Perennial Forage Project

Partners: Alberta Beef Producers
Alberta Agriculture and Forestry
Chinook Applied Research Association
Foothills Forage and Grazing Association
North Peace Applied Research Association
Gateway Research Organization
Battle River Research Group
West-Central Forage Association
Mackenzie Applied Research Association
SARDA Crop Research
Peace Country Beef and Forage Association

Objectives:

1. To provide unbiased, current and comprehensive regional data regarding the establishment, winter survival, yield and economics of specific species and varieties of perennial forage crops.
2. To identify perennial crop species/varieties that demonstrate superior establishment, hardiness, forage yield and nutritional quality characteristics in different eco-regions of Alberta.
3. To assess any benefits from growing mixtures of selected species.

Background:

Perennial forages include a diverse range of grasses and legumes that are utilized by livestock producers for a wide variety of purposes – from hay and greenfeed to summer pasture and winter grazing through stockpiled forage. They make up on the of largest sources of livestock feed on the prairies and the wide diversity in growth characteristics makes them ideal for many purposes.
According the Alberta Agriculture's Agriprofits Benchmaks, two thirds the cost of maintaining a cow comprising pasture, stored feed and bedding. Consequently, managing the perennial forage supply and having access to high quality and high yielding forage varieties is extremely important to producers.

Historically there has been a gap in perennial forage production knowledge in Alberta and, in particular, regionally specific variety information. There is significant variation in Alberta's ecoregions and varieties that developed and tested in one location or region will likely not perform the same in another region such as those experienced in Northeastern Alberta.

To held bridge this gap in perennial forage information, the perennial forage trial was developed to test cultivars that have been recently developed but have had limited regional evaluation to provide producers with valuable, region specific data. The province wide project data will be available to all producers in Alberta.

Method:

The trial was seeded as three blocks of plots: legumes, grasses and grass/legume mixtures at the LARA Fort Kent Research Site (NE25-61-5-W4) in a randomized complete block designs (RCBD) with four

replicates to reduce error. The legume and legume mixture trials were seeded on June 7, 2016 and the grass trial was seeded on June 2, 2016. Unfortunately, due to slow and patchy establishment, the grass and grass/legume trials were reseeded on August 8, 2016. Table 1 illustrates the forage varieties seeded in each trial.

Table 1. Perennial Forage Trial Varieties seeded, 2016.

Grasses	Legumes	Grass/Legume Mixtures
Fleet Meadow Brome	20-10 Alfalfa	Fleet/Yellowhead
AC Admiral Hybrid Brome	44-44 Alfalfa	AC Knowles/Yellowhead
Success Hybrid Brome	Assalt ST Alfalfa	Success/Yellowhead
Knowles Hybrid Brome	Dalton Alfalfa	Fleet/Spredor 5
Greenleaf Pubsecent Wheatgrass	Halo Alfalfa	AC Knowles/Spredor 5
Kirk Crested Wheat Grass	PV Ultima Alfalfa	Success/Spredor 5
AC Saltlander Green Wheatgrass	Rangelander Alfalfa	Fleet/AC Mountainview
Tom Russian Wilde Rye	Rugged Alfalfa	AC Knowles/AC Mountainview
Killarney Orchard Grass	Spreder 4 Alfalfa	Success/AC Mountainview
Grinstad Timothy	Spredor 5 Alfalfa	
Fojtan Festulolium	Yellowhead Alfalfa	
Courtney Tall Fescue	AC Mountainview Sainfoin	
	Nova Sainfoin	
	Oxley 2 Cicer Milkvetch	
	Veldt Cicer Milkvetch	

Prior to seeding, soil tests were taken and a blend fertilizer was developed (30-22-10-12) and side-banded with the grass trial at seeding. Due to the nitrogen fixing ability of legumes, the legume and grass/legume trial was seeded with 50 lbs/ac of 11-52-0-0 side-banded at seeding. All legumes were inoculated prior to seeding and seeding took place with the LARA Fabro five-row zero-till small plot drill with 9” row spacing. Plots measured 1.15m x 6m in area.

To determine percent emergence and establishment, plant counts were conducted 7, 14 and 21 days after seeding as the number of plants in 3 separate ¼ m squared areas in each plot. Another count was taken 70 days after seeding.

No yield or quality data was taken on the trial in the year of establishment, but will be taken in 2017 when the trial is harvested.

Results:

The emergence counts and plant counts results for the grass, legume and grass/legume mixture trials can be found in table 2, table 3 and table 4, respectively. Due to the early snow this fall, final plant counts were collected later than desired (November 3, 2016).

After reseeding on August 8, 2016, establishment of the grass trial was faster than that seen in the legume trial, with the majority of varieties emerging within 1 week of seeding. The variety with the highest emergence was Fojtan Festulolium at 5.67 plants per ¼ m.

Fojtan Festulolium is the result of a cross between Italian Ryegrass and Tall Fescue and has high yields, strong persistence, drought resistance and tolerance to periodic flooding. As a result, Fojtan is well suited to forage production in many situations. The high yields make it an excellent forage crop and feed values tend to be higher than Tall Fescue but not to the levels of Perennial Ryegrass.

