# VEGETABLE CROPS HOTLINE

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

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***No. 420***
***May 16, 2003***

*http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm*

## IN THIS ISSUE



**MANAGING STRIPED CUCUMBER BEETLES AND BACTERIAL WILT IN EARLY-SEASON** – *(Frankie Lam)* – ***The following article was written as a Vegetable Crops Hotline - BULLETIN, May 6, 2003.*** Striped cucumber beetles have been found in the early-planted muskmelons at the Southwest Purdue Agricultural Center near Vincennes, Knox County. On April 30 striped cucumber beetles were randomly scouted in the field, 61 beetles were found on 1,080 plants with an average of 0.56 beetle per plant. However, on May 2, 2,845 beetles were found in the same field and having an average of 2.63 beetles per plant. These indicated that a relatively high number of adults had emerged from the overwintering sites and scouting your field for the striped cucumber beetles (Figure 1) should begin.

*Figure 1. Striped cucumber beetle (Picture by A. York)*

The adult beetle has three black stripes along the length of the body and a black abdomen. The over-wintered beetles feed on the cotyledons, leaves, and stems of the seedlings or transplants. The pest is a vector of the bacterium that causes bacterial wilt of muskmelon and cucumber. Muskmelon and cucumber are susceptible to bacterial wilt (Figure 2), but watermelon and squash are not. The bacterium, which causes the disease, is transmitted to the plants during the feeding of the beetles. The bacteria multiply in the water conducting vessels of the plant and stop the flow of water, resulting in sudden and permanent wilt of a

*Figure 2. Early symptoms of bacterial wilt on muskmelon (Picture by R. Latin)*

vine or the entire plant. The symptoms appear 2-6 weeks after the plant is infected. Once a plant is infected with the bacterium, nothing can be done to save the plant. The management tactic for the disease is to avoid the beetle feeding on the plants especially during the early-season. For muskmelon and cucumber, the economic threshold is 1 beetle per plant, whereas for watermelon and squash the economic threshold is 5 beetles per plant.

The beetles tend to congregate on plants along the borders during the early season. Sample the field borders 2-3 times a week. Once beetles are found on several scattered plants along the field edges, the entire field should be scouted in a "Z" pattern. For each 20-acre field, at least 10 plants in 10 locations should be checked. If the population number reaches the economic threshold, the whole field should be treated. The influx of beetles into the field should last for 2-4 weeks. After the period of beetle influx, sample the field weekly and treat the field only when the beetle population exceeds the threshold. The foliar insecticides recommended for control of cucumber beetles are Adios, Pounce, Ambush, Capture, Asana, and Sevin. Check the list in the Midwest Vegetable Production Guide for Commercial Grower 2003 (ID-56) <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm> for management of striped cucumber beetles. Follow label directions carefully before using any pesticides.

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**Managing Seedcorn Maggots in Early-Planted Muskmelons -** (*Frankie Lam*) - Seedcorn maggots have been found in the earliest planted muskmelons on the Southwest Purdue Agriculture Center, in Knox county North of Vincennes. A muskmelon field was transplanted on April 28, 2003 and the field was sampled on May 8. Out of 1,584 plants sampled 331 plants were infested with the maggot, approximately 21% of the plants sampled.

If you have muskmelons transplanted in the field you should scout your field daily for leaf flagging and wilting of plants, which are indications of seedcorn maggot injury. Dig up the plant showing the symptoms and examine the crown and root system carefully for the presence of maggots. Split the crown and the main root with a pocketknife to look for any maggots feeding inside the plant (Figure 1). The maggot is yellowish-white, legless, with a pointed head and is about 1/4 inch long when fully grown. The maggots feed on the root and stem tissues and

*Figure 1. Seedcorn maggots (Picture by G. Brust)*

complete their life cycle in about 3 weeks. This insect prefers soil with an abundance of decaying vegetable matter. In addition, cool and wet periods favor the development of the maggot. Soil that has reached 70˚F at the 4-inch depth seldom has an outbreak of seedcorn maggots. The adult is a small fly about 1/5 inch long. There are 3 to 5 generations of seedcorn maggot per year depending on latitude, but mainly the first generation is economically important.

