

Natural soil antibiotics offer alternative to farm chemicals

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Several naturally occurring antibiotics can control disease and promote crop health, offering an alternative to chemicals currently used in farming.

"All you have to do is make your microbial community happy," said Linda Thomashow Sunday during a symposium at the national meeting of the American Association for the Advancement of Science. She was one of several scientists speaking on "How Microbes Can Help Feed the World."

Thomashow, a USDA-ARS research geneticist and adjunct professor in [plant pathology](#) at Washington State University, said the door is open for scientists, farmers and industry to develop commercial applications of root bacteria that can protect the rest of the plant.

But typically, science has concentrated on treating the above-ground parts of a plant, she said.

"So much less is understood about the plant mechanics for defense that are available underground," said Thomashow.

In recent years, she said, the tools of [molecular biology](#) have helped scientists understand the microbial and molecular workings of bacteria in the rhizosphere, the layer of soil next to roots, including how antibiotics there can suppress [plant diseases](#).

"They are a first line of defense," she said.

One particular disease, Take-all, causes more than \$1 billion in losses a year by rotting roots and depriving plants of water and nutrients. It's often found in soils that are continuously replanted in wheat, whose money-making potential discourages farmers from planting alternative crops that might break disease cycles.

In some areas of Eastern Washington, said Thomashow, farms have seen several decades of continuous wheat. Those same soils have in turn seen high densities of the [bacterium](#) *Pseudomonas fluorescens* producing a compound called DAPG that can suppress the Take-all fungus.

Such [beneficial bacteria](#) create what are called suppressive soils. In a variety of circumstances, said Thomashow, they help control soilborne pathogens with minimal use of commercial [fungicides](#) and other chemicals. It should be possible to get similar results with a commercially available soil amendment if scientists, industry and farmers rise to the challenge and expense of bringing a living thing to market.

"If you balance that against the expense of developing a new chemical, it really doesn't cost any more," she said, "and it's a sustainable alternative to the use of chemicals."

Provided by Washington State University

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