2024 Idaho Barley Yield Contest in the Works

BY BRETT WILKEN, SCOULAR AND LAURA WILDER, IDAHO BARLEY COMMISSION

In the annals of agricultural history, Idaho has long been celebrated for its bountiful harvests of potatoes, wheat, and other staple crops. Yet, amidst the verdant fields and rolling plains, one crop has remained conspicuously absent from the record books—barley. While other states have boasted impressive yield records for various grain crops, Idaho's barley harvests have never been officially recognized on a state or national level. That is, until now.

2023 marked a pivotal moment in Idaho's agricultural narrative as efforts were made for the first time to establish a barley yield record Mix Miller Farms of Jerome Idaho established an incredible yield of 200.97 bushels per acre growing Molson Coors' groundbreaking spring variety, Moravian179™.

A standout feature of Moravian179™ is its remarkable test weight. Miller's barley sample clocked in at an astounding 55 lbs. per bushel—a feat that surpasses the typical high-quality barley, which usually hovers around 52-54 pounds per bushel. This not only speaks to the density and robustness of Moravian179™ but also highlights its potential to elevate the overall quality standards in the malt barley industry.

Building on this momentum, the Idaho Barley Commission, in collaboration with industry sponsors, is set to launch the first-ever Barley Yield Contest in 2024—an exciting initiative that aims to celebrate and elevate the art of barley cultivation.

The contest comes on the heels of the historic barley yield achieved by Molson Coors' Moravian179™, a variety developed by Dr. Bob Brunick's breeding program for Molson Coors in Burley, Idaho and serving as a testament to the industry's commitment to pushing boundaries and fostering continuous improvement. The contest is designed to recognize excellence in three distinct divisions—Dryland, Irrigated Spring, and Irrigated Winter—providing a platform for farmers to showcase their expertise across various growing conditions.

The 2024 contest is considered a pilot program for Idaho, with plans to expand to a national scale in 2025. This pioneering initiative not only adds an exciting new dimension to the agricultural landscape but also underscores Idaho's role as a trailblazer in the barley industry. The three divisions reflect the diverse agricultural practices employed across the state, ensuring that farmers from different regions and climates have an equal opportunity to participate and shine.

Molson Coors Moravian179™, 2023 yield record setter.

"The contest promises more than just accolades," said Brett Wilken of Scoular in Twin Falls. "It offers a platform for knowledge exchange, collaboration, and the collective pursuit of excellence. By fostering healthy competition, the barley industry is set to unlock untapped potential, encouraging farmers to explore innovative techniques and share best practices that will benefit the entire community."

As the barley fields of Idaho prepare for this inaugural contest, the air is charged with anticipation and excitement. Farmers, researchers, and industry stakeholders alike are eager to witness the fruits of their labor unfold in the form of record-breaking yields and exceptional barley quality.

The Idaho Barley Commission invites farmers across the state to join this historic event, marking a new chapter in the legacy of Idaho's barley industry. As the pilot contest unfolds in 2024, it sets the stage for a national competition in 2025, where the best in barley cultivation from coast to coast will converge to celebrate the art and science of growing this essential grain. Contest details will be available soon on the Commission's website at https://barley.idaho.gov.

UI Barley Agronomy Program Update

BY DR. JARED SPACKMAN, UNIVERSITY OF IDAHO IDAHO BARLEY COMMISSION ENDOWED BARLEY AGRONOMIST

Dr. Jared Spackman's Idaho Barley Commission Endowed Barley Agronomy program has been conducting research and Extension programming on sustainable irrigated and dryland barley and wheat production strategies with an emphasis on nutrient management practices for yield, end-use quality, plant health, and soil and water quality. A major objective of Dr. Spackman's program is to produce nutrient management data that can be used to update the University of Idaho's barley and wheat production guides.

