Beetle Identification

Striped and spotted cucumber beetles can be serious pests of cucurbit crops (cucumber, melon, pumpkin, squash) grown in Alabama. Both beetles are about 1⁄4 inch long, 1⁄8 inch wide, and yellow-green. The striped cucumber beetle adult has three black stripes along the length of the body, and the spotted cucumber beetle has 12 black spots on its back (Figure 1). Spotted cucumber beetles attack other crops in addition to cucurbits (such as corn, sweetpotato, peanuts), but striped cucumber beetles prefer cucurbits to other crops.

Adult females deposit eggs in the soil at the base of the plants. The eggs hatch and the larvae, or immature stage, feed on the underground plant stem and root tissue. The larvae can cause some damage by underground feeding, but the primary economic damage to cucurbits results from the adult beetles feeding on foliage, stems, and flowers. The larvae pupate in the soil and the next generation of beetles emerge.

Multiple generations of cucumber beetles occur in Alabama each season, with more generations produced in the south half of the state than in the north. Cucumber beetle adults emerge very early in the spring and may feed on weeds before moving into nearby plantings of cucurbits.

Beetle Feeding Damage and Spread Of Bacterial Wilt Disease

Feeding by large numbers of cucumber beetles can kill or stunt early-season cucumber and squash seedlings or young transplants. Beetles may also feed on watermelon and muskmelon and later in the season causing cosmetic damage that reduces the value of the crop.

In addition to feeding damage, cucumber beetles are the only known vectors of bacterial wilt disease caused by the pathogen *Erwinia tracheiphila*. Bacterial wilt is a serious disease of cucumber and muskmelon and to a lesser extent, squash and pumpkin. The bacteria do not survive in crop debris, soil, or on seeds. It is thought that the pathogen overwinters in weeds that show no disease symptoms, and that beetles pick up the pathogen when feeding on the weeds in early spring. In the spring when beetles become active and begin feeding on melons and cucumbers, they spread the bacteria through their feces and contaminated mouthparts.

Studies in Alabama have shown that the severity of wilt disease on cucumber in the field is proportional to the number of beetles feeding on the plant. Even low beetle numbers (one per plant) are sufficient to cause infection.

Young plants are more susceptible to infection than older plants. In addition, young plants are more attractive to beetles and are likely to be fed upon more heavily than older plants.

On young plants, the first signs of beetle-feeding damage are observed on cotyledons and stems (Figure 2). Beetles feeding on infected plants can spread the bacteria to healthy plants. In addition, beetles seem to be attracted to wilted leaves, thus increasing their exposure to the pathogen and its spread.

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Once the bacteria enter the plant, they multiply and move quickly through the vascular system. In the process, they interfere with the movement of water and nutrients and this results in the drooping, wilting, and death of the aboveground parts of the plants. Plants usually show symptoms between 5 to 14 days after infection. The first sign of wilt is a distinct flagging of individual leaves, followed by wilting of adjacent leaves, and the entire vine (Figure 3). The wilting quickly spreads as the vascular system becomes blocked by bacteria and the entire plant eventually withers and dies. Once the plant is infected it cannot be saved. The only way to prevent the spread of bacterial wilt is to control beetle feeding on the plant.

**Management**

**Insecticides And Scouting**

The first 2 to 3 weeks after plant emergence is the critical period for cucumber beetle control. At this time, plants are most attractive to beetles and most susceptible to disease infection. If heavy cucumber beetle populations are expected, it may be advisable to apply the systemic soil insecticide carbofuran (Furadan 4F) at planting. This insecticide has a special registration for use in Alabama on cucumbers, melons, squash, and pumpkins for cucumber beetle control. Carbofuran must be applied directly into the seed furrow; it cannot be used as a foliar spray. It may also be mixed with liquid fertilizer. Please refer to the Furadan 4F label for rates, application guidelines, and restrictions. Some research has shown that carbofuran may provide 4 to 6 weeks of beetle control, while other tests have shown only 1 to 2 weeks of control.

In any event, high beetle populations may still transmit the wilt pathogen before the insecticide inside the plant can have an effect. Therefore, even if carbofuran is used, it is advisable to monitor plants for presence of beetles, and to apply a foliar insecticide if the beetles seem to be surviving the carbofuran treatment. A secondary advantage of carbofuran is that it may provide some control of soil insects like seed maggots and cutworms.

