

Evaluation of Annual Cover Crops for Grazing Purposes
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Partners

- Union Forage
- Performance Seeds
- Northstar Seed Ltd.
- Yellowhead County
- Brazeau County
- Bart Guyon (Co-operator)

Background

Cover crops are planted for many purposes, one of which is grazing livestock. What if producers could utilize their equipment to plant cover crops early in the season to provide a high quality source of forage as well as improve the soil at the same time?

In this situation, where the beef cattle owner is also in the cash crop business or in contracts with a cash crop farmer to allow grazing of cover crops, lengthening of the grazing season occurs and results in saving on feeding costs, therefore providing additional economic and environmental benefits.

Objective

Determine dry matter yield and quality on annual cover crops.

Methodology

Plots were seeded at the WCFA Forage Research Site in Yellowhead County, AB on June 7, 2018 and at the WCFA Forage Research Site in Brazeau County, AB on June 8, 2018, with a small plot Fabro disc drill in 5 rows at 22.5cm spacing (9m by 1.14m plot area). Soil testing was done and used to prescribe fertilizer applications. See Tables 1 and 2. We targeted the recommended seeding rate for each seed company. A pre-seed herbicide application was applied.

Note on data collection:

The excessive amount of precipitation on the Yellowhead County site particularly in July (See Graphic 4), prevented us from collecting significant samples from each repetition. Nevertheless, samples were collected from the Brazeau County Site. One square meter from each variety was taken to determine yield and sub-samples were collected to test for nutritional quality. These sub-samples were sent to A & L Laboratories where quality analysis with wet chemistry was performed.

Fertilizer Applications

Nutrient analysis (ppm)														Soil Quality			
Depth	N*	P	K	S**	Ca	Mg	Fe	Cu	Zn	B	Mn	Cl	BiCarbP	pH	EC(dS/m)	OM(%)	Sample#
0" - 6"	27	>80	575	5										6.2	0.52	11.3	6084428
Excess														Alkaline	Extreme	High	
Optimum														Neutral	Very High	Normal	
Marginal														Acidic	High	Low	
Deficient														Very Acidic	Good	Very Low	
Total lbs/acre	53	160	1149	9	Texture n/a	Hand Texture n/a			BS n/a	CEC n/a			Ca n/a	Mg n/a	Na n/a	K n/a	
Estimated lbs/acre	109	160	1149	19	Sand n/a	Silt n/a	Clay n/a	Ammonium n/a	TEC n/a	Lime n/a	Buffer pH n/a	Est. N Release n/a	K/Mg Ratio n/a				

*Nitrate-N **Sulfate-S n/a = not analysed

Table 1. – Soil Analysis used to calculate fertilizer applications 2018 Cover Crops Variety Trial, Brazeau County, AB.

Nutrient analysis (ppm)														Soil Quality			
Depth	N*	P	K	S**	Ca	Mg	Fe	Cu	Zn	B	Mn	Cl	BiCarbP	pH	EC(dS/m)	OM(%)	Sample#
0" - 6"	9	9	330	3										6.2	0.42	7.0	6084426
Excess														Alkaline	Extreme	High	
Optimum														Neutral	Very High	Normal	
Marginal														Acidic	High	Low	
Deficient														Very Acidic	Good	Very Low	
Total lbs/acre	18	18	660	6	Texture n/a	Hand Texture n/a			BS n/a	CEC n/a			Ca n/a	Mg n/a	Na n/a	K n/a	
Estimated lbs/acre	37	18	660	13	Sand n/a	Silt n/a	Clay n/a	Ammonium n/a	TEC n/a	Lime n/a	Buffer pH n/a	Est. N Release n/a	K/Mg Ratio n/a				

*Nitrate-N **Sulfate-S n/a = not analysed

Table 2. – Soil Analysis used to calculate fertilizer applications 2018 Cover Crops Variety Trial, Yellowhead County, AB.

Treatments

The seed for this variety trial was provided by Union Forage (UF), Northstar Seed (NS) and Performance Seed (PS).

