VegNet

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On the WEB at: http://vegnet.osu.edu

In This Issue

Cucumber Downy Mildew Spreading in Northern Ohio

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****Read the NEW fact sheet Managing Downy Mildew in Organic and Conventional Vine Crops by Ron Becker and Sally Miller, available as a downloadable pdf at http://ohioline.osu.edu/hyg-fact/3000/index.html

Downy mildew is now confirmed in cucumbers in six northern Ohio counties (Henry, Sandusky, Ottawa, Geauga, Ashtabula and Huron). The Ashtabula and Geauga county confirmations were made on July 14, but the disease was first noticed about July 7. In Huron county, cucumbers on the OSU-OARDC Muck Crops Research Station were diagnosed with a very low incidence of downy mildew on July 14. Downy mildew was confirmed in the other counties in late June or early July. The dry weather of the past week has likely slowed development and spread of downy mildew within those counties and to other counties, but cucumber growers in northern Ohio should use the highly effective fungicides (see below) in a rotation that includes fungicides with different modes of action as well as protectant fungicides. Cucumber growers in Central and Southern Ohio should continue to watch for reports of downy mildew nearby and maintain a protectant fungicide spray program.

What about other vine crops? We have not had any confirmed reports of downy mildew in any vine crops in Ohio except cucumbers. The next most susceptible vine crop after cucumber is muskmelon, followed by pumpkin and other squashes and watermelon.


Downy mildew on cucumber Downy mildew on cantaloupe


Downy mildew on pumpkin Downy mildew on watermelon

Downy Mildew Fungicide Recommendations - Cucumbers:

These recommendations are for cucumbers, which are highly susceptible to downy mildew. A less intense fungicide program may be necessary for other vine crops.

Protection before disease appears (downy mildew is not present in your county/growing area): Apply one of the following fungicides on a 7-10 day schedule: chlorothalanil (e.g. Bravo Weather Stik) or mancozeb (e.g. Manzate or Dithane). The application interval can be lengthened under dry conditions. Use the shorter interval under cool, moist conditions.

Protection before disease appears (downy mildew is in your county/area but not in your fields): Apply one of the following fungicides on a 7-10 day schedule, tank mixed with Bravo, Manzate or Dithane: Gavel, Previcur Flex, Tanos, Ranman, Curzate or Presidio. Alternate products. The application interval can be lengthened under dry conditions. Use the shorter interval under cool, moist conditions.

Management after disease appears: Apply one of the following fungicides on a 5-7 day schedule, tank mixed with Bravo or Dithane: Previcur Flex, Tanos, Ranman or Presidio. Alternate products. The application interval can be lengthened under dry conditions. Use the shorter interval under cool, moist conditions.

Note that the fungicides recommended above have different preharvest intervals (PHI). Keep this in mind for fungicides applied after harvesting begins.

Product	Efficacy	Rate	PHI (days)
Presidio	+++++++++	3.0-4.0 fl oz 4SC/A	2
Ranman	+++++++++	2.1-2.75 fl oz 400SC/A plus an adjuvant	0
Previcur Flex	+++++++	1.2 pt 6F/A	2
Tanos	++++++	8.0 oz 50WDG/A	3

Curzate	++++++	3.2 oz 60 DF/A	3
Gavel*	+++++	1.5-2.0 lb 75DF/A	5
Protectant fungicides (tank mix partners)			
Bravo Weather Stik	++++	1.5-2.0 pt/A	0
Dithane or Manzate	++++	3.0 lb 75DF/A	5

*Contains mancozeb, which is a protectant and therefore does not need to be tank mixed with another protectant product

Keep abreast of the movement of downy mildew by regularly checking VegNet and the Cucurbit Downy Mildew Forecast website operated by North Carolina State University (http://www.ces.ncsu.edu/depts/pp/cucurbit/). All confirmed reports of downy mildew in Ohio sentinel plots and first reports in each Ohio county on each crop are submitted to the site.

