied on July 26 and we resampled the plot on July 31, 5 days after treatment.

As you can see in the table on the next page, the population of mites in the untreated control increased between July 24 and 31. All three treatments significantly reduced the number of mites compared to the untreated control and Brigade® provided control that was significantly better than either Portal® or Danitol®. These results are a surprise to me. Several years ago, I received numerous reports from growers of unsatisfactory control of mites with Brigade® (bifenthrin) and we have not included in the recommendations in the *Midwest Vegetable Production Guide* (ID-56) as a result. The reasons for the discrepancy between my results and the control experienced by growers are unknown. It could be that growers were not using the high rate that I used, since the labeled range is 5.12 to 6.4 fl. oz. per acre. Certainly, those of us who make the recommendations in the production guide need to take another look at Brigade® to determine if it should be included in the future. A couple of advantages of Brigade® over some of the other miticides is the wide range of crops on the label and the relatively short pre-harvest intervals (3 days for watermelon).

Table 1: Comparison of miticides for control of twospotted spider mites on watermelons, Meigs Farm, Lafayette, IN.

		Relative Abundance of Mites	
Treatment	Rate/Acre	Pre-Treatment	Post-Treatment
Untreated	----	252	328 A
Portal	2 pints	331	162 B
Brigade	6.4 fl. oz.	386	76 C
Danitol	16 fl. oz.	347	135 B
Prob. > F		0.20	0.0001

Corn Earworm - *(Rick Foster)* - Catches of corn earworm moths in pheromone traps have increased dramatically in most areas of the state in the last few days. This is the time of year that really tests your management program for earworms. Sweet corn growers should be treating whenever green silks are present on a 2 to 3 day schedule using the high rate of the best insecticide available. If the pyrethroid insecticides are still effective for you, you should use Brigade®, Hero®, Mustang Max®, or Warrior®. If you have had problems with the pyrethroids, you should be using Coragen® or Radiant®. Remember, even if you are growing Bt sweet corn, you should continue to treat with insecticides just as you would for non-Bt corn. The combination of Bt corn and insecticides will give you a better result than insecticides alone and much better than Bt corn alone.

Also, remember that another name for corn earworm is tomato fruitworm. Tomatoes, peppers, and other crops are subject to attack by this insect, especially late in the season when the field corn has all dried down. Check the *Midwest Vegetable Production Guide* (ID-56) for information about controlling tomato fruitworm in various crops.

Striped Cucumber Beetles - *(Rick Foster)* - The biggest problem with striped cucumber beetles at this time of year is feeding on the fruit. The danger of losses from leaf feeding or transmission of bacterial wilt of cucurbits is pretty much past. However, fruit feeding can seriously impact the appearance of your cucurbit crops and reduce marketability of the fruit. If you see fruit feeding, you should probably apply an insecticide to kill the beetles. Fortunately, striped cucumber beetles are relatively easy to kill with a variety of insecticides, including any of the pyrethroids.

Update on Downy Mildew of Cucurbits - (*Dan Egel*) - In the last 7 days, downy mildew has been reported on cucumbers in La Porte and Parke County in Indiana. Cucurbit growers should take note of these observations and scout their fields carefully. **MELCAST** cannot be used to manage downy mildew. If downy mildew is confirmed close to your operation, move to a 7-day schedule and use one of the specialty products discussed in the last *Vegetable Crops Hotline* issue (No. 556). The strain of the downy mildew fungus that has been observed in Indiana so far will affect cucumber and muskmelon, however it is less likely that it will affect pumpkin or watermelon. Management of this disease was discussed in detail in the last issue of the *Vegetable Crops Hotline*. For locations of current confirmed downy mildew outbreaks, check the Cucurbit Downy Mildew Forecasting site at **http://cdm.ipmpipe.org/.** As always direct your questions and comments to Dan Egel.

Powdery Mildew on Pumpkin - *(Dan Egel)* - Although most growers are well into the management of this disease for the 2012 season, it may be worth a review since I have received many questions on this subject. Note: do not confuse powdery and downy mildew. Downy mildew is discussed elsewhere in this issue.

