

# Rejuvenation of Perennial Forage Stands with Soil Rejuvenation and Foliar Fertilizer

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Under the right conditions, fertilizer application can be one of the most cost-effective methods to improve old forage stand yield and quality. In addition to dry fertilizer application, foliar fertilizer can also be used to rejuvenate old perennial forage stands. Foliar fertilization can correct deficiencies, strengthen weak or damaged crops, speed growth and grow better plants. This does not mean that foliar fertilizers replace solid fertilizer, but the use of foliar fertilizer has been shown to increase the availability of the applied major elements, that have been applied in solid/dry form. The present study examined two Best Farming Systems products (Soil Rejuvenation and Foliar Fertilizer) in improving hay field production.

## Methods

The study was carried out at Double LA Farms (Lawrence & Lori Andruchiw) in the Happy Valley area (RGD Road 75, SW-05-78-07-W6), near Spirit River, Alberta by Peace Country Beef & Forage Association (PCBFA) in collaboration with Best Farming Systems and Double LA farms. An old hay field consisting of an alfalfa-grass mixture was used. Rainfall received from May 1 to July 30 in Spirit River was 6.33 inches (160.7 mm).

A randomized complete block design (RCBD) with three (3) replications was used. Four (4) treatments consisting of the following were studied for their effects on forage production and quality:

1. Soil Rejuvenation (SR, 3 acres)- SR treatment was sprayed 2 twice (at the rate of 100 ml/acre on June 13 and again on July 4)
2. Foliar Fertilizer (FF, 3 acres)- FF was sprayed twice at the rate of 1.5 L/acre, on June 13 and July 4
3. SR+FF (3 acres)- SR at 100 ml/ac + FF at 1.5 L/acre were mixed and sprayed twice, on June 13 and July 4
4. Check (no Best products applied)

Depending on the Best Farming Systems' products, the blends may contain some or all of the following nutrients: N, P, K, S, Mg, Fe, Cu, Zn, Mo, Mn, and B (See Table 1).

	<b>N</b>	<b>P</b>	<b>K</b>	<b>S</b>	<b>Mg</b>
<b>Product</b>		<b>(P<sub>2</sub>O<sub>5</sub>)</b>	<b>(K<sub>2</sub>O)</b>		
Soil Rejuvenation (SR)	2	1		2	0.01
Foliar Fertilizer (FF, 3-14-3)	3	14	3	2	1

*Soil Rejuvenation is a custom blended formulation that is applied to the soil and to the plants. It helps to stimulate and activate the bacteria in the soil which are the main organisms involved in fertilizer conversion. The bacteria help to convert the man made fertilizers into plant available nutrients and also help to unlock the nutrients that are already in the soil, but not necessarily plant available.*

*Foliar Fertilizer is a custom blend of nutrients consisting of NPK and micronutrients for in-crop application, which are developed to meet the crop nutrient requirements during its growth. Foliar Fertilizers helps plants to absorb the required nutrients through the leaves when the products are sprayed as foliar. For more information on Best Farming Systems products, please visit <http://www.bestfarmingsystems.com/>*

*Measurements* - Harvest for forage yield and quality was done on July 30. Composite forage samples were sent to Central Testing Laboratory Ltd., Winnipeg, for forage quality analysis using NIR.

## Results

### Forage Moisture and Yield

The forage moisture content at harvest appeared to be lower for check (49.6%) than other treatments (Table 2). SR treatment had the highest forage moisture at harvest (57.2%), followed by FF (55.8%) and then SR+FF (52.4%).

The forage dry matter (DM) yield was statistically similar for all treatments. However, a combination of SR + FF treatments as well as FF treatment had 436-795 lbs/acre more DM than check (Figure 1).

