2019 Organic Spring Barley Variety Trial

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With the revival of the small grains industry in the Northeast and the strength of the locavore movement, craft breweries and distilleries have expressed an interest in sourcing local barley for malting. Malting barley must meet specific quality characteristics such as low protein content and high germination. Depending on the variety, barley can be planted in either the spring or fall, and both two- and six-row barley can be used for malting. In 2019, UVM Extension in collaboration with the Eastern Spring Malting Barley Nursery (ESBN) testing network, conducted a spring malting barley trial to evaluate yield and quality of 28 varieties. Some varieties that had not performed well or are no longer commercially available,

Following the harvest of spring barley, seed was cleaned with a small Clipper cleaner (A.T. Ferrell, Bluffton, IN). Quality measurements included standard testing parameters used by commercial malt houses. Plot yield was weighed. Harvest moisture was determined for each plot using a DICKEY-john Mini GAC moisture and test weight meter. Generally the heavier the barley is per bushel, the higher malting quality. A one-pound subsample was collected to determine quality. The samples were then ground into flour using the Perten LM3100 Laboratory Mill, and were evaluated for crude protein content using the Perten Inframatic 8600 Flour Analyzer. Falling number for all barley varieties were determined using the AACC Method 56-81B, AACC Intl., 2000 on a Perten FN 1500 Falling Number Machine. The falling number is related to the level of sprout damage that has occurred in the grain. It is measured by the time it takes, in seconds, for a stirrer to fall through a slurry of flour and water to the bottom of the tube. Falling numbers greater than 350 indicate low enzymatic activity and sound quality sample. A falling number lower than 200 indicates high enzymatic activity and poor quality. Deoxynivalenol (DON) analysis was analyzed using Veratox DON 2/3 Quantitative test from the NEOGEN Corp. This test has a detection range of 0.5 to 5 ppm. Samples with DON values greater than 1 ppm are considered unsuitable for human consumption. Percent germination (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 using 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.

All data was analyzed using a mixed model analysis where replicates were considered random effects. The LSD procedure was used to separate cultivar means when the F-test was significant ($p < 0.10$).

Variations in yield and quality can occur because of variations in genetics, soil, weather, and other growing conditions. Statistical analysis makes it possible to determine whether a difference among varieties is real or whether it might have occurred due to other variations in the field. At the bottom of each table a LSD value is presented for each variable (e.g. yield). Least Significant Differences at the 10% level of probability are shown. Where the difference between two varieties within a column is equal to or greater than the LSD value at the bottom of the column, you can be sure in 9 out of 10 chances that there is a real difference between the two varieties. In this example, variety A is significantly different from variety C, but not from variety B. The difference between A and B is equal to 725, which is less than the LSD value of 889. This means that these varieties did not differ in yield. The difference

Foliar diseases reduce photosynthetic leaf area, use nutrients, and increase respiration and transpiration within colonized host tissues. Diseased plants may exhibit reduced vigor, growth, and seed fill. Earlier occurrence, greater degree of host susceptibility, and longer duration of conditions favorable for disease development will increase the yield loss. When scouted on 20-Jun, each plot was assessed for several distinct diseases. These individual disease ratings were combined into a single foliar disease rating for statistical analysis. Very little fungal disease was noted. There was no powdery mildew present at the time of scouting, and only eleven individual plants scouted showed any sign of leaf rust.

The variety with the highest disease burden was Pinnacle, with more than 16% of the foliar surface of this variety affected by disease. All plants of this variety were affected with distinctive foliar lesions that did not appear to spread to surrounding plots. Samples were sent to the University of Vermont Plant Diagnostic Clinic but the disease could not be id

CDC Fraser	316[a-c]	6.33[a-c]	3.5[j]	4.7[d]	0.89[cd]	0.29[bc]	-	-
Champion	201[b-d]	5.00[b-f]	12.3[g-j]	7.0[a-d]	1.44[b-d]	0.42[bc]	31.0[a-i]	0.00[c]
Crescendo	242[a-d]	4.00[c-f]	7.7[h-j]	4.7[d]	0.89[cd]	0.55[ab]	32.8[a-f]	0.00[c]
Esma	203[b-d]	3.00[f]	36.4[b-d]	7.0[a-d]	1.11[cd]	0.16[bc]	31.9[a-h]	16.7[b]

Yields were exceptionably

DISCUSSION

Despite a challenging beginning to the growing season with cold weather delaying planting and suppressing germination, 2019 was overall a fairly good year for growing spring barley. Quality parameters were very good for most varieties. Yields were extremely variable, with some very high yields. The average yield for the trial was 3553