

Caribou-Targhee National Forest  
Native Grass Initial Evaluation  
2004-2005

Preliminary Report (July 18, 2005)

Derek J. Tilley, Range Conservationist (Plants)

Loren St. John, Team Leader Aberdeen Plant Materials Center

## INTRODUCTION

The purpose of this study is to evaluate collections of two species of native short-lived perennial grasses for use in revegetation, stabilization and beautification projects in the USDA Forest Service, Caribou-Targhee National Forest (CTNF).

During the summer of 2004, CTNF collected 11 accessions of slender wheatgrass (*Elymus trachycaulus* [Link] ssp. *trachycaulus*) and 10 accessions of mountain brome (*Bromus marginatus* Nees ex Steudel). The collections were cleaned for future evaluation by the USDA-NRCS Aberdeen Plant Materials Center (PMC). Appendix 1 lists the accessions collected, the size of each collection and collection location. The initial establishment evaluation was conducted on June 15, 2005.

## MATERIALS AND METHODS

Harvested seed collections were cleaned at the PMC seed cleaning facilities during the winter of 2005. Appendix 2 provides detailed information on seed cleaning equipment and calibrations used. Estimated viability was obtained using the kerosene heater “popping” method outlined in Ogle and Cornforth (2000) and was used to approximate pure live seed (PLS).

The trial is being conducted at the Aberdeen Plant Materials Center, Fish and Game farm located approximately 5 miles northeast of Aberdeen, Idaho. Experimental design was a randomized complete block with six replications. Individual plots were 20 feet long and contained one row; rows were planted on three foot centers. Experimental design also contained plots of known industry standards from each species for comparison. Soil at the site is a Declo silt loam with pH of 7.4 to 8.4. Average annual precipitation is 8.75 inches. Ground was plowed in the fall of 2004 and subsequently disked and roller packed in the spring of 2005 prior to planting.

Plots were seeded on May 19, 2005 using a hand-pushed belt seeder calibrated to drill 30 pure live seeds (PLS) per foot of row. Seeds were drilled to an approximate depth of one half inch. Border rows of ‘Tegmar’ intermediate wheatgrass (*Thinopyrum intermedium* [Host] Barkworth & D. Dewey) were planted on the outside of the blocks to eliminate edge effect. Plots were sprinkler irrigated for initial establishment and as needed throughout the growing season. Weeds were controlled with herbicide treatments and between row mechanical cultivation.

The first evaluation was conducted on June 15, 2005 (27 days after planting) when most of the plants from both species had reached a one to two leaf stage. Plots were evaluated for percent stand, plant density and seedling vigor. Percent stand was measured using a twenty foot rope marked with one foot increments stretched the length of the plot and

anchored at either end. Plants intercepting the one foot increments are summed and recorded as a percentage. Plant density was measured by counting seedlings found in the middle two feet of row and converted to average plants per foot of row. Seedling vigor is measured on an ordinal scale of one to nine (one being most healthy and nine being dead). Entire plots as well as individual plants within plots were viewed and given a rating based on overall apparent vigor. Data from percent stand and plant density was analyzed for Analysis of Variance (ANOVA) and means were separated using Duncan's Multiple Range Test.

## 2005 EVALUATIONS AND DISCUSSION (PRELIMINARY)

### Slender Wheatgrass

CTNF accessions of slender wheatgrass were compared against five previously released varieties; 'AEC Hillcrest', 'Pryor', 'Revenue', 'San Luis', and 'Adanac', and one non-released selection from the U.S. Army (D.O.D.). Of these, three (AEC Hillcrest, Revenue and Adanac) come from collections originally made in Canada. Pryor comes from a collection made in Montana and San Luis was originally collected in Colorado. See Tilley et al (2005b) for a detailed comparison of the characteristics for each released cultivar. The Army accession is a currently unreleased breeding population made of several collections from Colorado. AEC Hillcrest differs from the other accessions by being of the subspecies *subsecundus* and should not be considered directly comparable to the collections made by CTNF.

