

The Project: Building the Oregon Barley Brand

Director: Pat Hayes (OSU Crop and Soil Science – Barley Project)

Producer: Clare Sullivan (OSU Crop and Soil Science Linn County Extension)

Cast* (by location):

- Klamath: Rich Roseberg and Tom Silberstein (Klamath Basin Research and Extension Center).
- Grande Ronde: Darrin Walenta (Union County Extension); Valtcho Jeliaskov and Karl Rhinhart (Columbia Basin Agricultural Research Center).
- Willamette: Scott Fisk, Pat Hayes, Laura Helgerson, and Dustin Herb (Barley Project); Jeff Clawson and Tom Shellhammer (Fermentation Science).

*All are members of the Dept. of Crop and Soil Science, Oregon State University except Clawson and Shellhammer, who are in the Dept. of Food Science and Technology, Oregon State University.

The Funds: Oregon Wheat Commission; Great Western Malting; Limagrain; Malteurop; Secobra.

The Short Story: We propose to build the Oregon Craft Malting Barley Brand by generating agronomic and brewing performance data on key varieties at representative locations. In these experiments we will also determine the response of varieties to nitrogen rates. Oregon is a world leader in craft brewing and distilling and also has the potential to develop strong commercial and craft malting industries – and to create a true “all-Oregon beer”. In addition to a strategically located commercial malting facility (Great Western Malting), Oregon has a developing craft malting industry with two malt houses scheduled to start production in 2015. Oregon growers are ideally positioned to provide these industries with barley, but additional variety and management information is needed to ensure the integrity and superiority of the Oregon “brand”. The craft malting industry has lower specifications for grain protein (8 – 12%) and protein-related malting quality traits than the commercial industry. The focus this year is on two irrigated environments and one high rainfall environment: the Klamath Basin, the Grande Ronde Valley, and the Willamette Valley respectively. The data we generate will allow stakeholders to make agronomic, malting, and brewing decisions based on variety and nitrogen management. In order to generate sufficient grain for malting and brewing we will produce 200 or more pounds of grain per variety/nitrogen combination at each location. Therefore, this is a larger-than-average trial. The principal funding agency is the Oregon Wheat Commission. Supplementary funding is provided by the owners/users of the test varieties. Additional funding will be sought for malting and brewing of selected samples.

The Objectives: Generate agronomic, malting, and brewing performance data for spring 2-row varieties in order to establish the Oregon malting barley variety “brand”.

The Procedures: The keys to meeting malting barley quality expectations are genotype, environment and nutrient management; and understanding the interactions between these factors. Replicated trials of relevant varieties at relevant locations and nitrogen rates are required.

- *Varieties:* Five spring 2-row varieties were chosen based on commercial availability, current use by local maltsters and/or craft brewers, and/or on performance at other geographic locations. The varieties are: Copeland (Great Western Malting, currently contracted and used); Expedition (Malteurop, European style for all-malt brewing); Explorer (Secobra, European style for all-malt brewing); Full Pint (OSU, interest from craft brewers based on flavor); and Genie (Limagrain, European style for all-malt brewing).
- *Locations/Environments:* We chose three of Oregon's many potential production environments: the Grande Ronde Valley, the Klamath Basin, and the Willamette Valley. There are research programs in each region that have access to the plot-scale equipment necessary to conduct varietal and agronomic research.
- *Nitrogen application rates:* Grain protein is a key parameter for craft brewers, who require grain proteins in the 8 – 12 % range. Three nitrogen fertilizer rates (predicted to achieve 8%, 10%, and 12% protein) will be used at each location, based on researcher experience and soil tests. Other nutrients will be supplied as indicated by soil tests.
- *Experimental design and data collection:* At each location, a factorial set of treatments (5 varieties x 3 N rates) will be used with a minimum of four replications and a randomized complete block design. A minimum of 200 lbs. of seed from each variety/fertilizer treatment will be needed for subsequent malting and brewing. The 200 lbs. will be generated by combining replicates of each variety/fertilizer combination. Plot sizes and the number of replicates will be adjusted at each location to produce this amount of seed and to accommodate local equipment. The following traits will be measured at each location on a plot basis: heading date, grain yield, plant height, lodging, diseases (as these occur), grain protein, grain plumpness, and test weight. Composite samples from each location will be used for micromalt analysis.

Beyond agronomics and on to malting and brewing: Based on the grain physical data (protein and plumpness) and micro-malt data, selected variety/fertilizer treatment/location samples will be malted and brewed at Oregon State University. The resulting malts and beers will be used for a battery of chemical and sensory analyses. The costs of malting and brewing are *not* covered by the current project. The estimated cost to malt and brew from 200 pounds of grain is \$4,000 - \$5,000. Therefore, only selected samples from each variety/fertilizer treatment/location will be malted and brewed. The costs of malting and brewing will be the responsibility of interested industry and/or grower partners and we will actively seek external funding to accomplish this. The integration of grain to glass agronomy and brewing science at this scale is unique in the US, if not the world.

Next steps: We plan to repeat the trial in 2016 and, with additional support and engagement to add locations and malting/brewing components.