Sainfoin-Alfalfa Mixture Trial 2013 - 2016

Fito Zamudio Baca, WCFA

Partners:

- Alberta Agriculture and Forestry
- Agriculture and Agri-Food Canada (Lethbridge)
- Yellowhead County

Background

Older Sainfoin cultivars, although easy to establish and seed, do not tolerate frequent cutting or grazing, and lack competitive ability to grow with other forages, and therefore cannot be used with Alfalfa for reducing pasture bloat.

Sainfoin has previously only been grown for research in Alberta's brown soil zones. With increasing interest in growing Sainfoin in the west-central region of the province, research to determine suitability in the gray wooded soil zone was needed. Beyond determining the suitability of this crop for this region, varieties were they tested for yield and winter survivability, from 2013 until 2016 to assess and compare the new and old Sainfoin varieties.

There were four varieties grown, LRC05-3900, LRC05-3901, LRC05-3902 and Nova, "the older variety", used as a check. Three experimental Sainfoin lines have been developed by Dr. Surya Acharya.

Objectives:

- To compare the establishment, growth and winter survival of new and old Sainfoin varieties
- To compare the forage yield and quality of new and old Sainfoin varieties

Methodology

Soil was tested for nutrients in the fall of 2012 and results were used to prescribe fertilizer applications. Plots were seeded to a prepared seedbed on June 11, 2013 using a small plot Fabro disc seeder in five rows at 22.5cm spacing (10.5m by 1.14m plot area), with a seeding rate of 15 lbs./ac of Sainfoin and 6 lbs./ac of Alfalfa. All seed was inoculated. A glyphosate treatment was administered prior to seeding and Gladiator was applied four weeks following seeding. In 2013, hand weeding was performed twice, along with one gentle mowing, and twice in each of the consecutive years. Samples were taken when Sainfoin was at 40-50% bloom and Alfalfa at 20-30% bloom to determine percent composition of both components immediately prior to each cut. Biomass was calculated and quality samples were sent to Agriculture and Agri-Food Canada (Lethbridge) for wet chemistry analysis.

Treatments:

Treatments	Sainfoin	Alfalfa
1	LRC05-3900	AC Grazeland
2	LRC05-3901	AC Grazeland
3	LRC05-3902	AC Grazeland
4	Nova	AC Grazeland

Proportion (%)

All three experimental Sainfoin lines LRC05-3900, LRC05-3901, and LRC05-3902 comprised 30% or more of the stand over the duration of the trial. In an Alfalfa stand, 15% Sainfoin is needed to aid in the prevention of bloat. The proportions of Sainfoin and Alfalfa in the mixtures are displayed in Table 1. Populations of all the new Sainfoin lines consistently maintained higher proportions than Nova. It is noteworthy to mention that LRC05-3902 and Nova showed a constant increase year after year.

	2014		2015		2016	
Treatments	Sainfoin (%)	Alfalfa (%)	Sainfoin (%)	Alfalfa (%)	Sainfoin (%)	Alfalfa (%)
LRC05-3900	38	62	51	49	48	52
LRC05-3901	39	61	37	63	50	50
LRC05-3902	37	63	42	58	46	54
Nova	31	69	33	67	41	59

Table 1. - Proportion of Sainfoin (%) and Alfalfa (%) in the mixtures. Sainfoin-Alfalfa Mixture Trial 2013-2016, Wildwood, AB.

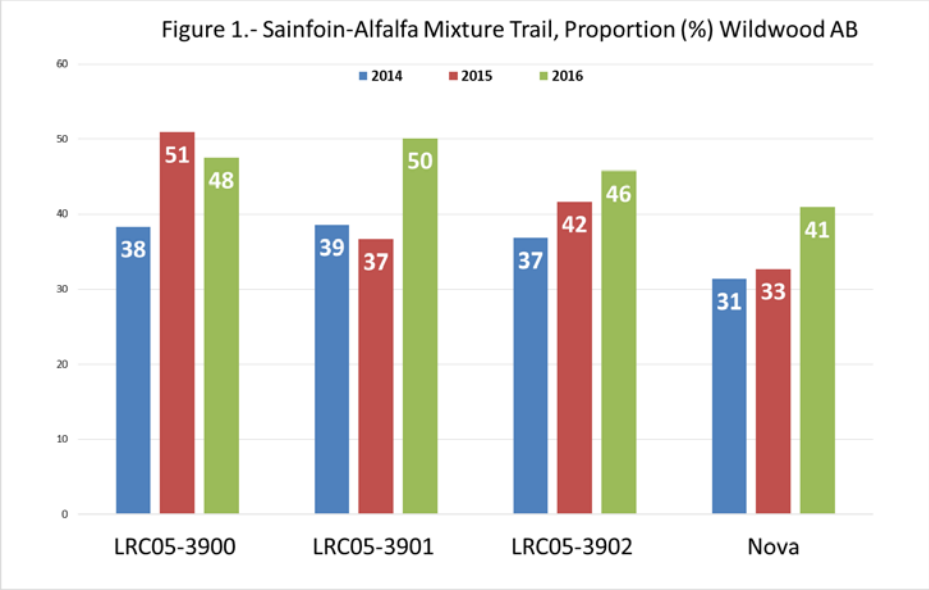


Figure 1. - Sainfoin-Alfalfa Mixture Trial 2013-2016. Proportion (%) of Sainfoin in the mixture. Wildwood AB

