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 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, such as cotton seed, corn, and pistachios.

- 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 a registration for AF 36 in almonds.

Background and Discussion:

Aflatoxin is a carcinogenic contaminant produced by the fungi *Aspergillus flavus and A. parasiticus* which occur in nut crop orchards. The almond industry has taken extensive measures to control aflatoxin. This project seeks to further this effort with the 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), contributes to the transmission, 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. Contamination can continue in stockpiles containing too much moisture.

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For More Details, Visit

- Poster location 22, Exhibit A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-AFLA1-Michailides); or on the web (after January 2014) at www.almondboard.com/researchreports
- Related Project: 12-AFLA2-Lampinen