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Fiscal Year: FY11 (NCE for FY12)
USDA-ARS Agreement ID: 59-0206-0-060
USDA-ARS Agreement Title: Developing More Precise Markers to FHB Resistance QTLs for Wheat.
FY11 USDA-ARS Award Amount: $ 9,756

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<tr>
<th>USWBSI Research Category*</th>
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<tr>
<td>HWW-CP</td>
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* MGMT – FHB Management
   FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
   GDER – Gene Discovery & Engineering Resistance
   PBG – Pathogen Biology & Genetics
   BAR-CP – Barley Coordinated Project
   DUR-CP – Durum Coordinated Project
   HWW-CP – Hard Winter Wheat Coordinated Project
   VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
   SPR – Spring Wheat Region
   NWW – Northern Soft Winter Wheat Region
   SWW – Southern Soft Red Winter Wheat Region

Principal Investigator Date
Project 1: Developing More Precise Markers to FHB Resistance QTLs for Wheat.

1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?

Our previous work had resulted in two pieces of important information about the FHB resistance in wheat: 1) mapped major FHB-resistant QTLs and 2) FHB-resistance-related genes. Our hypothesis was that, at least, some of these FHB-resistance-related genes are the gene components of the major FHB-resistant QTLs and therefore can be used as more precise markers for those QTLs. The proposed research was to test this hypothesis by linking these two pieces of information together with real-time RT-PCR and association mapping and to develop gene-specific markers for the QTLs. Our objective for FY11 and FY12 was to associate known FHB-associated genes with known major FHB-resistant QTLs by functionally studying their differential expression in a pair of near-isogenic lines for Qfhb1 and among the Sumai 3/Y1193-06 recombinant inbred population. The objective aims at identifying candidate genes that have potential to be precise markers to the QTLs they are associated with.

2. List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):

   Accomplishment:

   This research had been progressed well according to our plan but could not be completed because funding from USWBSI was cut off in the middle of the planned research. However, we were able to complete our objective for FY11/FY12. The number of our candidate genes was narrowed down from 637 to 47 after two years of bulk analysis with the Sumai 3/Y1193-06 recombinant inbred population we created. Three of the 47 candidates were also associated with QFhb1 by analyzing the Qfhhb1 near-genic lines in the two years.

   Impact:

   This research has paved a solid foundation for our identification of a functional genic component of QFhb1 and for our development of a gene-specific marker for QFhb1 with funding from other sources.
Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Non-peer reviewed Poster presentation and Abstracts:


