Using bale grazing to optimize pasture productivity and quality

With support from the Alberta Crop Industry Development Fund (ACIDF), Agriculture and Agri-Food Canada (AAFC) initiated a study to determine if bale grazing twice in a three year period had any positive or negative effects on pasture productivity or quality.

Two locations within Central Alberta were selected based on age of forage stand (old perennial pastures) and soil type (common soils where bale grazing is currently taking place). Site one is located north of Caroline in the Dry Mixedwood Subregion of the Boreal Forest Natural Region on an Orthic Gray Luvisol while site two is located south of Vermilion in the Central Parkland Subregion of the Parkland Natural Region on a thin Black Chernozem. Bale grazing occurred on both locations in 2012/13 and again in 2014/15. Bale spacing for both treatments was 12.5 m (40 feet) with the second treatment offset from the first for better nutrient distribution.

Following one bale grazing session, many pastures like the one on the left, display areas of greater growth where individual bales were located and lesser growth in between each bale (note the increased growth in the centre of the adjacent photo). This variability is caused by the non-uniform deposition of bale residue, manure and urine resulting in areas of higher production /quality (where bales were placed) and areas of lower production/quality (between bales).

Key Findings

Forage Productivity

One of the project objectives was to even out forage production throughout our pastures by bale grazing twice in three years. Forage productivity however was significantly higher at both locations on areas where the 2014/15 bales were located. This increase in production started in the middle of the first growing season (June 2015) and continued until September of 2017. Even though forage production of the most recent bale grazing treatment was significantly higher, the photo on the right does show less variability on the pasture grazed twice in three years (left) compared to a single bale grazing treatment (right).

Forage Quality

Crude protein was the only forage quality parameter that was consistent between treatments, bales, sampling date and site location. For most sampling periods, crude protein was significantly higher in forage growing on the 2014/15 bale locations. Some mineral levels were also consistent between locations, bales, and treatments.

The increases in potassium (K) and reductions in calcium (Ca) and magnesium (Mg) in the forage growing on the 2014/15 bale locations however was concerning. For example, the K/(Ca+Mg) charge ratio for forage from 2014/15 bale locations in 2016 was 5.4 for the Caroline site and 5.8 for the Vermilion site. These levels are high considering that grass tetany effects can occur at levels exceeding 2.2. This may explain anecdotal evidence where cattle have been observed avoiding or alternating between the lush forage associated with the bale locations and areas between the bales during the first year following bale grazing. Our data suggests that this risk may continue into the second year. Forage quality testing should be considered if base grazing frequently on soils with high potassium levels.

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