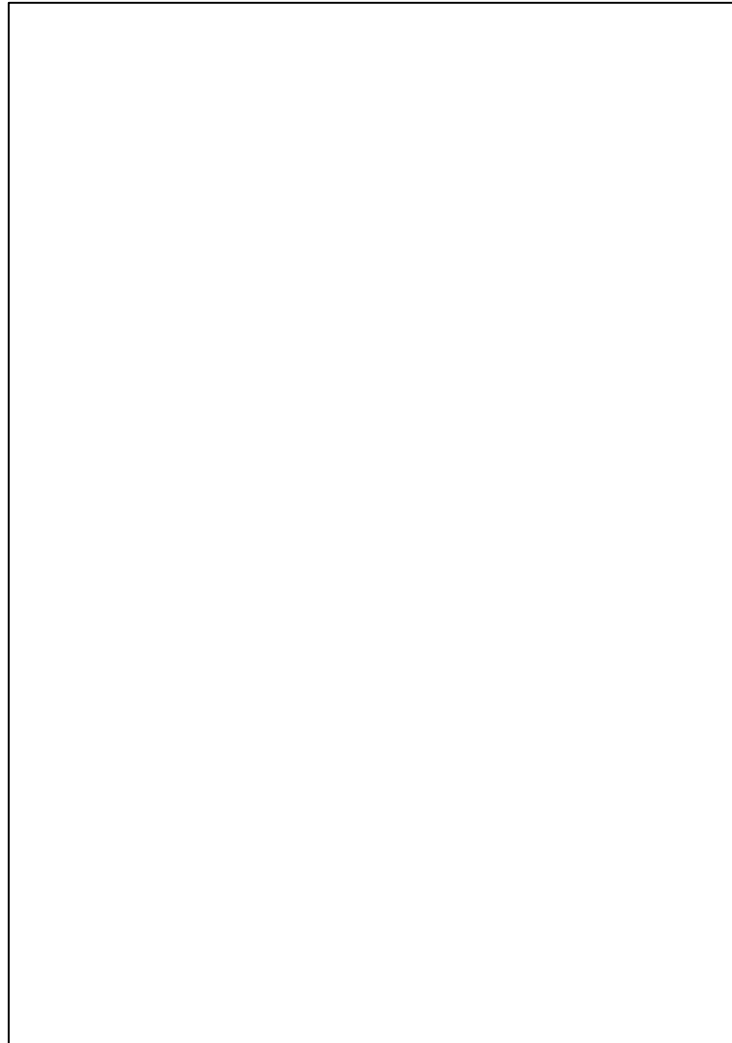# 2020 Steam Treated Grains Trial

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On 25-Jun, a smut assessment was done by taking three 1-foot sections and counting the total number and number of smutted heads per section. On 8-Jul, the plots were scouted for powdery mildew, *Fusarium* head blight, and other signs of disease or insect damage in three 1-foot sections. These observations were recorded by percent severity (0-100%) by a visual assessment.

Both the Robust barley and the Prosper spring wheat were harvested on 21-Jul. Grains were harvested

station, equipped with a WeatherLink data logger. Precipitation was below average from April through July; overall there was nearly 1 in. less rain during that four-month period. A cool April led to Growing Degree Days (GDDs) lagging behind the 30-year average, followed by a hotter than normal June and July. It was over 4 degrees warmer than normal in July. Plants may have exhibited drought stress as a result of the lack of rain and warm temperatures. A total of 3434 GDDs were accumulated April through July, 56 more than the 30-year normal.

Table 2. Temperature and precipitation summary for Alburgh, VT, 2020.

Alburgh, VT	April	May	June	July
Average temperature (°F)	41.6	56.1	66.9	74.8
Departure from normal	-3.19	-0.44	1.08	4.17
Precipitation (inches)	2.09	2.35	1.86	3.94
Departure from normal	-0.72	-1.04	-1.77	-0.28
Growing Degree Days (32-95°F)	315	746	1046	1326
Departure from normal	-99	-13	35	132

Table 6. Population and percent disease severity for Robust spring barley, Alburgh, VT, 2020.

Treatment	Powdery mildew	Leaf spots	Leaf rust	Physiological spotting	Arthropod damage	Smutted heads
	% severity					%
None	7.24	8.28	0.250	7.08	4.65	

steam treatment, nor was there a significant impact on the amount of smutted heads. There were no significant effects on the Robust spring barley in terms of the severity of pests and disease, or the percentage of spiked smutted heads in the total grain population. It is important to note that this trial did not measure the incidence of pests and disease. Smutted heads accounted for less than 1% of grain heads in all treatments. The steam treated Prosper spring wheat had significantly lower harvest moisture and higher test weight than the non-steam treated wheat. The harvest moisture was lower for the non-steam treated spring barley. This indicates that the quality of the grains was not affected by the steam treatment. DON levels were under 1 ppm and therefore considered suitable for human consumption. Overall, this season, there were low levels of pest and disease pressure, potentially due to the hot, dry season.

This is the third year that this experiment has been conducted at Borderview Research Farm in Alburgh, VT, and the results vary by year. In the 2018 season, it was warmer and drier than normal. Overall, loose smut of *Ustilago tritici* and *Fusarium* pressure was low, but results suggested steam treatment of wheat may be effective in reducing loose smut. Steam treatment did not appear to affect other disease indicators, such as spotting or increased FHB. However, the results also suggested that the steam treatment may have decreased grain quality, as indicated by the lower test weight and crude protein in the steam-treated wheat. Those differences were not observed in the spring barley. In 2019, the spring was cool and wet, followed by hot, dry weather in July. DON levels were low and smutted heads accounted for <1% of the total grain population; this trend was seen again in 2020. There was no significant impact of the steam treatment on either spring barley or wheat, nor did the steam treatment affect yield or quality.

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