CORN/SORGHUM BOARD PROPOSAL—**Progress Report, November, 2007.**

Title: Remote Sensing of Stress Areas in Corn Fields to Prevent Aflatoxin

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Objectives: To determine the ability of remote sensing technology to detect and allow mapping and inspection of stressed areas in commercial corn fields under different production systems

To determine the level of aflatoxin and fumonisin contamination, as well as yield potential, of remote-sensed and GPS-mapped stressed corn areas, compared to non-stressed areas of commercial corn fields

Five corn fields in Phillips, Lonoke, Jefferson, and Desha Counties were selected for this research project. Satellite or aerial multispectral imagery was purchased in early July for the select corn fields to determine the usefulness of imagery as a scouting tool for predicting high risk areas for aflatoxin and fumonisin development. Images were classified using four zones: where Zone 1 represents the lowest level of plant biomass and Zone 4 represents the highest level of plant biomass. In evaluating the images, we noted that a majority of the corn fields had variations in plant growth/plant biomass in both the irrigated and non-irrigated areas. Next, scouting and aflatoxin sampling maps were constructed and used to determine the accuracy of the plant biomass images and to sample/compare aflatoxin levels with plant biomass zones created from the imagery. The results showed that plant biomass was illustrated very well with the imagery based on visual observations; however, the plant biomass representation within each zone was different for each field. One to two weeks prior to harvest, three corn samples (25 ears) were collected from each of the four zones with in each field, shelled, and sent to a private lab for quantification of aflatoxin and fumonisin levels. Unfortunately, the results of the tests indicated that while there were aflatoxin and fumonisin detected the levels were quite low in a majority of the fields. Three (Phillips 1, Phillips 2, & Jefferson Co. (Lyons)) of the five fields had samples with 40 PPB and greater levels of aflatoxin and two (Phillips 1 and Phillips 2) of the five having at least 1 sample with 120 PPB and greater levels of aflatoxin (See Attached). In comparing the aflatoxin levels and the plant

biomass zones, we did find higher aflatoxin levels in the lower biomass areas except for the Phillips county 1 field. For the Phillips County 1 field, similar levels of aflatoxin were found in almost every zone except in zone 1 which had no detectable aflatoxin. One possible explanation for this oddity is the Phillips Co. 1 field was not as lush and productive as the other fields evaluated. Thus, the overall field was more representative of the low to moderate biomass zones in the other fields. Fumonisin levels did not follow the same trend as aflatoxin. Finally, aerial imagery did show potential in predicting aflatoxin high risk areas within a field. There is still some improvement needed in developing this prediction tool for high risk aflatoxin areas which include adding more information like plant stand counts, row width, irrigation type, etc into defining the plant biomass zones along with more representative sampling strategies within each zone.

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