Optimizing Boron Maintenance Fertilization for Alfalfa

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Introduction

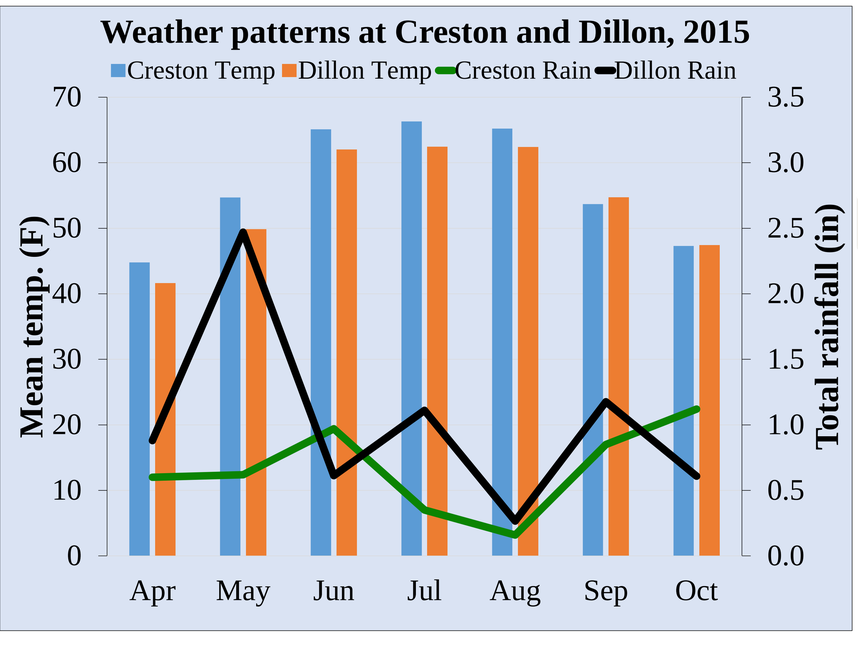
- Alfalfa (*Medicago sativa* L.) accounts for approximately 72% of total hay production in Montana (NASS, 2015).
- Alfalfa has the highest boron (B) demand among many crops (Rathore, 2015).
- A 46 to 62% increase in forage yield response has been reported in applying 3-4 lb B per acre (IPNI, 2014).
- Regular supply of B during growing season is essential to address B deficiency to limit effects on growth and productivity (Malhi & Karamanos, 2013; Herrera-Rodríguez et al., 2010).
- To improve alfalfa production and forage quality, strategic B fertilization needs to be determined for various soils and environmental conditions in Montana

Objective

- Evaluate the impact of applying B at different rates and timing on the yield and nutrient content of alfalfa.

