

Washington Grain Commission
Wheat and Barley Research Annual Progress Reports and Final Reports

Project #: 3208

Progress Report Year: ___2___ of ___3___ (*maximum of 3 year funding cycle*)

Title: **End-Use Quality Assessment of Washington State University
Wheat Breeding Lines**

Cooperators: *Mike Pumphrey, Arron Carter, USDA-ARS WWQL*

Executive summary:

WSU spring and winter wheat variety development programs heavily emphasize selection for superior end-use quality. Quality evaluation of WSU breeding lines has been ongoing for over 50 years. Effective quality testing is essential for the recent release of new varieties from all market classes that are at or near the top of end-use quality rankings. This project supports a scientist to conduct thousands of quality tests per year for the WSU wheat breeding programs in conjunction with USDA-ARS Western Wheat Quality Laboratory efforts.

The majority of wheat from the PNW is exported to overseas markets. To maintain current markets and penetrate new markets, PNW wheat must possess quality characteristics that make it superior for use in both domestic and overseas markets. Therefore, before it is released, a new variety must be tested to determine if it is suitable for use in specific end-use products. In addition, increased competition from traditional and non-traditional export countries necessitates enhancing the end-use quality of our wheat. The loss of overseas markets would continue to cause a reduction in the demand and therefore the price of wheat, resulting in losses to Washington farmers. Washington wheat growers, as well as grain buyers and exporters, benefit from the availability of wheat varieties that require less inputs and possess superior, consistent end-use quality.

Impact:

Sockeye CL+, Jasper, Puma, Piranha CL+, Devote, Stingray CL+, Otto, Scorpio, Sequoia, Net CL+, Glee, Alum, Chet, Tekoa, Seahawk, Ryan, Melba, Hedge CL+, Hale, and Roger are examples of top-performing and widely grown WSU variety releases that were released by WSU winter and spring wheat breeding programs in recent years that also have very good to excellent end-use quality. One of our primary goals as public breeding programs in Washington State is to set a high bar for end-use quality and continue to raise that bar for long term market health. By releasing lines with superior agronomics, paired with most desirable end-use quality, we provide growers with options that put quality in the decision process, while not sacrificing yield or other agronomic and yield protection traits. Several of our newest varieties are preferentially sourced because of their superior end-use quality, and specific traits like gluten strength and breadmaking quality, low cadmium concentration, partial waxiness, and outstanding cookie and cracker quality. This short, medium, and long-term impact is of paramount importance to the Washington grain industry.

Outputs and Outcomes: File attached

WGC project number: 3208
WGC project title: End-Use Quality Assessment of Washington State University Wheat Breeding Lines
Project PI(s): Mike Pumphrey and Arron Carter
Project initiation date: 1-Jul-20
Project year (X of 3-yr cycle): 2 of 3 year cycle

Objective	Deliverable	Progress	Timeline	Communication
Early to late generation quality testing of WSU experimental lines to aid variety development	New spring wheat and winter wheat varieties that are superior to existing varieties. This effort includes all market classes of spring and winter wheat and all precipitation regions in Washington state.	Over 1200 breeding samples were analyzed by numerous milling and baking quality tests in 2021. Four new wheat varieties were released in part due to this project and data in 2021. Others are planned for 2022 release.	The economic return for this work will manifest itself each breeding cycle with superior quality varieties and germplasm.	Progress was discussed at numerous field days (>10), grower meetings (4), the annual Research Review, through WSCIA meetings, Wheat Life, Variety Release Meetings, and direct communication with the WGC.
Support genetic analysis of end-use quality to identify desirable alleles and to predict end-use quality through new genotyping methods	Improved germplasm selection procedures which translate to more efficient, cost-effective, and consistent genetic gain for end-use quality.	Multiple special milling and baking trait experiments were evaluated in 2021, including evaluation of DNA markers for PPO and a dough strength locus. The quality of soft white common by spring club lines were analyzed. The quality of new germplasm with Hessian fly resistance and other introgressed traits was determined.	The reward for this work will compound each year and will fully be realized for many years to come as these lines continue to be crossed into existing breeding lines. We expect this effort to result in routine selection of outstanding quality wheat.	