**Research supported by the Brewers Association and the Flavor Pack.**

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| **Germplasm** | **Malts and beers** | **Sensory** | **Metabolomics** | **Flavor gene mapping** | **Publication** | **Messages** | **Questions** |
| **Oregon Promise** Doubled haploids derived from Golden Promise x Full Pint | 34 experimental malts, + parents, nano-beers x 3 locations | Trained panel beer | No | Preliminary | Herb et al. a,b | There is a genetic basis to flavor. There is terroir.  Degree of modification important but does not override genetic contribution. | Are results limited to the germplasm and to the small scale malts and beers and the sensory assessment method? |
| **Oregon Promise** | 3 experimental malts, pilot beers + Copeland check | Brewery panels, lab panel, consumer panel | Yes | Haplotype alignment | Bettenhausen et al. in press. | There is a genetic basis to flavor. Differences are not scale dependent.  Different panel types identify unique differences.  There are consistent associations of metabolites and flavor descriptors. | Will a variety be released? Probabaly…  Can genes/markers be associated with relevant flavor metabolites? Need mapping, see next |
| **Oregon Promise** | 228 for map construction; 160 for mapping malt and sensory QTLs; a subset for mapping beer metabolic compounds metabolomics | Trained panel beer | In process | Higher density linkage map completed; QTL mapping in progress | Munoz-Amatriain et al. In process | The first comprehensive attempt at mapping barley contributions to beer flavor – using malting quality, beers sensory and metabolite data. | Will metabolite and sensory QTLs align and allow for identifying candidate genes, selectable markers? |
| **Romp of Otters** Doubled haploids derived from crosses of Maris Otter with Violetta and 04-028-36 | 4 experimental malts, pilot beers + Wintmalt check  1 location | Lab panel beer and malt hot steep, consumer panel | Yes | Haplotype alignment | In process | Grain harvested 2019; malt, brewing, sensory in 2020 | What unique flavors are there in Maris Otter and its partners? |
| **Romp of Otters** | 4 experimental malts + Maris Otter, + Wintmalt from Corvallis 17, 18, and 19 harvests; Lebanon 18 and 19 harvests. | Lab panel hot steep | No | Haplotype alignment | Windes et al. | Genotype, environment (terroir) and genotype x e(t) | What are the relative effects of g and e(t) on malt analysis specs and hot steep sensory? |
| **La crème**  Oregon State University potential new winter and facultative doubled haploid varieties derived from different crosses | 4 experimental malts, pilot beers + Thunder check  4 locations | Lab panel beer and malt hot steep, consumer panel | Yes | Haplotype alignment | Halstead et al. In process | Grain harvested 2020; malt, brewing, sensory in 2021 | What unique flavors are there in a broader sample of germplasm?  What are the relative contributions of genotype and environment? What are the contributions of nitrogen fertilization? |
| **Naked barleys + check**  Streaker, DH133783, Copeland | 2 naked malts + Copeland check, brewed two different ways- Mash filter and lauter tun + rice hulls | Lab panel, consumer panel | Yes? | Haplotype alignment | Meints et al.  In process | Grain harvested 2019; malt, brewing, sensory in 2020 | Flavor differences between naked and covered and brewing method |

**Research supported by the Western Rivers Conservancy and Mecca Grade Estate Malt Brewers Association and the Flavor Pack – Leveraging Brewers Association and Flavor Pack resources.**

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| **Germplasm** | **Malts and beers** | **Sensory** | **Metabolomics** | **Flavor gene mapping** | **Publication** | **Messages** | **Questions** |
| Five commercially available winter varieties  Calypso, Flavia, Thunder, Violetta, Wintmalt | 5 malts, pilot beers x 1 location | Trained panel beer and malt hot steep, consumer panel | Yes | Haplotype alignment | Windes et al. In process.  Target spring, 2020 | There are differences and preferences, based on consumer panel. Lab panel in process. Target pub | How much variation in flavor will there be in a sample of unrelated commercially available varieties? |
| Next Pints  Three potential varieties derived from crosses of Full pint with Maris Otter and Violetta | 3 pilot beers + Full Pint x  1 location | Lab panel beer and malt hot steep, consumer panel | Yes | Haplotype alignment | Windes et al. In process.  Target spring 2020 | In process | What unique flavors are there in Full Pint derivatives of crosses with Maris Otter and Violetta? Can flavor be used as a criterion for variety release? |