

## Soft Wheat Quality Laboratory (SWQL), Wooster, Ohio



### MISSION

Improve end-use quality, nutrition, and value of soft wheat produced in the eastern U.S. for the domestic milling and baking industries and for export through contribution to the development of wheat varieties of superior quality.

Lead scientific research on end-use quality traits of soft wheat and their underlying genetic components; develop efficient and reliable test methods for estimation of the milling and baking qualities of wheat.

Contribute to the improvement in human nutrition and health, in collaboration with wheat foods processors and eastern U.S. wheat breeding programs, through identifying and deploying traits for greater food quality and nutrition.

### CURRENT OBJECTIVES

- Develop accurate and efficient laboratory methods for end-use quality evaluation of soft winter wheat breeding lines and varieties.
- Establish quality characteristics of soft winter wheat non-conventional and healthier whole grain food products to enable new and/or expanded commercial uses.
- Identify the biochemical, physical and genetic factors associated with flour yield and endosperm separation from bran during milling.
- Identify, evaluate, and screen the intrinsic end-use quality to enhance cultivar development as a direct mission of service designated by congress.

## BACKGROUND

Wheat is the world's largest crop used for direct human consumption. Approximately half of the wheat in the U.S. is milled in the eastern region served by the USDA-ARS Soft Wheat Quality Laboratory (SWQL), Wooster, Ohio. Since the 1930's, the SWQL has conducted end-use quality evaluation of soft wheat breeding lines and scientific research on wheat quality through long-established coordinated research with state land-grant universities and private breeding programs in the eastern U.S. for the purpose of improving the milling and baking quality of soft wheat produced in the region. It is one of the few laboratories in the world that develops methods for testing quality of soft wheat, the major wheat type grown in the eastern U.S.

Today, the SWQL evaluates in excess of 5,000 breeding lines and varieties submitted by 17 public and private breeding programs in 13 eastern states annually for end-use quality potential to develop wheat varieties possessing desirable quality traits. The SWQL also plays a pivotal role in variety evaluation under the Uniform Regional Variety testing programs, the Wheat Quality Council project for testing end-use quality potential of newly released varieties in cooperation with the eastern soft wheat breeders, and the regional milling and baking companies. The SWQL critically evaluates the quality of nearly all the wheat cultivars marketed from Missouri to the Atlantic seaboard. It also publishes new methods and conducts research in the areas of milling and flour quality. Research findings are shared with breeders, millers and food processors through the annual SWQL Research Review, annual Soft Wheat Quality Council meetings, publications in refereed journals and presentations at international conferences. Our website makes SWQL data, protocols, cultivar descriptions and research news publicly available.

## CURRENT STAFF AND RESOURCES

Current base funding supports research and testing activities of two scientists (Byung-Kee Baik & Bryan Penning), a support scientist (Anne Sturbaum), four full-time and one part-time USDA support staff. Extramural funding agreements provide support for an additional Ohio State University (OSU) support staff and a post-doctoral research associate.

The SWQL's chemistry, molecular biology, and grain handling laboratories in Williams Hall on the OSU/OARDC Campus provide sufficient modern space for the lab's activities. The laboratory continues to improve the efficiency and reliability of quality evaluations of breeding lines and varieties under declining discretionary funds. Renovations to the flour milling facilities and mills are ongoing and will continue as funding permits. Renovation of the

HVAC system in the milling facility was completed in October 2015 to provide better control of humidity and temperature conditions which improve sample reproducibility.

#### LABORATORY IMPACTS

The SWQL has supported the development of wheat cultivars that produced 432 million bushels of grain per year, equivalent to \$2.65 billion (2011-2016 USDA Ag Statistics). Using USDA economic multiplier effects, the grain cultivars result in annually \$7.1 billion in food and agricultural related business and \$17.5 billion in the U.S. economy as a whole. The genetic improvement in flour yield since 1990, due to breeding programs using the SWQL, resulted in an estimated \$12.7 million annually in increased flour extracted from wheat milled in the U.S. (2007 production at \$16 per 100# of flour). These improved cultivars reduce consumer's food costs and improve the efficiency and competitiveness of the eastern U.S. milling industry.

#### CONTACT

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