### Forage Quality

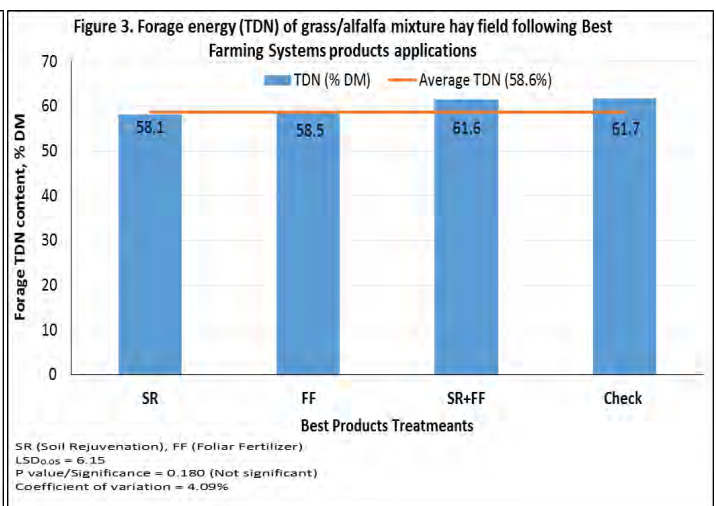
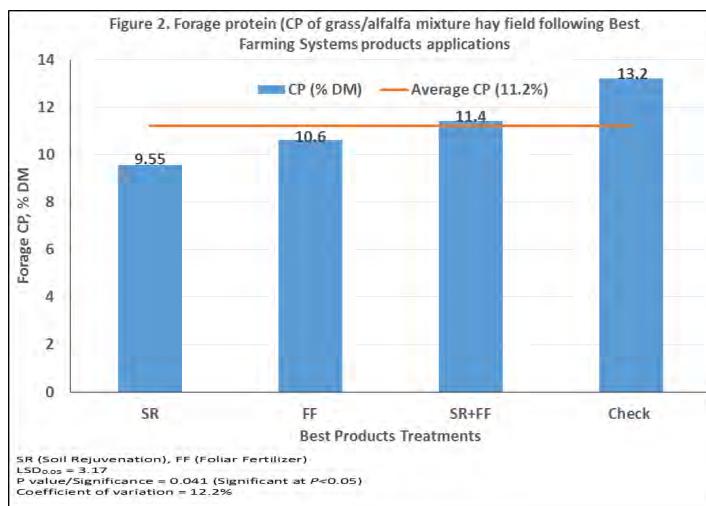
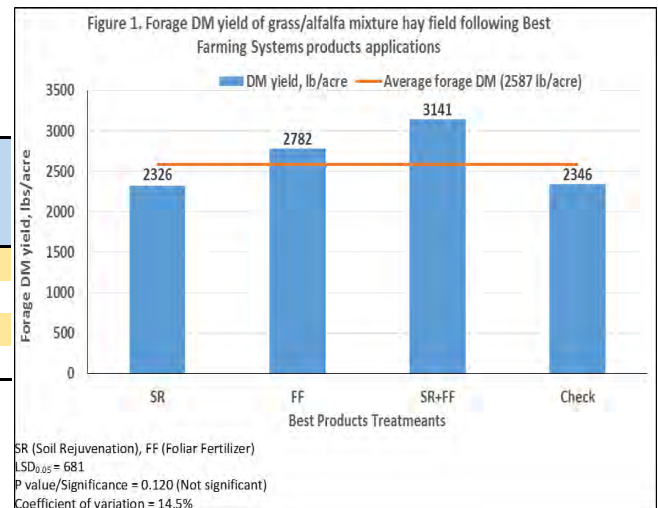
The forage protein (CP) content was significantly different between treatments, but the check for some reason had higher CP than other treatments.

For the forage macro-minerals analyzed for (Ca, P, Mg, K and Na - see Table 2), the forage Ca, K and Na were significantly affected by treatments applied and Best products used seemed to have some positive effects. Treatment combination of SR+FF appeared to favour forage Ca over other treatments. When compared to the check, forage K was improved by the applications of SR and FF as well as the combination of SR+FF. Forage Na was far higher for check than other treatments. Forage P and Mg content were similar for all treatments.

