

Sainfoin-Alfalfa Mixture Trial

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Objectives:

1. To compare the establishment, growth and persistency of new sainfoin varieties to old sainfoin varieties and alfalfa.
2. To compare the forage yield and quality of new sainfoin varieties to old sainfoin varieties and alfalfa.

Background:

Inclusion of legumes into pasture systems can be highly productive stands and are an excellent source of quality feed for grazing cattle. However, cattle grazing a typical high legume pasture stand, such as alfalfa, can be at increased risk of bloat. One bloat mitigation strategy that can be used is the inclusion on non-bloat legumes, including sainfoin. Sainfoin contains tannins, which are a compound in the plant that attaches themselves to the bloat-inducing proteins in alfalfa, thus helping to eliminate the potential for bloat.

In the past, sainfoin has been known as a very uncompetitive legume with poor establishment and longevity when under grazing pressure. However, recent research into the development of new varieties at the Lethbridge Research Centre has produced more resilient cultivars, including AC Mountainview.

To assess and compare the new sainfoin varieties with older sainfoin varieties and alfalfa, the sainfoin-alfalfa mixture trial was established in the spring of 2014.

Method:

The trial was seeded in May of 2014 at the LARA Research Site in Fort Kent (NE25-61-5-W4) in a randomized complete block design (RCBD) with four replicates to reduce error. Soil tests were taken prior to seeding to determine soil nutrient content and 100 lbs/acre of 11-52-0-0 was side-banded at the time of seeding. The plots measured 2.3m x 6m.

Suggested seeding rates were 30 lbs/acre of sainfoin and 12 lbs/acre of alfalfa. As the trial was seeded as alternate row mixtures, seeding rate was reduced by half to 15 lbs/acre of sainfoin and 6 lbs/acre of alfalfa. The monoculture plots were seeded at full rates. The trial was seeded with the LARA five-row zero-till small plot drill at 0.5 – 0.7” deep and all seed was inoculated. Hand weeding was conducted for weed control twice in 2014 and once in 2015.

Plant counts were done four weeks after seeding and percent composition of each treatment was calculated. The plots were cut at 10-15% flower where yield was determined and quality samples were taken. Prior to cutting, biomass samples were taken and sorted to determine species composition and species biomass yield. Where possible, two cuts were made to ensure the sainfoin did not go to seed.

Quality samples were sent to A & L Canada Laboratories for wet chemistry analysis. The same procedures were used for each year of the trial.

The following table summarizes the treatments seeded in the trial.

Table 1. Treatments seeded, 2014.

Treatments
AC Grazeland Alfalfa/Nova Sainfoin
Bulklines*
AC Grazeland Alfalfa/Bulklines*
AC Grazeland Alfalfa
Nova Sainfoin

Results:

Results so far show that the experimental bulkline have similar establishment and persistence to the old sainfoin variety used in the trial known as Nova (table 2). Stand composition increased slightly by 2015 for the bulkline and decreased slightly for the Nova. However, there have been no significant varieties in species composition in the mixture treatments. One of the bulkline varieties has recently been registered as AC Mountainview.

Table 2. Sainfoin/Alfalfa trial percent composition, 2014-2015.

Treatment	Composition (%)					
	2014				2015	
	Spring		Fall		Sainfoin	Alfalfa
	Sainfoin	Alfalfa	Sainfoin	Alfalfa		
AC Grazeland/Bulklines	36	64	38	62	43	57
AC Grazeland/Nova	46	54	44	56	42	58
Average	41	59	41	59	42	58

AC Grazeland/Nova treatment has consistently yielded the highest in both cuts of the trial in 2016 at 7072.35 lbs/acre in the first cut and 4540.56 lbs/acre in the second cut. Similarly, AC Grazeland was the second highest yielding treatment in both the July cut and the August cut.

In the first cut, the bulkline treatment yielded higher than the Nova treatment at 5824.90 lbs/acre compared to 5473.07 lbs/acre although this was not significantly different. However, regrowth of the bulkline treatment as a monoculture and as a mixture with AC Grazeland was slower than the Nova which led to decreased yields in the second cut of the trial for both treatments. As well, the AC Grazeland/Bulkline treatment has yielded consistently low in the trial. The results indicate that the bulklines could be less competitive in mixtures with alfalfa than the established Nova variety of sainfoin when seeded in alternate rows.

When considering quality, there does not appear to be any significant trends between the alfalfa, sainoin/alfalfa and sainfoin treatments.

Table 3. Sainfoin/Alfalfa trial yield and quality data, 2016.

Treatment	DM Yield (lbs/acre)		DM Yield % AC Grazeland	Moisture (%)	Quality Data							
					CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
¹ AC Grazeland/Nova	7072.35	a	100	68.74	10.31	50.66	59.68	49.44	0.77	0.14	1.61	0.22
¹ AC Grazeland	6236.26	ab	88	71.06	9.85	47.97	63.38	51.53	0.85	0.15	1.73	0.23
¹ Bulklines	5824.90	ab	82	69.27	14.47	37.17	40.91	59.94	1.27	0.21	1.43	0.39
¹ Nova	5473.07	ab	77	71.03	11.01	43.34	53.19	55.14	0.87	0.20	1.75	0.34
¹ AC Grazeland/Bulklines	5289.69	b	75	71.69	9.02	48.05	60.38	51.47	0.76	0.14	1.52	0.21
<i>Average</i>	<i>5979.25</i>			<i>70.36</i>	<i>10.93</i>	<i>45.44</i>	<i>55.51</i>	<i>53.50</i>	<i>0.90</i>	<i>0.17</i>	<i>1.61</i>	<i>0.28</i>
<i>CV</i>	<i>12.87</i>			<i>2.60</i>								
² AC Grazeland/Nova	4540.56	a	100	72.20	17.85	37.44	41.53	59.73	1.08	0.21	2.08	0.28
² AC Grazeland	4524.80	a	100	71.71	16.46	44.93	52.24	53.90	1.16	0.17	2.00	0.20
² Nova	3822.26	a	84	73.60	12.20	50.26	58.94	49.75	0.83	0.14	1.78	0.21
² AC Grazeland/Bulklines	3743.18	a	82	73.37	17.76	39.92	44.25	57.80	1.25	0.20	2.27	0.26
² Bulklines	3651.86	a	80	74.44	14.17	45.08	52.40	53.78	1.01	0.16	2.06	0.22
<i>Average</i>	<i>4056.53</i>			<i>73.06</i>	<i>15.69</i>	<i>43.53</i>	<i>49.87</i>	<i>54.99</i>	<i>1.07</i>	<i>0.18</i>	<i>2.04</i>	<i>0.23</i>
<i>CV</i>	<i>23.28</i>			<i>3.71</i>								

¹ data from first cut – July 8, 2016

² data from second cut – August 31, 2016

The trial will continue to be monitored in 2017.



Nova Sainfoin, May 16, 2016



AC Grazeland Alfalfa, May 16, 2016