Symptoms of powdery mildew are fairly easy to recognize. Growers should look for white talc-like lesions on the upper and lower side of the leaves (see Figure 2). More lesions can usually be found on the underside of leaves since relatively higher humidity in the plant canopy encourages disease development. The natural variegation on the leaves of some pumpkin varieties may be mistaken for powdery mildew. Under severe conditions, plants may lose vigor due to powdery mildew infection. It is my observation that pumpkin stems or 'handles' may turn brown prematurely under such conditions.

I have observed less powdery mildew than usual this year. This may be due to the low relative humidity we have had this year. Nevertheless, growers should still manage this disease.

Growers who have chosen pumpkin varieties with partial resistance to powdery mildew will have an easier time managing this disease than growers who have selected varieties without resistance.

After the production of pumpkins, it is always a good idea to keep that particular field out of cucurbit production for 2 to 3 years. However, the fungus that causes powdery mildew is readily spread on the wind. Therefore, the powdery mildew that you find in your field may have come to you from several miles away.

Most growers find it necessary to apply systemic fungicides to help control powdery mildew of pumpkins. Systemic fungicides, or fungicides that move within the plant, are recommended because powdery mildew causes lesions on both surfaces of a leaf. The first application of a fungicide should occur when the pumpkin plant has formed a 'bush' in the field but has not begun to vine out yet. It is at this stage that the relative humidity inside the plant canopy favors disease development.

Below is a list of products that have been effective in powdery mildew management in Indiana. Alternate all products between the FRAC or MOA groups that are shown below. More information about these products may be found in the *Midwest Vegetable Production Guide* (ID-56) and in the *Pumpkin Fungicide Guide and Disease Timeline* 2012 (BP-135-W**) http://www.extension.purdue.edu/extmedia/BP/BP-135-W.pdf**. The active ingredients are listed in parentheses.

Quintec® (quinoxyfen, group 13) This product is not systemic, but has been shown to redistribute to both surfaces of leaves. Since it is not systemic, make the first application of this product before the disease has been observed or at least in the early stages of the disease. This product is effective only for powdery mildew, so additional products must be used if additional diseases threaten.

Rally® (myclobutanil) and Procure® (triflumizole) are both group 3 fungicides and have systemic activity. Like Quintec® above, these products are only effective against powdery mildew.

Products with tebuconazole listed as the active ingredient include Monsoon® and Toledo®. These products are in group 3. These products also have good activity against black rot (gummy stem blight).

Inspire Super®(difenconazole and cyprodinil) has active ingredients from groups 3 and 9. This product is labeled for black rot (gummy stem blight) in addition to powdery mildew.

Pristine® (boscalid and pyraclostrobin) also has two active ingredients. However, my research indicates that in Indiana, only boscalid (group 7) has activity against powdery mildew, while the pyraclostrobin portion is less effective. Pristine® is labeled for black rot (gummy stem blight), but strains of this causal fungus resistant to both active ingredients have been found in Indiana. Although Pristine® is not labeled for Plectosporium blight, my research has shown that there is some efficacy against this disease.

Fontelis® (penthiopyrad) is in group 7. It is labeled for black rot (gummy stem blight) in addition to powdery mildew, but it will have the same limitations against black rot as described for Pristine® above.

Figure 2: Powdery mildew can be recognized by the talc-like lesions on leaves. *(Photo by Dan Egel)*

Bacterial Canker of Tomato - *(Dan Egel)* - The dry weather across much of Indiana has resulted in low levels of most foliage diseases of vegetables. Recently, however, I have observed a few outbreaks of bacterial canker of tomato. This article will serve as a review of this disease.

Symptoms of bacterial canker include:

- Marginal chlorosis and necrosis of leaves (yellow and brown on the edge of leaves).
- In some cases, wilting of entire plant.
- Distinctive fruit lesions. The lesions have a dark center surrounded by a pale area that gives rise to the term 'birds-eye' lesion. (see Figure 3, next page)

Biology-The bacterium that causes bacterial canker of tomato requires localized water-soaking of the leaf interior in addition to surface wetness of the leaf. Water-soaking of the leaf may occur after a rain, dew or irrigation event.

