# Polston Lab ‘Recruits’ Insects as Allies for Plants in Food Security Project

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A University of Florida lab spearheaded a campaign to recruit insects as allies that can aid in reducing plant stress to enhance food security.

*DR. JANE POLSTON*

The initial, 12-month “recruiting” effort by Jane Polston, a professor of plant pathology at the UF Institute of Food and Agricultural Sciences, successfully completes the first of three phases of a scheduled four-year project under the Defense Advanced Research Projects Agency’s (DARPA) Insect Allies program (https://www.darpa.mil/program/insect-allies).

Almost $900,000 will fund the Polston lab’s effort throughout the project. The aim of the project is to develop a rapid response capability for farmers to defend mature crops from unanticipated or fast-moving environmental and biological threats.

UF participates in Insect Allies as part of a team of researchers led by Penn State (https://news.psu.edu/story/495037/2017/11/20/research/penn-state-team-receives-7m-award-enlist-insects-allies-food), alongside additional subcontractors from the University of Texas at San Antonio and Pacific

Northwest National Laboratory. Together, they study plant-insect-virus systems to understand and improve how they might work together to improve plant defenses.

Polston, who leads the virus team, said the interdisciplinary project has been an exciting opportunity for her to bridge her background in plant virology with other contributors' backgrounds in biology, entomology, chemical engineering and "OMICS" (proteomics, metabolomics, genomics).

The Polston Lab facilities for insect-rearing and capabilities for analyzing viruses and virus-plant host range were critical for executing a Phase I demonstration and will continue to be vital to meeting the rigorous research milestones set by DARPA.

"It's so interesting to reconsider insects and viruses as allies rather than as detriments that need to be eliminated to increase food production," Polston said, noting how, as a plant virologist, she spent decades studying ways to manage crop-destroying plant viruses and the insects that transmit them—without ever considering them as potential tools for beneficial intervention.

The project team ultimately aims to demonstrate its rapid response capability in a system that uses common whiteflies to deliver beneficial genes to tomato plants to alleviate the effects of drought stress.

During Phase I— and consistent with the team's biocontainment methodology— their objective was limited to confirming that gene delivery by an insect is possible in a laboratory. The team successfully demonstrated transmission of a deconstructed virus from one plant to another via a whitefly.

Specifically, Polston's team of researchers — including co-Principal Investigator Garry Sunter, UTSA department of biology, (https://www.utsa.edu/today/2017/10/story/DARPA.html) UF/IFAS post-doctoral researchers Alba Nava and Zafar Iqbal; and UF/IFAS biological scientist Heather Capobianco — used a deconstructed begomovirus to transmit genes that encoded for yellow fluorescent protein.

“We were so excited when we looked in the microscope lens and saw that glow,” Polston said.

*Source: University of Florida Institute of Food and Agricultural Sciences (https://ifas.ufl.edu/)*

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