

**Project: COPMC-P-0701-CR**

**Report- 2007**

**By: Heather Plumb**

## **Initial Evaluation of Blue Wildrye for Routt-Medicine Bow National Forest**

### **OBJECTIVE**

To evaluate different seed sources of Blue Wildrye *Elymus glaucus* for revegetation in critical areas, forest lands, and mining land in Routt-Medicine Bow National Forest.

### **INTRODUCTION**

There is a constant demand for plants that are ideal for revegetation work on critical land sites, mining lands, and forested lands. Upper Colorado Environmental Plant Center (UCEPC) and the Routt-Medicine Bow National Forest are working together to evaluate if *Elymus glaucus* Blue Wildrye is an ideal plant for revegetation in disturbed land sites.

### **EXPERIMENTAL DESIGN**

The statistical design for the study is a randomized complete block with three replications

### **MATERIALS AND METHODS**

Forty-two collection of Blue Wildrye were attained from Routt-Medicine Bow National Forest and cleaned at UCEPC. Twenty-seven collections from the forty-two original collections from Routt- Medicine Bow National Forest were used in the initial evaluation study as well as two plant material collections from the UCEPC. For comparison Blue Wildrye releases “Arlington” and “Elkton” from Corvallis Oregon and two potential Blue Wildrye releases from Pullman Washington were used in the evaluation. A total of thirty-three collections were used in the initial evaluation. Table 1 lists the accessions used in the evaluation. No PLS seed testing was performed on the Routt- Medicine Bow National Forest seed collections or the two plant material collections from UCEPC, thus seed viability was assumed. Planting began on August 1, 2007, a total of forty-nine plots were planted due to high wind conditions, the remainder of the plots had to be planted on August 2, 2007. The plots were designed as 16 foot long rows, three rows per plot, three replications for each entry, 30 seeds per linear foot, 12 foot and six foot spacings between plantings for alleyways. Table 3 provides a visual for the plot plan design. This configuration allowed for 14.6 grams of seed per entry for a single test. This plot design was used due to the fact the collection grams made by the Routt-Medicine Bow National Forest were insufficient to have more replications and longer row lengths.

Plot locations were determined by using Excel. Random plot numbers were placed into the Excel randomization function and random plots were chosen. Table 2 lists the random numbers for the plots used. A belt seeder was used for the entire planting of the three replications. Prior to planting five grams of Blue Wildrye seed were measured out for each entry and placed in seed packets. These packets were spaced out evenly over the belt on the seeder for planting. After seeding no irrigation was needed for germination due to a thunderstorm shower that provided enough water for germination to occur.

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The parameters of the evaluation to be examined are Year 1: Seed emergence. Year 2-Advanced Evaluation: vigor, percent stand cover, seed production rating, date of greenup, date of seed ripeness, disease, insects, and nutrient problems.