The varieties with the slowest emergence were AC Admiral Hybrid Brome, AC Knowles Hybrid Brome and Kirk Crested Wheat Grass, which showed no emergence 1 week after seeding. Final plant counts showed Fojtan Festulolium well ahead of the other varieties in the trial at 13.50 plants per ¼ m. This is followed by AC Saltlander Green Wheatgrass and Greenleaf Pubescent wheatgrass.

Table 2. Perennial Forage Grass Trial Plant Counts, 2016.

	Emergence Counts (pls per 1/4 m)			Plant Count
Variety	**15-Aug-16**	**22-Aug-16**	**29-Aug-16**	**17-Oct-16**
Fleet MB	1.57	3.25	4.67	12.50
AC Admiral HB	0.00	0.60	1.67	7.33
Success HB	1.69	2.20	2.25	5.83
Knowles HB	0.00	0.66	1.75	7.33
Greenleaf PWG	0.97	3.34	6.33	17.00
Kirk CWG	0.00	0.98	1.83	6.25
AC Saltlander GWG	3.59	5.32	6.83	13.33
Tom RWR	1.33	2.84	3.08	15.25
Killarney OG	1.97	2.00	2.25	12.08
Grinstad Tim.	2.15	3.10	3.17	10.17
Fojtan Festulolium	5.67	8.10	13.50	36.42
Courtney TF	2.45	4.14	4.42	17.67

The legume trial was slow to established, with very few varieties emerging within one week after seeding (44-44 alfalfa, Rangelander alfalfa and Rugged alfalfa). However, by the June 28, 2016 count, all varieties had begun to emerge and establish and by July 5, 2016 plots were starting to fill out.

Final plant counts were taken on August 26, 2016 and showed good establishment with all different varieties (table 3). The Nova sainfoin had the lowest plant count at 3.50 plants per ¼ m, which was 80% fewer plants than the next lowest variety of Oxley Cicer Milkvetch at 4.33 plants per ¼ m. The new sainfoin variety, AC Mountainview, which is being grown in the High Legume Pasture Project, established well at 5.50 plants per ¼ m.

Table 3. Perennial Forage Legume Trial Plant Counts, 2016.

	Emergence Counts (plants per 1/4 m)			Plant Count
Variety	**21-Jun-16**	**28-Jun-16**	**05-Jul-16**	**26-Aug-16**
20 - 10	0.00	1.45	3.99	4.92
44 - 44	0.09	1.15	4.32	4.67
Assalt ST	0.00	0.65	2.68	4.58
Dalton	0.00	0.33	3.09	4.67
Halo	0.00	0.69	4.44	5.33
PV Ultima	0.00	1.02	4.38	5.83
Rangelander	0.10	1.50	3.74	5.50
Rugged	0.04	0.99	2.97	4.67
Spreder 4	0.00	0.68	3.48	4.83
Spredor 5	0.00	0.43	5.02	5.25
Yellowhead	0.00	1.07	3.57	5.92
AC Mountainview	0.00	0.79	4.61	5.50
Nova	0.00	1.12	2.72	3.50
Oxley 2	0.00	1.03	3.86	4.33
Veldt	0.00	0.54	4.15	4.75

The grass/legume trial was slow to establish but, unlike the legume trial, most mixtures emerged within one week after seeding with the Success Hybrid brome/Yellowhead alfalfa treatment being the only one to show no emergence.

Final plant counts showed the Fleet Meadow brome/Spredor 5 alfalfa treatment with the most even emergence of both the legume and grass species at 2.33 plants per ¼ m and 2.83 plants per ¼ m, respectively.

Table 4. Perennial Forage Mixtures Trial Plant Counts, 2016.

	Emergence Counts (pls per 1/4 m)						Plant Count	
	15-Aug-16		22-Aug-16		29-Aug-16		17-Oct-16	
Variety	**Grass**	**Legume**	**Grass**	**Legume**	**Grass**	**Legume**	**Grass**	**Legume**
Fleet MB/Yellowhead	0.37	0.08	1.33	1.17	2.58	1.17	8.75	3.50
AC Knowles/Yellowhead	0.00	0.33	1.15	0.67	1.33	0.83	6.42	2.42
Success HB/Yellowhead	0.00	0.00	1.05	0.22	1.50	0.67	11.58	4.75
Fleet MB/Spredor 5	1.64	0.97	2.20	1.15	2.83	2.33	10.42	5.25
AC Knowles MB/Spredor 5	0.65	0.83	0.99	1.64	1.50	1.92	12.58	4.00
Success HB/Spredor 5	0.89	0.00	0.89	0.44	2.50	0.92	11.08	4.92
Fleet MB/AC Mountainview	0.00	0.06	2.48	0.78	3.25	1.00	6.67	6.83
AC Knowles HB/AC Mountainview	0.10	0.00	0.77	0.00	1.50	0.75	13.83	4.08
Success HB/AC Mountainview	0.72	0.00	1.33	0.00	1.50	0.67	14.25	4.67