



# 2020 Heirloom Hulless Spring Barley Variety Trial



Dr. Heather Darby, UVM Extension Agronomist  
Henry Blair and Hillary Emick  
UVM Extension Crops and Soils Technicians  
802-524-6501

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**2020 HEIRLOOM HULLESS SPRING BARLEY VARIETY TRIAL**  
Dr. Heather Darby, University of Vermont Extension  
heather.darby[at]uvm.edu

There is an interest amongst the

**Table 2. Spring hulless barley agronomic information, Alburgh, VT, 2020.**

Grain plots were harvested with an Almaco SPC50 plot combine on 16-Jul 2020. Prior to harvest, plant heights and lodging were recorded. The height of three plants per plot were measured in centimeters, excluding the awns. Grain yield, test weight, and moisture were determined at harvest. Grain quality was

Seasonal precipitation and temperature data were collected using Davis Instruments Vantage Pro2 weather station. The 2020 season was drier than average spring but warmer and drier from April to July, which was 55 Growing Degree Days (GDD) and 3.81 inches below normal. A drier than average 2020 season. Warm and dry conditions may have affected the harvest as well. For comparison, the 2019 season was 6-Aug, respectively, and the 2020 trial was 6-Aug, respectively, and the 2020 trial was 6-Aug, respectively.

**Table 3. Seasonal weather data collected from 2019 to 2020.**

Average temperature (°F)
Departure from normal
Precipitation (inches)
Departure from normal
Growing Degree Days (32°-95°F)
Departure from normal

Based on weather data from a Davis Instruments Vantage Pro2 weather station. The averages are for 30 years of NOAA data (1981-2010).

During the 2020 growing season, several weather events were recorded and are shown in Table 6 reW\*n /P <<(-8

**Table 4. Spring hulless barley varieties and yields at harvest moisture, Alburgh, VT, 2020.**

<b>Variety</b>	<b>Heading date</b>	<b>Height</b>	<b>Lodging</b>	<b>Test weight</b>
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**Figure 1. Spring hulless barley lodging and moisture, Alburgh, VT, 2020.**

Moisture levels were quite high for this trial, ranging from 15.4% to 21.9% which, as mentioned, could indicate premature harvest. However, some varieties had heavy lodging in the field. Lodging and moisture were poorly correlated ( $r=0.31$ ) but it is possible, if not likely, that more time left in the field to dry down could lead to more lodging (Figure 1). Additional trials will need to be conducted to evaluate possible lodging resistance, grain moisture and harvest timing.

**Table 5. Spring hulless barley grain quality, Alburgh, VT, 2020.**

Variety	Crude protein %	Falling number seconds
Arabian Blue	13.6 <sup>cd</sup>	435 <sup>b-d</sup>
Burbank	13.6 <sup>cd</sup>	409 <sup>de</sup>
Burbank Purple	13.6 <sup>cd</sup>	463 <sup>ab</sup>
Dolma	14.3 <sup>b-d</sup>	174 <sup>j</sup>
Dolma Purple	13.9 <sup>b-d</sup>	

Grain quality was analyzed for protein and falling number, results are shown in Table 5. Ethiopian had the highest crude protein at 16.8%, adjusted for a 12% grain moisture basis, and Tibetan the lowest at 11.5%. Protein requirements will vary by end-use. For food grade hulless barley, high protein levels are likely more desirable, while lower protein is likely preferred for distilling or malting.

Falling number measures viscosity which is an indicator of enzymatic activity in the grain. It is determined by the time it takes, in seconds, for a stirrer to fall through a slurry of flour and water to the bottom of a test-tube. Falling numbers are best understood for wheat, in which case values between 300-350 indicate low enzymatic activity and sound quality wheat. A falling number lower than 200 indicates high enzymatic activity and poor-quality wheat, typically as a result of pre-harvest sprouting damage in the grain. This is most common if there are rain events as the grain is ripening prior to harvest. To the contrary, lower falling number is more favorable for rye, roughly 90-200, if it is going to be used for baking. Research on rye falling number is ongoing and is discussed further in the 2020 Rye Harvest Date Trial Report.

There was a range of falling numbers in this trial from 480 to 174 with a trial mean of 375. The lowest value, 174, was the variety Dolma which also had the lowest moisture of 15.4. The three varieties with the highest harvest moistures each had falling numbers above 400 which is considered slightly high for most baking purposes. Ethiopian, Excelsior, and Sheba tested in what would be the ideal range for wheat for baking. Dolma and possibly Glutinous would be in an acceptable range for rye for baking. More research is needed to evaluate appropriate falling number ranges for hulless barley. Regardless, it will likely depend on intended end use. If the barley is going to be malted, higher falling numbers are preferred because at the malthouse the grain will be sprouted by a controlled method, so there cannot be excessive pre-harvest sprouting damage in the kernels.

## DISCUSSION

The 2020 growing season was warmer and drier than the 30-year average. This allowed for early planting in April, low disease pressure, high yields, protein and falling numbers across the grain trials at Borderview Research Farm. Grain yields were high across the board in 2020 and hulless barley yields were higher than expected, even considering they are all heirloom varieties. As mentioned previously, this is still lower than the Spring Malting Barley trial, but much higher than expected and possibly acceptable depending on demand and prices paid by specialty markets.

Although falling number and moisture values were not strongly correlated ( $r=0.24$ ), this likely suggests there is a range of ripening times between these varieties which all come from many different geographicaT/F2 allus

variable protein levels may be more acceptable to bakers because of the wide variety of food products that can be produced with barley.

Research from Oregon State University (OSU) indicates several possibilities and potential end-uses for hulless barley including food, beverages and feed. Although these parameters were not measured in this trial, OSU research suggests variation in starch composition and  $\beta$ -glucan values can indicate end-use acceptability, with multiple end-uses possible