**Table 1.** List of Blue Wildrye accessions used in the Initial Evaluation.

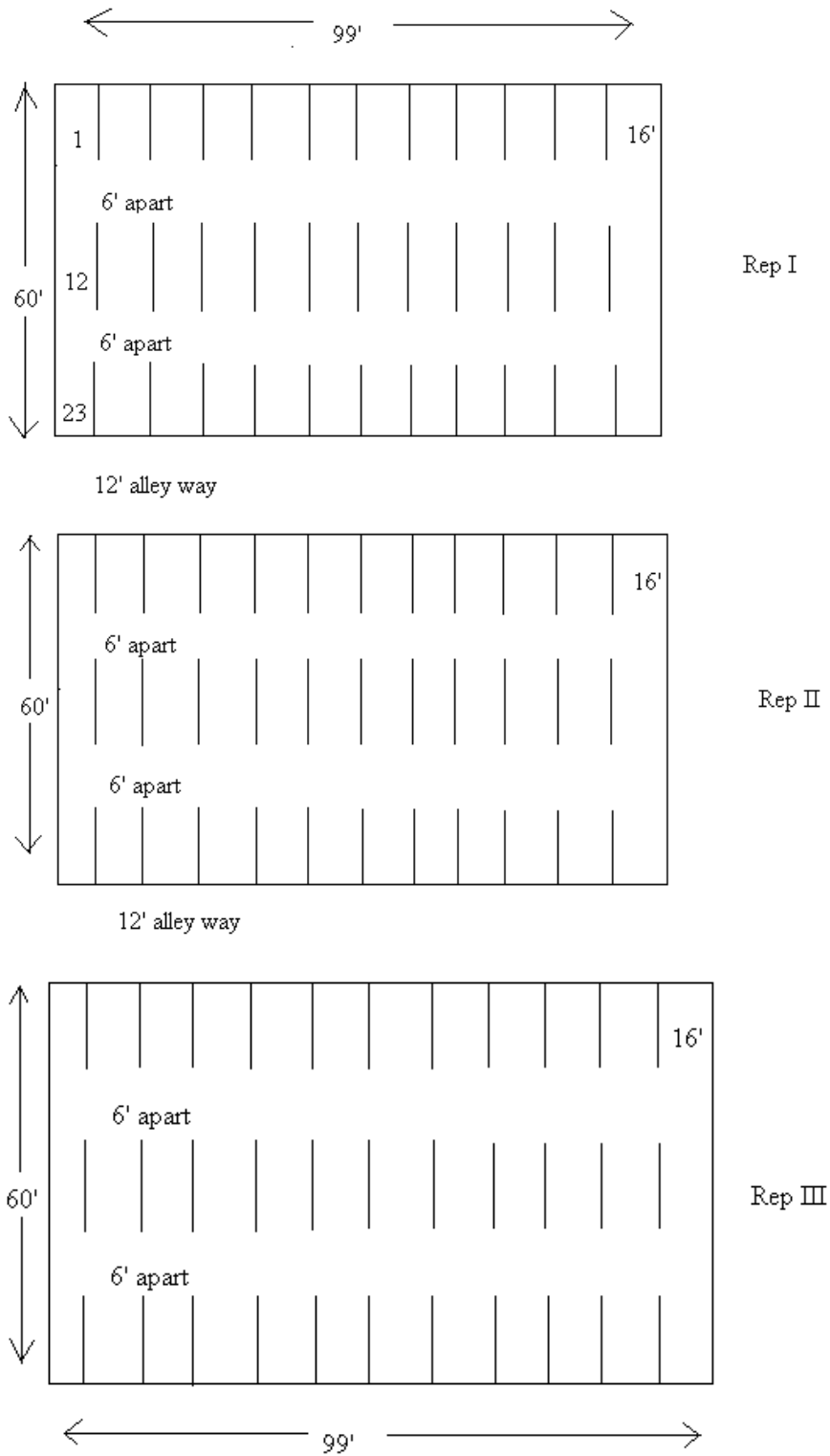
Number of Entries	Collection	Id in plot design
1	080106-A1	A
2	080106-A2	AA
3	073106-A2	AB
4	073106-A1	AC
5	072706-A3	AD
6	072006-A1	AE
7	214-03	AF
8	214-02	AG
9	221-03	AH
10	080406-A1	B
11	080106-A4	C
12	091406-A1	D
13	091406-A2	E
14	481-02	F
15	091206-A1	G
16	481-06	H
17	481-04	I
18	091206-A3	J
19	091206-A2	K
20	481-07	L
21	221-02	M
22	080306-A1	N
23	481-05	O
24	080106-A3	P
25	Marvine Creek	Q
26	Uncompaghre 04	R
27	080906-A1	S
28	214-01	T
29	221-01	V
30	SP05-1	W
31	BO5-1	X
32	SBR-06-Arling	Y
33	SBR-06-Elkton	Z

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**Table 2.** Randomization blocks from Excel used to determine plots

