

Two Approaches to Combat Contaminated Corn



Miscarriages and infants born with neural tube defects are just two of the possible risks for pregnant women who consume corn that has been contaminated by the mycotoxin fumonisin produced by species of *Fusarium* that cause Fusarium ear and kernel rot of corn. Women who take vitamins containing folic acid when they are pregnant are more protected from the effects, but women in many countries may not be.

"In the United States, food grade corn is tested at the grain elevators for mycotoxins, including fumonisin," said Martin Bohn, maize breeder and geneticist at the University of Illinois. "If the mycotoxin is present at an unsafe level, the corn is not sold for human food consumption. But in cultures that consume large quantities of corn in their diet and in countries that do not test for the presence of fumonisin, there have been higher cases reported of embryo abortions and deformities in newborns," Bohn said.

Fusarium ear and kernel rot is primarily a problem in drought-stricken areas with high humidity. "Farmers in parts of North Carolina, California, and other coastal areas have been forced to take a loss and sell their entire crop for animal feed instead of getting the premium

prices for human food when the grain is tested at the elevator and high levels of fumonisin are found," said Don White, U of I plant pathologist.

Bohn was a member of a team when he was in Germany studying the resistance of corn cultivars to the European corn borer. They believe that corn borer larvae feed on the corn, injuring the stalks and ears, creating an opening for fungi to develop and rotting to occur. They were also investigating the association between these resistant corn varieties and the presence of a fumonisin.

The study also evaluated genetically modified Bt corn for its resistance to the European corn borer. "The study showed that although insect management did not reduce contamination by some fungi diseases, using Bt corn did reduce mycotoxins produced from *Fusarium* rot," said Bohn. "We believe that at least a short-term solution is to plant corn carrying the Bt gene in order to increase the resistance to European corn borer and, in so doing, reduce the incidence of ear rot and the concentration of fumonisin."

White believes that the corn borer is just one of the injury-causing elements that can give fumonisin an opening to take hold in corn. High levels of fumonisin can be found in corn grain with little or no evidence of insect damage or kernel rot. White has a collection of 1,500 inbred lines that have been screened for resistance to *Fusarium* ear rot and the production of fumonisin. He has already narrowed the search to four or five highly resistant inbreds and knows where the resistance is located in the molecular makeup of two inbreds.

White hopes that genes for resistance can be added to locally grown varieties that will replace the currently used local varieties.



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