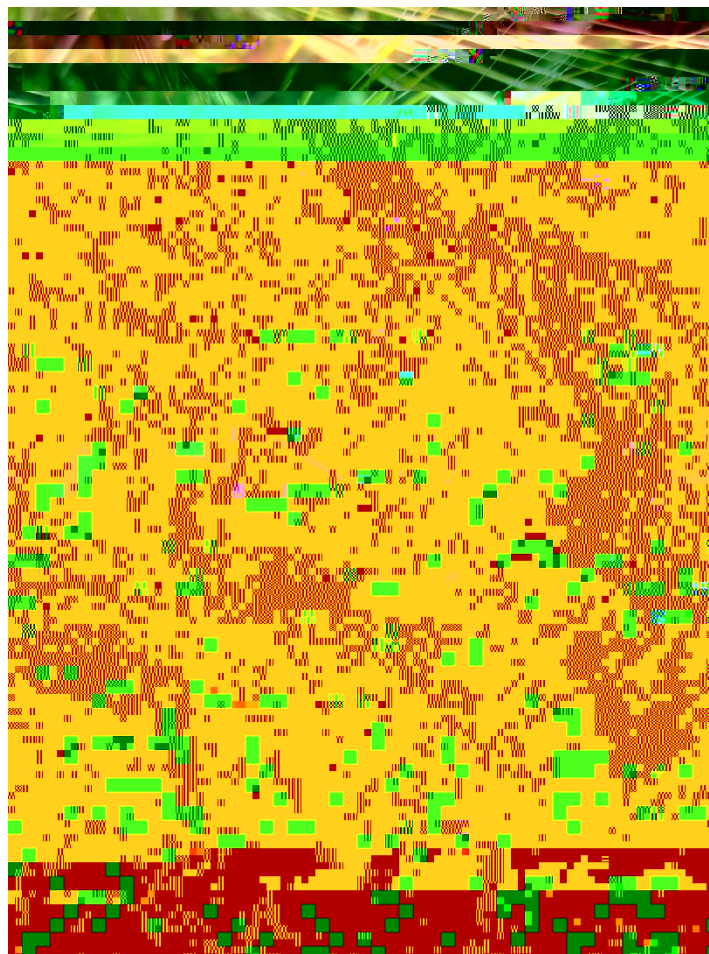


2017 Winter Barley Seeding Rate, Cover Crop and Variety Trial



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2017 WINTER BARLEY SEEDING RATE, COVER CROP, AND VARIETY TRIAL

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With the revival of the small grains industry in the Northeast and the strength of the localvore movement, craft breweries and distilleries have expressed an interest in sourcing

in temperature and growing degree days, leading to later maturation and delayed harvest until the end of July.

Table 2. Weather data for winter barley variety trial in Alburgh, VT.

Alburgh, VT	Sep-16	Oct-16	Nov-16	Mar-17	Apr-17	May-17	Jun-17	Jul-17
Average temperature (°F)	63.6	50.0	40.0	25.1	47.2	55.7	65.4	68.7
Departure from normal	3.03	1.80	1.82	-6.05	2.37	-0.75	-0.39	-1.90
Precipitation (inches)	2.50	5.00	3.00	1.60	5.20	4.10	5.60	4.90
Departure from normal	-1.17	1.39	-0.13	-0.63	2.40	0.68	1.95	0.73
Growing Degree Days (base 32°F)	949	559	270	98	459	733	1002	1138
Departure from normal	91	57	85	98	75	-		

Interactions between treatments:

