

Coffee Point Off-Center Advanced Test Site
1995 Progress Report
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INTRODUCTION

The purpose of the Coffee Point Off-Center Advanced Test Site is to evaluate the potential of grasses for revegetation and forage for livestock and wildlife in areas of 8-10 inch annual precipitation in southeast Idaho. The site is in MLRA 11B, Snake River Plains of the Northwestern Wheat and Range region of the Intermountain United States.

The site is located in the Coffee Point Exclosure, approximately 25 miles northwest of Aberdeen on land administered by the USDI - Bureau of Land Management. The exclosure has been used by the Aberdeen Plant Materials Center for testing purposes since 1982.

The soils on the site are a Splittop-Atomic complex with 2 - 8 percent slope. The Splittop soil is moderately deep and well drained brown loam with moderate permeability, low available water capacity and effective rooting depth of 20 - 40 inches. The Atomic soil is deep and well drained, pale brown silt loam. The effective rooting depth is 60 inches or greater. Permeability and available water capacity is moderate. There are scattered pockets of exposed bedrock. The pH of this soil complex is 7.4 - 8.4. The dominant vegetation in the natural plant community is bluebunch wheatgrass and Wyoming big sagebrush. The site is a Loamy 8 - 12 inch range site. The elevation is 4850 feet, the average annual air temperature is 43°F and the frost free period is approximately 90 days.

MATERIALS AND METHODS

The off-center advanced test site is composed of two components, the inter-center strain trial and a display nursery. The inter-center strain trial includes 26 grass accessions which are arranged in a complete randomized block design with 4 replications. The display nursery includes 47 accessions of grasses, forbs, and shrubs to allow landusers and agency personnel to view examples of released cultivars and promising accessions that are adapted to the general area.

The area had been used previously for testing purposes. However, the vegetation was dominated by cheatgrass and annual weeds. The site was plowed in late October, 1993. It was planned to fallow the site during 1994 to control cheatgrass but due to extreme drought conditions, no cheatgrass emerged and fallowing was unnecessary. Russian thistle *Salsola iberica*, halogeton *Halogeton glomeratus*, and kochia *Kochia scoparia* were scattered on the site and were removed with a hay rake prior to firming the seedbed. On October 31, 1994 the site was culti-packed three times. On November 3, 1994 the site was planted except for the winterfat shrub plots in the display nursery which were seeded with a hand pushed belt seeder on April 12, 1995. The reason for delaying planting of the winterfat display plots was to obtain as fresh seed as possible. Table 1 lists the accessions which were planted and shows percent PLS and the source for each accession. Figure 1 is a plot map showing the layout of the test site.

All seed except for the winterfat display plots was mixed with rice hulls prior to seeding to plant approximately 25 seeds per square foot. A double disk drill with depth bands and

press wheels was used. Plots are 6.67 feet wide X 20 feet long. Row spacing was 10 inches with the exception of basin wildrye and Russian wildrye accessions which were planted to 20 inch row spacing. Depth of seeding ranged from 0.25 - 0.75 inches dependent upon species. The winterfat display plots were seeded at a rate of 15 pure live seeds per row foot.

Areas which were plowed but not seeded with test plots or display plots were seeded to a cover crop seed mixture composed of the following species and rates:

'P-27' Siberian wheatgrass	1.8 #PLS/ac
'Hycrest' crested wheatgrass	1.3
'Bannock' thickspike wheatgrass	1.1

On August 3, the test site was mowed to a height of approximately 6 inches to remove tumble mustard *Sisymbrium altissimum* and prickly lettuce *Lactuca serriola* which were shading the plots and to facilitate collection of data. Because some of the test plants were lightly clipped, plant height data was not collected from the grass plots during the second evaluation.

Evaluation data collected during the establishment year from the grass plots included plant height, percent stand, plant density and vigor. Data collected from the forb and shrub display plots included plant height, vigor, and the number of plants from the middle 2 rows of each plot. Evaluation dates were May 24 and September 6, 1995.

