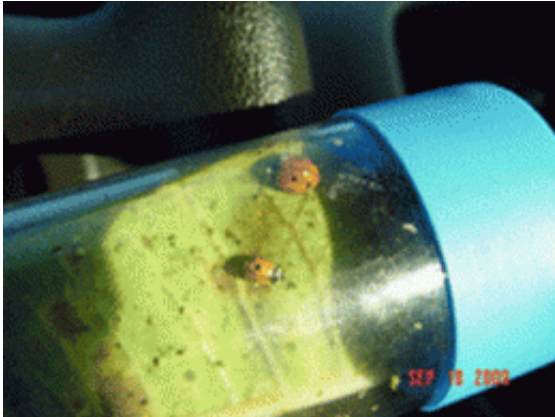


Researchers find that rare lady beetles prefer traditional diet

19 March 2010



An entomologist's field photo shows nine-spotted lady beetles collected from western South Dakota grasslands in September 2009. The insects were the parental line of a successful colony at North Central Agricultural Research Laboratory. The male is the smaller insect.

(PhysOrg.com) -- Experts from South Dakota State University and the nearby North Central Agricultural Research Laboratory watched helplessly as a colony of rare, captive lady beetles was lost in 2008, then teetered on the edge of disaster again in 2009.

"It was pretty gloomy," SDSU Extension Entomologist Mike Catangui said.

"We were actually on the brink of losing the entire colony for the second time."

But late in 2009, [entomologists](#) figured out what was wrong — and they now have a colony that can help them do the research to understand why some species are not thriving. At some point in the future, provided entomologists can figure out what is working against the insects in some environments, the colony can provide the means to re-introduce rare lady beetle species into the wild.

"This is a very important accomplishment. We now

have a means of re-introducing it," Catangui said.

"It's not a matter of if, it's a matter of when and where."

Catangui has been collaborating with research entomologist Louis Hesler and biological technician Eric Beckendorf at the North Central Agricultural Research Laboratory, or NCARL, an ideal place to find experts at raising insects in captivity. NCARL is a research laboratory for the U.S. Department of Agriculture's Agricultural Research Service.

The researchers plan to publish an academic article soon to give other scientists the details on how they established a successful captive breeding colony of 400 nine-spotted lady beetles from only nine insects. They have established a similar colony of about 400 rare transverse lady beetles as well.

One important secret for raising rare lady beetles: go easy on the foreign food if you're feeding a bug with conservative, Midwestern American appetites.

The scientists explained that they first tried to raise the nine-spotted lady beetles, captured from native grasslands in western South Dakota, by feeding them a diet of soybean aphids. The problem with that is that [soybean aphid](#) is a pest native to Asia that was first found in North America in Wisconsin in the year 2000. By that time the nine-spotted lady beetle, a predator, had already vanished from eastern South Dakota and some other states. It has completely vanished from some areas.

"The nine-spotted ladybugs had been here a long time, but they started to decline without ever encountering the soybean aphid. We were assuming they could survive on soybean aphid, a species they hadn't preyed upon when they were still abundant," Catangui said.

Hesler and Beckendorf have experience in raising insects because they are entomologists at NCARL.

One of NCARL's claims to fame is that it raises most of the corn rootworms needed for research purposes around the world. But scientists couldn't get the rare lady beetles to thrive.

Fortunately, Catangui and Hesler are both among the handful of scientists nationwide who lead the Lost Ladybug Project, an effort to track species of native lady beetle that have been declining over the past 20 years. Their colleagues, John Losey and Leslie Allee — entomologists from Cornell University who are also part of the Lost Ladybug Project — made the suggestion that the South Dakota scientists try other species of aphid instead.

Beckendorf said lab technicians have now tried offering the captive lady beetles various diets that includes bird cherry oat aphid, pea aphid, yellow sugarcane aphid and, currently, greenbug. Most of those are native species. Pea aphid is a species of insect introduced to North America from Eurasia at some point before 1900, so nine-spotted lady beetles had encountered it before.

"To begin with, we had to tinker around with diet. We hadn't seen them for years, so we didn't know what they were feeding on in the wild," Beckendorf said.

"We started getting a grasp on different diets that worked better for them and all of a sudden they took off."

Hesler said having a thriving colony of nine-spotted lady beetles at NCARL opens the door to possibilities of the kind scientists had in mind when they started the Lost Ladybug Project, which is funded by a \$2 million grant from the National Science Foundation.

"Having the colony allows us to set up experiments to get at some of those questions of why they've become rare," Hesler said. "That's what we're trying to answer, what are the reasons for their decline.

"So if we want to test competition or their ability to survive on different aphid prey, those kinds of things, we could test those in the laboratory and make some guesses or some inferences about

what might be happening out in the field or out in nature."

The decline of some species of lady beetles started in the eastern United States and is a nationwide problem — hence the need for the Lost Ladybug Project.

Cornell University entomologist John Losey said Cornell also has colonies of the nine-spotted lady beetle and other rare lady beetles. As in South Dakota, the Lost Ladybug Project is making use of these colonies to test various hypotheses regarding why they declined.

"Specifically, we're testing if the introduced species could have introduced a disease, outcompeted the natives for aphids or interbred with the native species," Losey said. "Using this laboratory data along with the direct observation data from the field will give us the insights we need. Once we know why they declined, we will be on our way to being able to help them and other species in the same predicament. All this research was made possible by our dedicated volunteer 'spotters.'"

Hesler said a leading hypothesis now is that recently introduced exotic species are out-competing native lady beetles. In eastern South Dakota, for example, at least two species of lady beetle — the two-spotted and the transverse — began declining about the same time that the seven-spotted lady beetle came in. The seven-spotted lady beetle is an introduced species from Europe that, in South Dakota, first showed up in 1988.

Having the colony also makes it possible to take displays of the rare insects to science fairs or other events where scientists can get children involved in the Lost Ladybug Project. The nationwide project has been seeking to enlist children as citizen scientists — quite successfully, it turns out — to help scout for lost lady beetles and provide information about where species are still being found. People can learn more about the Lost Ladybug Project at its Web site, www.lostladybug.org/.

Hesler said already the photos and information submitted from all over the country show a prevailing pattern in where rare lady beetle species

are still being found.

“It’s predominantly from the eastern slope of the Rockies and westward where they’re showing up,” Hesler said.

Provided by South Dakota State University

APA citation: Researchers find that rare lady beetles prefer traditional diet (2010, March 19) retrieved 23 April 2021 from <https://phys.org/news/2010-03-rare-lady-beetles-traditional-diet.html>

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