Yield

Treatments	2014		2015		2016	
	Kg/Ha	lbs/ac	Kg/Ha	lbs/ac	Kg/Ha	lbs/ac
LRC05-3900	2081.7	1858.9	3107.8	2775.2	3500.0	3125.5
LRC05-3901	3728.3	3329.4	4726.4	4220.7	4722.2	4216.9
LRC05-3902	3858.9	3446.0	4152.2	3707.9	10944.4	9773.4
Nova	3093.6	2762.6	3955.8	3532.6	6222.2	5556.4

Table 2. – Dry matter yield of Sainfoin in the mixtures per year. Sainfoin-Alfalfa Mixture Trial 2013-2016, Wildwood, AB.

In 2014 and 2016 LRC05-3902 yielded highest with 3446 and 9773.4 lbs/acre dry matter, respectively. In 2015 LRC05-3901 yielded highest with 4220.7 lbs/acre dry matter. Table 2 shows the dry matter yield of Sainfoin in the mixtures per year. When looking at the three year yield average (Figure 2) the overall highest yielding was LRC05-3902 with 5642 lbs/acre dry matter.

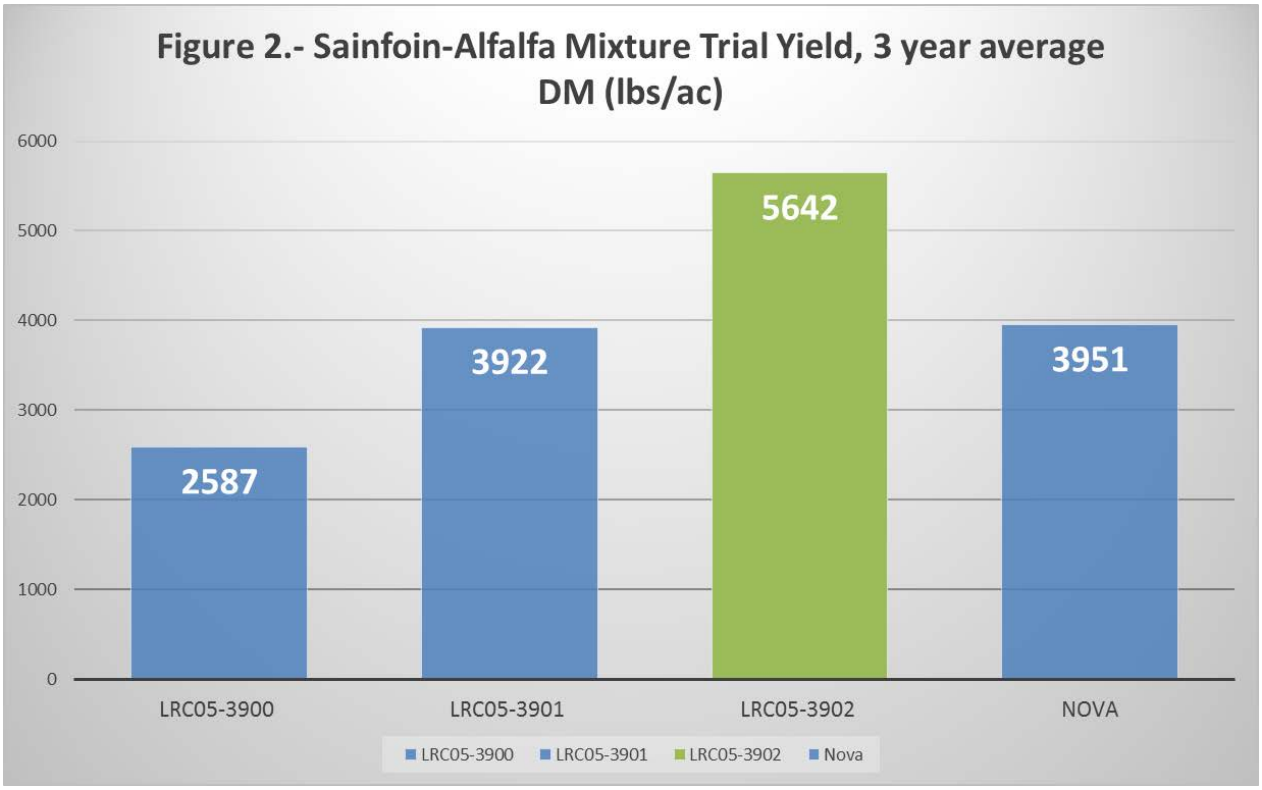


Figure 2. – Sainfoin-Alfalfa Mixture Trial 2013-2016. Sainfoin 3 Year yield average. Wildwood AB.

