Evaluation of Methods of Pasture Rejuvenation for Improved Forage Production

Trial Site: Wanham, Alberta
Project Lead: Dr. Akim Omokanye
Data from 2016-2018

Objective

To evaluate 11 pasture rejuvenation methods for their effectiveness in improving forage yield, quality, and profitability in northwestern Alberta (2016–2018).

Key Methods

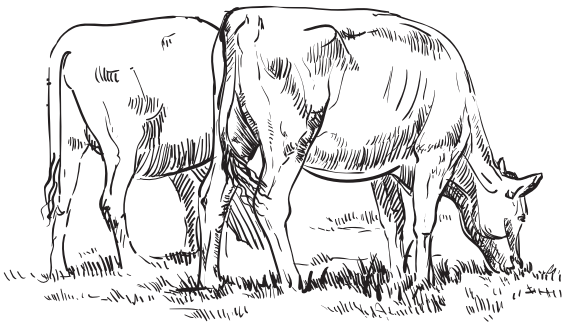
- Break & Reseed
- Spraying to control weeds and brush through spraying
- Fertilizer application following soil test recommendations (FERT)
- Spring herbicide to suppress vegetation + direct seeding (RSS)
- Fall herbicide + spring broadcast seeding
- Spring herbicide application only - Roundup WeatherMax® applied in spring without seeding
- Additional Methods: Aeration, broadcast seeding (spring and fall), Grazon herbicide to control brush, and resting pastures.
- Check (control)- no rejuvenation method, just normal grazing.

Pasture rejuvenation treatment implementation was in 2016 followed by two production years (2017 & 2018). A forage seed blend of 80% grasses and 20% legumes was utilized. A partial budget analysis determined profits, calculated as revenue (forage DM yield multiplied by existing hay price) minus total input cost.

Results

- **Forage Yield:**
  - RSS and FERT produced the highest forage DM yield increases over the 2 years after the implementation of the rejuvenation methods, with increases of 235% for RSS and 311% for FERT over the control
  - Fertilization increased yield but with diminishing returns after two years.
  - ROS reduced forage DM yield after two years of trial due to weed invasion and left the soil exposed and prone to runoff and erosion. Therefore, this method is discouraged as a method of improving a depleted pasture.

- **Legume Composition:**
  - RSS increased legume content up to 29%, compared to 2-17% with other methods.



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- **Forage Quality:**
  - RSS consistently delivered higher protein contents for the two years after implementation due to the increase in legume proportion in the stand.
  - The crude protein (CP) content for RSS was consistently highest for RSS over the two years after trial implementation. All rejuvenation methods were generally within the 7-9-11% CP required by mature beef cows, with only RSS adequately meeting 12-14% growing beef cattle stock.
  - Rejuvenation methods hardly influenced the energy content of forages which was for the most part below the 65% required by growing and lactating beef cattle.
  - RSS contained adequate levels of Calcium, Phosphorus, Potassium, Magnesium, and Sulphur to satisfy the needs of dry-gestation beef cows. Some form of mineral supplementation is necessary when using any of the rejuvenation methods during grazing.
- **Economic Analysis:**
  - Revenue: RSS and FERT outperformed all other methods, generating revenues of 223 and 165% respectively over the control.
  - Costs: RSS incurred the highest input cost, with the costs of herbicide, spraying, seed and seeding contributing to input expenses.
  - Profit: RSS led with a profit margin to the tune of CAD $154/ac over the 2-year forage production.

Conclusions

RSS is the most effective method for pasture rejuvenation, enhancing forage yield, quality, and profitability; however, none of the methods effectively enhanced forage mineral content to meet lactating beef cattle requirements. This highlights the need to provide free-choice minerals for grazing beef cows.

Recommendations

- Adopt RSS as the primary strategy for pasture improvement.
- ROS method is the least recommended method as it did not only lead to reduce forage DM yields over 3 years after treatment implementation but also encouraged weed invasion and left the soil exposed to nutrient runoff and erosion
- Provide protein supplement and free choice minerals to compensate for protein and mineral inadequacies
- Consider alternatives like fertilization (short-term gains) and aeration (cost-effective but moderate results).

Challenges Addressed

- Declining pasture productivity due to drought, pests, and overgrazing.
- Rising input costs for traditional pasture management methods (e.g., breaking and reseeding).

Acknowledgments

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Source: Peace Country Beef & Forage Association