

Seed Saver: Iodine-based Fungicide Foils *Fusarium*

Corn seeds are bull's-eye targets for *Fusarium verticillioides*, formerly known as *F. moniliforme*, a fungus that produces toxins harmful to humans and animals. ARS scientists are exploring Plantpro 45, an iodine-based fungicide made by Ajay North America, LLC, as a treatment to reduce *Fusarium* infection.

Because Plantpro 45 is being examined as a seed treatment, it is vitally important that it be safe and effective. ARS plant physiologist Ida Yates likes the idea of using the treatment because, "iodine is the active ingredient, and it is a non-toxic, naturally occurring element."

Ajay, of Powder Springs, Georgia, initially tested Plantpro 45 as a foliar fungicide on bananas in 1994. The company saw indications that the compound might have other uses and sought partners to develop them. Ajay and ARS in nearby Athens, Georgia, combined their efforts in a cooperative research and

development agreement to investigate Plantpro 45's potential.

"A century of research on *F. verticillioides* hasn't produced methods to control infections," said Yates. "Plantpro 45, however, shows the ability to control mycotoxin-producing fungi in post-harvest corn seed."

Yates' studies of commercial sweet corn cultivar Silver Queen revealed that Plantpro 45 reduced *F. verticillioides* growth by almost 75 percent in infected kernels. These findings suggest a potential postharvest use of Plantpro 45: disinfecting corn seed kernels before storage and planting. In the studies, 10 micrograms of Plantpro 45 per kilogram of seed was found to be optimal.

Plantpro 45 has other benefits as well. While it inhibited *F. verticillioides* growth in infected corn, it didn't harm the growth of corn plants when used at a rate of 10 micrograms per kilogram of corn seed. In fact, compared to distilled

water, Plantpro 45 increased plant growth by 30 percent and seed viability by 100 percent.

F. verticillioides's reproductive spores are on corn silks before kernel infection and appear to be sensitive to Plantpro 45. A concentration of just 5 parts per million was adequate to eradicate 50,000 spores under laboratory conditions. As an experimental preharvest treatment, spraying Plantpro 45 on corn plants after appearance of the silks could considerably lessen the amount of kernel infection. Preliminary field studies were conducted this year, and the data is being analyzed.

In general, Plantpro 45 might fill a major need, since growers currently have no fungicides or cultural practices to control most mycotoxin-producing fungi in corn. "Plantpro 45 could be extremely useful because it might be a cost-effective, alternative method for fungal control," said Yates.—By **Sharon Durham, ARS.**

This research is part of Food Safety (Animal and Plant Products), an ARS National Program (#108) described on the World Wide Web at <http://www.nps.ars.usda.gov>.

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Plant physiologist Ida Yates and biological lab technician Donnie Maxey inoculate corn ears with *Fusarium verticillioides* at a field site near Athens, Georgia.