

Mycotoxin Control in Corn, Wheat and Barley

What is the purpose of this research project?

Fusarium head blight (FHB) or scab is a fungal disease that can occur on small-grain crops, including spring, winter and durum wheat, and barley. The disease causes significant loss of crop yield and infected grain may contain fungus-produced toxic substances called mycotoxins. This project is designed to reduce levels of mycotoxins and fungal infection in corn, wheat, and barley through the development of novel genetic strategies to interfere with the infection process and to develop plants with improved resistance to disease.

What problem does it address?

In the last decade, FHB has been responsible for billions of dollars of wheat yield loss in the United States. Additionally, mycotoxin contamination from the fungus *Fusarium* makes barley unacceptable for malting and brewing, and wheat unacceptable for milling. Since all of the available commercial varieties of wheat or barley are susceptible to *Fusarium* infection, it is imperative that we develop methods to prevent FHB. This requires a better understanding of the mechanisms of fungus-plant interactions, infection processes, differences in virulence (i.e. ability to infect), and mycotoxin production by *Fusarium* strains. This information can then be used to develop new crop varieties with improved disease resistance and improved yields.

What makes this research team unique?

This research team combines natural product chemists, microbiologists, and molecular biologists with extensive expertise in the analysis of mycotoxins, FHB, and genetic analysis of fungal genes involved in toxin production. This team has developed a collection of mycotoxin-producing fungi and a library of mycotoxins that can be used to screen for new sources of disease resistance.

Who are the potential customers for this technology?

The information and technologies generated by our research are important to crop breeders working to develop varieties of plants that produce grain free of fungal toxins, farmers requiring more consistent crop yields, and consumers that benefit from lower cost of production.



How is this technology transferred?

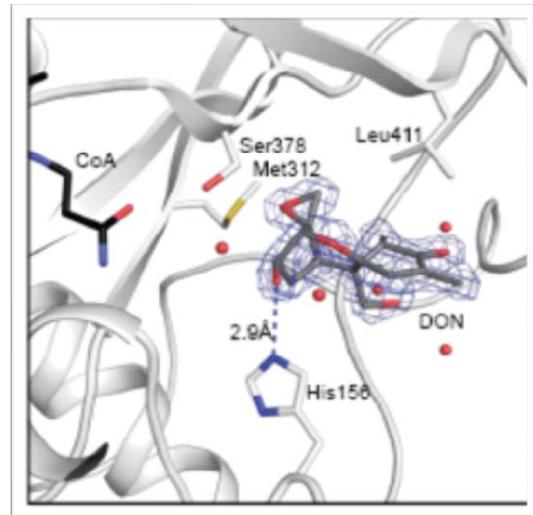
Project scientists respond to requests from Center for Disease Control, Department of Defense, United States Department of Agriculture, and university scientists for information and assistance with Fusarium, mycotoxin production and genetic analyses.

The Research Team

Research on this project is conducted by Dr. Nancy Alexander (Research Microbiologist), Dr. Susan McCormick (Research Chemist), Robert Proctor (Research Microbiologist) and three laboratory technicians. Drs. Alexander, McCormick and Proctor have over 50 years combined research experience analyzing genetic control of mycotoxin production in agriculture.



Premature spikelet bleaching of wheat caused by Fusarium.



Molecular interaction of Deoxynivalenol (DON) and a protein that detoxifies the mycotoxin

For more technical information about this project:

http://www.ars.usda.gov/research/projects/projects.htm?accn_no=409643

Contact Information

Nancy J. Alexander, Ph.D., Research Microbiologist
Bacterial Foodborne Pathogens and Mycology
National Center for Agricultural Utilization Research, Agricultural Research Service, U.S. Department of Agriculture
1815 N. University St. Peoria, IL 61604 (309)685.4010
Voice: (309) 681-6295 Nancy.Alexander@ars.usda.gov