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**Pest management through plant defenses a focus of new Arkansas Agricultural Experiment Station entomologist**

By Brittaney Mann

U of A System Division of Agriculture

## Fast facts

* Rupesh Kariyat is a new associate professor of crop entomology
* Studies plant defenses and herbivore counter defenses for use in sustainable pest management
* Part of a team of scientists studying interactions among sugarcane aphid, fall army worm, in grain sorghum and other field crops

(789 words)

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FAYETTEVILLE, Ark. — Plants naturally equip themselves with defenses against insect herbivores. Understanding how those defenses work can reveal alternative approaches to pest management. Rupesh Kariyat, associate professor of crop entomology with the Arkansas Agricultural Experiment Station, researches the principles of those defenses to find innovative pest management strategies.

“I have always been interested in understanding insect behavior,” Kariyat said of plant and insect herbivore interactions in the field. “Because I believe that once you understand the behavior, that gives you a gauge where you can look at growth, development, mating, reproduction, dispersal — all these things which are key components in pest management.”

Kariyat joined the Agricultural Experiment Station, the research arm of the University of Arkansas System Division of Agriculture, in late July. He will spend much of his time doing research. He will also work with the Cooperative Extension Service and teach courses through the Dale Bumpers College of Agricultural, Food and Life Sciences at the University of Arkansas.

Before joining the experiment station, Kariyat was a faculty member at the University of Texas Rio Grande Valley. He studied plant surface defenses and secondary metabolites in plants, which are some ways to identify alternative pest management methods, to understand how those affect an insect herbivore’s overall fitness traits.

He also used chemical ecology —plant volatiles and insect pheromones— to see how it affects multitrophic interactions among plants, herbivores and pollinators, Kariyat said. His goal is to manipulate these traits to devise pest management solutions.

One of his new focuses is to see if planting cover crops might improve arthropod community dynamics, Kariyat said. The purpose is to attract beneficial insects and deter insect herbivores from the cash crops.

Kariyat plans to continue some of these methods in Arkansas regarding the major row crops — soybean, rice, corn, and grain sorghum.

“The fundamental goal of our lab is to come up with sustainable and integrated pest management practices for crops” in Arkansas and the United States, Kariyat said. Farmers depend on chemical pesticides, so he is also interested in examining alternative methods that focus on using a plant’s resistance traits.

Over recent years, the Division of Agriculture has placed more importance on collaborations within departments and other land-grant universities.

Kariyat said he sees many opportunities for collaborations in his department and within the division as well. He said collaborations will improve his skill set and his lab’s skill set. Kariyat also said that extension entomologists work more closely with agricultural producers than he does, but he wants to work as a bridge to answer their questions. In return, he hopes they can help him with field work and answer important questions from the producers.

For his first project at the experiment station, Kariyat began a small collaboration with Nick Bateman, associate professor and crop entomologist, on rice varieties and how their surfaces interact with herbivores.

Kariyat said he is also a collaborator on a four-year, U.S. Department of Agriculture project with researchers at the University of Nebraska to understand the biology and chemistry underlying interactions among sugarcane aphids, and grain sorghum.

“We are excited to have Dr. Kariyat joining our faculty,” said Ken Korth, department chair of entomology and plant pathology at the University of Arkansas System Division of Agriculture and the Dale Bumpers College of Agricultural, Food and Life Sciences. “He comes with a wealth of experience in both field- and lab-based approaches to understanding how plants and insects interact. He has an impressive publication record examining how plants in the field use their natural defenses to fend off insect pests.”

As an example of his different approaches to teaching, Kariyat, in the past, implemented an interactive program that includes activities like field trips to farms to enhance slideshows and notes. He also initiated a video project about the students’ favorite insects and growing insect eggs throughout the semester. He said he wants to apply the interactive method to future classes.

“I am confident that he will be a valued contributor to our teaching program,” Korth said. “He has developed several large entomology courses and is an effective mentor to both undergraduate and graduate students.”

Kariyat earned his bachelor’s degree in agriculture science in 2003 from Kerala Agricultural University in India, his master’s degree in agronomy from the University of Wyoming in 2007 and his doctorate focused on insect-plant Interactions from Pennsylvania State University in 2012. He also completed postdoctoral work at ETH Zurich in Switzerland and spent time doing field work in Greece.

“I hope that with the vast amount of resources that are available in Arkansas, I should be able to do some good work through which I can come up with better pest management practices and also improve our understanding of the mechanisms underlying these practices,” Kariyat said.

To learn more about Division of Agriculture research, visit the Arkansas Agricultural Experiment Station website: <https://aaes.uada.edu/>. Follow us on Twitter at [@ArkAgResearch](https://twitter.com/ArkAgResearch).

For information about the Cooperative Extension Service, visit <https://www.uaex.uada.edu> and follow us on Twitter at [@AR\_Extension](https://twitter.com/AR_Extension).

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## About the Division of Agriculture

The University of Arkansas System Division of Agriculture’s mission is to strengthen agriculture, communities, and families by connecting trusted research to the adoption of best practices. Through the Agricultural Experiment Station and the Cooperative Extension Service, the Division of Agriculture conducts research and extension work within the nation’s historic land grant education system.

The Division of Agriculture is one of 20 entities within the University of Arkansas System. It has offices in all 75 counties in Arkansas and faculty on five system campuses.

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