PLPA-FC004-2009

AFLAGUARD: A FUNGUS FOR BIOLOGICAL CONTROL OF AFLATOXIN CONTAMINATION OF CORN

What Is It?

Aflaguard is a commercial preparation of a certain strain of the fungus, *Aspergillus flavus*. This strain does not produce aflatoxin. The preparation consists of dead grain coated with spores of the fungus. It was developed in Georgia for control of aflatoxin contamination of peanuts. It has recently received a label for aflatoxin control on corn from the Environmental Protection Agency.

How Does It Work?

First, in order for it to work, the spores must germinate, grow, and reproduce, using the dead grain seed as a food source. The spores coating the wheat will not readily disperse into the environment. However, by growing on the grain seed, the spores will lead to the production of many more, which will be readily released into the environment by air movement. Under optimal moisture and temperature conditions, new spores will be produced, starting two days after placement (Fig. 1). Spores will continue to be produced several days longer if these optimal conditions persist (Fig. 2).

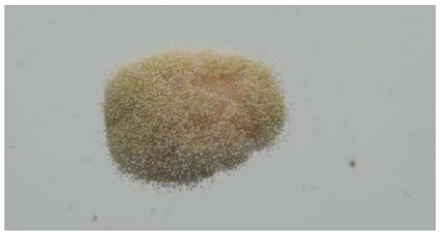

Fig. 1. Spore production two days after placement, under optimal conditions.

However, the time for production of spores is limited. Eventually, nutrients in the grain seed will become exhausted or the seed will become colonized by other species of fungi in the environment

Once the spores are moved into the environment, they may land on the corn silk. If they grow into the ear and colonize the membrane and embryo parts of the developing seed before the arrival of any native, aflatoxin-producing strain of *Aspergillus flavus*, they will prevent colonization by these toxic strains. ***"It is competition for food and whoever arrives at the food source first, wins."***

So the strategy is to swamp the corn field with lots of spores of the Aflaguard strain, outnumbering the native, toxin-producing strains. The application of Aflaguard should be made early during flowering, but the window of opportunity has not been clearly established. It may be earlier, but too early and the spores may not persist long enough to get to the ear.

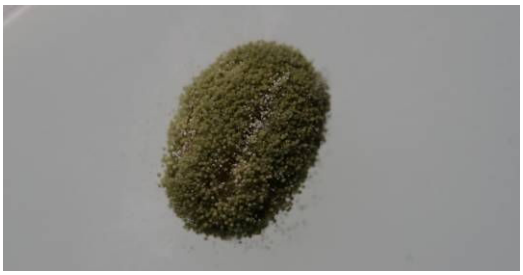

Fig. 2. Spore production three days after placement, under optimal conditions.

How Can It Fail to Work?

If the seed kernels are placed on dry soil, the spores will not germinate. On the other hand, if there is a heavy rain shortly after placement, the seed kernels may get buried under mud.

The approach has the best chance of success for irrigated corn, because soil moisture can be controlled. Its use in dryland corn, particularly in dry years, may be risky.

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