Percent stand ranged from 51.8% (accessions 9076500 and 9076502) to 85.1 (San Luis and Adanac). The high rating from San Luis and Adanac did not, however, differ significantly from several collections with percent stands of 70% or greater. The best plant density rating came from Revenue with 17.9 plants/foot. The poorest density was recorded from accession 9076496 with a density of 2.3 plants/foot. This accession similarly had the lowest seedling vigor rating of 6.7, while the best vigor was observed in Revenue (1.2). Of the CTNF accessions 9076495, 9076498 and 9076499 performed the best in the three evaluated categories (see table 1).

### Mountain Brome

The mountain brome trial included two industry releases, Garnet Germplasm from Montana and 'Bromar' from the Pacific Northwest. See Tilley et al (2005a) for detailed information on these mountain brome releases.

The best percent stand and plant density both came from Garnet (81.6 % and 22.3 plants/foot). Second best in both categories was Bromar (78.1 % and 14.1 plants/foot) which also had the best possible rating for seedling vigor (1.0). In general, the CTNF accessions showed little if any significant differences from one another (see table 2).

This is a preliminary report of the initial evaluation conducted in June 2005. The trial will be evaluated again in late September and a report summarizing the evaluations conducted during 2005 will be prepared.

Table 1. Slender wheatgrass

Accession No.	% Est. viability	% PLS <sup>3/</sup>	% stand	Density <sup>1/</sup>	Vigor <sup>2/</sup>
			6/15	6/15	6/15
9076493	95	90.25	54.4 c <sup>4/</sup>	6.8 def	4.0 bcd
9076494	95	90.25	70.2 ab	13.0 abc	4.0 bcd
9076495	90	85.5	77.2 ab	13.4 abc	3.0 def
9076496	90	85.5	25.4 d	2.3 f	6.7 a
9076497	95	90.25	64.0 bc	7.8 cdef	3.3 def
9076498	95	90.25	75.4 ab	15.3 ab	3.7 cde
9076499	85	80.75	71.1 ab	14.5 ab	3.0 def
9076500	95	90.25	51.8 c	4.8 ef	4.8 bc
9076501	95	90.25	73.7 ab	10.8 bcde	2.8 def
9076502	90	85.5	51.8 c	8.2 cdef	3.7 cde
9076503	85	80.75	52.7 c	8.0 cdef	5.0 b
AEC Hillcrest	95	91.2	71.9 ab	13.3 abc	2.7 ef
Pryor	99.9	91.9	71.9 ab	12.3 abcd	2.2 fg
Revenue	*	80.1	79.8 ab	17.9 a	1.2 g
San Luis	99	87.12	85.1 a	16.9 ab	5.2 b
D.O.D.	98	90.2	79.8 ab	16.6 ab	1.3 g
Adanac	98	84.3	85.1 a	18.1 a	1.5 g
LSD (0.05)			13.8	1.9	0.4

<sup>1/</sup> Plants per foot of row<sup>2/</sup> Rated 1-9 with 1 best, 9 worst<sup>3/</sup> Percent PLS based on estimated 95% purity<sup>4/</sup> Means followed by the same letter are not significantly different

\* Information not available from source

Table 2. Mountain brome

Accession No.	% Est. viability	% PLS	% stand	Density	Vigor
			6/15	6/15	6/15
9076504	85	80.75	72.8 abc	10.9 b	3.8 a
9076505	85	80.75	66.7 abc	11.3 b	3.3 ab
9076506	90	85.5	66.7 abc	8.7 b	2.7 ab
9076507	90	85.5	70.2 abc	9.8 b	3.8 a
9076508	85	80.75	74.6 abc	12.8 b	2.8 ab
9076509	95	90.25	73.7 abc	12.6 b	3.2 ab
9076510	95	90.25	74.6 abc	12.8 b	2.8 ab
9076511	90	85.5	59.7 bc	10.8 b	3.2 ab
9076512	90	85.5	59.7 bc	11.9 b	2.3 abc
9076513	90	85.5	54.4 c	10.1 b	2.2 bc
Garnet	55	53.35	81.6 a	22.3 a	2.0 bc
Bromar	97	96.0	78.1 ab	14.1 b	1.0 c
LSD (0.05)			18.4	1.9	0.5

## REFERENCES

Ogle, D., and B. Cornforth. 2000. Technical Note 35: A Quick Method to Estimate Germination Percentages for Seed Species. USDA-NRCS, Boise, ID. ID-TN35, Mar. 2000. 3p. (9 KB) (ID# 2250)

Tilley, D.J., D.G. Ogle and L. St. John. 2005a. Mountain Brome. NRCS Plant Guide. USDA, NRCS, Idaho State Office & the National Plant Data Center. 5p.