The middle 2 rows of each plot are sampled for evaluation purposes. Percent stand data is collected utilizing a 20 foot rope with 1 foot increments stretched and anchored from one end of the plot to the other between the middle 2 rows. Basal cover is measured by the interception of plant parts along the rope at each 1 foot increment which are then summed to give a cover estimate recorded as a percent. Plant density is measured using a row count technique at the mid point of the plot. Plants are counted from the middle 2 rows for a distance of 18.3 cm for 10 inch row spaced plots and 9.2 cm for 20 inch row spaced plots. The number of plants counted converts directly to the number of plants per square foot. Vigor is a qualitative rating based upon plant health and growth rate. A plant rated 1 would be best whereas a 9 rating is very poor. Data from the replicated plots is averaged while data from the non-replicated display plots is the actual data from that plot. Table 1 summarizes the evaluation data collected during 1995. Although the accessions which are in the replicated plots are also included in the display nursery, data was not collected from the display plots. The accessions shown in Table 1 under the display plots are not replicated in the inter-center strain trial.

Precipitation data is collected with a direct reading rain gauge which is located at the southeast corner of the enclosure. Although no long term site specific precipitation data exists for the Coffee Point enclosure, it is in a 8 -12 inch precipitation zone. Estimates of precipitation for the site have been 4 - 5 inches annually for the six years prior to 1993. 1993 was an exceptionally wet year, receiving 11.25 inches from April 28 to October 17. From October 1993 to early September 1994, 3.52 inches of precipitation were recorded. During late September and October 1994, 2 inches of precipitation were recorded which definitely improved soil moisture conditions for seeding. Precipitation data for the first year of plant establishment is presented below:

<u>Sampling period</u>	<u>Precipitation</u>
10/27/94 - 4/5/95	0.15 inches

4/5 - 4/12	0.15
4/12 - 5/24	3.55
5/24 - 6/30	3.20
6/30 - 8/3	0.14
8/3 - 9/6	0.74
9/6 - 10/2/95	<u>0.06</u>
Total	7.99 inches

On September 13, 1995 Dan Ogle and myself toured the test site.

1995 EVALUATIONS AND DISCUSSION

Due to the very favorable amount and timing of precipitation from just prior to seeding and during the establishment year, the majority of the stands have established. Excellent seed bed preparation and the lack of cheatgrass invasion has also made strong contributions to the first year success of the Coffee Point Off-Center Advanced Test Site. Observations of the site on April 5 indicated that soil crusting could have inhibited plant emergence, however, precipitation during the last half of April and during May and June prevented soil crusting from occurring.

Plant height data collected from the first evaluation date shows 'Hycrest' crested wheatgrass and 'Vavilov' Siberian wheatgrass to have the maximum heights at 12.8 cm. The shortest grass was 9040137 Columbia needlegrass (Table 1).

Percent stand data ranged from 4.5 percent for 9040137 Columbia needlegrass to 86.5 percent for Hycrest crested wheatgrass during the first evaluation. Plant density ranged from 0.8 plants per square foot for 'Secar' Snake River wheatgrass to 9.0 for Vavilov Siberian wheatgrass and vigor was the best on Hycrest and Vavilov which both rated 1 to 7.3 for 9040137 Columbia needlegrass.

Percent stand data from the second evaluation date was statistically analyzed for one-way Analysis of Variance (ANOVA) and Duncan's Multiple Range Test was completed to show means separation and is also shown on Table 1. Overall, there was a slight decline in percent stand from the first evaluation date to the second evaluation date but Hycrest and Vavilov continued to have the best stands and 9040137 Columbia needlegrass had the poorest stand. Overall, plant density and vigor also declined slightly from the first evaluation to the second. Plant density from the second evaluation ranged from 1.3 for 9040137 Columbia needlegrass, Secar Snake River wheatgrass, and 'Volga' mammoth wildrye to 5.5 for 'Bannock' thickspike wheatgrass and Vavilov. Vigor ranged from 2.3 for Syn A Russian wildrye to 7.5 for 9040137 Columbia needlegrass. It appears that the Columbia needlegrass accessions are not well adapted to the site.

The non-replicated grass display plots also show a slight decline in percent stand, density, and vigor from the first evaluation to the second. 'Parkway' crested wheatgrass had the best stand during the second evaluation. The best performing forb or shrub plot in terms of number of plants was Pamirian winterfat followed by 9067481 winterfat and 9063535 winterfat.

We plan to continue evaluations for the next four years. In addition to plant height, percent stand, plant density and vigor, forage production data will also be collected.