Quintec for Control of Powdery Mildew on Winter Squash, Gourds, and Pumpkin

Supplemnetal Labeling for Quintec now includes Winter Squash, Gourds and Pumpkin.
Apply Quintec before visible symptoms of powdery mildew appear. Quintec will not control latent or established infections of powdery mildew. If powdery mildew infection is established, Quintec should be applied in tank mix combination with a curative fungicide or following application of a curative spray or, if multiple diseases are present, following application of a broad-spectrum fungicide. Under low disease
conditions (as per a predictive modeling system), minimum label use rates per application can be used. Maximum label rates and short application intervals are recommended for severe or threatening disease conditions.

The number of sprays of Quintec per crop must not exceed 50% of the total number of powdery mildew sprays. Quintec is in mode of action Group 13. Alternation with other modes of action is recommended after each application of Quintec. When more than one application of Quintec is made per crop, at least one of the applications of Quintec must be a tank mixture with a product that is effective on powdery mildew and has a mode of action different from Quintec. Apply the alternate product or tank mix within 14 days of applying Quintec. Do not make more than two consecutive applications of Quintec. Rate of Quintec is 4-6 fl oz per acre. See the label for all details, restrictions and crop rotations

Controlling weeds in cucurbits with Sandea by D. Doohan

In the past week I have had a number of calls about using Sandea postemergence (POST) in pumpkins and other cucurbit crops. From these conversations I've learned that many growers are afraid to put Sandea over the top of pumpkins, in particular, and of those who do use it POST, most do not include surfactant. There is no justification in my opinion for this degree of caution. Literally hundreds of plots testing Sandea on cucurbits have been conducted throughout the US with many of those in Ohio. In the many trials conducted at Ohio State we have not experienced a yield loss with Sandea even following relatively severe injury (25% stunting) soon after treatment. In contrast yield losses are regular and can be devastating when weeds are not controlled! Similarly, there is nothing to be gained, and as much as 30% weed control to be lost, when a non-ionic surfactant is left out of the spray-mix.

Sandea should be applied at oz/A POST, when cucurbits are on average in the 2-5 leaf stage. NIS should be included at 1 qt/100 gallons of spray. The label specifies application before flowering; however, there is little or no evidence to support this restriction. With pumpkins in particular, Sandea will turn the foliage yellow and slow down growth for the week after application but with a full-growing season ahead the crop will recover. Sandea POST is an important component in a weed control program that includes cleaning up perennials before planting, using crop rotation to reduce the soil weed seed bank, PRE herbicides such as Strategy, or Dual (in the case of pumpkins), cultivation, and grass control with POST herbicides if needed. However, Sandea will not control all weeds, and is not a "stand-alone" treatment. Sandea POST will not provide complete weed control; its strengths are excellent nutsedge, cocklebur, galinsoga, pigweed, ragweed, smartweed and velvetleaf control.

Western bean cutworm on sweet corn by Dr. C. Welty

Editor's Note: The information below is also available in a Quicktime movie slide show:"New Pest Alert for Sweet Corn, Western Bean Cutworm" with more illustrations at the VegNet website: : **http://vegnet.osu.edu**
"Please note this Quicktime movie is not available in the Flash player on the top of the page but in the right hand column just below the flash player.