#	Company	Mixtures	Varieties	seed rate lbs/ac
1	Union Forage	Union Forage Ultimate Blend		12
		blend		
			Green Spirit Italian Rye Grass 60%	
			Hairy Vetch 18%	
			Hunter Brassica 11%	
			Winfred Brassica 11%	
			forage peas 40-10	10
			CDC Haymaker Oats	45
2	Union Forage	Union Forage Relay Blend		12
		blend		
			50% crusader italian ryegrass	
			20% hairy vetch	
			15% hunter	
			15% winfred	
			forage peas 40-10	10
			CDC Haymaker Oats	45
3	Union Forage	Union Forage All Brassica Blend		5
		blend		
			20% winfred	
			20% goliath	
			20% hunter	
			40% graza	
			CDC Haymaker Oats	50
4	Northstar Seed Ltd.	Italian Annual Ryegrass	Italian Annual Ryegrass	13
5	Northstar Seed Ltd.	Vivant	Forage Brassica	5
6	Northstar Seed Ltd.	Gorilla	Forage Rape	5
7	Northstar Seed Ltd.	NS Double Cover Crop Blend		12
		blend		
			Experimnetal Annual Ryegrass 25%	
			Proso Millet 20%	
			Purple Top Turnip 15%	
			Vivant Forage Brassica 15%	
			Hairy Vetch 15%	
			Kale 10%	
8	Performance Seed	Performa Concentrate Blend		10
		blend		
			17% Impact Forage Collards	
			11% Premier Kale	
			17% Frosty Berseem Clover	
			11% Kentucky Pride Crimson Clover	
			11% Purple Bounty Hairy Vetch	
			28% Meroa Italian Rye Grass	
			5% Spring Green Festulolium	
9	Performance Seed	Frosty Berseem	Clover	12
10	Performance Seed	Fixation Balansa	Clover	10

Table 3. - 2018 Cover Crops Variety Trial, Treatments and seeding rates, Brazeau and Yellowhead County, Alberta.

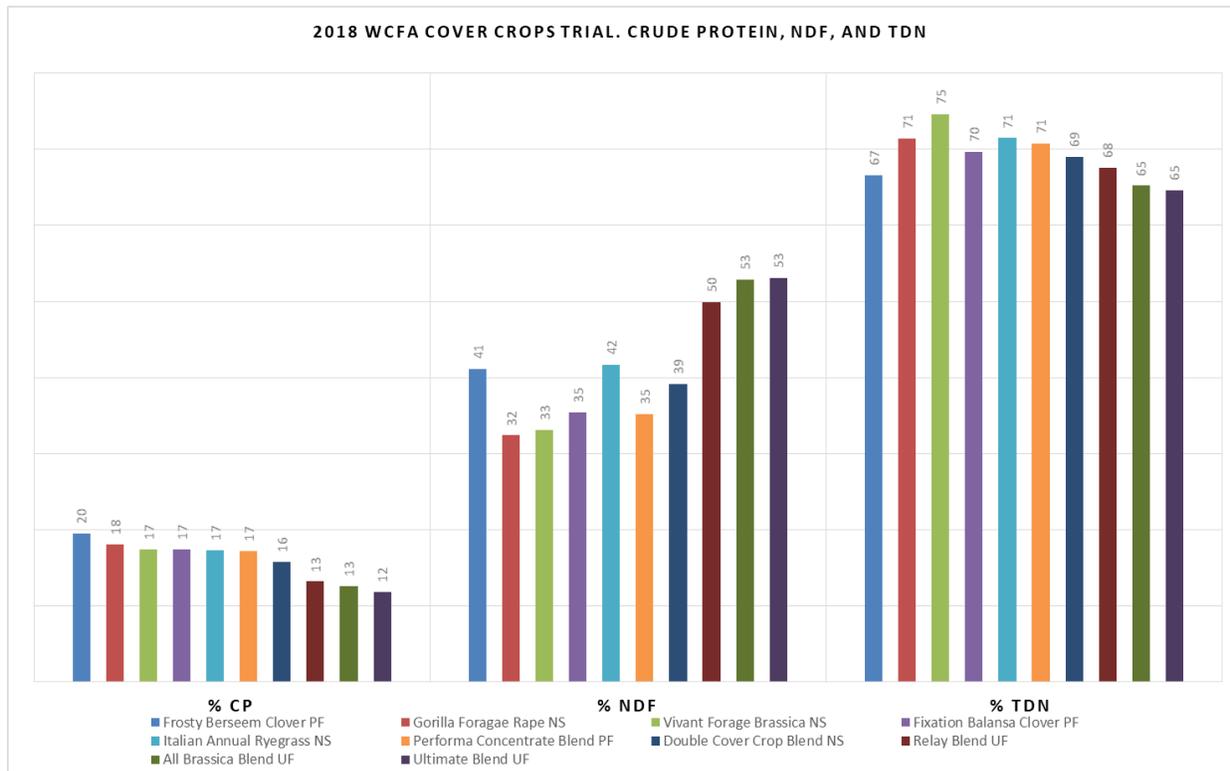
Discussion

Forage Quality

This year the cover crops variety trial was seeded on fair soil moisture, ½ inch from the top, with a soil temperature of 12.6°C approximately. The quality values for treatments were analysed by Near Infrared Reflectance spectroscopy (NIR) analysis plus wet chemistry methods for minerals. The highest crude protein CP (%) was from Frosty Berseem Clover PF with 19.97% and the lowest was from Ultimate Blend UF with 12%. The highest Total Digestible Nutrients TDN (%) was from Vivant Forage Brassica NS with 75%. All Brassica Blend UF and Ultimate Blend UF have the lowest TDN, with 65% for both. See Graph 1.