Plot no	Block 1		Block 2		Block 3	
	Treatment	Random no	Treatment	Random no	Treatment	Random no
1	A	0.12685	Z	0.827168	N	0.934148
2	AA	0.093156	Q	0.253182	X	0.607366
3	AB	0.174891	L	0.675272	F	0.432386
4	AC	0.617568	AD	0.832958	H	0.512774
5	AD	0.582068	V	0.431124	Y	0.615301
6	AE	0.737657	K	0.109453	P	0.30672
7	AF	0.857693	B	0.480481	O	0.094621
8	AG	0.605914	H	0.22079	L	0.843278
9	AH	0.087742	AF	0.027586	J	0.732068
10	B	0.196349	AA	0.242081	AH	0.837903
11	C	0.832278	S	0.327228	Z	0.055589
12	D	0.492825	I	0.630387	AF	0.327078
13	E	0.584923	R	0.186464	D	0.220671
14	F	0.234286	E	0.262094	M	0.640431
15	G	0.303769	J	0.768045	V	0.765237
16	H	0.514176	AH	0.01053	C	0.369469
17	I	0.579793	AE	0.816434	K	0.723174
18	J	0.811658	AB	0.207076	I	0.740771
19	K	0.316422	C	0.086017	G	0.560539
20	L	0.236978	M	0.037421	AC	0.014513
21	M	0.625428	N	0.17345	AA	0.746739
22	N	0.934488	A	0.557107	AD	0.339793
23	O	0.797779	X	0.366823	AB	0.789311
24	P	0.643109	G	0.94481	T	0.821769
25	Q	0.644642	AG	0.51776	S	0.03205
26	R	0.481264	T	0.091443	AG	0.358766
27	S	0.061983	P	0.686283	Q	0.661964
28	T	0.557049	O	0.290737	AE	0.274787
29	V	0.585388	D	0.191142	E	0.787584
30	W	0.072611	Y	0.514224	A	0.757198
31	X	0.309719	AC	0.043549	R	0.30303
32	Y	0.434518	F	0.392722	W	0.412138
33	Z	0.830207	W	0.199344	B	0.846997

**Table 3.** The plot plan design for Blue Wildrye



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**UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
STUDY PLAN**

<b>Study ID Code</b>	COPMC-P-0701-CR	
<b>Title</b>	Initial Evaluation of Blue Wildrye	
<b>National Project No.</b>	Critical Area 1.1	
<b>Study Type</b>	Initial Evaluation	
<b>Study Status</b>	Active	
<b>Location</b>	UCEPC	
<b>Study Leader</b>	Heather Plumb, COPMC	
<b>Duration</b>	2007-2011	
<b>Cooperators</b>	Routt-Medicine Bow National Forest	
<b>Land Use</b>	Critical Area Forest Land Mine Land	
<b>Vegetative Practices</b>	Primary	342 Critical Area Planting
	Secondary	Forest Land, Mineland
<b>Resource Concerns</b>	<u>Resource</u>	<u>Consideration/Problem</u>
	Air	Particulate reduction
	Animals	Forage production & habitat
	Soil	Carbon sequestration, erosion, weed control
	Water	Erosion
	Human	Native plants
<b>Long Range Plan</b>	The study is linked to the NRCS 2006 National Strategic Plan, 2006-2010 National PM Strategic Plan and the UCEPC Long Range Plan for product development	
<b>Description</b>	Commercially available releases and soon to be released selections of blue wildrye from the Pacific Northwest will be compared to accessions originating primarily from Northwest Colorado and South central Wyoming.	

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**Status of Knowledge**

Blue Wildrye (*Elymus glaucus* and *Elymus glaucus* var. *jepsonii*) is a tall, rapidly developing, loosely tufted, native perennial bunch grass. They can grow to be up to five feet tall with an upright growth habit that contains very few stems per plant. It is considered under most conditions a short lived plant living three to eight years. This species is primarily self-pollinated and self fertile. Seedheads form a long, narrow, bearded spike with awns that turn purple when ripe. Leaf blades are flat and thin ranging from 4-12 mm wide. It provides good early season forage, but later becomes too coarse and stemmy for wildlife consumption. They are adapted to disturbed and undisturbed land areas. It tolerates a wide variation in soil and weather conditions, though *glaucus* prefers moisture, it tolerates drought conditions. Blue Wildrye is excellent for meadow and streambank restoration, swale seeding, reseeding burned and disturbed sites. It is great wildlife habitat for birds, mammals and waterfowl.

