

Native Buckwheat Initial Evaluation Planting
October 10, 2008
Study Number: IDPMC-P-0815-RA
Derek J. Tilley, Range Conservationist (plants)
Natural Resources Conservation Service
Plant Materials Center
Aberdeen, Idaho

Introduction

There is increasing demand for releases of native forbs and sub-shrubs for use in revegetation efforts throughout western North America. Native forbs and sub-shrubs are important for increasing biodiversity, improving wildlife habitat and providing food for numerous birds and mammals. Currently native forbs and sub-shrubs are being emphasized for use in revegetating rangelands, especially in regions occupied by sage grouse. Sulphurflower buckwheat has been identified as a top priority native forb species which increases insect populations that are necessary for chick survival. Buckwheat species are also utilized in the xeriscaping market and have potential for roadside beautification and diversification projects. The goal of this trial is to identify one or more superior sulphurflower (*Eriogonum umbellatum*) and/or whorled (*E. heracleoides*) buckwheat accessions adapted for use in the Aberdeen PMC service area.

Materials and Methods

The Aberdeen, Idaho Plant Materials Center (IDPMC) assembled 39 collections of *Eriogonum* spp. from Idaho, California, Oregon and Wyoming (appendix 1). Collections were made primarily by employees of the Idaho NRCS, but collections were also received from the Lockeford NRCS Plant Materials Center in California, Oregon NRCS, Craters of the Moon National Monument and Preserve (USNPS), Bridger Teton National Forest (USFS), Rocky Mountain Research Station (USFS), Western Regional Plant Introduction Station and one private seed company (Comstock Seed, Gardnerville, NV). Of the 39 accessions, 21 were chosen to be included in the 2007 IEP based on the quality and quantity of the original seed collection. These included 16 accessions of whorled buckwheat and five accessions of sulphurflower buckwheat.

Average seed per pound values for each species were obtained by weighing 500 seeds from 32 accessions (appendix 2). Sulphurflower buckwheat ranged from 0.98 to 1.94g per 500 seeds or 117,000 to 231,000 seeds per pound with an average of 170,000 seeds per pound. Whorled buckwheat seed weights ranged from 1.06 to 1.98g per 500 seeds or 114,000 to 214,000 seeds per pound with an average of 171,000 seeds per pound.

The trial was designed as a randomized complete block in a single row of six foot wide weed barrier fabric in field 12 at the PMC Home Farm. The trial contained four replications beginning with rep one on the west end of the field. Holes were burned into the fabric using an acetylene torch and a spacing jig designed for 18 inch hole spacing. Each plot contained six holes. Soil at the site is a Declo silt loam with pH of 7.4 to 8.4. Average annual precipitation is 9.4 inches.

The trial was seeded on November 1, 2007. Soil in each hole was roughened lightly and then hand-seeded with 12-25 seeds followed by a light packing by foot. Seeding depth was surface to 1/8 inch. The trial was watered minimally in 2008 to reduce soil crusting and allow plants to break the soil surface. Following emergence no additional water was applied.

Buckwheat plots were evaluated for percent stand on August 4, 2008. Counts were made of the number of planted holes in each plot containing live plants, and then divided by six to provide percent establishment per plot. Diameters of all living plants from each accession were measured and averaged to provide a mean diameter per accession. Data were analyzed with Statistix 8.2 software using an Analysis of Variance to determine significance ($\alpha=0.05$). Plant diameters were not tested for significance.

Results



Accession 9076543 whorled buckwheat, August 2008

No significant differences were detected between stand means for either species. Stand percentages were generally low. The best stand from the sulphurflower buckwheat accessions came from accession 9076549 with 20.8%. The largest average diameter was 7.31 inches from accession 9076550.

Accession No.	% Stand	Plant diameter ² (Inches)
9076549	20.8 ¹	5.31
9076550	16.7	7.31
9076554	16.7	6.81
9076560	8.3	4.31
9076514	4.2	1.31

¹ No significant difference

² Not tested for significance

Whorled buckwheat stands ranged from 4.2% (9076555) to 50.0% (9076543). Accession 9076543 also had the largest average plant diameter of 6.85 inches.

Accession No.	% Stand	Plant diameter ² (Inches)
9076543	50.0 ¹	6.85
9076540	41.7	3.40
9076538	37.5	3.53
9076536	37.5	4.38
9076561	33.3	5.13
9076546	33.3	4.25
9076553	29.2	4.94
9076548	25.0	3.25
9076533	25.0	3.75
9076542	25.0	6.00
9076532	16.7	5.85
9076558	12.5	3.93
9076529	8.3	3.76
9076547	8.3	3.60
9076539	8.3	2.93
9076555	4.2	1.26

¹ No significant difference

² Not tested for significance

In 2009 the plots will be evaluated for seed production, vigor, and general appearance (aesthetic value) in addition to percent stand. This trial will continue to be evaluated through 2010 at which time decisions will be made on selecting accessions for potential release.

