

# VEGETABLE CROPS HOTLINE

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

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**DOWNY MILDEW OF WATERMELON** - (Dan Egel) - This disease has been observed in watermelon fields in southwestern Indiana. Muskmelon, pumpkin and watermelon growers should scout for this disease.

**Symptoms** - Downy mildew is primarily a leaf disease. Often, the first symptoms one observes are yellow, angular or square looking spots on leaves. The underside of the leaves may be covered with a black fuzzy looking growth. Leaves eventually turn brown, crinkle and may turn upwards as they dry. Severe outbreaks may result in the rapid death of vines.

**Disease cycle** - The fungus that causes downy mildew does not over winter in Indiana; it "blows" in from southern states. Thus, we do not usually observe downy mildew until August or September.

Downy mildew requires a period of leaf wetness and high humidity for successful infection. Heavy dews can provide adequate moisture to get this disease going. Although the fungal spores may land in your field, there has to be leaf wetness for the disease to cause problems. The optimum temperature for downy mildew is 59 to 68°F.

The fungus that has been observed on watermelon can infect muskmelon and some races can also affect pumpkins.

**Control** - Protective fungicides such as chlorothalonil (e.g., Bravo, Echo, Equus) or mancozeb (e.g., Dithane, Penncozeb) can be used against downy mildew. Strobilurin products such as Cabrio, Flint and Quadris may provide adequate control if applied before the disease appears. Watermelon growers may want to consider at least one application of a Ridomil or Acrobat formulation. MELCAST growers in southwestern Indiana should now apply fungicides weekly.



**YELLOWING ON LEAF EDGES OF CANTALOUPE** - (Chris Gunter and Dan Egel) - We have received a few calls about yellowing on the edges of older leaves. These leaves are typically seen in the middle of the row and are usually the oldest leaves on the plant. Yellowing of these older leaves is normal on most vegetable plants this time of year. Typically this yellowing is caused by salt burn (Figure 1).

Salt burn is a noninfectious disorder that affects muskmelons more than watermelons. Early in the morning, water droplets from the plant accumulate at the edge of the leaf (Figure 2). If



Figure 1. Yellowing on the leaf edge of cantaloupe (Picture by Chris Gunter)



Figure 2. Water droplet accumulation on the leaf edge of cantaloupe (Picture by Chris Gunter)

these water droplets have a high salt content, the leaf margin will turn yellow. Salt accumulation is often associated with foliar application of nutrient solutions and/or pesticides.

Copper sprays, for example, often result in distinct bands of yellow tissue around leaf margins. Soil applied urea or ammonium nitrate fertilizers may contribute as well.

No yield loss has been recorded as a result of these symptoms and therefore no control measures are necessary.



**THIRTEEN-LINED GROUND SQUIRRELS** - (Judy Loven and Liz Maynard) - Earlier this season there were a fair number of questions about how to protect pumpkin seeds from predation by ground squirrels. These rodents are about 10" long, including a 3-inch tail, and live in ground burrows (Figs. 1 and 2). They eat both

animals (insects, worms, mice, small birds) and plants. On vegetable farms they cause problems by digging up and eating seed of pumpkins and other cucurbits as well as corn.



Figure 1. Thirteen-lined ground squirrel (Picture by USDA APHIS WS)



Figure 2. Entrance to thirteen-lined ground squirrel burrow (Picture by E. Maynard)

Sometimes they will also eat or dig up small-emerged seedlings (Fig. 3). The predation may not be noticed until the crop fails to emerge and close inspection shows missing seed, discarded seed coats, and/or disturbed soil.

While it is too late to protect

most of this season's crops, it's not too early to plan for next year. Control options are listed below. For more information on ground squirrels and other problem wildlife, see the Wildlife Conflicts Information Web site at

<[www.entm.purdue.edu/wildlife/wild.htm](http://www.entm.purdue.edu/wildlife/wild.htm)>, or call the IDNR/APHIS Nuisance Wildlife Hotline at 1 (800) 893-4116.