The forage detergent fiber (ADF & NDF, Table 3), energy (TDN, Figure 3) and other forms of energy measured (Table 3) were not statistically different between treatments.

**Table 2. Forage Moisture & mineral content with & without Best Farming Systems Products** (\* indicates significant at  $P < 0.05$ ; \*\*\* indicates significant at  $P < 0.001$ , ns indicates not significant at  $P < 0.05$ , CV means coefficient of variation)

Best Product Treatment	Moisture (%)	Ca (%)	P (%)	Mg (%)	K (%)	Na (%)
SR	57.2	0.78	0.14	0.23	1.52	0.03
FF	55.8	1.09	0.13	0.29	1.49	0.03
SR+FF	52.4	1.16	0.15	0.29	1.52	0.02
Check	49.6	0.96	0.16	0.26	1.21	0.11
Mean	53.8	1.00	0.15	0.27	1.44	0.05
LSD <sub>0.05</sub>	4.84	0.39	0.06	0.14	0.19	0.01
P value	0.04*	0.04*	0.42 <sup>ns</sup>	0.51 <sup>ns</sup>	0.04*	0.00***
CV, %	5.01	17.6	18.4	21.1	5.22	9.96



**Table 3. Forage acid detergent fiber and other forms of energy with and without Best Products***(ME- metabolizable energy, NE<sub>G</sub>- net energy for gain, NE<sub>L</sub>- net energy for lactation, NE<sub>M</sub>-net energy for milk, DE- digestible energy, ns indicates not significant at P<0.05)*

Best Product Treatment	ADF (%)	NDF (%)	ME (Mcal/kg)	NEG (Mcal/kg)	NEL (Mcal/kg)	NEM (Mcal/kg)	DE (Mcal/kg)
SR	38.0	59.0	2.13	0.70	1.31	1.27	2.57
FF	37.6	57.5	2.14	0.72	1.32	1.28	2.58
SR+FF	34.7	52.6	2.26	0.81	1.40	1.39	2.72
Check (Control)	34.6	51.4	2.26	0.81	1.40	1.40	2.72
<i>Mean</i>	36.2	55.1	2.20	0.76	1.36	1.34	2.65
<i>LSD0.05</i>	5.76	8.34	0.22	0.18	0.15	0.20	0.27
<i>P value/Significance</i>	0.179 <sup>ns</sup>	0.087 <sup>ns</sup>	0.152 <sup>ns</sup>	0.151 <sup>ns</sup>	0.161 <sup>ns</sup>	0.153 <sup>ns</sup>	0.166 <sup>ns</sup>
<i>Coefficient of variation, %</i>	5.98	5.67	3.93	9.81	4.27	6.17	4.00

In summary, the lack of any significant improvement in forage DM and forage quality following the different treatments imposed is difficult to explain. But looking at the generally low DM in this study (mean of 2587 lbs DM/acre), which is less than 2 bales per acre at an experimental level, dry weather at the site as with most parts of the Peace River region in 2015 was thought to have reduced the biological benefits of the treatments imposed on forage production and quality.

But in a previous on-farm study on pastures by PCBFA, forage DM yields of 424 lbs/acre (from FF) to 1639 lbs/acre (from SR+FF) over control have been reported. The study also showed some benefits of sole SR and FF applications as well as the combination of both SR and FF over check in terms of CP, P, K, ADF, NDF, TDN and relative feed value. The study also indicated that after the first spraying of SR, FF and SR+FF, cows were allowed to graze the sprayed plots a few weeks later. The observation was that cows had heavily grazed plots sprayed with a combination of BFF + BSR than other plots. This indicated that cows probably preferred treatment consisting of SR+FF to other treatments. And FF was slightly grazed more than SR or the control. The greater consumption of the preferred treatments could be related to better forage quality (particularly lower values of both ADF and NDF) and brix levels for treatments BFF + BSR and BFF than either BSR or control check. For the full report please visit <http://www.bestfarmingsystems.com/data/internal/article002.asp>