Whether or not carbofuran is used, it is important to begin scouting fields immediately after plant emergence or transplanting to detect beetles on plants. A recommended foliar insecticide should be applied if beetles are detected on plants during the first 2 to 3 weeks after plant emergence or transplanting, particularly if the field has a history of bacterial wilt disease.

If many beetles are observed feeding on weeds or plants along the field edges, make a foliar insecticide application within 24 to 36 hours in anticipation of the migration of beetles into the field. Because beetles are highly mobile and plants produce new growth rapidly, twice-weekly applications of foliar insecticides may be required. Pyrethroid insecticides generally have long residual activity but are highly toxic to some beneficial insects. Their use may result in outbreaks of secondary pests like aphids. Because watermelon is not susceptible to wilt disease, protection with insecticides is only necessary when plants are small and high beetle populations are feeding on the plants or fruit. Please refer to the table below for a listing of recommended foliar insecticides for cucurbit crops.

Foliar insecticide applications will probably not be necessary or cost-effective after beetle populations begin to decrease and the plants mature (usually in 2 to 4 weeks after plant emergence). Older plants are much more tolerant of beetle feeding damage and bacterial wilt infection than young plants. Frequent use of some foliar insecticides may also reduce fruit set because the chemicals may cause abortion of flowers. In addition, foliar insecticides kill beneficial insects like predators, parasites, and pollinating bees.

A new type of insecticide, Adios, is now registered for use on cucumbers, squash, melons, and pumpkins. Although used as a foliar spray, Adios acts as a bait because it contains a cucumber beetle feeding stimulant along with 13% carbaryl insecticide. When Adios is sprayed on foliage, beetles are stimulated to feed on the compound and are

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Figure 3. Symptoms of bacterial wilt disease.
Management Of Cucumber Beetles And Bacterial Wilt Of Cucurbits

Recommended Insecticides for Cucumber Beetle Control on Cucurbits

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Amount of formulation per acre</th>
<th>Minimum days from last application to harvest</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbofuran</td>
<td>FURADAN 4F 3.8 fl. oz. per 1,000 feet of row</td>
<td>not applicable</td>
<td>Apply in the furrow at planting. Furadan 4F may be mixed with water or liquid fertilizer. Furadan is a restricted use insecticide.</td>
</tr>
<tr>
<td>carbaryl</td>
<td>SEVIN 80WP 1.25 lb</td>
<td>0</td>
<td>Adios acts as a bait that contains a beetle feeding stimulant and carbaryl insecticide.</td>
</tr>
<tr>
<td></td>
<td>ADIOS 0.5 - 0.75 lb</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>endosulfan</td>
<td>PHASER 0.66 - 1.33 qt</td>
<td>2</td>
<td>Phaser and Thiodan are not registered for use on pumpkin.</td>
</tr>
<tr>
<td></td>
<td>THIODAN 3EC 0.66 - 1.33 qt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>esfenvalerate</td>
<td>ASANA XL 5.8 - 9.6 fl oz</td>
<td>3</td>
<td>Asana is a restricted use insecticide.</td>
</tr>
<tr>
<td>permethrin</td>
<td>AMBUSH 2EC 6.4 - 12.8 fl oz</td>
<td>0</td>
<td>Ambush and Pounce are restricted use insecticides.</td>
</tr>
<tr>
<td></td>
<td>POUNCE 3.2EC 4 - 8 fl oz</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

 Killed by the carbaryl. In field tests, Adios has provided cucumber beetle control ranging from lower to or equal to that of foliar insecticides. It has no harmful effect on beneficial insects, including pollinators (because insects other than cucumber beetles are not stimulated to feed on the compound).

For organic growers who prefer not to use insecticides, cheesecloth or other suitable row cover material may be used to protect plants from beetles during the period from emergence to bloom. Row covers must be removed before flowers appear to allow pollination by insects. In addition, control of weeds in and around fields may reduce beetle populations and the amount of bacterial wilt inoculum that is transmitted by beetles. Interplanting of cucurbit plants with radish, pansies, marigolds, or nasturtiums has been reported to repel cucumber beetles.

Row Covers
Geoff Zehnder, Extension Entomologist, Associate Professor, Entomology, Auburn University

Use pesticides only according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended only if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used only to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county’s name to find the number.

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