Figure 3. Seedlings damaged by thirteen-lined ground squirrels: (a) pumpkin and (b) sweet corn (Pictures by E. Maynard)



Thirteen-lined Ground Squirrel control options:

1. Exclusion – buried galvanized hardware cloth – effective but expensive
2. Cultural Methods –
  - a. deep soil tillage – destroys burrows and habitat
  - b. allow growth of tall rank vegetation
  - c. plant as early as possible before squirrels emerge from hibernation
  - d. lure crop – provide alternative foods in minimum tillage fields, short term effect
3. Repellents – not effective in crops
4. Toxicants – zinc phosphide – pre-emergent application in food / feed crops
5. Fumigants – gas cartridge – limited effectiveness
6. Traps –
  - a. cage traps
  - b. snap traps – rat size
  - c. glue boards
7. Shooting – time consuming, location may not be suitable for shooting



**MANAGING PUMPKIN DISEASES** - (Dan Egel) - Production of quality ornamental pumpkins requires that growers take steps to reduce pressure from common pumpkin pests. Some hints include:

- **Rotation** - Pumpkin production should be rotated away from cucurbits for 2 to 3 years after a crop. This will reduce the chance of diseases such as black rot and bacterial spot. To reduce the chance of squash vine borer, rotate to a field as far away as practical.
- **Fall tillage** - Pumpkin vines and fruit may harbor disease causing organisms. When vines and fruit are buried, the decay process will be accelerated. To reduce soil erosion, plant a cover crop such as rye.
- **Resistant varieties** - There are now pumpkin varieties resistant or tolerant to powdery mildew. Has Fusarium fruit rot been a problem? A few varieties exist which are tolerant.
- **Planting date** - The best way to avoid virus damage to your pumpkin fruit is to plant early. If pumpkin fruit is set before severe virus pressure, the fruit will be relatively unaffected even though the foliage may show symptoms. For example, growers in Southern Indiana may avoid virus losses by planting on June 20 or before.

Growers who follow the above guidelines may still have pest problems. The application of pesticides presents an option to some growers. The table below lists one possible pesticide schedule. The dates in the table are based on a planting date of about 20 June.

**Table 1. One possible pesticide schedule for pumpkins. Based on a planting date of 15-20 June.**

Application Date	Powdery Mildew	Black rot	Bacterial Spot	Bacterial spot & black rot
July 10			Copper, if lesions observed	EBDC, if lesions observed
July 20	Topsin Nova Procure Cabrio Flint Quadris		Copper	EBDC
August 1		Chlorothalonil (if no EBDC)	Copper	EBDC, if no Chlorothalonil
August 10	Procure Topsin Nova Cabrio Flint Quadris	Chlorothalonil (not necessary if Quadris or Cabrio applied)		
August 20		Chlorothalonil		
August 31	Procure Topsin Nova Cabrio Flint Quadris	Chlorothalonil (not necessary if Quadris or Cabrio applied)		

- EBDC fungicides=Maneb, Manex, etc.
- Chlorothalonil=Bravo, Echo, Equis etc.
- The fungi that cause powdery mildew may become resistant to the systemic fungicides listed here unless precautions are taken. It is important to always alternate between fungicides with different modes of action. Cabrio, Flint and Quadris have the same mode of action and must never be applied in back to back sequence. Nova and Procure have the same mode of action. Topsin has a separate mode of action. Be certain to read the label carefully. More information is also listed in the **Midwest Vegetable Production Guide for Commercial Growers 2003** <[www.entm.purdue.edu/entomology/ext/targets/ID/index.htm](http://www.entm.purdue.edu/entomology/ext/targets/ID/index.htm)>.
- Adding an EBDC fungicide to a copper product may increase effectiveness against bacterial spot. Since EBDC fungicides have activity against black rot, there is no need to apply chlorothalonil and an EBDC product on the same date.
- If Cabrio or Quadris is applied for powdery mildew, it is not necessary to also apply a chlorothalonil product for black rot.
- Black rot is more commonly a problem in fields that have not been rotated properly. In such cases, it may be necessary to start chlorothalonil or EBDC applications sooner. Other growers may find chlorothalonil/EBDC applications unnecessary.
- Plectosporium blight-Management practices that help to reduce the incidence of black rot should help in the management of Plectosporium blight.
- Bacterial spot pesticide treatments should be applied when fruit are approximately softball sized. Apply copper/EBDC treatments earlier only if lesions have been confirmed on foliage.
- Apply first powdery mildew treatment earlier on plants which have a well developed canopy and are beginning to touch within rows.
- To apply a pesticide effectively and legally, **read the label and follow the instructions carefully.**



**MATURE WATERMELON VINE DECLINE - (Dan Egel) -**  
This disease has been observed in a few watermelon fields in Sullivan and northern Knox County. Please take a moment to read the description of the disease below. If you think you have Mature Watermelon Vine Decline (MWVD), please call me. I would like to take samples of diseased vines in your field for research purposes.

