**Barley Stripe Rust Screening Trial – 2016 data**

**Overview:**

The trial consisted of current and potential varieties submitted by the Oregon State University, UC-Davis, USDA-ARS Aberdeen, ID, and Washington State University barley breeding programs. The trial included winter, facultative, and spring growth habit types representing the both two-row and six-row types and all end uses (feed, food, forage, and malting). Experimental procedures were in accordance with standard practices at each location; location-specific details provided by those managing the trials are provided at the end of this document. Leaf rust was observed at some locations – potentially complicating stripe rust assessment but also providing important data on this increasingly important disease. In summary, disease resistant varieties are available and there are promising selections in the pipeline.

**Stripe rust:**

Considering the stripe rust severity on representative resistant and susceptible checks (Full Pint and Robust, respectively) the data from Corvallis, Davis, and Mount Vernon (date 2) may be the most useful for assessing degree of adult plant resistance in current and potential varieties. The QTL alleles in on chromosomes 5H and 7H in Full Pint remained effective against the spectrum of virulence encountered in these trials, providing a benchmark level of adult plant resistance. Stripe rust severities similar to Robust at these locations should be cause for concern. In terms of recommending varieties and making selection decisions regarding potential varieties, stripe rust severities equal or less than those observed on Baronesse (~ 30%) are advisable.

**Leaf rust:**

The leaf rust data were an unexpected windfall. Leaf rust appears to be increasing in frequency and intensity at the test sites. Checks were not included for this disease. However, Full Pint has consistently been resistant to the prevailing spectrum of virulence in the Pacific Northwest and it was resistant in the trials at Davis and Mount Vernon. A recommendation would be to focus on levels of leaf rust. Given limited experience with leaf rust at these test sites, target levels of resistance in terms of a specific variety are not possible – but certainly the lower the better.

**Location-specific details:**

**Corvallis:**

*Cooperators:* Scott Fisk, Pat Hayes, Laura Helgerson, Javier Hernandez:

The trial was planted in mid-February in order to provide vernalization for winter types but minimize risk of low temperature injury to spring types. Furthermore, the intensity of scald is reduced with “mid-winter planting”, optimizing opportunities for assessment of stripe rust. Plots consisted of a single, 3-m row planted with a head row drill and an average of 5g of seed per row. There were two replications of a Randomized Complete Block Design. Stand establishment was reasonable. There was minimal scald. We relied on natural infection, supplemented with spores collected the previous. Spreader rows consisting of a blend of susceptible varieties were planted throughout the field. Intense natural epidemics were observed in nearby fields of fall-planted barley. The development of the stripe rust epidemic in the BSRST was slow to start, and was constrained by unreasonably warm weather in early May. The subsequent application of supplemental irrigation provided enhanced conditions for stripe rust epidemic development. Stripe rust severity was rated on a plot basis by teams of at least two Barley Project members when most entries were at anthesis. Ratings were consistent, with a “heritability” (repeatability ) value of 0.84.

Davis:

**Mount Vernon:**

*Cooperators:* Xianming Chen, Kent Evans, Jason Sprott:

The trial was hand planted both in the fall on October 15, 2015 and spring on April 18, 2016. For each entry, about 5-gram seed was planted in a single row of about 0.6 m for each entry. In the winter nursery, winter barley cultivar ‘Hundred’ was planted between every 20 rows and also in the last few rows to make the trial end with an even number of 60; and in the spring nursery, spring barley cultivar ‘Morex’ was used for the similar purpose. Common practices in the region were used for fertilization and weed control. Stripe rust was recorded as infection type and severity twice, on April 18 (Feekes 7-8) and May 18 (Feekes 10.5) for the winter nursery and on June 2 (Feekes 8-9) and June 28 (Feekes 10.6) for the spring nursery. Severity of leaf rust was recorded for the winter nursery at both times and scald severity was recorded at the early time. Severe leaf rust and scald make the stripe rust data unreliable in the winter nursery, especially for the entries with “0” readings. Stripe rust data were better in the spring nursery, especially the early note. Unfortunately, leaf rust and other diseases were not recorded for the spring nursery, due to different people taking notes. Cautions should be taken to interpret the lower stripe rust in the late note because other diseases might complicate the stripe rust notes and the Morex susceptible check had lower severity (about 20%) in the late note than the early note (60%).

**Pullman:**

*Cooperators:* Xianming Chen, Kent Evans, Jason Sprott:

In Pullman, the trial was also planted both in the fall (October 13, 2015) and spring (April 27, 2016) in the same way as in Mount Vernon. Infection type and severity of stripe rust were recorded once, on June 13 (soft dough), for the winter nursery and twice, on June 26 (early flowering) and July 6 (soft dough) for the spring nursery. No any other diseases were observed in the nurseries. In the winter nursery, trace stripe rust was recorded on few entries while most entries had no rust. In the spring nursery, stripe rust developed up to 20% in the early note and 30% in the late note on the Morex susceptible check. This level of severity was the highest for barley stripe rust in the recent five years, but not comparable for the extremely severe wheat stripe rust. As the barley nursery was next to wheat nurseries and wheat stripe rust was very severe, cautions still need to take to interpret the data on barley because some barley varieties may be infected by the wheat stripe rust pathogen.