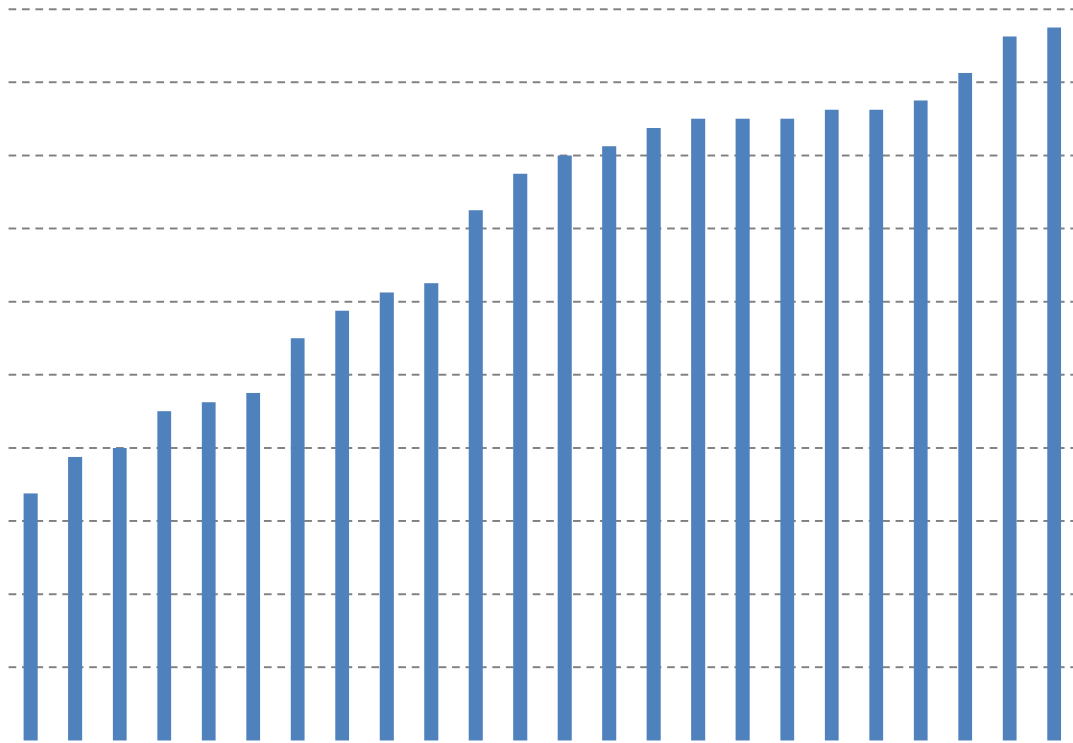


Figure 1. Impact of seeding rate, cover crop, and variety on barley winter survival, Alburgh, VT, 2017.

There was significant interaction between seeding rate, cover crop and variety affecting winter survival ($p=0.03$). Six combinations had winter survival less than 50%, while another six combinations had winter survival greater than 85% (Figure 1). The Wintmalt variety had higher winter survival than the Endeavor variety, and did particularly well with higher seeding rates and the clover and/or cover crop mixes. The Endeavor variety did not over winter well especially with lower seeding rates.