Bacterial canker differs from other bacterial diseases of tomato (e.g., spot, speck) in that the pathogen becomes systemic in the plant, moving inside the plant as the plant grows.

Since the canker bacterium may become systemic in the plant there is little that can be done to protect or cure a plant once infected.

Although tomato is the primary host for bacterial canker, pepper may also show symptoms. Several weedy nightshade species may also play host to the canker bacterium.

Disease cycle-Inoculum may get into a field or greenhouse in several ways. These include seed, transplants, crop residue, volunteers, or weeds. Seed infection may only be 1 to 2 percent. However, infection may spread quickly from diseased to healthy seedlings in the transplant greenhouse.

Management of bacterial canker can be challenging and should center on prevention. Once plants are infected, the disease is difficult to manage. Items to include in a management program include:

- Always use seed that has been tested for the canker bacterium. Producers may want to consider treating their own seed as described in the Ohio State University Bulletin *Hot Water and Chlorine Treatment of Vegetable Seeds to Eradicate Bacterial Plant Pathogens* (HYG-3085-05) **http://ohioline.osu.edu/hyg-fact/3000/3085.html**.
- Inspect transplants as they are grown or upon delivery. Scout for symptoms in the greenhouse or in the field.
- Sanitize all surfaces, tools, stakes or equipment used in tomato production. The bulletin *Sanitation for Disease and Pest Management* (HO-250-W) can be found here **http://www.extension.purdue.edu/extmedia/HO/HO-250-W.pdf**.
- Practice crop rotation away from solanaceous crops for 3 to 4 years. If crop rotation is not practical, as in a greenhouse situation, remove as much of the plant as possible soon after the season is complete. The use of a landscape cloth in a greenhouse helps sanitation between seasons. Destroy or properly compost tomato residue well away from the production area.
- Always till under the tomato crop as soon as possible after the season so that the canker bacterium will die out as the residue decays.
- Infected transplants or mature plants may serve as inoculum sources for spread of the disease. If plants can be removed soon after the disease is detected, the spread of the disease may be slowed. To be effective, apparently healthy plants or trays of transplants surrounding the diseased area must also be removed since it is very likely that these plants are infected but do not have symptoms yet.
- The regular application of products with copper as an active ingredient, for example copper hydroxide or copper sulfate, may help to slow down the spread of the disease. Products with the active ingredient mancozeb may help increase the usefulness of copper applications if the products are tank mixed.

More information about bacterial canker and the products that may be useful in controlling this important disease may be found in the *Midwest Vegetable Production Guide* (ID-56) (**http://www.btny.purdue.edu/Pubs/ID/ID-56/**) and *Tomato Fungicide Guide and Disease Timeline* (BP-136-W) **http://www.extension.purdue.edu/extmedia/BP/BP-136-W.pdf**. Also, a webinar on bacterial canker presented by Sally Miller of The Ohio State University and Dan Egel of Purdue University is available here **http://learn.extension.org/events/584**.

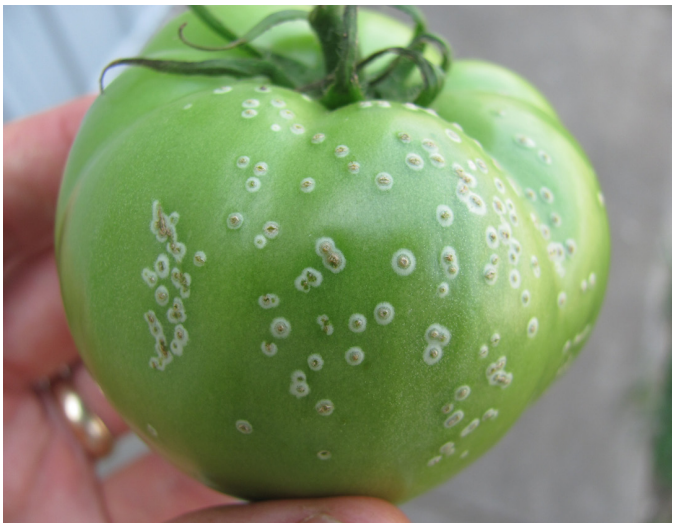

Figure 3: Symptoms of bacterial canker of tomato often include distinctive 'birds-eye' fruit lesions. *(Photo by Dan Egel)*