Recommended practices to reduce the incidence of infestation include; 1) plow down the cover crop at least 3 to 4 weeks before planting, 2) use commercially treated seed with a combination of fungicide and insecticide (ex. Captan-Lindance), and 3) apply a soil insecticide (ex. Furadan) at planting. However, no economic threshold has been developed for the maggot on early-planted muskmelons. The curative tactic for the management of seedcorn maggots on muskmelon is to replace the transplants. Scout your field and estimate the size of maggots in the plants. On an average, if the maggots are < 1/4 inch long, replant the muskmelons after 10 days. If the maggots are ≥ 1/4 inch long (fully grown), the muskmelons can be replanted after 5 days.

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**Illustrated Definitions -** *(Chris Gunter)* – When identifying and discussing plant problems, it is helpful to put a name on what you are seeing. This allows you to be sure you can identify a symptom and try to match it to known disease or injury symptoms. Here are some of the basics with which you should be familiar when you are talking to your county extension educator or extension specialist.

**Necrosis -** Death of cells or tissues through injury or disease, especially in a localized area. Such an area is usually brown or black (see Figure 1).

*Figure 1. Necrosis on the leaf of watermelon plant (Picture by C. Gunter)*

**Chlorosis -** Yellowing or whitening of normally green plant tissue because of a decreased amount of chlorophyll, often the result of disease or nutrient deficiency. We can describe chlorosis as Marginal, if it occurs at the edge of the leaf, or intervienal, if it occurs between the veins on the leaf leaving them green. Chlorosis may also be associated with lesions (see Figure 2).

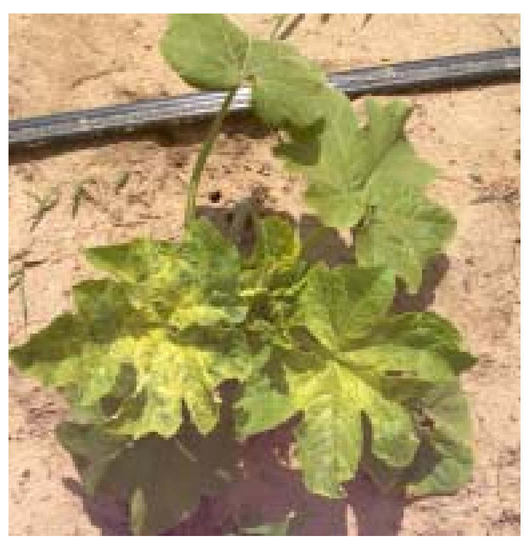

*Figure 2. Chlorosis of a pumpkin plant caused by herbicide injury (Picture by C. Gunter)*

**Water Soaking** - Tissue that appears to be wet or full of water between plant cells. These areas can be localized on the plant leaf, stem or root; or may occur over the entire plant (see Figure 3).

*Figure 3. Watersoaking of a watermelon caused by gummy stem blight (Picture by D. Egel)*

**Lesion** - A localized area of wounded or diseased tissue, often necrotic and/or chlorotic (see Figure 4).

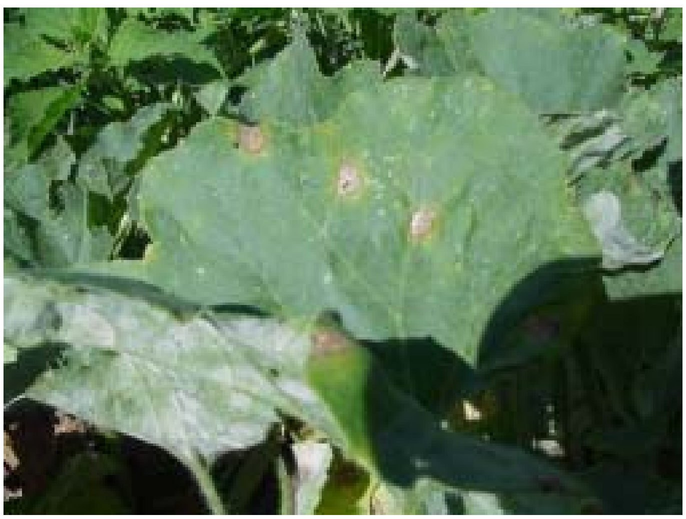

*Figure 4. A lesion on a pumpkin leaf with a chrorolic halo (Picture by D. Egel)*

*Figure 5. Wilting of a watermelon seedling. (Picture by C. Gunter)*

**Wilting** - A loss of rigidity and drooping of plant parts, may be caused by a lack of water or disease (see Figure 5, also Figure 1 of the Managing Seed-corn Maggots in Early-Planted Muskmelons article in this issue).