There is a new pest that Ohio vegetable growers need to know about: the western bean cutworm. The western bean cutworm is a long-time pest of field corn and dry beans out west in Colorado and Nebraska. It began to move eastwards into Iowa starting in the year 2000. It continued to move eastwards, and is now common in Illinois and Wisconsin. It is a concern to vegetable growers mostly as a pest of sweet corn ears.
How do we identify a western bean cutworm, given that we already have three other caterpillar species that infest corn ears? Although it is similar to corn earworm, it differs in a few ways. The number of worms per ear can be many for western bean cutworm (Figure 1), while it is commonly just one for corn earworm, because corn earworm is cannibalistic and the cutworm is not. In the case of corn earworm, there can be several in one ear when worms are small, but there is rarely more than one per ear when worms are large. The prothorax, which is the segment just behind the head, has broad dark stripes on western bean cutworm (Figure 2) but not for corn earworm. This characteristic is usually the first feature mentioned in various fact sheets, but it is not as clear a feature as it sounds, so it helps to consider a few more features. We need to look for presence of tiny microspines on the body. There are none on of western bean cutworm, while there is a dense covering of microspines on the corn earworm. These cannot be seen with the naked eye but can be seen with a 15x or 20x magnifier. Finally, look for net-like marks on the head capsule. The western bean cutworm does not have these marks, but the corn earworm does.
How do we monitor the western bean cutworm? The adult form of western bean cutworm is a moth. The distinctive feature of the moth is the white band across the top edge of each forewing (Figure 3). The moths can be monitored by a pheromone lure placed in a trap. The trap can be made from a plastic milk jug with the sides cut out and with dilute antifreeze in the bottom, or bought as a bucket-style unitrap. We know that there is just one generation per year of this pest, and the adults are active in July. The traps should thus be used from about mid-June until mid-August. Catches of the western bean cutworm moth in northwest Ohio were confirmed in 2007 and 2008. Confirmed catches in central Ohio (Clark County and Franklin County) as well as northwest Ohio have been found in July 2009.
What numbers are typical for catch of western bean cutworm in pheromone traps? In Colorado, where the pest has been common for decades, trappers look at the cumulative catch from the start of flight until the peak flight. A cumulative catch under 700 moths is considered as a low risk. Catch of 700 to 1000 moths is considered as a moderate risk. Catch above 1000 moths is considered a high risk. At the site in Ohio where the highest trap counts were found in 2008, in Wood County, the highest number of moths caught per day was 4 and the cumulative catch was 16 moths. In contrast, at the site in Illinois that had the highest catch in 2008, the highest number of moths caught per week was about 175, and the cumulative catch was about 500 moths. What these trap reports show is that this new pest has arrived in Ohio, but so far it is at very low levels. Where are trap counts posted? There are several websites where trap cooperators are reporting their catches in agronomic crops as well as in vegetable crops: the Ohio field crops website: http://entomology.osu.edu/ag/ (select "corn" then "cutworm map"); the Ohio veg pest website: http://bugs.osu.edu/welty/veg_traps1/Veg_traps.html; and a regional midwest website: http://www.ent.iastate.edu/trap/westernbeancutworm/isite .

There is a second stage to monitoring that needs to be done if any western bean cutworm moths are found in a pheromone trap. This is scouting. Scouting needs to be done in late July and early August. Scouting should be done in plantings that have tassels emerging, before silking. Examine the upper 4 leaves of 100 plants per planting. On these leaves, look for eggs (Figure 4a) and young larvae (Figure 5). Eggs are found in masses, and are white when they are newly laid.

The next question is how to decide on whether or not control is needed? The action threshold for sweet corn depends on the market. Processors are using a threshold of 4% of plants infested. Our tentative threshold for fresh-market sweet corn is 1% of plants infested.

What are control options for western bean cutworm? Insecticide can be used if the threshold is exceeded. Insecticide is most effective if applied at the time when eggs are hatching. Eggs turn purple (Figure 4b) when they are ready to hatch. Insecticide for this pest is most effective if applied when about 90% of tassels have emerged. As for the choice of insecticide, any of the pyrethroids or Penncap-M or Sevin are effective. The pyrethroids are Warrior, Capture, Brigade, Baythroid, Mustang Max, Asana, and Pounce. Another tactic of pest management on corn is the use of transgenic varieties that contain the BT toxin. "Attribute" varieties of sweet corn and "YieldGard" varieties of field corn are NOT effective in control of western bean cutworm, although they are very effective for control of other species of worms. The "Herculex" field corn transgenics are" effective for western bean cutworm control, but currently this event is not available in sweet corn varieties. Please alert me or your local county extension educator if you find this pest in your sweet corn, so that we can track its spread in Ohio.
Images:

Fig. 1. Larvae at tip of ear (photo from U. Nebraska).

