2018 Cover Crop Variety Trial

THE UNIVERSITY OF VERMONT

2018 COVER CROP VARIETY TRIAL

	Appin turnip	2			Everleaf oats	70
	Hyoctane triticale	60		13*[ƚ]	Eco-till radish	3
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plots were analyzed by the Cornell Soil Health Testing Laboratory (Ithaca, NY) for wet aggregate stability and active carbon. Cover crop biomass was analyzed for nitrogen concentration

RESULTS

Seasonal precipitation and temperature were recorded with a Davis Instrument Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT (Tables 3 and 4).

Table 3. Seasonal weather data collected in Alburgh, VT, 2017.

	2017				
Alburgh, VT	**August**	**September**	**October**	**November**	**December**
Average temperature (°F)	67.7	64.4	57.4	35.2	18.5

Results from Fairfax Location

Table 5. Cover crop mix yield and quality, Fairfax, VT, 2017-18.

*Treatments marked with an asterisk did not perform statistically worse than the top performing treatment (p=0.10) shown in **bold.**
NS – There was no statistical difference between treatments in a particular column (p=0.10).
NA –

Figure 1. Soil NO_3 results from the Fairfax location.

Table 7. Soil NO_3-N within the different cover crop treatments, Fairfax, VT, 2017-18.

Mix	2017		2018						
	21-Aug	20-Oct	28-Apr	10-May	23-May	6-Jun	19-Jun	18-Jul	3-Aug

Results from the Grand Isle Location

Table 8. Cover crop mix yield and quality, Grand Isle, VT, 2017-18.

Mix	Fall 2017				Spring 2018		
	Dry matter yield	Percent cover	Nitrogen	C:N	Dry matter yield	Percent cover	Nitrogen
	lbs ac^{-1}	%	%	Ratio	lbs ac^{-1}	%	%
11	2048*	**85.6**	2.72*	13.1	---	15.1	---
13	**2678**	84.4*	2.37*	**17.0**	---	3.00	---
14	1401	71.6	**2.82**	13.6	2279	**35.8**	**2.03**
Control	835	44.9	1.66	12.9	---	17.8	---
LSD (0.10)	**654**	**10.7**	**0.500**	**2.96**	**NA**	**7.04**	**NA**
Trial mean	**1741**	**72.4**	**2.39**	**14.2**	**NA**	**17.9**	**NA**

*Treatments marked with an asterisk did not perform statistically worse than the top performing treatment (p=0.10) shown in **bold.**
NA – Statistical analysis was not performed as only one treatment had living biomass to measure in the spring.

In the fall, treatments 11 (radish) and 13 (oats, clover, radish) were the best performers for yield and ground cover (Table 8). Treatments 11, 13, and 14 (winter rye) had comparable nitrogen concentrations, which may reflect the strong ability for winter rye to absorb available nitrogen. Biomass in the control plots were weeds but still provided adequate ground cover to protect the soil from erosion. Treatment 14 (winter rye) was the best performer for percent soil cover in the spring, which is not surprising since it overwinters.

Table 9. Soil active carbon and wet aggregate stability, Grand Isle, VT, 10-May 2018.

Mix	Active carbon	Wet aggregate stability
	mg C kg^{-1}	%
11	585	**39.7**
14	574	29.7
LSD (0.10)	**NS**	**7.31**
Trial mean	**580.0**	**34.7**

The top performing treatment (p=0.10) shown in **bold.**
NS – There was no statistical difference between treatments in a particular column (p=0.10).

Treatment 11 (radish) outperformed treatment 14 (winter rye) for wet aggregate stability (Table 9). Soil aggregates are formed when biological activity in the soil causes soil particles and organic matter to become glued together. The more glue, the more stable a soil aggregate may become. The stronger the aggregate, the more resistant it is to being degraded when disturbed by rain or mechanical action. Higher aggregate stability can improve soil drainage and other biological properties. The radish growing in the fall likely improved biological activity and helped to build soil aggregates. Once the radish died from cold winter temperature, microbial activity to decompose the root may have further enhanced the aggregate stability.

Figure 2. Soil NO_3 results from Grand Isle location, VT, 2017-2018.

Table 10. Soil NO_3-N within the different cover crop treatments, Grand Isle, VT, 2017-18.

Mix	2017		2018							
	21-Aug	20-Oct	24-May	8-Jun	20-Jun	3-Jul	19-Jul	1-Aug	16-Aug	28-Aug
	mg kg^{-1}									
11	7.16	3.61*	3.34	5.47	7.38	14.8	25.5	26.3	41.2	44.1
13	6.60	1.40	4.04	5.23	6.58	15.9	20.6	29.0	56.2	45.3
14										

NS – There was no statistical difference between treatments in a particular column (p=0.10).

The sweet corn grown following the cover crop did not show any significant differences for yield or quality, between cover crop treatments (Table 11).

Results from Borderview Farm

Table 12. Cover crop mix yield and quality, Alburgh, VT, 2017-18.

*Treatments marked with an asterisk did not perform statistically worse than the top performing treatment (p=0.10) shown in **bold.**

At Borderview

Table 13. Soil active carbon and wet aggregate stability, Alburgh

8	10.8	8.94*	12.5	34.3	41.3	37.9	30.5	14.5	7.41
9	12.0	7.06*	13.3*	25.5	33.3	33.7	26.0	9.53	5.07
10	10.7	6.44	9.64	21.2	28.3	25.9	22.5	9.39	4.71
11	5.54*	9.35*	13.8*	32.0	27.9	33.9	26.2	14.0	5.57

DISCUSSION

At both Pomykala Farm and Borderview Farm, there was no measurable impact on the subsequent cash crop that would indicate differences between the cover crop treatments. However, it is interesting to note when peak soil NO_3-N generally was at each farm. For River Berry Farm, peak soil NO_3-N was between 6-Jun and 19-Jun, approximately 75 days after the field was prepped and planted with strawberries. This was earlier than the other farms and may be influenced by River Berry's light soil, which would have warmed faster than the soils at the other two farms. Also, regular irrigation at River Berry Farm likely helped cover crops decompose more quickly. At Pomykala Farm, peak was on 16-Aug, which was approximately 45 days after field prep and planting. This was fairly late in the season and likely