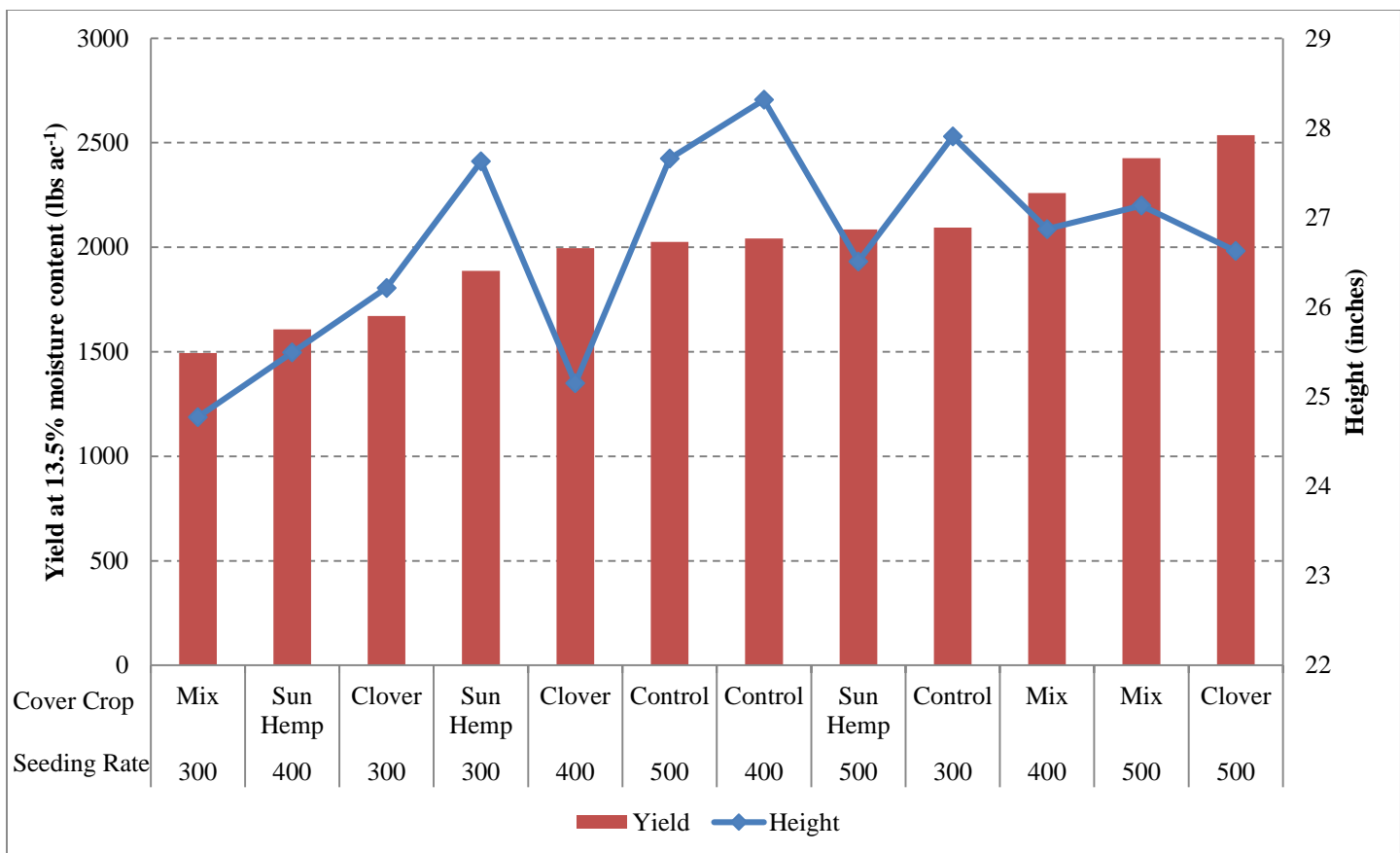


Figure 2. Impact of seeding rate and cover crop on winter barley height and yield, Alburgh, VT, 2017.

There was a significant interaction between seeding rate and cover crop in terms of height ($p=0.04$) and yield ($p=0.01$) (Figure 2). Higher seeding rates without cover crops resulted in the tallest barley plants regardless of seeding rate. Lower seeding rates and cover crops produced shorter plants than higher seeding rates and the control (no cover crop treatment). Higher seeding rates and incorporation of cover crops resulted in higher yields than the control. However, with lower seeding rates, cover crops outperformed the control treatments. It is possible that extra nitrogen provided by the cover crop treatments helped to increase barley yields under high seeding rates.

Figure 3. Impact of seeding rate and variety on DON levels in winter barley, Alburgh, VT, 2017.

Finally, there was a significant interaction between seeding rate and variety affecting DON levels ($p=0.04$) (Figure 3). Across the experiment, Wintmalt barley had lower DON levels than the Endeavor variety. In general for both varieties, the lowest seeding rate also had the lowest DON levels. This may indicate a link between seeding rate and DON concentrations.

Impact of Seeding Rate:

The seeding rates treatments had significant differences in winter survival, yield, crude protein, falling number, and DON (Table 3). The 500 seeds m^2 treatment had the best winter survival at 75.6% survival. This was significantly similar to the 400 seeds m^2 treatment at 70.8%. The 500 seeds m^2 treatment had the highest yield at 2268 lbs ac^{-1} , significantly higher than the other two seeding rates ($p=0.0008$). The 300 seeds m^2 treatment had significantly higher crude protein levels at 10.7% ($p=0.01$) and significantly higher falling number at 225 seconds ($p=0.03$). The 500 seeds m^2 and 400 seeds m^2 treatment had significantly lower levels of DON ($p=0.005$) although all treatments were above the 1 ppm threshold for human consumption.

Table 3. Impact of seeding rate on barley harvest and quality, Alburgh, VT, 2017.

Seeding rate lbs ac^{-1}	Cover crop N ac^{-1} lbs ac^{-1}	Winter survival %	Heading date	Height cm	Lodging %
300	28.2	64.1	6/10/2017	67.6	44.9
400	28.6	70.8*	6/9/2017	67.2	47.1
500	28.6				

Seeding rate	Harvest moisture	Test weight	Harvest yield @13.5% moisture	Crude protein @ 12% moisture	DON	Falling number	Germination
lbs ac ⁻¹	%	lbs bu ⁻¹	lbs ac ⁻¹	%	ppm	seconds	%
300	14.7	42.6	1787	10.7*	3.10	224*	84.0
400	14.2	43.4*	1977	10.3	2.61*	201	83.7
500	14.2	43.8*	2268*	10.1	2.38*	199	89.0
LSD (0.10)	NS	0.68	203	0.33	0.36	17.5	NS
Trial mean	14.4	43.3	2011	10.4	2.70	208	85.6

Cover crop	Harvest moisture	Test weight	Harvest yield @13.5% moisture
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Variety	Harvest moisture %	Test weight lbs bu ⁻¹	Harvest yield @13.5% moisture lbs ac ⁻¹	Crude protein @ 12% moisture %	DON ppm	Falling number seconds	Germination %
Endeavor	15.5	42.3	1566	11.1	3.33	149	89.5
Wintmalt	13.2	44.2	2455	9.7	2.06	267	81.6
LSD (0.1)	0.42	0.56	166	0.27	0.30	14.3	4.53
Trial mean	14.4						