Fig. 2. Larva (photo by Marlin Rice at Iowa State)

Figure 3. Moth (photo by Marlin Rice at Iowa State)

Figure 4. (a) Eggs, younger (left) and (b) older (right) (photo by Marlin Rice at Iowa State)

Fig. 5. Young larvae (photo by Marlin Rice at Iowa State).

Yellow vine disease on squash, pumpkins, and melons by Dr. C. Welty

Yellow vine is a relatively new disease of vine crops that was first verified in Ohio in 2003 and has been seen sporadically since then. This disease has been known in Kentucky, Oklahoma, and Texas for about 18 years. Studies in Oklahoma have determined the causal organism and its insect vector. The causal organism is *Serratia marcescens*, which is a common bacterium that is not typically a plant pathogen. The vector is squash bug. Squash bug is a well-known pest of squash but never known to be a disease vector until now.

The symptoms of yellow vine are a sudden yellowing of a plant followed by plant collapse and death, usually in late July. There is a period of at least 28 days between infection and appearance of symptoms. Symptoms can be confused with wilting due to squash vine borer or to bacterial wilt. Suspicious plants should be examined to determine if there are holes in the base of the stem that indicate squash vine borer is involved, or if there is yellowing or browning between leaf veins, which often indicates bacterial wilt infection. The best quick field diagnosis of yellow vine is to cut the plant at the stem base and look at the vascular tissue. The phloem ring should be green in a healthy stem but is honey-brown in a plant infected with yellow vine. If a plant is to be sent to a diagnostic lab, this section of the stem base is what should be sent, usually a 2 to 4-inch chunk just above and below the soil line. Our diagnostic OSU clinic is planning to offer a test for $50 per field, to be available in the next few weeks.

As with most insect-vectored diseases, the only control of the disease is control of the vector. To understand control of squash bug, we need to be familiar with this insect's life cycle and behavior. The squash bug overwinters as adults and moves into cucurbit fields as soon as new crops emerge. The adults are often overlooked because they feed on the underside of the cotyledons. They start to lay eggs in July. Eggs are shiny and brown, usually in clusters on the underside of leaves where two veins meet. In one to two weeks, eggs hatch into grey spider-like nymphs. Nymphs feed by sucking sap from leaves and stems. Nymphs go through 5 instars in about one month before they reach adulthood in late summer. They have one generation per year. Squash bugs are usually found on plants during the day but down on the ground under the plants at night.

Control of squash bug is best started at the time of stand establishment. Chemical or non-chemical tactics can be used. Mechanical tactics are row covers from planting time until first flowering, and destruction of crop residue immediately after harvest. Cultural controls are rotation with non-cucurbit crops, and promotion of early growth of the crop. Biological control often happens in plantings where no insecticides are used; squash bug is commonly attacked by a parasitic fly called *Trichopoda pennipes*, and there are several parasitoid wasps that attack eggs of squash bug. Chemical tactics include foliar insecticide sprays or systemic insecticides applied to soil at planting. Many growers are already using a systemic such as Admire (imidacloprid) or Platinum (thiomethoxam) in-furrow at planting (or as a pre-transplant plug drench) for control of cucumber beetles. These products do not have squash bug listed as a target pest on the label, but they are known to kill adult squash bugs during the seedling stage. Foliar sprays of pyrethroids or Thionex (endosulfan) are other options but these do not have systemic activity. To be effective, these need to be applied at weekly intervals. Pyrethroids currently registered for use on squash are Mustang Max, Baythroid, Warrior, Brigade, Asana, Pounce, Decis, and Danitol. Squash bug can be challenging to kill with insecticides due to their protected location in a dense crop canopy. The soft nymphs are more susceptible to insecticides than the hard-bodied adults. Sprays should be applied at high pressure to get good penetration into the canopy.