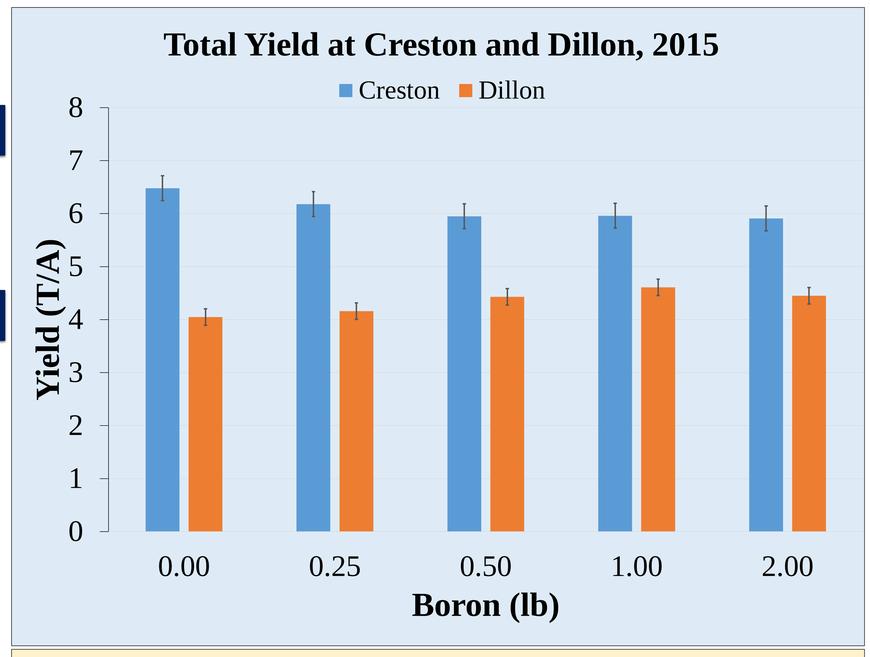
Materials and methods

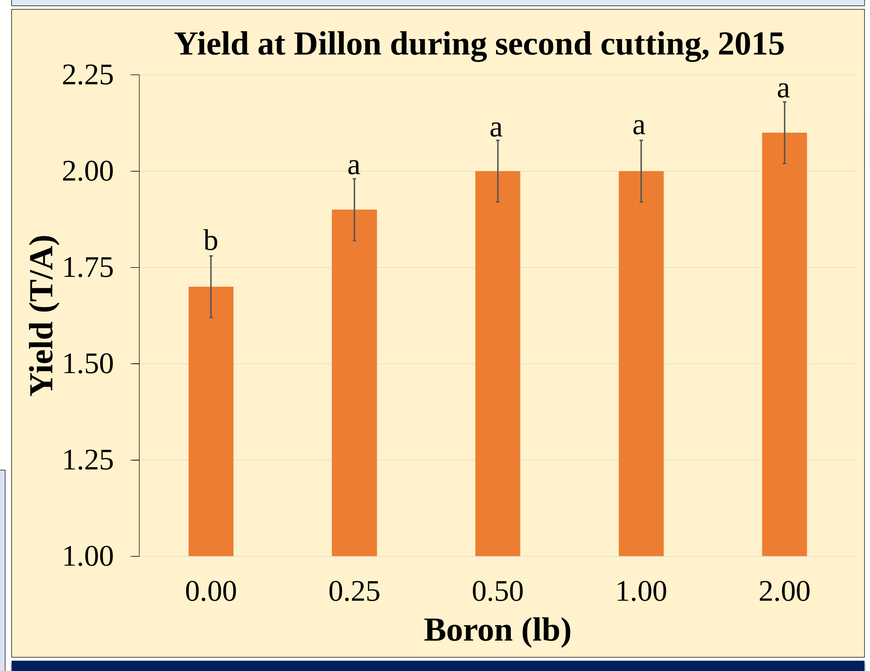
- Research was conducted at the NWARC in Creston, MT and at a producer's farm in Dillon, MT.
- The research was established as a randomized complete block design with five treatments and four replications.
- The B treatments were a) 0.0 lb, b) 0.25 lb at the beginning and 0.25 lb applied mid-season, c) 0.50 lb at the beginning of season and 0.50 lb applied mid-season, d) 1.0 lb at the beginning and 1.0 lb applied mid-season, and e) 2.0 lbs applied at the beginning of the season.
- Liquid B formulation (10% B AgriSolutions™) was used as B fertilizer and was applied using a backpack sprayer in 20 GPA of water.
- Yield and quality samples were collected at 10% bloom at each site.
- Three cuttings were harvested at the Creston site, whereas two cuttings at Dillon.
- Plant tissues were analyzed for B and other nutrient concentration, and forage quality.



