FY11 Research Area (RA) Program Descriptions and Research Priorities (PD-RP)

FHB MANAGEMENT (MGMT)

FY11 Program Description:

The FHB Management (MGMT) research area supports research to develop effective and economical disease management practices that reduce FHB severity and DON in harvested grain to meet the immediate and long-term needs of the wheat and barley industries.

This research area involves:

- tillage practices, crop sequences, and other cultural practices targeting *Fusarium*-infested residues;
- fungicides, biological control agents, and application technologies for chemical and biological agents;
- the refinement and deployment of disease prediction and forecasting models, and disease management decision tools; and
- studies of pathogen survival, inoculum production, dispersal, infection, colonization, mycotoxin production, and factors accounting for high levels of mycotoxin in asymptomatic grain.

NOTE: Priority will be given to multi-PI, collaborative, integrated pre-proposals that address the research priorities listed below. Pre-proposals pertaining to uniform fungicide/biocontrol trials (UT) and integrated management studies (IM) will be developed as multi-PI, collaborative, integrated proposals. Coordinators for those integrated proposals are listed in Table 1 (page 6).

FY11 Research Priorities Derived from Action Plan Goals:

1. Validate integrated management strategies for FHB and DON.
2. Develop the next generation of management tools for FHB/DON control.
3. Develop a full understanding of specific environmental and biological factors influencing infection and toxin accumulation.
4. Enhance communication and end user education/outreach.

FOOD SAFETY, TOXICOLOGY AND UTILIZATION OF MYCOTOXIN-CONTAMINATED GRAIN (FSTU)

FY11 Program Description:

The Food Safety, Toxicology and Utilization of Mycotoxin-Contaminated Grain (FSTU) research area supports research on food safety and food processing issues related to the presence of *Fusarium* spp. mycotoxins in wheat and barley grain. Practical outcomes of research in this area include: 1) improved toxicological data to assure that current guidelines are providing the appropriate safety factors for the consumer; 2) analytical tools that can be used by small grain producers, elevators, millers, and processors, to rapidly and reliably identify mycotoxin-contaminated grain; 3) develop appropriate strategies to deal with contaminated grain; and 4) diagnostic data on *Fusarium* spp. mycotoxins required for development of FHB resistant/tolerant varieties of wheat and barley.

FY11 Research Priorities Derived from Action Plan Goals:

1. Provide analytical support for DON/trichothecene quantitation for Initiative's stakeholders.
2. Provide requisite information on DON/trichothecene safety issues to producers, millers, researchers, risk assessors, and regulators.

GENE DISCOVERY AND ENGINEERING RESISTANCE (GDER)

FY11 Program Description:

The Gene Discovery and Engineering Resistance (GDER) research area (RA) will focus primarily on the identification of genes from wheat and barley that can be used to increase FHB resistance and/or reduce DON accumulation, and on development of engineered strategies for FHB resistance or reduced DON levels. Gene discovery and transformation of non-cereal systems will be supported only for the purpose of rapidly screening potential anti-*Fusarium* genes**.**

FY11 Research Priorities Derived from Action Plan Goals:

1. Characterize the genetic function of existing and novel loci for FHB resistance.
2. Identify candidate genes for resistance against FHB and/or reduced DON accumulation.
3. Develop effective FHB resistance and/or reduced DON accumulation through transgenic strategies.

PATHOGEN BIOLOGY AND GENETICS (PBG)

FY11 Program Description:

Research in this area includes studies that address pathogen diversity and mycotoxin biosynthesis on plants, host/parasite interactions, and host resistance mechanisms that target the pathogen. Research in PBG should complement and be linked to whole plant research that will lead to disease control and/or toxin reduction strategies. Population surveys should be accompanied by studies of biological relevance. Successive yearly surveys cannot be supported by this program, as funding is limited.

FY11 Research Priorities Derived from Action Plan Goals:

1. Characterize genetic variation in the pathogen population with regard to aggressiveness toward plants, mycotoxin potential, and potential for pesticide resistance.
2. Characterize plant-fungal interactions in plant lines being developed by researchers in the USWBSI.
3. Develop new strategies for reducing impact of FHB disease and mycotoxin contamination in barley and wheat. Focus on research that seeks to demonstrate a reduction in FHB or DON in planta. Establish a protocol for transferring these new strategies into viable crop product through collaborative interactions with GDER.