Images:

Figure 1. Plant with typical yellow vine symptoms (from Oklahoma State Univ.)

Figure 2. Stem with typical yellow vine symptoms (from Oklahoma State Univ.)

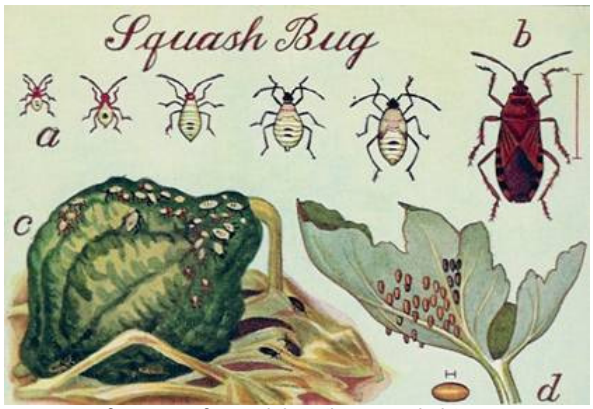
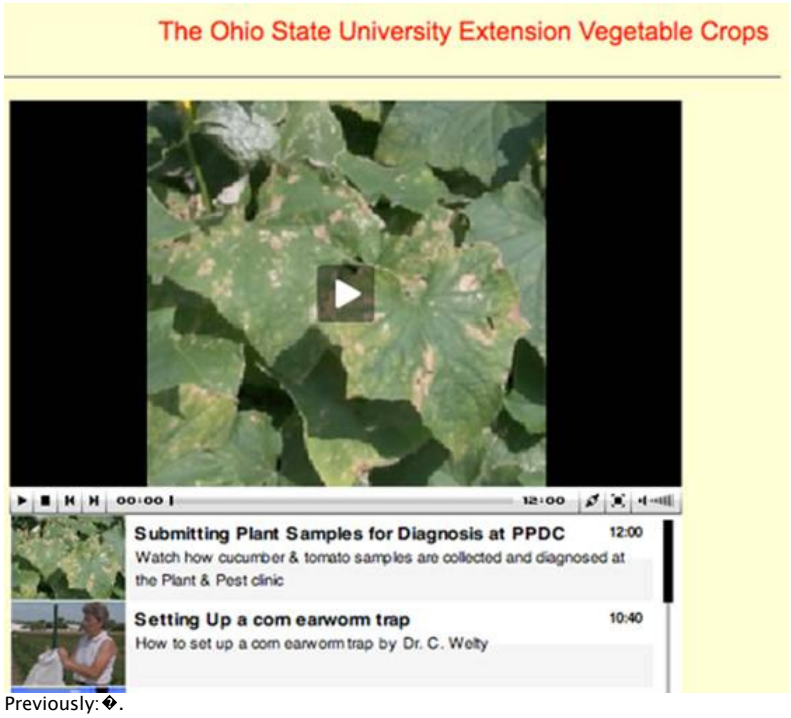


Figure 3. Life stages of squash bug (by Eva Melady)

Bob's Video Vegetable Notes

Got a disease, insect problem or physiological disorder? Not sure what it is? Check out this week's video at: **http://vegnet.osu.edu** Find out how to collect plant samples for submission to the Wayne C. Ellett Plant and Pest Diagnostic Clinic. Watch as we follow slicing cucumber and tomato samples in this rare, behind the scenes look into the diagnostic process at the clinic. See if the slicing cucumber sample really has downy mildew



Previously:.

8. Setting Up a corn earworm trap with Dr. Celeste Welty
7. How to Use a Cardy meter. Monitor your crop Nitrogen needs throughout the growing season.
Use the scroll bar on the right side of the playlist to see all the videos.