Since September 2020, Dr. Spackman's program has conducted 10 trials evaluating spring and fall-seeded annual grasses as forage crops. These studies have included awnless barley and wheat, forage oats, triticale, and hybrid rye. The program has also conducted irrigated and dryland trials that evaluate the yield and grain quality response of malt, feed, or food barley or hard red, hard white, or soft white wheat to nitrogen (N) fertilizer rate (48 trials), N fertilizer source (8 trials), N fertilizer application timing (42 trials), phosphorus fertilizer rate (5 trials), phosphorus fertilizer placement (4 trials), potassium rate (2 trials), sulfur (S) fertilizer rate (21 trials), S fertilizer source (8 trials), and micronutrients (3 trials). Additionally, the Barley Agronomy program has evaluated the effect of seeding rates on malt and feed barley (14 trials), seeding dates on winter wheat (2 trials), and soil moisture availability on dryland winter wheat yield potential (61 sites). Finally, the program is currently conducting 9 on-farm multi-year field trials evaluating precipitated calcium carbonate (sugar beet lime) as a lime amendment for acidic eastern Idaho soils that are primarily found in Ashton, St. Anthony, Swan Valley, Soda Springs, and Pocatello Valley. If you would like additional information about any of these research projects, you can visit https://www.uidaho.edu/cals/aberdeen-research-and-extension-center/barley or email Dr. Spackman at jspackman@uidaho.edu.

The following are some of the key takeaways from Dr. Spackman's research projects.

Project: Spring Malt, Feed, and Hulless Food Barley Yield and Protein Response to Nitrogen and Sulfur Rates and Application Timing (2021 – 2022; Aberdeen and Kimberly, 2021; Aberdeen and Rexburg, 2022);

Project: Malt Barley Response to Sulfur Fertilizer Products and Rates When Grown Outside the Snake River Plain (2023; Bellevue, Tetonia, and Soda Springs)

- Current University guidelines suggest that when soil (0-2') sulfate-S tests are <10 ppm and irrigation water sulfate content is low, barley and wheat may benefit from 20 to 40 lb sulfate-S/ac.
- In all measured variables (yield, straw, plumps, test weight, plant height, lodging, etc.), there was no response to S fertilizer applications (0, 15, or 30 lb sulfate-S/ac) across all barley classes and sites. Irrigation water sample analysis indicated that both surface (Kimberly) and groundwater (all other sites) irrigation sources can supply 33 to 70 lb sulfate-S/acre foot of water negating the need for additional S inputs (from a nutrient requirement standpoint).
- There are many different S products available on the market, but the S must be in or converted to the sulfate form before it is plant available.
- Elemental S is commonly used in the Snake River plain to acidify soils for improved phosphorus and micronutrient uptake and to improve soil tilth. A good rule of thumb is that 33% of elemental S will convert to sulfate annually.
- Bentonite S or micronized elemental S products may convert to sulfate-S more rapidly than elemental S. Sulfate-S sources are immediately plant-available and, depending on the formulation, may

Sulfur sources	Aberdeen 2021	Kimberly 2021	Aberdeen 2022	Rexburg 2022	Bellevue 2023	Soda Springs 2023	Tetonia 2023
SO_4-S (0-2' ppm)	6	11	25	4	8	5	4
UI Supplemental SO_4–S Recommendation (lb/ac)	20-40	0-20	0	20-40	20-40	20-40	20-40
Irrigation Water Sulfate-S (lb/ac foot)	70	46	46	33	11	0	29

Table 1: Barley fields irrigated with water from the Snake River or its aquifer can receive 33 to 70 lb sulfate-S per acre-foot of water. Dryland farms or farms irrigated with other water sources may benefit from S fertilization if the soil test (0-2') sulfate-S content is <10 ppm.

provide N, calcium, or potassium as an additional nutrient source.

- Malt barley fertilized with 20 lb S/ac sulfate-based fertilizer products headed out 3 days earlier than the 40 lb S/ac rates. In contrast, the 40 lb S/ac micronized elemental S products headed out 3 days earlier than the 20 lb S/ac rates.
- Micronized elemental S products improved yield by 7 to 10 bu/ac on average across all site years relative to elemental S, potassium sulfate, or calcium sulfate. Ammonium sulfate yield was no different than any of the other S products.
- There was no difference in grain yield when malt barley was fertilized with 0, 10, 20, 30, 40, or 50 lb S/ac as ammonium sulfate at all three locations in 2023.

