Scientists battle new threat to area crops

Bagrada bug is an invasive pest

By Leigh Cooper
lacooper@thecalifornian.com

The Bagrada bug started stalking northward from Los Angeles County in 2008. Last year the insects entered the Salinas Valley, where they found a buffet of broccoli and cauliflower seedlings.

Broccoli brings $426 million dollars into Monterey County, with an additional $163 million stemming from cauliflower, according to the county's 2013 Crop Report. To protect these cash crops, conventional farmers have turned to increased pesticide applications, while organic growers watch these pea-sized pests suck away their profits.

"They are established bugs in this area now. We have to live with this," said Shimat Joseph, entomologist with the UC Cooperative Extension for Monterey, San Benito and Santa Cruz counties. "This is going to be a serious problem for both conventional and organic growers. We will be putting our best efforts into findings solutions."

The Bagrada bug, an invasive stinkbug from Africa, has spread through 19 California counties as well as Arizona, New Mexico, Texas, Nevada and Utah. It prefers to munch on plants in the mustard family, Brassicaceae. More informally, these plants are known as cole crops and include broccoli, cauliflower, cabbage, kale, collards and Brussels sprouts.

"Any new pest is concern-

See BUGS, Page 2A

PROVIDED/SHIMAT JOSEPH

Bagrada bugs feast on produce leaves.

Bugs

Continued from Page 1A

of the cole crops in the area," said Norm Groot, executive director at the Monterey County Farm Bureau.

People often mistake Bagrada bugs, which are black with orange and white markings, for the much larger harlequin bugs. The insects use their needle-like mouthparts to pierce a plant and ingest its juices. These pierce marks scar the plant with starburst-shaped lesions and often result in stippled, wilting leaves.

Cole crops are most susceptible to damage from the time they sprout until they are big enough to have grown four leaves. If the bugs feed on the top of the main shoot during this time, it can cause "multiple heads" to grow or "blind heads." Using broccoli as an example, "multiple heads" result in many, tiny, unsellable broccoli heads; a "blind head" means no head of broccoli ever forms.

No one can say exactly how much money is being lost to the Bagrada bugs in Monterey County, but conventional growers are facing a 5 to 30 percent loss, Joseph reports on his Salinas Valley Agriculture blog.

The bugs also will slurp on tomato, pepper and potato plants, although their numbers are usually lower in these fields. Attacks on strawberries, lettuce, spinach or grapes have not been reported, Joseph said. Farmers have found the bugs scrambling over these plants, but they have not documented any plant damage.

Farmers had hoped the colder temperatures in Central California would limit the spread of the bugs, but they survived their first winter in Salinas Valley. All life stages of the bug — eggs, larvae and adults — have been found in Salinas Valley in February, which means they are reproducing year-round and not lying dormant over winter, Joseph said.

In Central California, their populations increase quickly in late summer with the warmer temperatures, but insects need food to sustain a large population.

"And there is plenty of food here," said Joseph. "Some of the growers are growing back-to-back Brassica crops."

Managing the pest has proven tricky.

"If they are migrating in large numbers to crop plants, control can be really difficult," said Surendra Dara, the UC Cooperative Extension adviser for San Luis Obispo, Santa Barbara and Ventura counties.

Conventional farmers are applying insecticides at almost double the normal rate during the four to five weeks when seedlings are most vulnerable. Some growers are forced to spray two applications per week, Joseph said. The growers are staying within the limits for pesticide use, but they are basically spraying money onto their fields with each application.

Joseph suggests that growers may have better luck managing the Bagrada bug through techniques such as weed management.

"Just spray and kill the bugs — that kind of idea needs to change a little bit," Joseph said. "Maybe we need to think differently."

Researchers found the insects harm crop plants near field borders more than those in the center. The bugs use weeds on the field's edge as reservoirs, placing them in prime position to hop to newly sprouting fields. Joseph suggests farmers remove weeds like sweet alyssum, London rocket, shepherd's purse and wild mustard from ditches, waterways and field edges.

Across organic farms, things are not looking good.

"For organic growers we don't have any concert tools at this moment," Joseph said. "They just take the loss."

Dara has performed a number of laboratory experiments using fungal pathogens and bacteria-based products to manage Bagrada bugs. The most promising product was the fungal agent in Mycotrol-O, which caused increased insect death. But a few farmers who have tried Mycotrol-O have not gotten the results they hoped for, Dara said.

"In the field, efficacy can be quite variable due to multiple factors. How we apply and when we apply is very important, especially with microbial pesticides. I am planning to do some field studies in cole crops," Dara said.

He will continue testing Mycotrol-O and other products in the hopes of bringing some reprieve to organic farmers.

With small plots, gardeners can remove the eggs or use vacuuming to remove adults. Females lay their small, barrel-shaped eggs on the underside of leaves and in cracks in the soil. The eggs start as white and change to orange-red over time.

"If you have a small garden and a few hundred Bagrada bugs, vacuuming also can be possible, but it is not practical for a commercial grower," Dara said.

The California Department of Food and Agriculture recently awarded a Specialty Crop Block Grant for research on the Bagrada bug. Joseph and Dara, both members of this group, will be looking at where the bugs lay their eggs, their preferred host plants and their reproduction rates. They will also be testing a number of management options, including exploring the use of natural enemies against the Bagrada bug.

The California Department of Food and Agriculture rates pests, including diseases, animals or weeds, according to their detrimental effects on California's agriculture and environment. The rankings help county agricultural commissioners decide where to spend their resources. At the moment, Bagrada bugs have a 'B' rating, which means that although they are affecting agriculture, they are only eradicated in nurseries.

"Likely they will be downgraded to level 'C' in January," said Bob Roach, assistant agricultural commissioner for Monterey County.

A 'C' rating means that there will be no controls on the Bagrada bug in California. "One of the most important considerations is how widespread the pest is," said Roach. "The pest rating system is meant to contain harmful pests. If something is all over the place, you might as well throw up your hands."

Although Groot expressed a desire for "a temporary exception on chemicals to fight the bugs for a short period of time to minimize an outbreak" he understands the Agricultural Commission's plans to downgrade the Bagrada bug.

"It's a practical solution, because we aren't going to sustain an eradication," he said.

Nationally, the Bagrada bug is listed as a "non-actionable pest" meaning international produce shipments can contain the insects. Individual states can negate this by limiting the transport of Bagrada bugs across their state lines; Florida has done this. "If they find one Bagrada bug, that's it, you're done. They can't ship into the state," Roach said.

If Florida finds a Bagrada bug in a produce shipment, state officials divert the shipment. Shippers have to explain to Florida how they will manage the Bagrada bug to ensure only clean produce will enter Florida.

For Salinas Valley growers and shippers who specialize in broccoli, cauliflower, cabbage and other vegetables enjoyed by the Bagrada bugs, the insect has become a permanent pest. Its quick invasion has left organic farmers struggling and commercial farmers spending extra money to protect the crops they need to pay the bills. Joseph said farmers to the north, in Oregon and Washington, may not have to deal with the Bagrada bug too much because the climate there is less favorable to them.

"But insects are crazy, so you never know," he said.

Follow Leigh Cooper on Twitter @gdaycoop