MWVD has only been observed on watermelon plants. The only above ground symptoms of this disease are vines that wilt and decline. The roots often have a reddish-brown discoloration (Figure 1). In the



Figure 1. Watermelon roots showing the red-brown lesions often observed on roots of plants affected by mature watermelon vine decline (Picture by D. Egel)

morning hours the vines may appear to have recovered, however, during the heat of the day wilting is obvious. The disease appears to be most common when the vines are under stress from heavy fruit load.

MWVD may be confused with Fusarium wilt of watermelon. While MWVD seems to 'move' down a row of watermelon plants, Fusarium wilt affects scattered plants. Plants with Fusarium wilt have healthy looking roots (Figure 2). The inside of the stem at the crown area usually appears white and healthy in MWVD plants; plants with Fusarium wilt have a brown discoloration in the stem area.



Figure 2. Healthy watermelon roots. The external appearance of watermelon roots with fusarium is often healthy (Picture by D. Egel)

Unfortunately, this relatively new disease is not well understood. Purdue University researchers now have evidence that MWVD is caused by some biological factor in the soil, probably a soil fungus. MWVD seems to be most common under black plastic mulch. Heavy

rains seem to be related to the onset of disease. At this point, no clear treatment or management strategies for MWVD exist. There are no chemical treatments that appear to be effective. Similarly, no varieties appear to offer resistance.



**NEW LABELS FOR ACTARA AND PROCLAIM** - (*Frankie Lam*) - Recently Syngenta announced that there are changes to the labels of Actara and Proclaim insecticides, including new listings for pests and crops. The active ingredient of Actara is 5% thiamethoxam, which is a neonicotinoid insecticide that offers good control of a broad range of insects at low application rates. For Proclaim, the active ingredient is 5% emamectin benzoate that has a good control at low use rates for lepidopteran (butterfly and moth) pests in vegetables.

On the new label of Actara, the following fruiting vegetables are mentioned, peppers, including bell, chili, cooking, pimento, and sweet. Cucurbit and other fruiting vegetables, which were listed on the label before, are not on the new label. Under the **Pollinator Precautions** section of the label, it is suggested that Actara is highly toxic to bees exposed to direct treatment or residues on blooming crops, and to wait at least three days after treatment before beehives are placed in the field. The insect pests that are controlled by Actara are aphids, whiteflies, potato leafhopper, flea beetles, and Colorado potato beetle.

For Proclaim, the new label includes control of lepidopteran larvae. Included in the list is fruiting vegetables, except cucurbits; leafy vegetables including Brassicas (cole crops); and turnip greens. The insect pests listed on the label are armyworms - beet, fall, southern, and yellowstriped; hornworms - tobacco and tomato; loopers - cabbage, alfalfa, and soybean; cabbageworms - cross-striped and imported; corn earworm; diamondback moth; and *Liriomyza* leaf miners. New statements of **Use Restrictions** and **Spray Drift** are added on the label. The label states not to use Proclaim in greenhouses, nurseries, plant propagation houses, or on any plants grown for use as transplants. Please read and follow the new labels carefully before applying either Actara or Proclaim insecticide.



**ANNOUNCEMENTS:**

**Southwest Purdue Agricultural Center Annual Field Day** - Thursday, August 7, 2003, 1-4 pm, 4369 N. Purdue Road, Vincennes, IN 47591.

**Muskmelon Variety Plot Tour** - Tuesday, August 19, 2003, 5:00 p.m. - LaPorte, IN.

**Pumpkin Variety Plot Tour** - Tuesday, Sept. 16, 2003, 5:00 p.m. - New Haven, IN.

Schedules and directions will be supplied closer to the events.

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