Quality

There was no significant difference between the new lines and Nova in the Sainfoin-Alfalfa Mixture Trial.

Figure 3. – Sainfoin-Alfalfa Mixture Trial 2013-2016.CP (%), NDF (%) and ADF (%) for Sainfoin new cultivars and Nova. Wildwood, AB.

Results

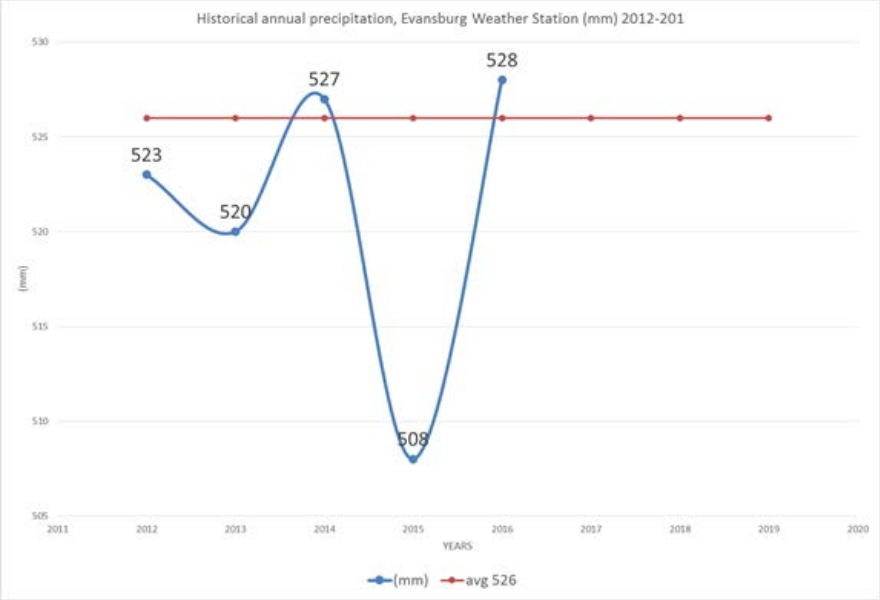
This was a demonstration and results are not statistically significant. Results should be treated with caution as they are from only three years of field testing, and there was low precipitation in 2015.

Good stand establishment was achieved in all treatments. There was heavy weed pressure in 2014 and grasshoppers due to the dry season in 2015. In years 2015 and 2016 only one cut was obtained due to low moisture.

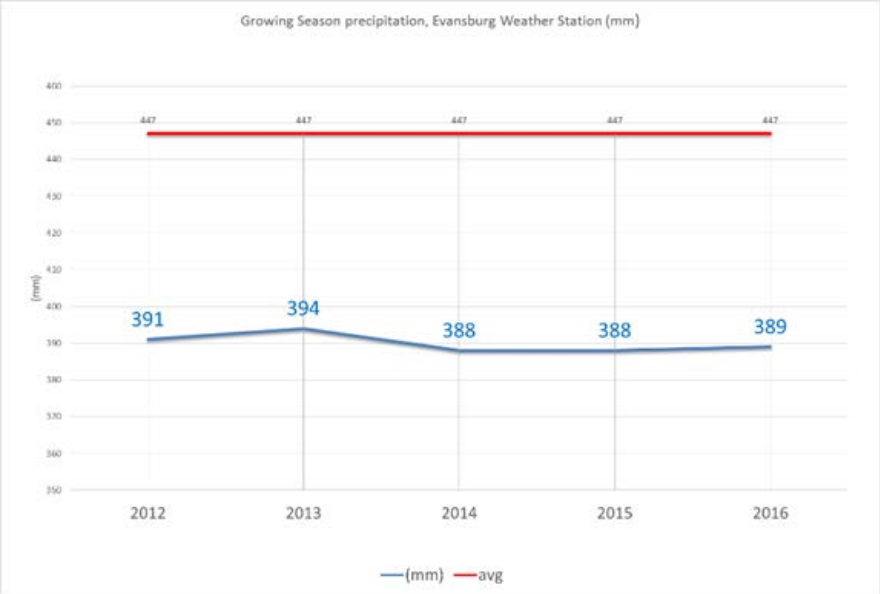
New Sainfoin line LRC05-3902, now registered as AC Mountainview, showed a consistent increase in the plant population and yielded the highest overall. Therefore, the establishment of AC Mountainview Sainfoin in an Alfalfa mixture is recommended to prevent bloat.

Environmental Conditions

The historical annual total precipitation of the gray wooded soil zone from 1971 to 2000 was 526mm on average and the growing season precipitation (May until October) is 447mm on average (Alberta Weather Data Viewer, 2016). Graphic #2 shows the Historic annual precipitation for the Evansburg weather station. Graphic #1 shows the accumulative precipitation for the growing season from the Evansburg weather station.



Graphic #1. – Historic annual precipitation for the Evansburg weather station from 2012 to 2016



Graphic #2. – Growing season precipitation in the Evansburg weather station from 2012 to 2016