Table 1.
Coffee Point Inter-Center Strain Trial
Summary of 1995 Evaluation data

Accession No.	Common Name	Scientific Name	Source	Percent PLS	Replicated Grass Plots			1/		2/	
					Plant	Percent	Stand	Plant		Vigor	
					5/24	Height (cm)	5/24	5/24	9/6	Density (per ft ²)	5/24
Hycrest	Crested Wheatgrass	<i>A. cristatum</i> x <i>desertorum</i>	Aberdeen	80.1	12.8	86.5	88.5 a	6.0	5.0	1.0	2.8
Vavilov	Siberian Wheatgrass	<i>Agropyron fragile sibiricum</i>	ARS	78.0*	12.8	81.5	78.3 ab	9.0	5.5	1.0	3.3
Sodar	Streambank wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	Aberdeen	96.6	8.5	67.8	72.3 bc	5.5	5.0	2.3	3.0
Syn A	Russian Wildrye	<i>Psathyrostachys juncea</i>	ARS	83.0*	11.0	75.3	69.8 bc	4.8	3.3	2.5	2.3
Critana	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	Bridger	93.6	8.5	67.3	68.3 bcd	5.8	3.5	2.5	2.5
Nordan	Crested Wheatgrass	<i>Agropyron desertorum</i>	Commercial	81.3	12.0	68.3	62.0 bcde	6.3	4.5	1.5	3.5
Bannock	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	Aberdeen	95.1	10.3	61.0	64.8 bcde	7.0	5.5	2.0	2.8
Mankota	Russian Wildrye	<i>Psathyrostachys juncea</i>	Bismark	83.5	10.3	57.3	63.5 bcde	2.8	2.8	3.5	2.5
Ephraim	Crested Wheatgrass	<i>Agropyron cristatum</i>	Aberdeen	92.2	9.5	63.5	60.3 cde	6.5	4.5	3.0	3.8
PI-275459	Siberian Wheatgrass	<i>Agropyron sibiricum</i>	Pullman	48.7	11.5	65.3	59.3 cde	5.0	4.5	2.0	3.5
P-27	Siberian Wheatgrass	<i>Agropyron fragile sibiricum</i>	Aberdeen	91.6	11.0	64.0	52.0 def	5.3	3.3	2.0	3.8
Bozoisky	Russian Wildrye	<i>Psathyrostachys juncea</i>	Bridger	94.1	9.5	58.3	51.5 def	3.5	3.3	2.8	2.5
SL-hybrid		<i>Elymus</i> x <i>Pseudoroegneria</i>	ARS	89.0*	9.5	53.0	49.0 efg	4.3	3.5	2.8	3.8
Douglas	Crested Wheatgrass	<i>Agropyron cristatum</i>	ARS	78.0*	10.0	64.8	48.8 efg	6.5	4.3	2.0	4.3
Trailhead	Basin Wildrye	<i>Leymus cinereus</i>	Bridger	93.3	12.3	58.5	41.5 fgh	5.3	2.8	3.0	4.3
Schwendimar	Thickspike Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	Pullman	89.4	8.0	34.5	35.8 fghi	4.0	3.0	4.3	3.8
9040189	Bottlebrush Squirreltail	<i>Elymus elymoides</i>	Meeker	95.1	11.3	44.8	34.0 ghi	4.3	3.5	3.0	4.0
9019219	Bottlebrush Squirreltail	<i>Elymus elymoides</i>	Bridger	70.2*	10.3	34.0	32.0 ghi	2.8	2.5	3.3	5.0
9040187	Bottlebrush Squirreltail	<i>Elymus elymoides</i>	Meeker	80.7	9.3	42.5	33.3 ghi	4.0	3.0	2.8	4.0
Tetracan	Russian Wildrye	<i>Psathyrostachys juncea</i>	ARS	58.0*	9.5	54.3	32.0 ghi	3.5	2.8	3.5	4.8
Magnar	Basin Wildrye	<i>Leymus cinereus</i>	Aberdeen	93.7	11.3	59.8	31.5 hi	3.8	2.3	3.3	5.3
9019218	Bottlebrush Squirreltail	<i>Elymus elymoides</i>	Bridger	75.6*	8.3	27.0	20.3 ij	4.5	2.5	3.8	6.3
Volga	Mammoth Wildrye	<i>Leymus racemosus</i>	Pullman	25.7	8.8	25.0	10.3 jk	1.8	1.3	5.3	6.8
Secar	Snake River Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	Pullman	69.4	6.8	9.5	9.0 jk	0.8	1.3	5.5	6.0
9024804	Columbia Needlegrass	<i>Stipa nelsonii</i> v. <i>dorei</i>	Meeker	64.9	6.3	10.0	9.8 jk	1.8	1.8	6.5	6.8
9040137	Columbia Needlegrass	<i>Stipa nelsonii</i> v. <i>dorei</i>	Meeker	69.0	4.8	4.5	1.5 k	1.3	1.3	7.3	7.5

