

Spots and stripes: two bandits of the West! Ecology and a new aggregation pheromone of cucumber beetles

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Guest Speaker

Jasmin Ramirez Bonilla, UC Davis Dept. of Entomology

The Western striped cucumber beetle and the Western spotted cucumber beetle are two serious pests of cucurbits in California. In this week's session of the Lunchtime Seminar Series for Organic Growers, UC Davis researcher Jasmin Ramirez Bonilla discussed the work that she is doing with Dr. Ian Grettenberger, the UC Davis/ UCCE Specialist in Entomology, to investigate their behavior, ecology and management.

	<p>The Western striped cucumber beetle (<i>Acalymma trivittatum</i>) is a major pest on melons in California. They are specialists on cucurbits and do not complete their generations on other crops. Larvae feed on roots, while adults feed on foliage and fruit rinds. They especially love the tender fruits as they emerge from the flower, resulting in major cosmetic damage. This can make fruits unmarketable.</p>	
	<p>The Western spotted cucumber beetle (<i>Diabrotica undecimpunctata undecimpunctata</i>) is often less damaging than the striped cucumber beetle because it frequently feeds on the foliage and the flowers, although it will also feed on fruits. However, it can still be a very serious pest. They feed on many species besides cucurbits and may come from neighboring fields of tomatoes or alfalfa.</p>	 

Where do they go in the off season?

Western spotted cucumber beetles live in many non-cucurbit crops, often overwintering in alfalfa. However, less is known about where the Western striped cucumber beetles overwinter. They have been observed sheltering under tree bark, but it's not known whether they are also attracted to specific weeds. Ramirez Bonilla researched their abundance on weeds in two organic farms. They appeared to be most abundant on a few species, including wall barley, milk thistle, and little mallow. However, it wasn't clear whether that was because they were attracted to these weeds or whether these weeds were most abundant. Numbers of beetles on the weeds steeply declined when the crop was planted and increased when it was harvested, meaning that the cucurbits were a much stronger attractant than the weeds.

Non-crop habitat and IPM

Knowing which weeds attract the beetles most can help streamline monitoring--if you know where to look, it reduces time and resources. As we learn more, it could also have implications for weed management. The team's next step will be to conduct controlled trials among the top four weed species they observed beetles on to determine whether the beetles display a preference.

Aggregation pheromone

Another tool which holds promise for monitoring both cucumber beetles, and perhaps ultimately controlling them, is the use of pheromones. A new pheromone known as vittatalactone has shown promise as an attractant for a related East Coast species, the striped cucumber beetle (*Acalymma vittatum*) in work by USDA researchers.

Vittatalactone is an aggregation pheromone produced by male striped cucumber beetles that attracts both males and females. The research team used clear sticky cards baited with the pheromone, with and without the addition of a floral lure. They also set up cards with no lures. Both Western striped and spotted beetles were attracted by the pheromone alone. However, they were much more attracted when a floral lure, which mimics the scent of cucurbit flowers, was added. The effect was season-dependent, being strongest after harvest, and weakest while the crop was flowering.



The team's next steps will be to test the floral lure alone, and to test the attractiveness of the combined treatment early in the season. Vittalactone isn't on the market yet. However, the results suggest that combined with a floral lure it could be a useful tool for growers to monitor their cucumber beetle populations. Eventually it could become part of an attract-and-kill strategy.

Control options

So what options do growers currently have for controlling cucumber beetles? Following the talk, growers and extensionists attending the seminar discussed some of their experiences. Unlike many insects, cucumber beetles don't have many natural enemies or parasitoids, making biocontrol difficult. Row covers are also not a good option, because they cannot be used once the crop needs to be pollinated. One approach is the strategic choice of melon varieties to grow. Orange honeydews and galia seem to sustain more damage and collapse sooner than canary melons or cantaloupes. Sunflowers and callaloo (amaranth) have been observed to be a good trap crops for the Western spotted cucumber beetles, for an attract-and-vacuum approach. Some growers report success with diatomaceous earth, or with combinations of cucurbitacin (a feeding stimulant) combined with Spinosad (an insecticide).

TAKEHOME POINTS AND RESOURCES

- Western striped and Western spotted cucumber beetles are serious cucurbit pests in California
- The striped beetles are generally a more serious pest of melons than the spotted beetles, as they preferentially attack the fruit
- Knowing non-crop hosts can help you monitor populations better
- Aggregation pheromone vittatalactone shows promise for improving monitoring and control options

More information on the biology and management of cucumber beetles can be found at the UC IPM website <http://ipm.ucanr.edu/PMG/r116300511.html>

Questions? Stories to share? Contact Dr. Margaret Lloyd at mglloyd@ucdavis.edu

A recording of this talk is available at:

[http://ccsmallfarms.ucanr.edu/Events and trainings/Organic Agriculture Seminar Series for Growers/](http://ccsmallfarms.ucanr.edu/Events_and_trainings/Organic_Agriculture_Seminar_Series_for_Growers/)