Food Banks, Soup Kitchens, Food Pantries Need Produce - *(Liz Maynard)* - Fresh produce is hard for food banks, pantries, and soup kitchens to get, yet is sorely needed by many who they serve. If you have excess production, consider contacting a food bank or other food provider in your area to see if they can use it. Some food banks have volunteers available to glean fields that you are done harvesting. Most food banks have trucks that can stop by to pick up produce. Tax benefits may exist for food donations to 501(c)3 organizations. Get in touch with a food bank in your area by contacting Feeding Indiana's Hungry (FIsH), a state food bank network, at 317-396-9355, or one of the FIsH member food banks listed below.

In addition to the larger food banks, many local pantries, soup kitchens, and housing shelters will welcome direct donations that can be worked into their distribution schedule. Local social service agencies should be able to put you in touch with organizations in your area that can use produce donations.

Food Bank of Northwest Indiana, Inc.
2248 W. 35th Ave. Gary, IN 46408
Phone: 219-980-1777
Fax: 219-980-1720
http://www.foodbanknwi.org

Community Harvest Food Bank of Northeast Indiana, Inc.
999 E. Tillman Road
Fort Wayne, IN 46816
Office: 260.447.3696
http://www.communityharvest.org

Food Finders Food Bank
50 Olympia Ct.
Lafayette, IN 47909-5182
765.471.0062
http://www.food-finders.org/

Gleaners Food Bank of Indiana, Inc.
3737 Waldemere Ave.
Indianapolis, IN 46241
Phone: 317-925-0191
Outside Indianapolis 800-944-9166
Fax: 317-927-3189
http://www.gleaners.org

Hoosier Hills Food Bank
2333 W Industrial Park Dr.
Bloomington IN 47404
Phone: 812.334.8374
Fax: 812.334.8377
http://www.hhfoodbank.org

Second Harvest Food Bank of East Central Indiana, Inc.
6621 N Old SR 3, Muncie, IN 47303
Office: 765-287-2061
Fax: 765-287-2036
http://www.curehunger.org

Food Bank of Northern Indiana
702 S. Chapin Street
South Bend, IN 46601
Phone: (574) 232-9986 or (800) 879-7040
Fax: (574) 232-0143
http://www.feedindiana.org

Terre Haute Catholic Charities Foodbank
1356 Locust St.
Terre Haute, IN 47803
(812) 232-1447
http://www.CatholicCharitiesTerreHaute.org

Tri-State Food Bank
801 E. Michigan St.
Evansville, IN 47711
(812) 425-0775
http://www.tristatefoodbank.org

Dare To Care Food Bank
5803 Fern Valley Road
Louisville, KY 40228
502-966-3821
http://www.daretocare.org

The Freestore Foodbank
1141 Central Parkway
Cincinnati, Ohio 45202
(513) 482-4500
http://www.freestorefoodbank.org

Tell Us Your Ideas for Winter Meetings - *(Liz Maynard)* - We are planning programs for the Indiana Horticultural Congress, Illiana Vegetable Growers' School, and other winter meetings. The best ideas for topics and speakers come from you! Let us know what you want to hear and who you want to hear it from. Call or email with suggestions: 219-508-1429 or **emaynard@purdue.edu**. Thanks!

Upcoming Events

Organic Variety Selection and Seed Saving Workshop, Purdue University Meig's Horticulture Research Farm, 9101 South 100 East, Lafayette, IN. August 16, 7:30 a.m.to 12:30 p.m. EDT. To register contact Dr. Lori Hoagland, **lhoagland@purdue.edu** or 765-494-1426.

Sourcing Organic Seed Just Got Easier: An Introduction to Organic Seed Finder Webinar. August 21, 2012, 2:00 p.m. EDT. Join Chet Boruff of the Association of Official Seed Certifiying Agencies and Kristina Hubbard of the Organic Seed Alliance as they introduce the new Organic Seed Finder database, which will serve as a valuable tool for the organic community by providing reliable organic seed availability information. The webinar is free and open to the public. Advance registration is required. Find out more and register at **http://www.extension.org/pages/64782**.