

Project Title: 2020 Cool Season Forage Production Trial

Objective: To evaluate the yield and quality of five perennial cool-season grasses (2nd year of study)

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Summary:

Five cool season forage grasses were planted on May 2019 and continued in 2020 to evaluate their performance (yield and quality) and suitability for production in northwest Montana. Seeding rates used in this study followed the industry recommendation. Other management information is provided in Table 1.

Weed pressure within plots was low, and hand-weeding was performed throughout the growing season. No irrigation and fertilizer were applied in 2020 growing season. Results are reported based on two cuttings.

The average total yield (cumulative 1st and 2nd cuttings) was 4.3 t/A. Among the varieties, dry land mix grasses had the highest yield at 5.4 t/A and Timothy had the lowest, at 2.9 t/A. In both cuttings, dry land mix grasses had the highest yield whereas Timothy is the lowest. Crude protein (CP) averaged 9.4% in the 1st cutting, ranging from 10.9% for Oahe and 7% for Timothy. Except for Timothy, the second cut had lower CP in the second cut compared with the first cut. Average water soluble carbohydrates (WSC) increased over the cuttings, ranging from 8.9% (1st cutting) to 11.5% (2nd cutting). Regardless of cuttings, orchard grass had the highest WSC content (11% and 14.7%) and Luna had the lowest WSC content (7.6% and 9.5%). Relative forage quality (RFQ) averaged 119.4 in the 1st cutting, ranging from 114.8 for both dryland mix and Luna, and 125.5 for Oahe. In the 2nd cutting, dryland mix (95) had the lowest RFQ and Timothy (143.3) had the highest with an average RFQ of 112.4.

Table 1. Management Information

| | | | |
|----------------|--|--|--|
| Seeding date: | 5/29/2019 | Field Location: | R8 |
| Julian date: | 149 | 2020harvest date: | 6/11; 8/11 (2 nd cut Luna & Timothy); 9/29 (2 nd cut orchard grass & dryland mix) |
| Seeding rate: | Various | Julian date: | 163; 224; 273 |
| Previous crop: | Barley | Soil type: | Fine sandy loam |
| Herbicide: | None | Tillage: | Conventional |
| Insecticide: | None | Soil residual nutrient (NO ₃ ⁻ , P, K lb/A): | (Spring, 2019), 22-15-99 |
| Fungicide: | None | Nutrient fertilizer applied (N, P ₂ O ₅ , K ₂ O lb/A): | (Spring, 2019): 100-20-60 (spring, 2020): none |
| Irrigation: | 2019, minimal for establishment 2020, none | | |

Table 2. Quality and yield performance of forages

| Forage* | CP | | WSC | | RFQ | | Yield | | |
|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------|
| | -----%----- | | -----%----- | | | | -----t/A----- | | |
| | 1 st Cut | 2 nd Cut | 1 st Cut | 2 nd Cut | 1 st Cut | 2 nd Cut | 1 st Cut | 2 nd Cut | Total |
| Dryland Mix | 8.7 | 4.9 | 8.6 | 10.2 | 114.8 | 95.0 | 3.6 | 1.7 | 5.4 |
| Oahe | 10.9 | 8.1 | 8.7 | 9.5 | 125.5 | 113.8 | 3.5 | 1.7 | 5.2 |
| Luna | 10.5 | 7.7 | 7.6 | 9.5 | 114.8 | 103.5 | 3.3 | 1.7 | 5.0 |
| Orchard grass | 10.1 | 4.5 | 11.0 | 14.7 | 118.8 | 106.3 | 2.2 | 1.1 | 3.3 |
| Timothy | 7.0 | 9.0 | 8.5 | 13.4 | 123.0 | 143.3 | 2.1 | 0.8 | 2.9 |
| Mean | 9.4 | 6.8 | 8.9 | 11.5 | 119.4 | 112.4 | 2.9 | 1.4 | 4.3 |
| LSD | 3.1 | 1.3 | 1.9 | 1.5 | ns | 10.7 | 0.9 | 0.7 | 1.4 |
| CV (%) | 14.4 | 8.7 | 9.3 | 5.6 | 5.7 | 4.2 | 14.6 | 21.8 | 14.5 |
| Pr > F | <0.01 | <0.001 | <0.001 | <0.001 | ns | <0.001 | <0.001 | <0.01 | <0.001 |

*Forage species

Dryland Mix: tall fescue, intermediate wheatgrass, smooth brome, Alaska brome, meadow brome

Oahe: intermediate wheatgrass

Luna: pubescent wheatgrass

CP = Crude protein; WSC = Water soluble carbohydrates; RFQ = Relative Forage Quality