Cucumber Beetles: Pair of Pests Can Be a Bit of a Pickle

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Few insects cause as much frustration for vegetable growers as cucumber beetles. Small, fast, and surprisingly destructive, these beetles can devastate cucurbit crops before a gardener even realizes they have a problem. Understanding their biology, behavior, and weaknesses is the first step toward keeping them in check.

Description

The common name ***cucumber beetle*** is used to refer to several members of the largest beetle family on earth: Chrysomelidae, the leaf beetles. In Arkansas, two common species that cause the most damage are the **striped cucumber beetle** (*Acalymma vittatum*) and the **spotted cucumber beetle** (*Diabrotica undecimpunctata*), pictured below. The spotted variety is also known in its larval form as the southern corn rootworm, which hints at just how far-reaching this insect's impact can be.

Both species are small (roughly ¼ inch long) with bright, yellow-green coloration that serves as a mild warning to predators. Both have noted resistance to compounds called cucurbitacins. These defensive phytochemicals are found in many cucurbit species to make them distasteful to herbivores, but these volatiles actually help cucumber beetles locate host plants. Male beetles also release aggregation pheromones when feeding. This helps attract others of their species to suitable food, and increases their mating opportunities.

Photo by Katja Schulz (CC-BY 2.0, flickr.com).
Acalymma vittatum
striped cucumber beetle

Photo by Katja Schulz (CC-BY 2.0, flickr.com).
Diabrotica undecimpunctata
spotted cucumber beetle

Biology and Life Cycle

Cucumber beetles undergo complete metamorphosis, passing through distinct phases: egg, three larval instars, pupa, and adult. Adults overwinter in leaf litter and in other sheltered locations near old cucurbit patches. Preferred host plants include many varieties of cucumbers, squash, pumpkins, melons and gourds. Beetles appear in spring as temperatures climb and host seedlings begin to emerge, typically in late April to early May in Arkansas and much of the mid-South.

Once active, adults begin to feed and mate. Female cucumber beetles lay pale yellow-orange eggs just under the surface of the soil at the base of host plants. Eggs are deposited in clusters of 25-50, with a single female able to produce between 150-400 eggs or more in her lifetime. Eggs require moist soil to survive. They hatch in 6-14 days in favorable conditions, but can take up to 30 days if temperatures remain cool.

Larvae are small (around 3/8 inch) and creamy white in color. The pale, slender larvae burrow deeper into the soil to feed on plant roots for 3-4 weeks before pupating underground. Adults emerge from pupation after about a week, and the new generation begins feeding on above-ground plant parts. In Arkansas, there are typically 2-4 generations per year (depending on latitude), with peak adult activity in late spring and again in midsummer. Towards late summer and fall, adults will seek overwintering sites and enter diapause, remaining dormant until next spring.

Damage

After hatching in the soil, **striped cucumber beetle** larvae feed almost exclusively on plant roots, which can stunt their growth and weaken a plant's structure. Adults feed on nearly every above-ground plant part of various cucurbits.

Larvae of **spotted cucumber beetle** can feed on roots, stem base and the surface of fruits. In addition to cucurbits, their larvae can also damage roots of corn and winter rye. Adults may also feed on tomato, okra beans, eggplant, sweet potatoes and corn silk (causing kernel loss). Roses and some other ornamentals are also occasionally damaged.

Once they mature, adult beetles move above ground to feed on cotyledons, leaves, and flowers. Smaller plants can become totally defoliated, but feeding on flowers may not greatly decrease yield. When populations are high, beetles may also feed on stems and the skin of the fruit itself. In addition to direct feeding, these beetles can vector bacterial wilt and squash mosaic virus, to which melons and cucumbers are particularly susceptible.

Both species of cucumber beetle cause similar damage to seedling, foliage, flowers and fruit. (Photos from University of Minnesota Extension)

Control

Natural enemies include epigeal predators such as wolf spiders and ground beetles, as well as parasitoid flies and wasps. However, when large aggregations of cucumber beetles come together to feed, natural enemies are likely insufficient to control their populations before damage occurs.

Seedling plants are most susceptible to damage. Row covers can be used to exclude adults from feeding on emerging plants. Remove these covers when plants begin to flower, to allow access to pollinators. Once plants are higher than 6 inches, or past 3rd true leaf stage, they are less susceptible to damage, but heavy defoliation can still reduce plant vigor.

In home gardens, control early season adult beetles before they mate and lay eggs. Monitor emerging seedlings and young plants regularly. If you see 2 or more beetles on 25% of plants, promptly spraying may be necessary. More mature plants can tolerate feeding from higher numbers of beetles, but if more than 25% defoliation is observed, spray plants. Pack thick straw around the base of mature plants to make it more difficult for adults to lay eggs in the soil.

Consider using a **trap crop** to lure beetles away from your main garden plot. Plant a highly attractive cucurbit variety (such as blue hubbard squash) 1-2 weeks before your other plantings. As trap plants emerge, monitor them for the presence of early cucumber beetle adults to appear, and treat these plants with an insecticide.

Remove weeds in and around garden plots, which can serve as alternative hosts for these beetles and other pests. Promptly remove any plants that show signs of bacterial wilt, before additional beetles can feed on this plant and vector the bacteria to new hosts. At the end of summer, remove dead plants, garden debris and leaf litter to reduce the number of sites adult beetles can overwinter.

Chemical control can be achieved with products containing acetamiprid, bifenthrin, carbaryl, cyfluthrin, esfenvalerate, imidacloprid, permethrin or zetamethrin. Many cucurbit species are monoecious (having separate male and female flowers on the same plant) making them heavily dependent on insect pollination. Without critical pollinator visits to adequately fertilize ovules, sufficient seed set will not occur, and fruit may not develop. Therefore minimize danger to pollinators by applying chemical pesticides judiciously to stems and foliage only, taking care to avoid flowers. Before using any pesticide, be sure to read and follow all label instructions, and note pre-harvest intervals for crops to be eaten.

Organic management is also possible. Kaolin clay is a non-toxic, chalky residue that can be sprayed onto foliage. It acts as a feeding deterrent to adult cucumber beetles (and some other pests), and may also reduce egg-laying. Entomopathogenic nematodes (such as *Heterorhabditis bacteriophora* or *Steinernema carpocapsae*) applied to the soil may reduce the survival of larvae and pupae, but may require reapplication for control of the next generation of beetles. Cucumber beetles are highly attracted to the color yellow. Suspending yellow sticky cards above growing plants may aid in monitoring for cucumber beetles, but will also tend to trap many other beneficial insects (predators and pollinators).