Seeding Rates

For the Union Forage blends, the seeding rate for the cereals mixed with the blend was 45 and 50 lbs/ac. This resulted in 95% of the stand being cereals (Oats). Therefore, we assumed that the cereal seeding rate was too high. It is noteworthy that these seeding rates are used and proven to work for other Union Forage customers. See Pictures 2 and 6.

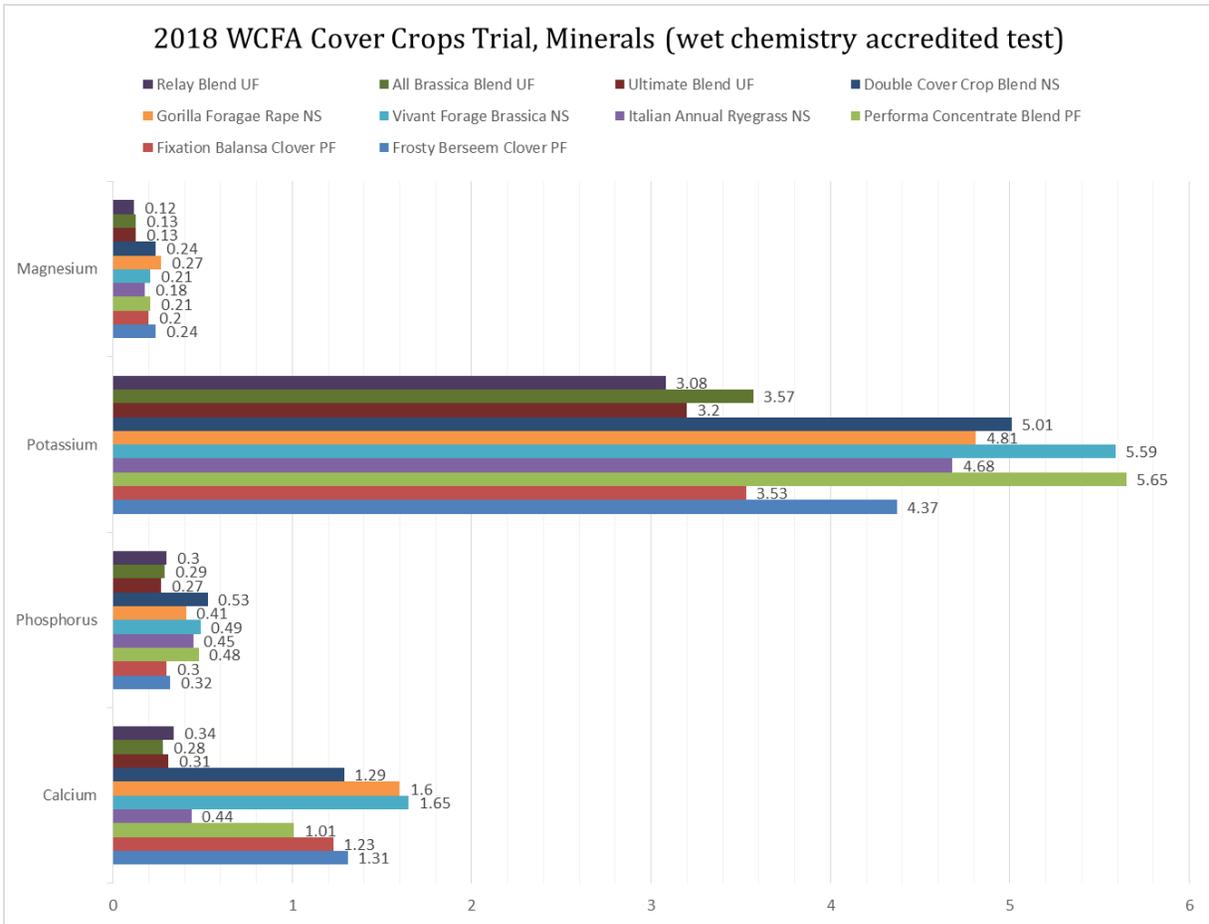


Graph 1. – 2018 Cover Crop Variety Trial, Crude Protein (CP %), Neutral Detergent Fiber (% NDF) and Total Digestible Nutrients (TDN) Brazeau County AB.