Tilley, D.J., D.G. Ogle and L. St. John. 2005b. Slender Wheatgrass. NRCS Plant Guide. USDA, NRCS, Idaho State Office & the National Plant Data Center. 5p.

### Appendix 1. Collection data

Accession No.	Species	Date collected	Cleaned wt. (lbs)	National Forest	District	Location	Elevation (ft)
9076493	ELTR7	8/31/04	1.00	Bridger-Teton	Jackson	Shadow Mt	7,872
9076494	ELTR7	8/10/04	0.85	Targhee	Island Park	Taylor Creek	6,619
9076495	ELTR7	8/31/04	1.06	Bridger-Teton	Jackson	Curtis Canyon	7,662
9076496	ELTR7	8/23/04	0.92	Caribou	Montpelier	Green Canyon	8,309
9076497	ELTR7	9/1/04	0.49	Targhee	Dubois	Bear Trap Creek	7,402
9076498	ELTR7	7/29/04	0.20	Caribou	Westside	Big Springs	6,290
9076499	ELTR7	8/19/04	1.54	Caribou	Soda Springs	Diamond Creek	6,784
9076500	ELTR7	8/3/04	0.70	Caribou	Palisades	McCoy Creek	5,766
9076501	ELTR7	8/11/04	0.57	Targhee	Teton Basin	Dry Creek	6,743
9076502	ELTR7	9/9/04	1.62	Bridger-Teton	Buffalo	Togwotee Pass	8,514
9076503	ELTR7	7/30/04	0.10	Caribou	Palisades	Little Elk Creek	5,990
9076504	BRMA4	8/24/04	0.84	Caribou	Montpelier	Egan Basin	8,135
9076505	BRMA4	8/4/04	1.46	Caribou	Palisades	Moody Meadow	6,307
9076506	BRMA4	8/3/04	0.76	Caribou	Palisades	McCoy Creek	5,766
9076507	BRMA4	7/30/04	0.24	Caribou	Palisades	Little Elk Creek	5,990
9076508	BRMA4	8/11/04	0.36	Targhee	Teton Basin	Dry Creek	6,743
9076509	BRMA4	8/31/04	2.04	Bridger-Teton	Jackson	Shadow Mt.	7,872
9076510	BRMA4	8/10/04	0.94	Targhee	Island Park	Taylor Creek	6,619
9076511	BRMA4	7/29/04	0.20	Caribou	Westside	Big Springs	6,290
9076512	BRMA4	9/9/04	3.60	Bridger-Teton	Buffalo	Togwotee Pass	8,514
9076513	BRMA4	8/19/04	2.25	Caribou	Soda Springs	Diamond Creek	6,784

## Appendix 2. Seed cleaning calibrations

---

### **Mountain Brome**

#### I. Air Screen Cleaner

1. Screens
  - a. top: 5.550
  - b. middle: 4.750
  - c. bottom: blank
2. Valves
  - a. 3.25
  - b. 3.5
  - c. 5.0
  - d. closed
3. Settings
  - a. sieve: 10.0
  - b. blower 5.0

#### II. Indent Cleaner (used to remove seeds w/ smut)

1. Drum: 7.25

### **Slender wheatgrass**

#### I. Hammermill

1. Screen: 0.5 inch
2. Air: low

#### II. Air Screen Cleaner\*

1. Screens
  - a. top: 3.550
  - b. bottom: 6x24
2. Valves
  - a. 3.45
  - b. 3.50
  - c. 4.75
  - d. closed
3. Settings
  - a. sieve: 2.0
  - b. blower: 2.0

\*Ran through three times to clean out inert matter.