

## Wheat Research Progress Report

**Project #:** 3019-5358

**Title:** Quality Assessment of WSU Wheat Breeding Lines

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**Progress Report Year:** 2008

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### ACCOMPLISHMENTS/RESULTS:

The Washington State University Wheat Quality Program (WSUWQP) provides end-use quality testing for the spring and winter wheat breeders at WSU. For the crop harvested in 2007, approximately 1194 samples were tested by the WSUWQP in conjunction with the Western Wheat Quality Lab (WWQL). The test results were analyzed, summarized and reported to the WSU wheat breeders. The end-use quality evaluation data have been used by the breeders for making selections of their breeding lines for the next growing season.

The end-use quality assessment of WSU wheat breeding lines also facilitated the release of new varieties that are not only agronomically superior to existing varieties, but also have improved end-use quality for their marketability.

The technologist position partially funded by this project facilitates the timely completion of WSU breeder quality evaluation. This technologist (Tracy Harris) performs all of the quality tests and ensures that WSU breeder lines are not caught in quality testing bottlenecks. End-use quality testing of wheat breeding lines and other research activities of WSUWQP for the overall improvement of Washington wheat varieties are summarized below.

1. Winter wheat quality testing
  - a. Advanced breeding lines, conventionally grown (500 g regularly-milled samples)
    - All wheat samples were tested for test weight, single kernel hardness, NIR wheat and flour protein content, milling quality, flour ash, and sedimentation volume.
    - Soft white and club winter wheat (211 samples) were tested for cookie diameter and flour swelling starch pasting properties.
    - Of these, 39 samples of soft white and club winter wheat were tested for sponge cake volume.
    - Hard red and hard white wheat (42 samples) were tested for mixograph absorption and bread loaf volume. Hard white wheat samples were also tested for alkaline noodle color and Rapid Visco Analyzer starch pasting properties.
  - b. Organic breeding lines (500 g regularly-milled samples)
    - 158 organic culture breeding lines were tested for test weight, single kernel hardness, NIR wheat and flour protein content, milling performance, flour ash content and sedimentation volume.
    - Soft white organic lines (103 samples) were tested for cookie diameter and starch pasting properties. Of these, 25 were tested for sponge cake volume.

- Hard winter organic lines (55 samples) were tested for mixograph absorption. Of these, 47 samples were tested for bread baking quality.
2. Spring wheat quality testing  
All samples (420 hard and 313 soft/club) were tested for test weight, single kernel hardness, NIR wheat and flour protein content, milling quality, flour ash content and sedimentation volume. Additional tests included:
    - Selected hard red and hard white spring wheat lines (341 samples) were tested for mixograph mixing properties and bread baking quality. Hard white wheat lines (102 samples) were also tested for alkaline noodle color and flour pasting properties, using RVA.
    - Soft white wheat and spring club wheat lines (313 samples) were baked into cookies. Brookfield viscosity and cake volume data were gathered for club samples. Japanese sponge cakes were also made from advanced soft white/club wheat lines (47 samples). Flour swelling volume for prediction of starch pasting properties were performed on all soft white common lines.
  3. Dr. Gill's wheat germplasm collection: We tested 30 soft white spring varieties (10 kernels only for each sample) for single kernel hardness, diameter, and weight, and protein content.
  4. Since its inception in 2000, the WSUWQP has contributed to the release of 12 new varieties in all market classes grown in Washington. These varieties could not be released without timely quality analysis performed by the WSUWQP in close cooperation with the Western Wheat Quality Lab.

## **PRESENTATIONS/ PUBLICATIONS**

- Baik, B.-K. 2008. Field Day plot tours: Connell (June 5), St. John (June 17), and Pullman (June 26).
- Baik, B.-K. 2008. Washington Wheat Commission Research Review. February 2008, Pullman, WA.
- Baik, B.-K. Session leader of Wheat Quality Workshop. June 2008.
- Choi, H.-W., and Baik, B.-K. 2008. Differences in Functional Properties of Starches Between Hard and Soft Wheat Genotypes. AACC Annual Meeting, Honolulu, Hawaii, September. Abstract for a poster presentation at <http://www.aaccnet.org/meetings/2008/abstracts/p08ma41.htm>
- Baik, B.-K. and Harris, T. 2008. WSU Wheat Quality Program and Research on End-Use Quality of Wheat. *In* 2008 Field Day Abstracts: Highlights of Research Progress, pp. 33. Department of Crop and Soil Sciences, Technical Report 08-1, Washington State University.