USDA, OAES and NRCS have released three accessions of Blue Wildrye; "Arlington" in 1995, "Elkton" in 1997 and "Mariposa" in 2000. "Arlington" and "Elkton" are a native, cool season perennial bunch grass. They establish in low elevations (200-400 feet above sea level). They establish rapidly from seed, but are short lived plants. They are appropriate for uses on erosion control and swift self-perpetuating cover on logging roads, clear cut timberlands, burned areas and steep hillsides. "Mariposa" does well growing on loamy to clay loamy soils. It is best grown on moderate well drained, moist, medium textured soils. It persists on moderately deep road cut slopes and does not tolerate poor drainage or prolonged flooding. It grows at an elevation of 600 feet above sea level.

Average seeds per ft<sup>2</sup> at 1 lb/acre would be 2.6 seeds.  
Seeding rate is five to seven lbs/ac PLS.

**Experimental Design**

Randomized Complete Block

**Treatment:**

33 selected accessions of blue wildrye

**Replications:**

Each treatment will be replicated 3 times  
33 plots total per replication.

**Materials and methods** A number of collections of Blue Wildrye were attained from Routt- Medicine Bow National Forest and cleaned at the Upper Colorado Environmental Plant Center (UCEPC). Twenty-seven collections from Routt- Medicine Bow National Forest were used in the initial evaluation study as well as two plant material collections from the UCEPC. For comparison Blue Wildrye releases “Arlington” and “Elkton” from Corvallis Oregon and two potential Blue wildrye releases from Pullman Washington were used in the evaluation. A total of 33 collections were used in the initial evaluation.

No PLS seed testing was preformed on the Routt- Medicine Bow National Forest seed collections or the two plant material collections from the UCEPC, thus seed viability was assumed.

For the plot plan design, plots were designed as 16 foot long rows, three rows per plot, three replications for each entry, 30 seeds per linear foot, 12 foot and six foot spacing’s between plantings for alley ways. This configuration allowed for 14.6 grams of seed per entry for a single test. This plot design was used due to the fact the collection grams made by the Routt-Medicine Bow National Forest were insufficient to have more replications and longer row lengths. Plot locations were determined by using Excel. Random plot numbers were placed into the Excel randomization function and random plots were chosen.

Planting equipment consisted of a belt seeder. Prior to planting, five grams of Blue Wildrye seed were measured out for each entry and placed in seed packets. These packets were spaced out evenly over the belt on the seeder for planting.

The planting was irrigated to ensure seed establishment. No irrigation will be applied after the establishment year. Weeds will be controlled by the most appropriate method. Plots will be evaluated as follows:

**Year 1:**

- Seed emergence

**Year 2- 5:**

- Vigor
- Percent Stand Cover
- Seed production rating

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- Date of greenup
- Date of seed ripeness
- Comments (disease, insects, nutrient problems)
- Digital photos from established photo points at harvest

**Final Evaluations**

Evaluations will be submitted to WNTSC PMS who will develop an annual report for submission into all participating PMC annual reports.

**Technology Transfer Products**

Annual reports

**Literature Cited**

PMC release documentation, Commercial literature

1. USDA, NRCS. 2007. The PLANTS Database (<http://plants.usda.gov>, 3 August 2007). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
2. USDA, NRCS. 2006. The Plant Materials Program (<http://plant-materials.nrcs.usda.gov/>, 3 August 2007).
3. Plant Guide. Blue Wildrye. 2007. (<http://plants.usda.gov/plantguide/doc/pg-elgl.doc>)
4. Corvallis Plant Material Center. 1995. Notice of release of "Arlington" Blue Wildrye.
5. Corvallis Plant Material Center. 1995. Notice of release of "Elkton" Blue Wildrye.