

# Featured Innovator: BarleyWorld



In preparation for this month's Variety Showcase, we sat down for a Q&A with Patrick Hayes, Brigid Meints, and Andrew Ross; researchers at Barley World, Oregon State University's Barley Breeding Program and one of the Regional Grains Project's partners on developing naked or hull-less barley. More information on the upcoming Variety Showcase and tickets for the event can be found [here](#).

**Q:** What makes barely unique or different from other "small grains"?

**Patrick Hayes:** Barley is unique in being so versatile: it is the base of beer, and that foundation lets one build on other attributes – including nutrition (human and animal), and flavor attributes. Barley is a much simpler organism – genetically speaking than wheat (14 vs. 42 chromosomes). That is an advantage when it comes to figuring out what genes drive what traits.

**Q:** What are some of the main objectives for OSU and the other partners on the naked barley grant?

**Brigid Meints:** The main objectives of the grant are as follows:

1. Evaluate multi-use naked barley varieties and breeding lines in diverse, representative organic systems across the United States.
2. Identify and characterize key agronomic and food, feed, and malt quality traits for naked barley lines grown under organic conditions.
3. Understand the genetics of traits important for organically produced multi-use naked barley.
4. Measure the economic and environmental benefits of organic naked barley production and products.
5. Educate the public about the performance of naked barley in various organic production systems, variety attributes, and end-use options.
6. Observe, analyze, and report the results of natural selection and artificial selection on an organically grown naked barley composite population.
7. Investigate, assess, and develop multiple markets for naked barley through engagement with the full spectrum of stakeholders.

**Q:** How is barley influenced by climate? Is it more tolerant to any specific environmental stresses that will be of use as the Earth's climate continues to become more volatile?

**Patrick Hayes:** Different varieties of barley are grown from high elevations at the equator to the margins of agricultural production in both hemispheres. A systematic characterization of the genetic basis of adaptation gives us hope that barley can be a tool to deal with the effects of climate change. Barley can be a key component of multi-pronged strategies to ensuring health, happiness, and satiety in the face of volatility.

Barley is a robust and hardy grain: it has lower input requirements (notably water and nitrogen) than wheat. Fall-planting of barley is a strategy for making the most of available precipitation, a fall-planted barley will produce ~ 25% more grain yield than a spring-planted barley at the same location.

**Q:** What are the advantages and disadvantages of naked barley for cooking and brewing?

**Brigid Meints:** For food consumption, covered varieties must have the hull removed by pearling, a mechanical abrasion process removes some of the bran and germ as well, effectively making it no longer a whole grain. Therefore, naked varieties are preferred for whole grain foods. They require no additional processing between cleaning and food preparation. They can be cooked up whole, flaked, milled into

flour, or cracked. Cooking times for whole-grain naked barley (cooked like rice) are typically longer than for pearled barley, which can be a disadvantage. However, cracking is one way to get around that, or using a pressure cooker.

**Q:** What can you tell us about the potential naked barley has to change the way we think of barley as a food?

**Andrew Ross:** Naked barley has a tremendous potential in foods. It can do pretty much anything that other non-wheat grains can do. We and our collaborators have had great success making breads, risen and flat when mixed with wheat flour, we have also produced noodles and pasta, cookies, crackers and shortbreads, we've nixtamalized it to make barley-masa, cracked it to make barley bulgur and couscous, and used it whole to make pilafs and risotto-style dishes where it adds texture, crunch and flavor. We have fed a hundred people with barley pancakes: a great and easy "gateway" product for anyone interested in learning to adapt barley into their formulations. One of the great things working with the barleyworld cultivars has been the opportunity to play with color. So far, the color palette we have to work with exceeds what is readily available in wheat. We have made layered-multicolored cookies, harlequin breads, or made batches of shortbreads and crackers with different colored (e.g. black versus white) barleys and then mixed them when plating to provide color contrast on the table.

Because naked barley does not need to be abrasively dehulled, it is a true whole grain and brings the attendant benefits of whole grain consumption in general. Whole grains have yet again been identified as having health benefits, a recent (July 2018) publication looking at 55,000 middle-aged people showing higher wholegrain consumption to be consistently associated with a lower risk of type 2 diabetes. In the specific, naked-barley is a potent source of soluble beta-glucan fiber, which is documented to bring a variety of additional health benefits.

Our efforts are to make barley foods that are attractive and delicious, the health benefits then piggybacking on the desirability of the foods, eaten for their own sake and culinary qualities.

**Q:** Generally in the brewing process, barley's hull creates a filter bed that proves useful in brewing. Does naked barley work as well in the brewing process?

**Brigid Meints:** For brewing, naked barley can present an opportunity through significantly higher levels of malt extract and improved beer quality due to the absence of unwanted compounds in the hull such as tannins and other polyphenols, as well as potential economic benefits associated with reduced freight and storage costs.

As you point out, hulls play a key role during the lautering process of the brew where they provide filtration. There are a few ways to get around this. Mash filters, which rely on mash filter membrane cloths to clarify the wort are a potential way to get around the hull. Additionally, we've worked with some brewers who have had success adding rice hulls or using only a percentage of naked barley in the total malt bill.