*Figure 6. Stunting in transplants of Chinese eggplant (Picture by C. Gunter)*

**Stunting** - A slowing or lack of growth and development of a plant, often the first symptom that a plant has a problem (see Figure 6).

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**FUNGICIDES: PROTECTIVE VS. SYSTEMIC** - *(Dan Egel)* - Most vegetable growers find it necessary to apply fungicides to manage diseases such as early blight of tomato or potato, rust of sweet corn, white mold of snap bean or gummy stem blight of watermelon. Most fungicides fall in to one of two categories: protective or systemic, Table 1. Since the use of protective vs. systemic fungicides varies, I'd like to talk here about the differences between the categories.

**TABLE 1. PROTECTIVE VERSUS SYSTEMIC TABLE**

| ACTIVE INGREDIENT | TRADE NAME EXAMPLES | CLASSIFICATION |
|---|---|---|
| **Aluminum Tris** | Aliette | Systemic |
| **Copper Hydroxide** | Champ, Cuprofix, Kocide | Protective |
| **Chlorothalonil** | Bravo, Echo, Equus | Protective |
| **Ipridione** | Rovral | Systemic |
| **Metalaxyl** | Ridomil | Systemic |
| **Maneb** | Maneb, Manex | Protective |
| **Mancozeb** | Dithane, Manex II, Penncozeb | Protective |
| **Strobilurins** | Strobilurins all have a very similar mode of action | |
| Azoxystrobin | Quadris | Systemic |
| Pyraclostrobin | Cabrio, Headline | Systemic |
| Trifloxystrobin | Flint | Systemic |
| **Sulfur** | Microthiol Disperse | Protective |
| **Thiophanate-methyl** | Topsin | Systemic |
| **Triflumazole** | Procure | Systemic |

Protective fungicides act as armor to guard against fungal infections. Areas on the plant surface where the protective fungicide exists are less likely to become infected because the fungicide stops the spore or the young fungus from growing. Areas of the plant that do not have any protective fungicide are not protected against fungal infections. An analogy could be made between protective fungicides and sunscreen: any skin not covered by sunscreen is completely unprotected and can be sunburned if the right conditions exist. Thus, the better the spray coverage a vegetable grower achieves on his or her crops, the better the chance of controlling fungal diseases. The label for each protective fungicide will give suggestions on how to increase coverage by using the proper gallonage or, perhaps, by using a wetting agent.

Most protective fungicides stop fungal growth through several modes of action in much the same fashion that drinking some corrosive liquid would cause harm to humans. For this reason, fungi are unlikely to become resistant to protective fungi. It is usually unnecessary to alternate protective fungicides with fungicides with different active ingredients.

Although systemic fungicides vary in properties, they all have in common the ability to move in the plant. Some systemic fungicides may move from one surface of the leaf to the other. Other systemic fungicides can be taken up through the roots and moved through the entire plant. Thus, coverage is less important with systemic than with protective fungicides. Use of a systemic fungicide is no excuse, however, for sloppy practices that limit coverage.

Most systemic fungicides act by a single mode of action. For example, the new strobilurins (Quadris, Flint, Cabrio) act by inhibiting a specific reaction controlled by a single enzyme. For this reason, it is relatively easy for a fungus to change (mutate) to a form that is unaffected (resistant) to the systemic fungicide.

Many new systemic fungicides have precautions to use to prevent fungi developing resistance. These precautions usually involve alternating the systemic fungicide with other fungicides with a different mode of action. Growers should be follow such instruction carefully.

Protective and systemic fungicides have different properties and therefore different uses. It makes sense for growers to become familiar with the fungicide products they use for disease control. Fungicides alone, however, are not the entire answer to disease control.

No amount of fungicide will make up for poor horticultural practices. In addition to using fungicides, there are several other practices growers need to follow to help avoid disease problems. Rotating from last year's crop to an unrelated crop is important for many diseases. Use fall tillage to bury the residue from last year's crop and start the decay process. Finally, use disease resistant varieties when ever possible. On pages 36 and 37 of the 2003 Midwest Vegetable Production Guide for Commercial Growers (ID-56) <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm> the importance of these factors are listed for many crops and diseases important to Indiana vegetable growers.



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