



2021 Winter Barley Variety Trial

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With the development of a robust localvore movement and the revival of the small grains industry in the Northeast, craft breweries and distilleries have expressed an interest in sourcing local barley for malting. Malting barley must meet specific quality characteristics, such as moderate protein content and high germination rate. Winter barley has not been traditionally grown in the Northeast due to severe winterkill. However, newly developed varieties and a changing climate have encouraged our team to investigate this crop for the area. In 2020-2021, UVM Extension Northwest Crops and Soils Program conducted a winter barley trial to evaluate the yield, quality and agronomic characteristics of malting barley varieties.

MATERIALS AND METHODS

A winter barley variety trial was initiated at Borderview Research Farm in Alburgh, VT. Winter barley was planted on 18-Sep 2020. Twenty-seven winter varieties (Table 1) were planted in a randomized complete block design with three replicates. The seedbed was prepared by conventional tillage methods into a Benson rocky silt loam at 125 lbs ac⁻¹ with a Great Plains cone seeder. R All plots were managed with practices similar to those used by producers in the surrounding areas (Table 2).

Table 1. Winter malting barley varieties and seed sources.

Variety	Row Type	Seed Source
0214-007	2	Ohio State University
02WI-13	2	Ohio State University
13ARS537-13	2	USDA-ARS, Idaho
13ARS537-19	2	USDA-ARS, Idaho
13ARS537-25	2	USDA-ARS, Idaho
ARS15B12	2	USDA-ARS, North Carolina
Avalon (VA16M-81 2R)	2	Virginia Tech
Charles	2	Univ of Idaho Foundation Seed
Dementiel	6	Secobra
DH140963	2	Oregon State University
DH141132	2	Oregon State University
DH141222	2	Oregon State University
DH141225	2	Oregon State University
Endeavor	2	Univ of Idaho Foundation Seed
Flavia	2	Ackermann
Hirondella	6	

Pixel	6	Secobra
SC 31450 TH	2	Secobra
Thoroughbred	6	Virginia Tech
VA16M-84 2R	2	Virginia Tech

(germination energy) was determined by incubating 100 seeds in 4.0 ml of water for 72 hours and counting the number of seeds that did not germinate. Each sample was run in duplicate. Grain assortment or plumpness was determined with the Pfeuffer Soritmat using 100g of clean seed, and was determined by the combining the amount of seed remaining on the 2.78mm and 2.38mm sieves.

Data was analyzed using mixed model analysis procedure of SAS (SAS Institute, 1999). Replications were treated as random effects, and treatments were treated as fixed. Mean comparisons fixed. Mean comparisons 2n comp

The variety with the best winter survival was Hironde; 100% of the plants of this variety survived the winter without any winterkill. This was statistically similar to 18 other varieties with 85% or greater survival (Table 4). Heading dates for all varieties fell within a six day period between May 19 to May 25. The weather at heading date is often related to fusarium infection and presence of deoxynivalenol toxin, with colder, wetter weather associated with higher infection rates and higher toxin concentrations. The late May weather in 2021 was warm and dry and was not conducive to fungus growth. One rep of each variety tested for DON (data not shown). All samples tested below the detectable limit for the DON vomitoxin test (<0.5 ppm).

Table 4. Agronomic characteristics for winter barley variety trial in Alburgh, VT.

Variety	Winter survival %	Heading date	Height cm	Lodging %
0214-007	91.7*	20-May	90.7	0.00

Heights and lodging were measured prior to harvest. Taller plants can be desirable for better competition against weeds; however, very tall plants can be prone to lodging. The tallest variety was NB15420 at 109.8 cm tall. This was statistically similar to VA16M-84 ZR and Avalon, both more than 100 cm tall.

Winter barley yields were good, averaging over two tons per acre (Table 5). The highest yielding variety was Hirondeella, with a yield of 6022 lbs ac⁻¹. This was statistically similar to three other varieties that all averaged over 5000 lbs ac⁻¹ (KWS Faro, Pixel, and DH140963). Harvest moisture overall was low and few plots required drying down for storage. Falling number was extremely variable, ranging from 65 to 397 seconds, indicating great variability in grain maturity at harvest. Only five varieties had falling number below the desired value of 250 seconds. Most varieties were within the acceptable range for protein concentrations for malting barley, but 8 varieties had protein concentrations higher than 12.5% and higher than ideal for malting barley. Test weights were somewhat low overall, with no varieties meeting the industry standard of 50 lbs bu⁻¹. Germination was good for most varieties in the trial, with several varieties exhibiting 100% germination. Only two varieties (13AR5537-13 and 13AR5537-25) had germination rates less than 95%. Plumpness, a proxy for starch content and overall malting quality, was (Figure 1). All varieties except one were above the 80% industry minimum.

