How CRISPR gene editing could unlock resistance to destructive citrus greening disease

Researchers at the University of California, Riverside have made an important step in understanding the molecular mechanism of huanglongbing (HLB), a destructive disease that is a serious threat to the citrus industry worldwide.

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In a paper published [April 30] in Nature Communications, a team led by [Wenbo Ma, a professor of plant pathology in UCR's College of Natural & Agricultural Sciences] reported a significant breakthrough in understanding the disease mechanism of HLB. They discovered that the bacterium secretes a protein—called Sec-delivered effector 1 (SDE1)—that helps infect plants. SDE1 works by attacking specific proteases—called papain-like cysteine proteases (PLCPs)—that could otherwise help the citrus trees resist infection.

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Ma said since scientists cannot grow CLas in the laboratory, the team used a surrogate system comprising the model plant *Arabidopsis thaliana* and the bacterial pathogen *Pseudomonas syringae* that was genetically engineered to produce SDE1. Using this system, they show that SDE1 promotes bacterial infection. This study is among the first to describe the molecular tactics employed by CLas to colonize citrus plants.

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The team is now investigating the molecular details of how SDE1 suppresses citrus PLCPs with the aim to use the CRISPR gene editing system to modify the proteases to become resistant to the inhibitory effects of SDE1.

Read full, original post: Researchers Move Toward Understanding Deadly Citrus Disease