*UF-Union Forage

*NS-Northstar Seed

*PS-Performance Seed



Graph 2. – 2018 Cover Crop Variety Trial, Minerals Brazeau County AB.

*UF-Union Forage

*NS-Northstar Seed

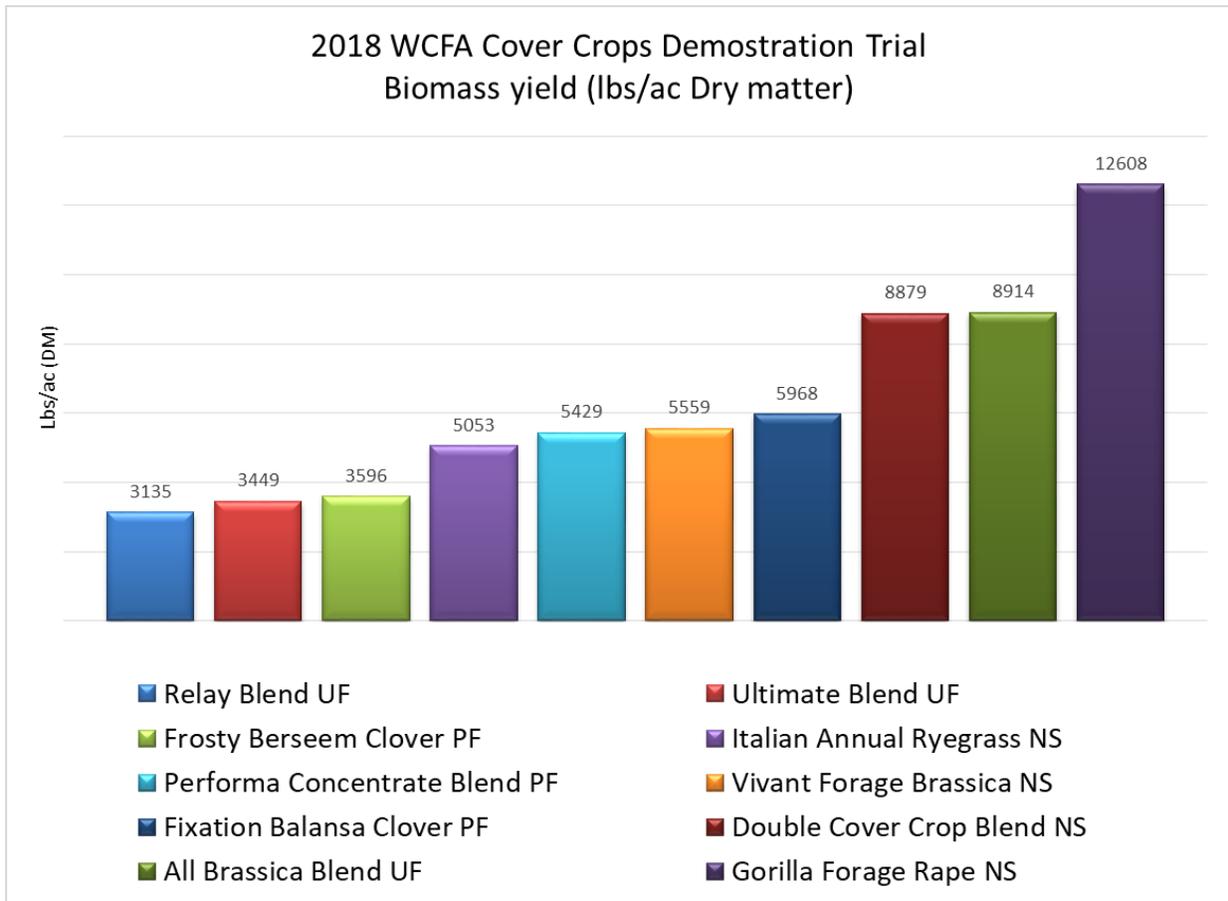
*PS-Performance Seed



2018 Cover Crop Variety Trial, WCFA Forage Research Site Brazeau County AB.

Dry Matter Yield

Graph 3 shows the comparison of dry matter (Lbs/acre) amongst the varieties. The highest yield being Gorilla Forage Rape NS with 12,000 lbs/ac followed by All Brassica Blend UF with 8,900 lbs/ac. The lowest yield was Relay Blend UF with 3,100 lbs/ac.



Graph 3. – Cover Crop Variety Trial, DM yield. (Lbs/ acre) Brazeau County, AB.

