

Pasture Rejuvenation with Soil and Foliar Fertilizers

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Foliar nutrients are mobilized directly into plant leaves, which is the goal of fertilization to begin with, increasing the rate of photosynthesis in the leaves, and by doing so stimulating nutrient absorption by plant roots. Foliar fertilization is by far the most effective way to apply micro nutrients or trace elements, and supplement the major elements. The readily-available nutrients are more easily utilized, because they do not have to be dissolved by moisture and go into the soil solution. Foliar fertilizers used in conjunction with solid fertilizers, can be used to quickly correct a nutrient imbalance and stimulate increase in root uptake. 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 form. The objective of this study was to examine the effects of soil rejuvenation versus foliar fertilizer forage growth, yield and quality.

Methods

The project was located in Brownvale (MD of Peace) on RGE road 263 and on 225 acres of land. The site was used as a hay field for years, but used as pasture for the last 4 years. Dominant forages are fescue, timothy and quack grass, and some alfalfa and a few stands of clover.

A section of a 75 acre field was used for the demonstration. There were four soil/plant nutrient/fertilizer treatments, which consisted of the following:

1. Check control
2. Best Soil Rejuvenation (BSR) - in liquid form (0.1% N - 0.02% P - 0.14% K - 0.007% S - 0.013% Ca)
3. Best Foliar fertilizer (BFF) - in granular form (7% N - 35% P - 8% K - 2% Mg - 6% S)
4. A combination of treatments 2 & 3 above

Spraying was done twice, with about 5 weeks between sprayings. Application rates used are:
BFF - One 22.5 kg pail of BFF treats 32 acres (the fertilizer was dissolved in water and then sprayed).
BSR - applied at a rate of 100 ml/acre.

For treatment 4 (a combination of treatments 2 & 3), a full rate of each BFF and BSR was used. BSR is used to restore soil nutrients, microbial populations and to promote plant growth.

(For more information, please visit: <http://www.bestenvirotech.com/best-farming-system>.

Preliminary results of an early study at the present study site by PCBFA is also available from:

<http://peacecountrybeef.ca/wp-content/uploads/2013/02/Final-PCBFA-2012-Annual-Report.pdf>

Results and Discussion

DM Yield (Table 1)

Feeding the plant through the soil by using BSR or feeding the plant via the leaf by using BFF or a combination of the two appeared to have some positive effect on DM production. The DM was highest for the combination of BFF + BSR (5041 lbs DM/acre) and lowest for control check (3402 lbs DM/acre). A combination of BFF + BSR (treatment 4), BFF (treatment 3) and BSR (treatment 2) respectively increased DM yield by 148, 112 and 125% over control check. The higher DM yield resulting from BFF + BSR indicates the likely potential benefit of applying both forms of nutrients/fertilizer to pasture for the purpose of improving forage growth.



Forage Quality (Table 1)

The forage protein content was in the order of: BFF + BSR (treatment 4) > BFF (treatment 3) > BSR (treatment 2) > control (treatment 1). The application of a combination of BFF + BSR increased protein content by double over control check. With the exception of control check, which appeared to slightly fall short of the 11% protein needed by a lactating cow, all spraying treatments exceeded the protein requirements of a dry gestating (7-9 % CP) and a lactating cow.

The forage Ca content was not consistently affected by the spraying treatments. But the Ca values obtained for all the spraying treatments far exceeded the Ca requirements by both pregnant and lactating cows.

Forage P and K followed the same pattern with the combination of BFF + BSR giving the highest values, followed by BFF, then BSR and then control check. Though forage P was greatly improved by spraying BFF or BSR or a combination of both, but none of the treatments applied increased the level of forage P up to the required P level needed by a lactating cow. All the treatments however had sufficient amount of P needed by a dry gestating cow both in mid and late pregnancy stages. The K requirements by beef cows were exceeded by all treatments including the control. Forage Mg content varied from 0.17% for both BFF + BSR (treatment 4) & control to 0.24% for BSR (treatment 2). All spraying treatments including control had adequate amount of Mg needed by a dry gestating cow, but only BSR (treatment 2) was able to meet the 0.20% Mg needed by a nursing cow. None of the spraying treatments had sufficient amounts of Na needed by beef cows.

Forage energy (%TDN) was in order of: BFF + BSR (60.33% TDN) > BFF (59.25% TDN) > BSR (56.61% TDN) > control (55.13% TDN). Only the combination of BFF + BSR (and possibly treatment BFF) conveniently met the 55 and 60% TDN needed by a dry gestating cow in the mid and late pregnancy stages. Other treatments only had sufficient amounts of energy needed by a dry gestating cow in the mid pregnancy stage.

Table 1. Forage DM yield and forage quality 4 weeks after the second spraying treatment.

Spraying treatment	DM (lb/ac)	CP	Ca	P	Mg	K (%)	Na	ADF	NDF	TDN	ME Mcal/kg	NEM Mcal/kg	NEG Mcal/kg	RFV
BFF + BSR	5041	20.02	0.51	0.24	0.17	3.68	0.01	35.70	57.60	60.33	2.18	1.32	0.74	99
BFF	3826	13.60	0.77	0.23	0.19	2.01	0.02	37.87	57.50	59.25	2.14	1.28	0.71	96
BSR	4244	11.98	0.84	0.17	0.24	1.85	0.02	43.14	60.45	56.61	2.04	1.19	0.63	85
Control check	3402	10.14	0.59	0.14	0.17	1.66	0.03	46.11	67.09	55.13	1.99	1.14	0.58	73

Brix (sugar level)

Generally, all the forage types found in the respective treatment plots and tested for brix appeared to be increased by BFF than other treatments (Table 2).

Table 2. Brix of individual forage within each treatment block 4 weeks after 2nd spraying.

Spraying treatment	Alfalfa	Bromegrass	Clover	Vetch	Others
BFF + BSR	9.33	7.33	6.33	10.33	4.67
BFF	10.3	10.0	5.20	14.20	5.83
BSR	7.67	6.83	6.00	-	5.00
Control check	7.16	9.50	5.50	-	5.50

Field Observations

After the first spraying, cows were allowed to graze the plots. Just before the second spraying was done, we observed that cows had heavily grazed plots sprayed with a combination of BFF + BSR than other plots. This is an indication that cows probably preferred treatment 4 to other treatments. And BFF was slightly grazed more than BSR 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.