

# Crop Scientists Explore Using Predator Insects To Eat Pests In High Tunnels

March 26 2022 7:15 AM

URBANA – Crouched between rows of tomatoes and peppers tucked inside a high tunnel, researchers pluck insects off plants in the name of science. Because to catch a pest, you may have to release a predator.



The flourishing local foods movement is driving more Illinois farmers to grow fruits and vegetables, using high tunnels to extend the growing season. All that fresh produce in an enclosed space makes insect outbreaks common. To help growers protect their

investment, University of Illinois Extension is researching how to use predator insects to control pests.

[Bronwyn Aly](#), an Extension local food systems and small farms educator in Southern Illinois, knew local farmers needed a safe, efficient, and cost-effective way to deal with pests in high tunnels. This need prompted her to reach out to University of Illinois researcher [Kacie Athey](#), assistant professor in the [Department of Crop Sciences](#), for a solution.

The question is, can other insects – their natural predators – be used to control pests?

“There isn’t a lot known about how effective these predators are in high tunnels,” Athey says. So, she, Aly, and [Matthew Turino](#), crop sciences research specialist, teamed up to find out.

“This project is a great example of how university crop scientists and field staff come together to solve a real-world problem for Illinois farmers,” says [Shelly Nickols-Richardson](#), associate dean and director of Illinois Extension.

## **Local foods movement brings high tunnels to Illinois**

In Illinois, fruit and vegetable growers are relying on high tunnels to meet the growing demand for fresh, local foods. The covered structures are heated by the sun, allowing for longer growing seasons. But insects, both greenhouse and open field pests, thrive in high tunnels.

Crop scientists have led fruit and vegetable field research for the university at [Dixon Springs Agricultural Center](#) in Southern Illinois since the 1960s. Their first high tunnel went up in 2010.

“We were starting to see growers looking at adopting high tunnel practices and we wanted to do research to help them,” Aly says. Now Dixon Springs has three commercial-size high tunnels.

## **Biological Control: Bring on the bugs**

To control pest outbreaks, many guides recommend using a pesticide followed by the release of predator insects, but many insecticides are not labeled for high tunnels and many growers worry about exposure risks in a semi-enclosed space.

Farmers and gardeners have introduced natural enemies of pests to control insect populations, an approach called biological control, for centuries. In a two-year project

that started the summer of 2021, the research team released insect predators in high tunnels with tomatoes, peppers, and a few other crops. They wanted to see if and how they affected pest populations of spider mites, aphids, whiteflies, and thrips.

“These are very common pests in greenhouses and high tunnels, and they are good candidates for this project because these are the type of pests that can continue to outbreak when you spray insecticides,” Athey says.

The researchers released three species of enemy insects into the high tunnels once a month: insidious flower bug (*Orius insidiosus*), a mite (*Amblyseius swirskii*), and two-spotted lady beetle (*Adalia bipunctata*). These species are already established in the U.S.

For biocontrol to be cost-effective, growers need to know which predators will eat which pests. This requires a gut check.

After a few weeks, researchers collected predatory insects and spiders and ran a gut content analysis. That test uses unique molecular markers that reveal the pests the predator had eaten.

## **Research Results**

The results are promising so far; the number of aphids, whiteflies, and leafhoppers decreased in high tunnels where predators were released.

“In the first season, we had reduced pest pressure in certain groups in the tunnels with predator release,” Athey says. “We also identified a successful biological control agent.”

They found the insidious flower bug was eating aphids, thrips, whiteflies, spider mites. The predator mite was eating thrips, whiteflies, and spider mites. The lady beetle, which is expensive to buy, ate aphids but was never found again after they were released.

## **What is Next**

This summer, the research team will use what they learned to further pinpoint useful biological control agents.

“Thrips are one species growers struggle with the most since they’re not easily controlled with chemical insecticides,” Athey says. “This summer, we’re going to focus on determining what predators to use to control thrips.”

The team has shared early results with southern Illinois high tunnel growers. They plan to publish a paper on their work and create a fact sheet of recommendations.

Always keeping farmers in mind, Aly says they also plan to compare the costs of biological controls and pesticides.

“That is going to be a big question for high tunnel growers. They’re going to want to know how well it works and also the cost of it,” Aly says.

This project is funded by an [Extension Collaboration Grant](#). First launched in 2018, grants are part of an ongoing effort to connect campus-based researchers and field staff to do applied research projects that will improve the quality of life of Illinois residents. The grants – which focus on addressing critical issues in food, economy, environment, community, and health – returned again in 2020. Illinois Extension and the [College of Agricultural, Consumer and Environmental Sciences](#) provided 17 grants in the current round of funding with financial support from University of Illinois’ [Office of the Provost Investment for Growth Program](#).

**SOURCES:** Kacie Athey, Assistant Professor [Department of Crop Sciences](#) and Extension specialist; [Bronwyn Aly](#), Illinois Extension Educator, Local Food Systems and Small Farms educator.

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