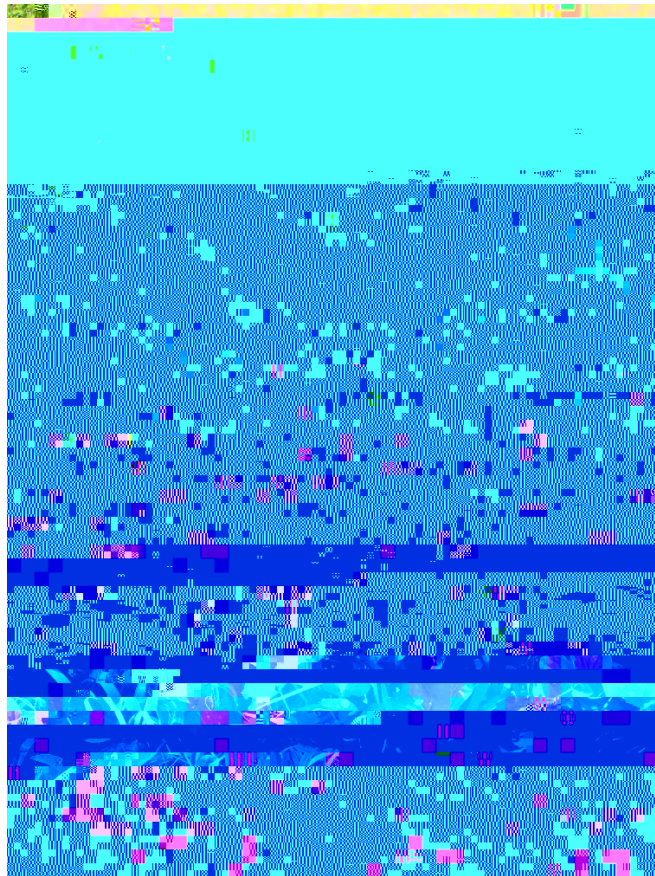


2018 Cool Season Annual Forage Mixtures Trial



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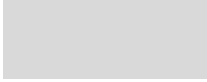
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In 2018, the University of Vermont Extension Northwest Crops and Soils Program evaluated yield and quality of cool season annuals planted in mixtures and in monoculture at Borderview Research Farm in Alburgh, VT. In the Northeast, cool season perennial grasses dominate the pastures and hay meadows farmers rely on throughout the season. It can be challenging for these grasses to rebound after the summer

a Wiley mill to a 2mm particle size and then to 1mm using a laboratory cyclone mill from the UDY Corporation. These samples were then sent to Dairy One Forage Laboratory (Ithaca, NY) for quality analysis via Near Infrared Reflectance Spectroscopy (NIR) techniques. Parameters measured include crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), non-fiber carbohydrates (NFC), relative feed value (RFV), net energy of lactation (NE_L), and total digestible nutrients (TDN).

Table 2. Forage mixture composition and seeding rates, 2018.



increased more with the addition of turnips than peas to the oats. The lowest yielding treatments included forage peas planted in monoculture, triticale planted in monoculture, and annual ryegrass planted in monoculture. However, within the annual ryegrass varieties, Kodiak produced almost twice the yield of Enhancer and almost four times the yield of Tetraprime. With the triticale and winter rye, it is important to note that these species will overwinter in this region and have the potential to produce spring forage as well. Investigating the spring yield potential of these treatments is beyond the scope of this trial.

Table 4. Yield and forage quality 18 forage species/mixtures, 2018.

Abbreviation/Treatment	DM yield	CP	ADF	NDF	NFC	TDN	NE _L	RFV
	lbs ac ⁻¹	-----% of DM-----					Mcal lb ⁻¹	
Oat/Pea	1616	37.7	30.1	39.2	12.3	66.7	0.693	156
Rye/Turnip	1647	37.0	21.4	26.9*	25.4	70.0*	0.763*	251
Trit/Pea	511	38.5*	25.1*	31.9	18.8	68.3	0.740	205
O/C/R	1745*	36.0	28.6	33.8	19.5	67.7	0.727	184
O/P/T	1991*	37.5	26.3	31.9	19.8	68.3	0.737	200
T/P/O	1007	38.4*	28.0	35.7	15.1	67.7	0.717	175
						65.7	0.683	149

carbohydrate fraction, which includes soluble fiber, sugars, and starches. Therefore, it is negatively correlated with NDF content and positively correlated with TDN. The NFC ranged from 8.80 to 25.4%. The highest NFC content was found in the Rye/Turnip mixture which was statistically similar to three other treatments including Barkant turnip monoculture, Dwarf Essex rape monoculture, and 40-10 forage pea monoculture. These same treatments had the highest TDN, NE_L , and RFV values as well. The TDN is an estimate of the proportion of the forage that contains digestible nutrients. This ranged from 65.7 to 70.3%. The NE_L is an estimate of the energy available from the forage for lactation and is expressed in Mcal lb⁻¹. The NE_L of the cool season annuals ranged from 0.677 to 0.770 Mcal lb⁻¹. The annual ryegrass varieties Kodiak and Enhancer had the lowest NE_L values. Interestingly, the annual ryegrass variety Tetraprime had significantly higher NE_L than the other two varieties. This again was likely due to its lower fiber and higher NFC content. These further impacted RFV which is an estimate of overall feed value. A rating of 150 represents high quality alfalfa. The annual ryegrasses scored just under this target while seven treatments scored over 200.

