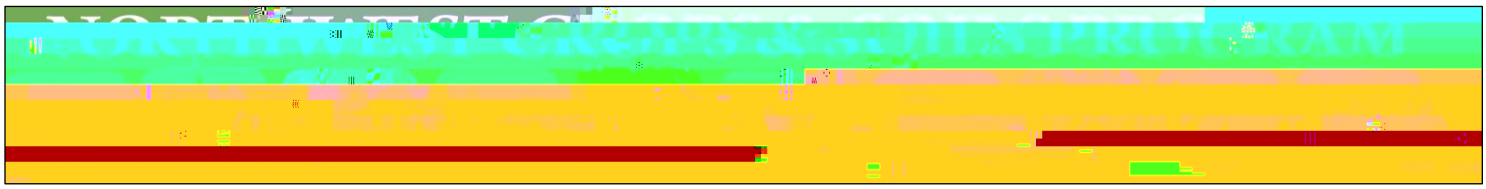

2023 Steam Treatment to Reduce *Ustilago spp.* Infection in Spring Barley

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Table 1. Agronomic and trial information for the steam treated grains trial, 2023.

	Borderview Research Farm, Alburgh, VT
Soil type	Benson rocky silt loam 8-15% slope
Previous crop	Industrial hemp
Tillage operations	Disk and spike tooth harrow
Harvest area (ft.)	5 x 20
Seeding rate (live seeds m^{-2})	350
Replicates	4
Planting date	14-Apr
Barley harvest date	8-Aug

On 9-May, at the tillering growth stage, populations were recorded by taking plant counts in 1-foot lengths 3 times per plot. On 21-Jun, the plots were assessed for the incidence of loose smut. The number of plants and the number of smutted heads were counted in two one-meter segments in each plot.

The barley was harvested on 8-Aug. Grains were harvested with an Almaco SPC50 plot combine. Grain moisture, test weight, and yield were determined with a DICKEY-John M20P meter and pound scale.

Data were analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications within the trial were treated as random effects, and treatments were treated as fixed. Treatment mean comparisons were made using the Least Significant Difference (LSD) procedure when the F-test was considered significant ($p<0.10$). Variations in project results can occur because of variations in genetics, soil, weather, and other growing conditions. Statistical analysis makes it possible to determine whether a difference among treatments 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 the 10% level of probability are shown. Where the difference between two treatments 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 values. Treatments that were not significantly lower in performance than the highest value in a particular column are indicated with an asterisk. In this example, treatment A is significantly different from treatment C but not from treatment B. The difference between A and B is equal to 200, which is less than the LSD value of 300. This means that these treatments did not differ in yield. The difference between A and C is equal to 400, which is greater than the LSD value of 300. This means that the yields of these treatments were significantly different from one another.

Treatment	**Yield**
A	**2100***
B	1900*
C	1700
LSD	300

Steam treated seed had lower smut incidence than the untreated seed, although none of those differences were statistically significant. The lowest smut incidence occurred in the seed, which had been treated for 90 seconds at 75 C, a 20% reduction in the incidence of smut. However, this treatment also had the lowest yield by a statistically significant margin (Table 3, Figure 1).

Figure 1. Yield and smut incidence in steam treated spring barley, Alburgh VT 2023. Treatments with the same letter did not differ significantly at p=0.10.

DISCUSSION

Although all steam treatments showed reductions in loose(e)9(am)-5( )11(t)-4(r)7(ea)8(t)-4(m)6(e)9(nt)-4(s s)6(how)5(ed