* Purity and germination data was not available from source. Germination tests were completed and purity was assumed to be 90% to calculate %PLS.

1/ Percent stand is equal to basal cover. 9/6/95 percent stand data was analyzed utilizing Duncan's Multiple Range Test; P=0.05, CV=23.3, LSD=14.89; means followed by the same letter are not significantly different.

2/ Rated 1-9 with 1 best, 9 worst.

Table 1 continued.
Coffee Point Inter-Center Strain Trial
Summary of 1995 Evaluation data (Cont.)

Non-replicated Grass Display Plots

Accession No.	Common Name	Scientific Name	Source	Percent PLS	Plant Height (cm)		1/ Percent Stand		Plant Density (per ft ²)		2/ Vigor	
					5/24	9/6	5/24	9/6	5/24	9/6	5/24	9/6
Kirk	Crested wheatgrass	Agropyron cristatum	Canada	73.0*	12		63	58	7	4	2	5
Parkway	Crested wheatgrass	Agropyron cristatum	Canada	78.0*	12		63	70	5	3	3	4
Fairway	Crested wheatgrass	Agropyron cristatum	Commercial	79.6	8		65	63	4	5	3	4
Pryor	Slender wheatgrass	Elymus trachycaulis	Bridger	93.6	9		13	13	1	2	4	6
San Luis	Slender wheatgrass	Elymus trachycaulis	Meeker	30.9	0		0	3	0	1	9	8
Newhy	RS Hybrid	Elytrigia x Pseudoroegneria	ARS	82.8*	10		35	48	4	4	4	4
Canbar	Canby bluegrass	Poa secunda	Pullman	71.2	4		5	5	2	2	5	8
Whitmar	Beardless wheatgrass	Pseudoroegneria spicata inermis	Bridger	89.7	11		30	33	2	2	3	5

Non-replicated Forb and Shrub Display Plots

Accession No.	Common Name	Scientific Name	Source	Percent PLS	Plant Height (cm)		Number of Plants/Sample Rows		Vigor	
					9/6	5/24	5/24	9/6	5/24	9/6
9021471	Fringed sage	Artemisia frigida	Meeker	32.0*	0		0	0	9	9
Lutana	Cicer milkvetch	Astragalus cicer	Bridger	73.9	6		17	1	2	9
Rincon	Fourwing Saltbush	Atriplex canescens	Meeker	39.1	7		8	3	2	3
Wytana	Fourwing Saltbush	Atriplex canescens	Bridger	46.6	4		0	6	9	3
9067480	Fourwing Saltbush	Atriplex canescens	Aberdeen	27.9*	3		8	2	3	4
Timp	Utah Sweetvetch	Hedysarum boreale	Meeker	63.0	0		16	0	2	9
Immigrant	Forage Kochia	Kochia prostrat	Los Lunas	59.7	0		0	0	9	9
Pamirian	Winterfat	Krascheninnikovia ceratoides	Aberdeen	91.1	9		160	61	3	3
9067481	Winterfat	Krascheninnikovia lanata	Aberdeen	68.9	7		63	54	3	2
9063535	Winterfat	Krascheninnikovia lanata	Bridger	81.5*	7		41	52	3	3
Hatch	Winterfat	Krascheninnikovia lanata	Meeker	66.7	9		44	20	3	2
Richfield sel.	Firecracker penstemon	Penstemon eatonii	Aberdeen	50.0*	5		2	15	3	3
Clearwater sel.	Alpine penstemon	Penstemon venustus	Aberdeen	50.0*	5		10	12	2	4

* Purity and germination data was not available from source. Germination tests were completed and purity was assumed to be 90% to calculate %PLS.

1/ Percent stand is also equal to basal cover. 2/ Rated 1-9 with 1 best, 9 worst.

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