*UF-Union Forage

*NS-Northstar Seed

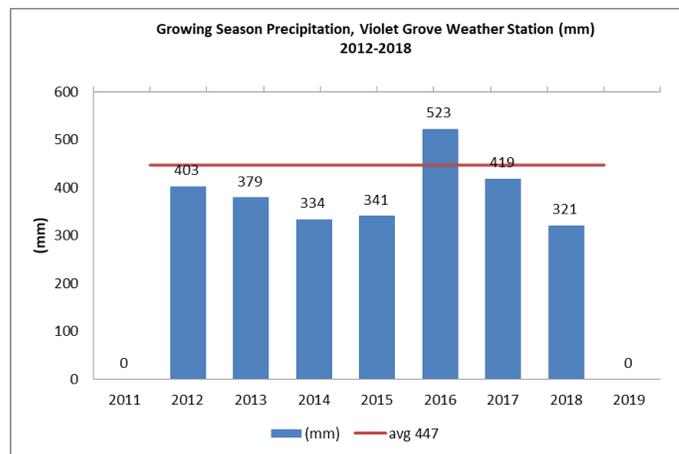
*PS-Performance Seed

Environmental Conditions

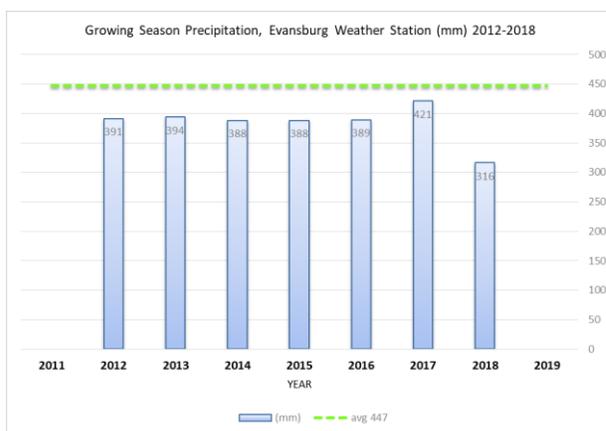
Historical annual total precipitation of the gray wooded soil zone from 1971 to 2000 was 526mm (20.70 inches) on average. The growing season precipitation (May until October) is 447mm on average (Alberta Weather Data Viewer, 2016).

The total precipitation in Violet Grove was 321 mm (12.6 inches) and in Evansburg it was 316 mm (12.44 inches). However, this site received over 100 mm (3.9 inches) just over the month of July, which made the soil extremely wet and saturated during this period and therefore prevented all blends in the trial at this site (Yellowhead County) to emerge. This phenomenon is commonly known as drowned seeds.

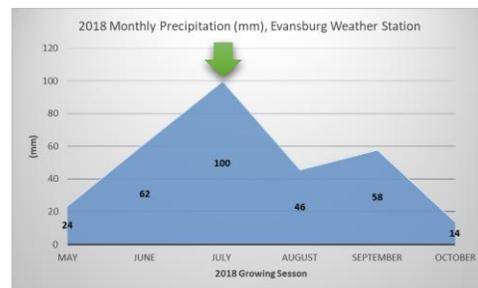
Graphic 4 and 5 shows the accumulative precipitation for the growing season for both weather stations. The amount of rain in the Yellowhead County site over the month of July 100 mm (3.9 inches) is highlighted in Graphic 6.



Graphic 4. – Growing season precipitation for the Violet Grove weather station, 2012 to 2018 at Brazeau County



Graphic 5. – Growing season precipitation for Evansburg weather station from 2012 to 2018 in Yellowhead County



Graphic 6. –Monthly precipitation for Evansburg weather station from 2012 to 2018 in Yellowhead County



Picture 1. – Northstar Seed Ltd., Gorilla showed plants up to 43 inches and leaves over 7 inches wide (Forage Rape) yielded 12,000 lbs/ac of dry matter. Brazeau County, August 2018



Picture 2. – Union Forage Ultimate Blend mixed with cereal (Oats). 45 lbs/ac cereal seeding rate. Brazeau County, August 2018



Picture 3. –Performance Seed, Performance Concentrate Blend yielded 5,400 lbs/ac of dry matter. Brazeau County, August 2018



Picture 4. – Performance Seed, Frosty Berseem Clover over 23 inches tall. Brazeau County, August 2018



Picture 5. – Northstar Seed, Vivant Forage Brassica picture showed plants with over 27 inches tall. Brazeau County, August 2018



Picture 6. – Union Forage, All Brassicas Blend mixed with cereal (Oats). 50 lbs/ac cereal seeding rate. Brazeau County, August 2018