

Priming plant defenses with aspirin-like compound

February 14 2014, by Jan Suszkiw



New ARS research suggests that a salicylic acid pretreatment may prevent or lessen infection of crop plants by potato purple top phytoplasma, a bacterium with no cell wall. Credit: Peggy Greb

For thousands of years, humankind has extracted salicylic acid from willow tree bark to alleviate minor pain, fever, and inflammation. Today, it's used in acne medication and wart removers, among other cosmetic products.

Now, findings by U.S. Department of Agriculture (USDA) scientists suggest salicylic acid may also offer "relief" to crop plants by priming their defenses against a microbial menace known as potato purple top phytoplasma, a bacterium that has no cell walls. Outbreaks of the bacterium in the fertile Columbia Basin region of the Pacific Northwest in 2002 and subsequent years inflicted severe potato yield and quality losses.

Carefully timed insecticide applications can deter beet leafhoppers from transmitting the phytoplasma while feeding. But once infected, the plant cannot be cured, according to Yan Zhao, a molecular biologist at the Molecular Plant Pathology Laboratory, operated in Beltsville, Md., by USDA's Agricultural Research Service (ARS).

In studies there, Zhao and his colleagues have collected evidence that pre-treating tomato plants—a relative of potato—with salicylic acid can prevent phytoplasma infections from occurring or at least diminish their severity.

For their research, [published](#) in the July 2012 *Annals of Applied Biology*, the team used an experimental group of potted tomato seedlings and a second group of the plants, called the control group, for comparison. The experimental group received two salicylic acid treatments—the first via a spray solution four weeks after the seedlings had been planted, and the second via a root drench two days before phytoplasma-infected scions were grafted onto the plants' stems to induce disease. The [control group](#) wasn't treated.

The team visually checked for disease symptoms and analyzed leaf samples for the phytoplasma's unique DNA fingerprint, which turned up in 94 percent of samples from untreated plants and 47 percent of treated ones. Significantly, the remaining 53 percent of treated [plants](#) were symptom- and pathogen-free 40 days after exposure to the infected scions.

Researchers credit [salicylic acid](#) with triggering systemic acquired resistance, a kind of general readiness state that primes plant defenses against pending microbial or insect attack.

More information: Read [more](#) about this research in the February 2014 issue of *Agricultural Research* magazine.

Provided by Agricultural Research Service

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