

Project Title: Cool-season and Warm-season Forage grass Trial

Objective: To evaluate the performance of selected grass forages in northwestern Montana

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Summary:

Fourteen cool season and two warm season forage grasses were planted on April 22, 2020 to evaluate their performance (yield and quality) and suitability for production in northwest Montana. Specific management information is provided in Table 1. This trial was under rainfed condition.

Yield results were reported as summation one to two cuttings (Table 2). Whereas, forage quality results were presented as per cuttings and mean of two cuttings where applicable. Total yield averaged 2.3 t/A and ranged from 1.7 t/A for dryland tall fescue to 3.3 t/A for teff grass. Although having only one cutting, smooth brome and creeping wheatgrass contributed to relatively high yield, 2.7 and 2.4 t/A, respectively.

Water-soluble carbohydrates (WSC) averaged 14% and 15.9% in 1st and 2nd cutting, respectively. In the 1st cutting, perennial ryegrass 1 had the highest WSC at 18%, while Meadow fescue had the highest WSC content (20.4%) in the 2nd cutting. Forage lignin content was 3% on average of two cuttings. Creeping wheatgrass had the highest lignin content at 3.2% in the 1st cutting, and in the 2nd cutting, both meadow brome and teffgrass had the highest lignin content (3.9%). The lowest lignin content the meadow fescue_2 at 1% in the 1st cutting and both meadow fescue 1 and tall fescue had the lowest lignin content at 2.4% in the 2nd cutting. Crude protein (CP) content averaged 10.9% in the 1st cutting, ranged from 8.4% for smooth brome to 14.3% for dryland mix_2. In the 2nd cutting, CP averaged 10.2%, ranging from 7.9% for meadow brome to 14.7% for tall fescue or meadow fescue mix. Relative forage quality (RFQ) did not significantly differ between the two cuttings. RFQ, on average of the cuttings, was 154.5. The highest RFQ was found for meadow fescue_1 for 1st and 2nd cutting, 180.7 and 192, respectively. Both smooth brome and creeping wheatgrass had the lowest RFQ (137) in the 1st cutting, while teffgrass had the lowest RFQ in the 2nd cutting at 124.7.

Table 1. Management information

Seeding date:	4/22/2020	Field Location:	P2
Julian date:	113	Harvest date:	7/17-10/15, depending on varieties; some had two cuttings
Seeding rate:	Variety-dependent		
Previous crop:	Winter wheat	Soil type:	Creston Silt Loam
Herbicide:	7/10: Shredder	Tillage:	Conventional
Insecticide:	None	Soil residual nutrient (NO ₃ ⁻ , P, K lb/A):	122-20-376
Fungicide:	None	Nutrient fertilizer applied (N, P ₂ O ₅ , K ₂ O lb/A):	4/8: 84-10-35-10(S)

Table 2. Forage yields of cool-season and warm-season

Variety	No. of cuttings	Forage yield (tons/A)
Cool season		
Orchardgrass	2	2.8
Smooth brome	1	2.7
Creeping wheatgrass	1	2.4
Meadow brome	2	2.4
Meadow fescue_2	2	2.4
Dryland mix_2	2	2.4
Tall fescue/meadow fescue mix	2	2.3
Meadow fescue_1	2	2.3
Dryland orchardgrass	2	2.2
Dryland mix_1	2	2.2
Perennial ryegrass_2	1	2.1
Perennial ryegrass_1	1	1.9
Tall fescue	2	1.9
Dryland tall fescue	2	1.7
Warm season		
Teff	2	3.3
Crabgrass	1	1.9
Overall Mean:		2.3
CV (%):		23.9
LSD		0.9
Pr > F		<0.01

Table 3. Quality performance per cuttings of the various forage varieties

Entries	Water Soluble Carbohydrates		Lignin		Crude Protein		Relative Feed Quality	
	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
Cool season								
Dryland mix_1	12.6	14.8	2.1	3.6	13.6	10.3	161.3	148.0
Dryland mix_2	12.0	15.3	2.2	3.6	14.3	10.2	156.3	149.7
Dryland orchardgrass	12.3	18.7	2.1	3.8	9.9	10.3	139.3	159.0
Dryland tall fescue	15.3	19.1	1.9	3.6	12.9	10.0	171.3	153.3
Meadow brome	11.8	14.1	2.3	3.9	12.3	7.9	151.7	138.0
Meadow fescue_1	16.2	20.1	1.1	2.4	11.3	13.5	180.7	192.0
Meadow fescue_2	15.0	20.4	1.0	2.7	10.6	10.2	173.0	172.0
Orchardgrass	13.9	20.3	1.9	3.8	9.2	8.4	145.0	150.0
Tall fescue	14.7	17.5	1.4	2.4	12.9	13.0	173.0	174.0
Tall fescue/meadow fescue mix	16.2	19.2	1.4	2.6	11.4	14.7	176.0	191.0
Teffgrass	10.2	9.4	3.0	3.9	13.8	9.4	145.3	124.7
Crabgrass	12.2	-	3.0	-	11.7	-	143.0	-
Creeping wheatgrass	15.0	-	3.2	-	9.1	-	137.0	-
Perennial ryegrass_1	18.0	-	1.2	-	10.6	-	178.7	-
Perennial ryegrass_2	15.8	-	1.6	-	8.4	-	154.0	-
Smooth brome	13.1	-	2.6	-	8.7	-	137.0	-
Warm season								
Teffgrass	10.2	9.4	3.0	3.9	13.8	9.4	145.3	124.7
Crabgrass	12.2	-	3.0	-	11.7	-	143.0	-
Mean	14	15.9	2.5	3.5	10.9	10.2	157.7	151.4
Mean (cuts)	14.9		3		10.5		154.5	
CV (%)	8.5	4.2	29.7	8.2	17.3	11.3	4.5	5.3
LSD	1.9	1.2	1.2	0.5	3.1	2.1	11.8	14.6
Pr > F	<.001	<.001	<.001	<.001	<.001	<.005	<.001	<.001