Project: Active Canopy Sensors to Prescribe In-Season Supplemental Nitrogen for Barley (2021 – 2023; Aberdeen and Kimberly 2021, Aberdeen and Rexburg 2022, Aberdeen 2023)

Project: Spring Malt, Feed, and Hulless Food Barley Yield and Protein Response to Nitrogen and Sulfur Rates and Application Timing (2021 – 2022; Aberdeen and Kimberly 2021, Aberdeen and Rexburg 2022)

There are many approaches to evaluating crop yield response data to determine the optimal N rate for barley production. One approach is the modified arcsine log calibration model. In this model, individual site's yield and available N (fertilizer and 0-2' soil N at planting) response data are converted to a common scale (relative yield) and are combined with other site years of data to create a larger, more representative dataset. This model estimates that across years and sites evaluated, the optimal N rate (accounting for available soil N (0-2') plus fertilizer N) for irrigated malt, feed, and hulless food barley is 254, 278, and 274 lb N/ac, respectively.

Another approach simply regresses yield against available N (at-planting soil N plus fertilizer N). The point at which yield is maximized (star) is the agronomic optimum N rate (AONR). In this example from Aberdeen in 2023, the AONR was 357 lb N/ac yielding 195 bu/ac when the fertilizer was applied as a single application at planting. 1.8 lb N/ac was required to produce 1 bu/ac of grain.

- When N is split-applied as 40 lb N/ac at planting and the remainder is applied at late-tillering, the AONR was 383 lb N/ac yielding 179 bu/ac. 2.1 lb N/ac was required to produce 1 bu/ac of grain.

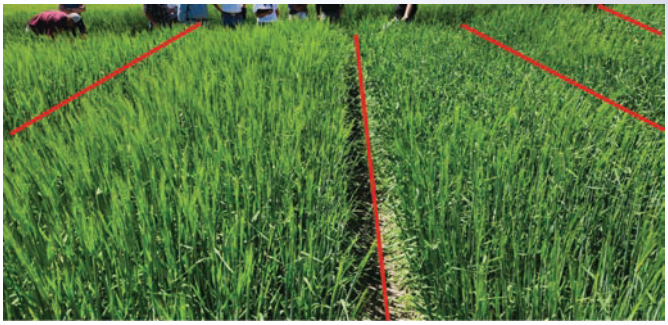

Image 1: Malt barley fertilized (from left to right) with 50 lb S/ac as ammonium sulfate, 20 lb S/ac as gypsum (calcium sulfate), 40 lb S/ac as gypsum, 20 lb S/ac as micronized elemental S, and 40 lb S/ac as micronized elemental S. (Photo Courtesy of Grant Loomis).

- It is often not economically feasible to maximize yield because as you approach the AONR, each additional unit of N produces less yield. The economical optimal N rate (EONR; triangle) is estimated as the point at which the last unit of N returns a yield large enough to pay for an additional unit of N. This will fluctuate as the price of N and barley changes. In the current scenario, malt barley was valued at $7.50/bu and N was $0.83/lb. This calculation does not account for the cost of applying the N fertilizer. If included, the EONR would move further to the left.
- The EONR for a single application at planting was 307 lb N/ac yielding 192 bu/ac with an N: yield ratio of 1.6. The EONR for a split application was 313 lb N/ac yielding 176 bu/ac with an N: yield ratio of 1.8.
- Across 42 site-years of data in barley and wheat, split-applying N at jointing on irrigated spring grains was either no different from or did not improve grain yield compared to a single application done at planting. In some instances, split applications reduced yield.
- Grain protein was 0.1 – 0.8 percentage points greater with a split application compared to a single application, except at the highest applied rates when the split application protein concentrations were 0.8 – 2 percentage points greater than a single application.

If you have specific agronomic research topics related to barley or wheat production that you would like us to address, please reach out to Dr. Spackman at jspackman@uidaho.edu, other University of Idaho researchers, or your county Extension educator.