2017 Perennial Forage Trial

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In 2015, the University of Vermont Extension Northwest Crops and Soils Program initiated a trial investigating forage yield, quality, and nitrogen use efficiency of cool season perennial grasses alone and in combination with red clover. The grass species selected were orchardgrass, timothy, brome, and meadow fescue. These grasses were chosen as they have been shown in previous research to have adeeeeeeeee7iivtab32(of

The soil type at the Alburgh location was a Benson rocky silt loam (Table 2). The seedbed was moldboard plowed, disked, and finished with a spike tooth harrow. The previous crop was winter wheat. Plots were 5' x 20'and replicated 5 times. Plots were harvested with a carter forage harvester in 3' x 20' area on 1-Jun, 19-Jul, and 11-Sep. At the first harvest, an additional sample was collected from a $0.25m^2$ area from each clover treatment plot. These samples were sorted into grass and clover fractions which were weighed and then dried to determine botanical composition of the treatments.

Table 2. Perennial forage trial management, Alburgh, VT, 2015-2017.

Location	Borderview Research Farm – Alburgh, VT
Soil type	Benson rocky silt loam
Previous crop	Winter wheat
Tillage operations	Moldboard plow, disk and spike tooth harrow
Planting equipment	Great Plains small plot drill
Treatments	32
Replications	5
Plot size (ft.	

RESULTS

Weather data was recorded with a Davis Instrument Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT (Table 3). In general, the fall of 2016 was warmer and drier than normal. These conditions persisted through the winter with temperatures well above average in both January and February. Throughout the 2017 season,

Overall, the grass species performed well, despite the poor weather, producing a total dry matter yield of 4.87 tons ac^{-1} across three cuttings (Table 5). Yields in the first cutting were quite high with an average of 2.26 tons ac^{-1}. The highest yielding species was timothy with 2.39 tons ac^{-1}, however this was statistically similar to all other species except for orchardgrass. The second cutting was approximately 1 ton ac^{-1} less than the first with timothy still producing the highest yield which was statistically similar to orchardgrass. The third cutting produced the lowest yields in which orchardgrass produced the highest yield of 1.36 tons ac^{-1}

Impact of Variety

The perennial grass species differed by variety for yield, but this was often dependent on harvest time. (Table 7). In the first harvest, the only species with varietal differences in yield was orchardgrass, The variety Echelon produced only 1.62 tons ac^{-1} which was significantly lower than all other varieties. No species showed varietal differences for the second harvest. At the third harvest, the only species with varietal differences was brome. The variety Hakari Alaska produced the highest yield of 1.34 tons ac^{-1} which was statistically similar to the Carlton smooth variety. No species showed varietal differences in overall yield. This was quite different from last year's trends in which varietal differences among species were observed both between harvests and for total yields.

Table 7. Yield and disease severity by variety at 1st, 2nd, and 3rd cuts, 2017.

Species	Variety	DM Yield tons ac^{-1}				Disease Severity	
						Rust	Other
		1st cut	2nd cut	3rd cut	Overall	1-10 scale	
Brome	AC Success	2.41	1.41	0.950	4.77	**0.00**	0.500*
	Carlton smooth	2.20	**1.42**	1.16*	4.78	0.00	0.600*
	Hakari Alaska	2.20	1.22	**1.34**	4.76	0.00	1.00
	York smooth	**2.41**	1.37	1.07	**4.85**	0.00	**0.500**
	LSD (p=0.10)	NS	NS	0.242	NS	NS	0.390
	Species Mean	2.31	1.35	1.13	4.79	0.00	0.650
Meadow Fescue	HDR	2.22	**1.37**	1.31	**4.90**	0.000*	0.800
	Laura	2.26	1.24	1.23	4.73	0.400	**0.800**
	Liherold	**2.58**	1.06	1.19	4.83	0.100*	0.900
	Preval	2.23	1.28	**1.32**	4.83		

Impact of clover

Species varied in yield performance with and without clover for some of the harvests (Table 8). These differences were not as large as in 2016 as overall less clover was present this year. There was no difference in yield between clover treatments for any of the species in the first cutting. In the second cutting, orchardgrass yielded approximately 0.30 tons ac^{-1} higher when planted alone than in a mixture. In the third cutting, meadow fescue yielded approximately 0.25 tons ac^{-1} higher when planted alone than in a mixture.

Table 8. Yield across all cuts by species with and without clover.

Species	**DM Yield** tons ac^{-1}	**Disease severity** Rust	Other
	1^{st} cut		

DISCUSSION

Overall, performance of these perennial forages was high and likely a result of the cool weather and abundant moisture. Yields were considerably higher this season compared to last season averaging 4.87 tons ac^{-1}. This yearly differences in yield may be a result of climatic conditions. The 2017 season was cool and wet whereas the 2016 season was hot and dry. There were few varietal differences in terms of yield, disease, and clover abundance this year. Furthermore, clover abundance was significantly lower this year compared to last year with mixture plots averaging only 22.8% clover. This was somewhat expected due to the short-lived nature of the red clover used in this trial. Farmers around the region noted high yields but low quality from perennial forages in 2017. This report will be updated with forage quality data as it becomes available. It is important to recognize that these data only represent one year