DISCUSSION

In comparing mixtures to their monoculture components, it is clear that the forage peas performed poorly and therefore did not significantly increase, and in some cases decreased, yield and quality. As dry conditions persisted through planting some of this poor performance may be explained by poor germination and establishment. These data suggest that adding peas into a mixture with oats or triticale did not sufficiently increase yield or quality to outweigh the cost compared to seeding these grasses in monoculture. A larger benefit was observed when forage turnip was added into a mixture with these grasses. For example, yield increased by approximately 400 lbs ac⁻¹ and RFV increased by almost 50 when turnips were added to the Oat/Pea mixture (Figure 1). Although some of these monocultures produced high yield and quality (Figure 2), it is important to recognize that not all of these treatments could be fed/grazed in the same capacity. The nutrient dense and highly digestible nature of the forage turnips or forage peas in monoculture would require additional fiber sources be fed to animal health complications. Furthermore, as mentioned previously, triticale and winter rye would overwinter in this region potentially providing both fall and early spring forage without reseeding. These additional factors should also be considered when selecting annual forages to ensure they meet your farms' needs as well as the nutritional demands of your animals.

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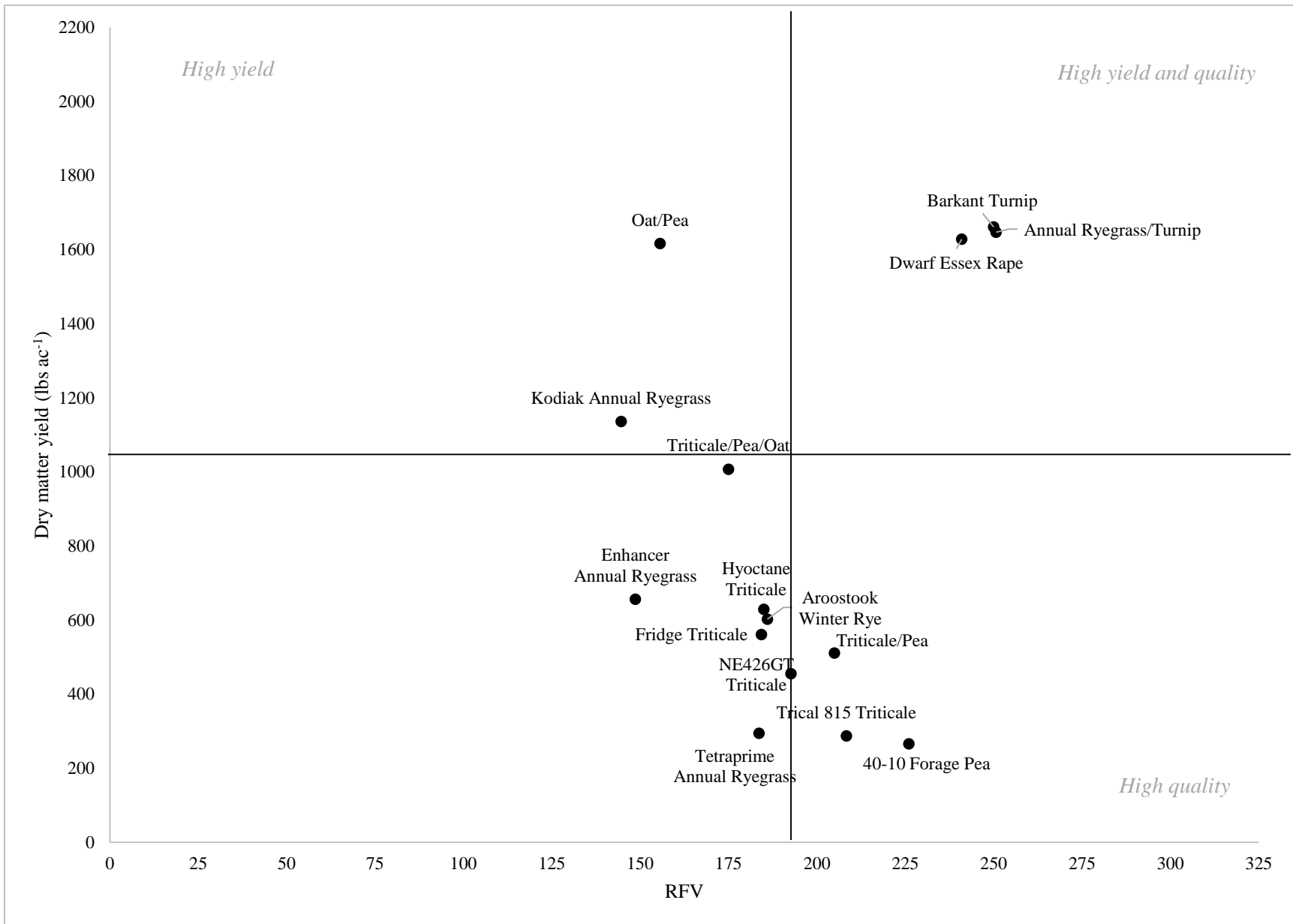


Figure 2. Yield vs quality of 18 annual forage treatments, 2018.