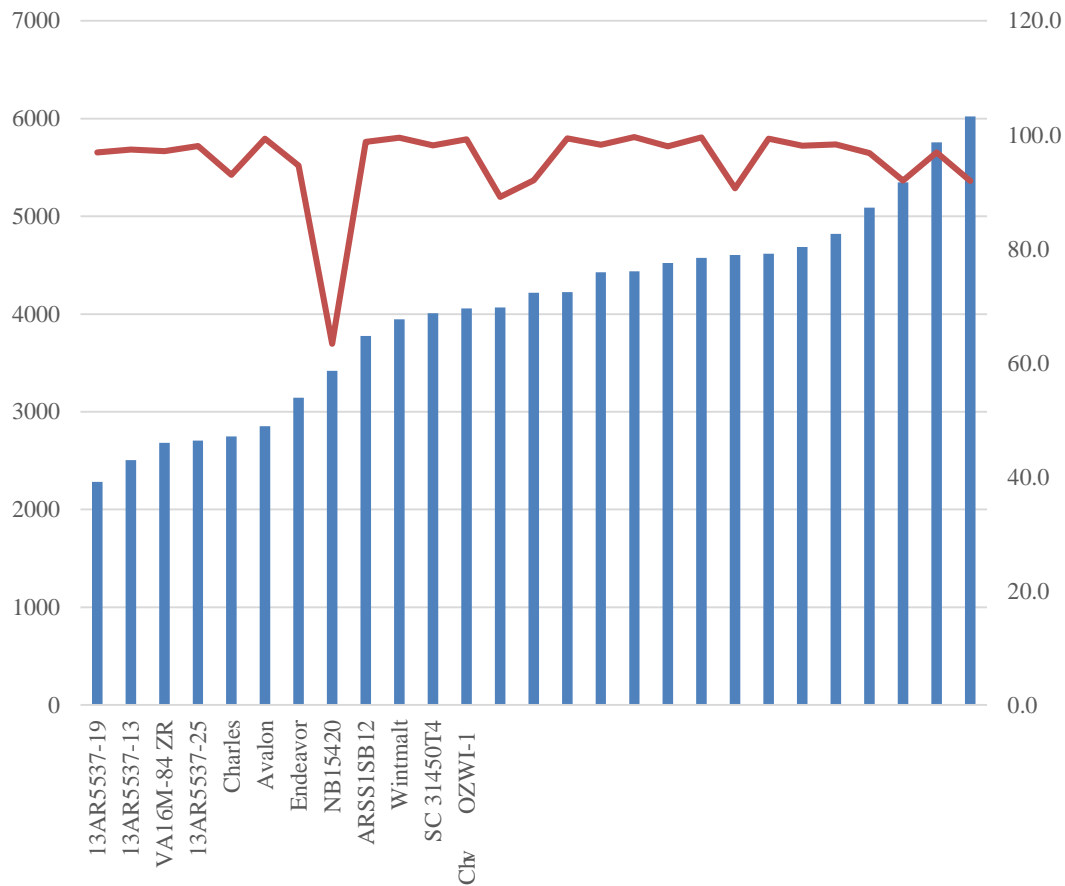


Figure 1. Yield and plumpness of winter malting barley varieties, Alburgh, Vermont

ACKNOWLEDGEMENTS

The UVM Extension Crops and Soils Team would like to thank Roger Rainville and the staff at Borderview Research Farm for their generous help with this research. We would also like to acknowledge Henry Blair, Catherine Davidson, Ivy Krezinski, Rory Malone, Lindsey Ruhl, Laura Sullivan, Sophia Wilcox Warren, and Sara Zeigler for their assistance with data collection and entry. This information is presented with the understanding that no product discrimination is intended and neither endorsement of any product mentioned, nor criticism of unnamed products, is implied.