Results and Discussion

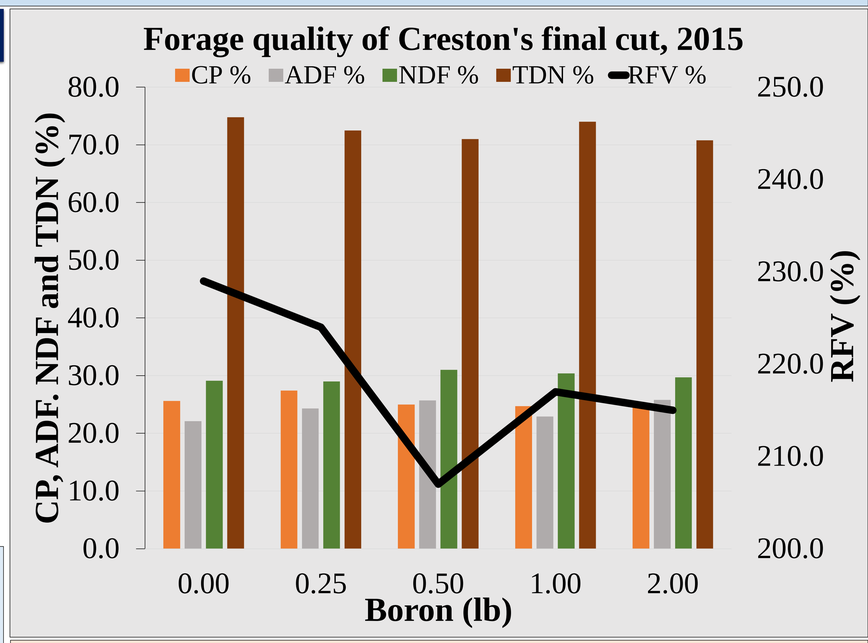
- No significant differences (P= 0.441) were found in alfalfa yields at Creston site.
- Second harvest yields in Dillon were significantly impacted (P= 0.049).
- Protein content at the Dillon site was higher than expected, averaging 29.9% amongst all treatments.
- All other hay quality parameters were within expected ranges at both sites.
- The effect of B application on yield observed at Dillon site shows the potential of B application on alfalfa performance.

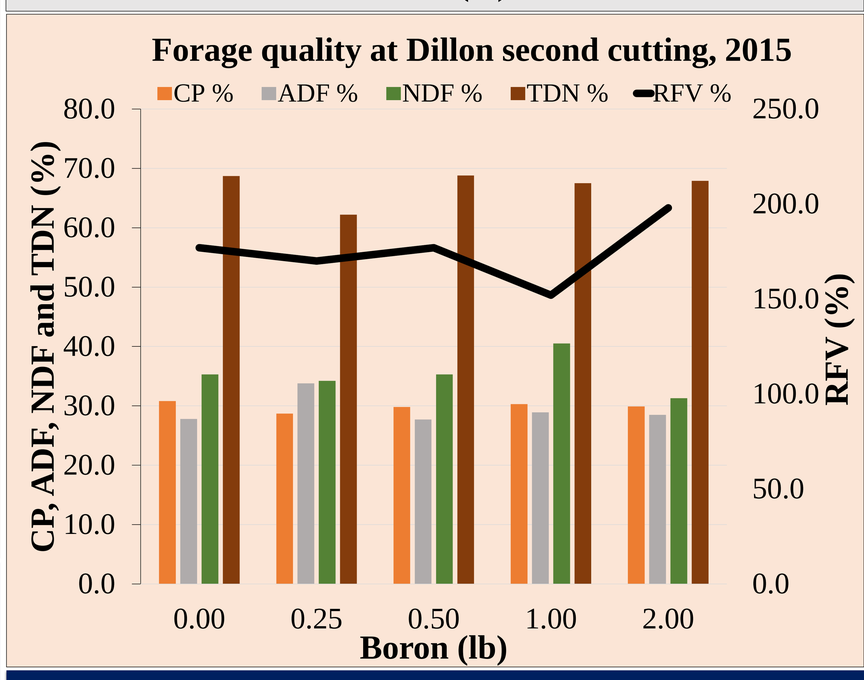




Conclusions

- The effect of B application on yield observed at the Dillon site was promising.
- Severe drought at Creston site in 2015 and insufficient irrigation availability may have contributed to the no yield differences, illustrating the importance of soil water availability on plant nutrient uptake.
- Research is warranted to investigate the impact of B and different irrigation based on crop water use demand on alfalfa production and forage quality.





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Acknowledgements

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