THE SACRAMENTO BEE

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UC Davis researchers uncover key step in rice immune response

HIGHLIGHTS

Findings published in online publication Science Advances

Work could help in fight against infections that harm crops

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In the battle between harmful pathogens and plants, lines of communication must remain open.

Researchers from UC Davis have uncovered details of a conversation between rice plants and bacteria that enables rice to mount an immune response to fight infection. This work was published online Friday in Science Advances, a journal published by the American Association for the Advancement of Science. It could lead to the development of new crop varieties or therapeutics with the ability to block harmful microbial infections.

Rice, the No. 1 staple for over half of the world's population, is often threatened by a bacterium known as *Xanthomonas oryzae pv. Oryae* (*Xoo*). Infection with this bacterium causes a disease that results in the yellowing and wilting of rice plants. The bacteria grows best in environments of heavy rain and wind and has played a large role in affecting yield of crops in the highest rice-producing continent, Asia.

Mounting an effective immune response is crucial to survival. Plants rely on a specific receptor, called XA21, to recognize the presence of the *Xoo* bacteria. If XA21 senses *Xoo*, the receptor gathers an army to fight the infection. The XA21 receptor is so successful at this task that plants with XA21 are resistant to the bacteria. Researchers had been puzzled over what molecule in the *Xoo* bacteria was speaking to XA21 directly, but a protein known as RaxX has now been identified as the key player.

Unfortunately some *Xoo* strains have evolved to trick the XA21 receptor. "They have a different version of the immune activator (RaxX). We hope that we can now use this information to predict whether or not the XA21 resistant trait will be useful in certain areas," said Rory Pruitt, co-first author of the paper. Knowing what molecule is directly interacting with XA21 could give researchers the necessary insight to engineer rice crops that are resistant to the evolved *Xoo* strains, providing farmers with an additional resource to fight this infection.

Collaborators on the study with UC Davis included researchers from Lawrence Berkeley National Laboratory; the

Australian National University; University of Tubingen, Germany; University of Texas at Austin; UC Irvine; and the Council of Scientific and Industrial Research, India.

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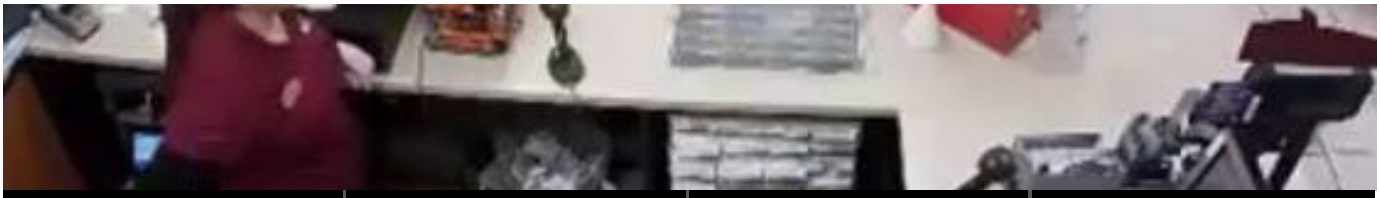

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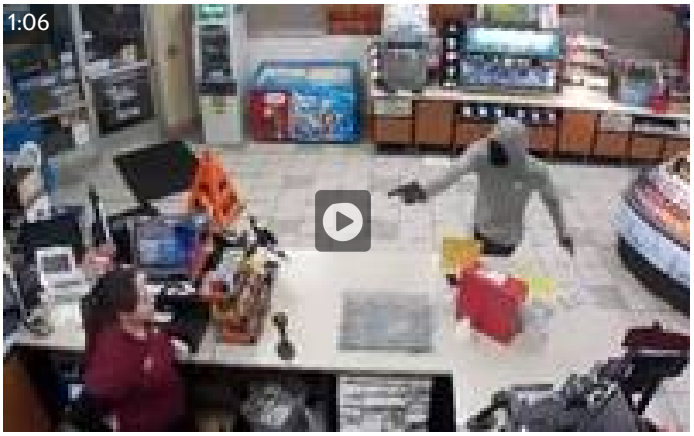

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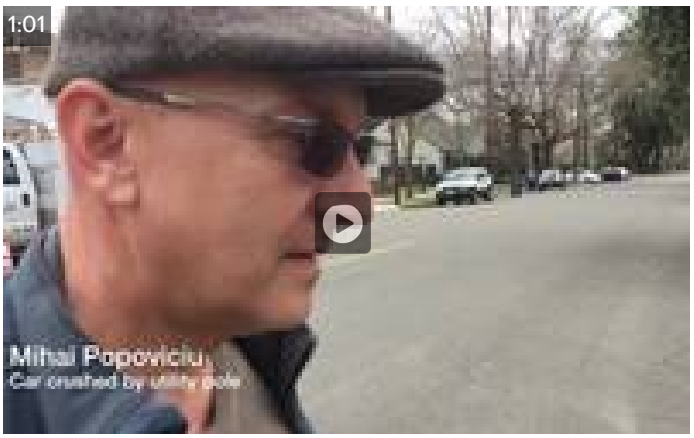

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