

Barley Coordinated Agricultural Project Work Plan FY07 (4/1/07 – 3/31/08)
Byung-Kee Baik, Washington State University

1) Describe the research, education, and outreach activities you are planning for the next year (4/1/07 – 3/29/08)

Research

In the first six months (4/1 – 9/30), we will continue the determination of the food-use quality traits of 959 barley varieties/lines harvested in 2006. Those barley grain samples were received October, 2006 from the breeding programs of Drs. Hayes, Blake and Griffey. We have determined grain hardness and removed the hull in hulled barley using an abrasive device. Currently, barley grains of 959 varieties/lines are being milled and determined for moisture content and starch amylose content, which we expect to complete before April 2007. As soon as the starch amylose content assay is completed, barley grains will be determined for phenolic compound content and polyphenol oxidase activity. Once tests are completed, data will be analyzed to determine the distribution/variation of barley varieties/lines in all four food quality traits and uploaded to the CAP data base before October 1, 2007.

In the second six month period (10/1/07 – 03/31/08), we expect to receive the second set of 959 barley varieties/lines harvested in 2007 from the breeding programs of Drs. Hayes, Blake and Griffey for the determination of food-use quality traits. As in the first year of this project, grains of those 959 lines will be cleaned, if necessary, and determined for kernel hardness. Dehulling of hulled barley, grinding to flour for chemical assays and determination of starch amylose content are expected to be completed before March 31, 2008.

Education

One Ph.D. student and one undergraduate student will work with a research scientist and participate in sample preparation process, dehulling and grinding of barley grain and moisture content determination of flour. The Ph.D. student plans to work on the genetic and environmental influences on grain hardness; the relationship between physical and biochemical characteristics of barley and its grain hardness; the significance of barley grain hardness in food processing and product quality; and the genetic basis of textural variation.

2) List specific outcomes and deliverables that will be accomplished in the first 6 months (4/1 – 9/30). These will be used as benchmarks for your bi-annual progress report.

- Data for food-use quality traits, including grain hardness, dehulling characteristics, starch amylose content, phenolic compound content and polyphenol oxidase activity of 959 barley varieties/lines harvested in 2006
- Information on the variability of those four food use quality traits among different classes and genotypes of barley

3) List specific outcomes and deliverables that will be accomplished in the second 6 months (10/1 – 3/31). These will be used as benchmarks for the bi-annual progress report.

- Kernel hardness, dehulling property (hulled barley only) and starch amylose content data of 959 varieties/lines harvested in 2007
- Information on the variability of different classes and genotypes of barley in those determined traits

Barley Coordinated Agricultural Project Biannual Progress Report
FY 06-07 (4/1/06-3/31/07)
Byung-Kee Baik, Washington State University

Research

We have identified methods and optimized procedures for the determination of food-use quality traits of barley, including grain hardness, total phenolic content, polyphenol oxidase activity and starch amylose content. We have received a total of 192 winter barley lines grown in the 2005/06 crop year, 96 from Oregon State University, 96 from Virginia Tech and 768 from Montana State University.

Barley lines were determined for grain hardness, and hulled barley grains were dehulled using an abrasive device. Barley grains of 959 lines were ground to flour using a cyclone sample mill and are being determined for moisture content and starch amylose content, which we expect to complete before April 2007. Barley grains will be determined for phenolic compound content and polyphenol oxidase activity between April and September. Once tests are completed, data will be analyzed to determine the distribution/variation of barley varieties/lines in all four food quality traits and uploaded to the CAP data base before October 1, 2007.

Education

A Ph.D. student and one undergraduate student were recruited for this project and have been actively working on the project since September 2006. The undergraduate student provides assistance to the graduate student in sample preparation, abrading, grinding and moisture determination. A part-time research scientist will also participate from April 2007 in the determination of phenolic content and polyphenol oxidase activity. The Ph.D. student is also investigating the genetic and environmental influences on grain hardness; the relationship between physical and biochemical characteristics of barley and its grain hardness; the significance of barley grain hardness in food processing and product quality; and the genetic basis of textural variation.

Outcomes and Deliverables

- Kernel hardness, dehulling property (hulled barley only) and starch amylose content data of 959 varieties/lines harvested in 2006
- Information on the variability of different classes and genotypes of barley in those determined traits