**Opportunities to collaborate:**

**The naked food barley doubled haploid composite project**

**Barley Project**

**Oregon State University**

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**Background:** We developed a training population for food barley genomic selection comprised of ~ 909 different doubled haploids derived from a diverse set of crosses. Briefly, there is diversity in height (dwarf to giant), flowering time, disease resistance, spike type (2-row, 6-row), growth habit (winter, facultative, spring), grain color (white, brown, blue, black, purple) and starch type (waxy, normal). We expect there is ample variation for other to-be-characterized traits, such as flavor and aroma. The only common denominator is that all the DH lines are hull-less (naked).

In addition to maintaining the set of 909 doubled haploids as a genetics resource, also harvested all doubled haploids *en masse* as a composite.

**Building on the shoulders of barley giants:** Following the classic work of Bob Allard, described in his landmark 1988 Journal of Heredity paper “Genetic changes associated with evolution of adaptedness in cultivated plants and their wild progenitors” - and the pioneering composite cross work of Harlan and Martini – we propose to use this “doubled haploid composite” seed as a resource for cost-effective food barley improvement.

**The simplicity of a doubled haploid composite:** This germplasm offers a very simple approach to food barley improvement: participants can grow out the bulk population in whatever format they choose and let natural selection, or artificial selection, do the work.  Since the population consists of doubled haploids, pure lines can be extracted at any time, the seed multiplied, and the selected lines advanced for testing as potential varieties.

Given ever-cheaper sequencing costs and ever-higher throughput, it will be relatively straightforward - at some point in the future - to determine the pedigree of any selected line extracted from the composite by reference to the genotypes of the individual lines maintained in reserve.

The ability to determine what was selected has practical and scientific benefits. Practically speaking, any variety released from the composite can be identified and readily co-licensed by OSU and selector’s institution. Of equal or greater importance - there are some interesting collaborative research opportunities in this endeavor as well: selection response, outcrossing rates, epigenetics – to name a few.

If you would like to participate in this endeavor, please fill out the following request.

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| Your name | Institution and mailing address | Amount of seed requested (minimum and maximum) | Amount of your donation to support continued food barley research at OSU\* |
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\*We are not in the seed business and we appreciate that in the future we may all benefit from co-licensing of varieties selected from this composite. But bearing in mind our investment to date ($20,000 in DH lines and $10,000 in assessment), here are some donation guidelines – based on the price list from the genetics stocks center of a leading model species…

Industry: $120 per sample plus $24.00/kilogram (the fee includes shipping and handling)

Academic: $12 per accession plus $24.00/kilogram (the fee includes shipping and handling)

Checks should be made out to “OSU Barley Project” and sent to

Dr. Patrick Hayes

Barley Project

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