Risk Factors, Spatial Patterns, and Biocontrol of Aflatoxin Contamination in California Almonds

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PROJECT SUMMARY

Objectives:

The focus of this research is to provide background for obtaining an Experimental Use Permit (EUP) and ultimately an almond registration for the atoxigenic *Aspergillus flavus* strain AF 36 to use as a biocontrol agent to reduce aflatoxin potential in the orchard. AF 36 is currently registered and being used successfully in other crops.

- Identify risk factors and spatial patterns associated with aflatoxin development in California almonds.
- Determine the spread and survival of the atoxigenic *Aspergillus flavus* strain AF36 previously applied to orchards.
- Obtain an EUP and registration for AF 36 in almonds.

Background and Discussion:

Aflatoxin is a carcinogenic contaminant produced by the fungi *Aspergillus flavus and A. parasiticus*. The almond industry has taken extensive measures to control aflatoxin. This project seeks to further this effort with the two pronged objectives outlined above.

Of note, the bio-control technique of "seeding" the atoxigenic (non-aflatoxin producing) AF36 strain of *A. flavus* is already showing promising results in almonds. This strain is inoculated into the field and displaces the naturally present aflatoxin-producing fungal strains. This approach in other crops like cotton seed has lead to a substantial reduction in aflatoxin contamination.

Other key findings include the following. The incidence of *A. flavus* and *A. parasiticus* in orchards of all growing regions presents a risk of aflatoxin contamination. The almond industry has taken a number of measures pre- and post-harvest to assure control and compliance with aflatoxin standards. These measures include: 1) Good agricultural practices like insect pest management and product handling; and 2) Sorting of insect damaged kernels.

This work continues to document insect feeding and damage, particularly by the navel orangeworm (NOW), which contributes to the invasion and development of *Aspergillus* fungi and the production of aflatoxin. Almond mummies—the overwintering source for NOW—show high levels of infection by *A. flavus* and *A. parasiticus*.

Aspergillus growth and aflatoxin production in the new crop can occur throughout crop maturation and harvest, starting after hull split and through the harvest steps. Collaborative research (see 11-AFLA2-Lampinen "Harvest and Stockpile Management to Reduce Aflatoxin Potential) shows contamination can continue in stockpiles containing too much moisture.

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For More Details, Visit

- Poster location 8, Exhibit Hall, Session 1 at the conference; or on the web (after January 2012) at AlmondBoard.com/AICposters
- 2010 - 2011 Annual Report CD (10-AFLA1-Michailides); or on the web (after January 2012) at AlmondBoard.com/ResearchReports
- Related Projects: 11-AFLA2-Lampinen