Appendix 1. Assemblage of collections

Acc. No.	Species	County, State	Date coll.	Collector, Affiliation	Wt. clean (g)
9076479	<i>E. sp.</i>	ID	2004	CMNM	29.47
9076514	ERUM	ID	2004	CMNM	28.01
9076560 ^a	ERUM	ID	2006	Shaw, USDA FS	31.79
9076561	ERHE2	ID	2005	CMNM	24.44
'Sierra'	ERUM ssp. <i>polyanthum</i>	Eldorado, CA	2003	Lockeford PMC, NRCS	1.8 lb
9076559	ERUM	Mono, CA	10 July 05	Comstock Seed	25.74
9076528	ERHE2	Washington, ID	27 July 06	Tilley, NRCS	6.68
9076529	ERHE2	Washington, ID	27 July 06	Tilley, NRCS	35.34
9076530	ERHE2	Washington, ID	27 July 06	Tilley, NRCS	9.30
9076531 ^{bc}	<i>E. thymoides</i>	Adams, ID	27 July 06	Tilley, NRCS	Trace
9076532	ERHE2	Adams, ID	28 July 06	Tilley, NRCS	81.25
9076533	ERHE2	Valley, ID	28 July 06	Tilley, NRCS	116.92
9076534	ERHE2	Elmore, ID	28 July 06	Tilley, NRCS	9.75
9076535 ^b	ERUM	Elmore, ID	28 July 06	Tilley, NRCS	2.72
9076536	ERHE2	Elmore, ID	28 July 06	Tilley, NRCS	34.34
9076537	ERUM	Elmore, ID	28 July 06	Tilley, NRCS	9.69
9076538	ERHE2	Elmore, ID	28 July 06	Tilley, NRCS	122.30
9076539	ERHE2	Elmore, ID	28 July 06	Tilley, NRCS	21.58
9076540	ERHE2	Blaine, ID	29 July 06	Tilley, NRCS	21.22
9076541	ERUM	Butte, ID	29 July 06	Tilley, NRCS	13.28
9076542	ERHE2	Bonneville, ID	1 Aug 06	Tilley, NRCS	42.19
9076543	ERHE2	Bonneville, ID	1 Aug 06	Tilley, NRCS	53.55

9076544	ERHE2	Caribou, ID	1 Aug 06	Tilley, NRCS	16.60
9076545	ERHE2	Caribou, ID	1 Aug 06	Tilley, NRCS	12.55
9076546	ERHE2	Caribou, ID	1 Aug 06	Tilley, NRCS	36.92
9076547	ERHE2	Cassia, ID	1 Aug 06	Tilley, NRCS	45.90
9076548	ERHE2	Twin Falls, ID	1 Aug 06	Tilley, NRCS	56.30
9076549	ERUM	Teton, WY	25 July 06	Yegorova, USDA FS	1.8 lb
9076550	ERUM	Elmore, ID	14 Aug 06	Ogle, NRCS	37.10
9076551 ^b	ERUM	Clark, ID	28 July 06	Edgerton, NRCS	2.08
9076552 ^b	ERUM	Fremont, ID	27 July 06	Edgerton, NRCS	No seed
9076553	ERHE2	Madison, ID	5 Aug 06	Mickelson, NRCS	1.7 lb
9076554	ERUM	Franklin, ID	23 Aug 06	Jones, NRCS	26.19
9076555	ERHE2	Franklin, ID	23 Aug 06	Jones, NRCS	33.84
9076556 ^d	ERHE2	Franklin, ID	23 Aug 06	Jones, NRCS	--
9076557 ^d	ERUM	Franklin, ID	23 Aug 06	Jones, NRCS	--
9076558	ERHE2	Franklin, ID	23 Aug 06	Jones, NRCS	15.25
9076562	ERUM	Lake, OR	14 Aug 06	Corning, NRCS	6.16
9076563	ERHE2	Washington, ID	2002	WRPIS	10.0

^a Increase field at IDPMC. Original collection from Slate Creek, ID.

^b Not enough seed to include in trial.

^c Seed given to Steve Love, U.I., for use in xeriscaping ornamental trial.

^d 9076556 and 9076557 inadvertently combined at time of cleaning; left out of IEP.

Appendix 2. Seeds/lb

ERHE2	500 wt (g)	Seed/lb	ERUM	500 wt (g)	Seed/lb
9076528	1.06	214,150	9076537	0.98	231,633
9076529	1.38	164,493	9076541	1.29	175,969
9076530	1.12	202,679	9076549	1.08	210,185
9076532	1.65	137,576	9076550	1.16	195,690
9076533	1.09	208,257	9076514	1.10	206,364
9076534	1.28	177,344	9076559	1.94	117,010
9076536	1.17	194,017	'Sierra'	1.55	146,452
9076538	1.16	195,690	9076479	1.92	118,229
9076539	1.20	189,167	9076554	1.43	158,741
9076540	1.19	190,756	9076560	1.53	148,366
9076542	1.20	189,167			
9076543	1.23	184,553			
9076544	1.30	174,625			
9076545	1.30	174,625			
9076546	1.32	171,970			
9076547	1.37	165,693			
9076548	1.31	173,282			
9076553	1.32	171,970			
9076561	1.71	132,749			
9076555	1.36	166,912			
9076558	1.98	114,646			
9076563	1.18	192,372			

Buckwheat trial field map

R1
(west)

548
533
553
538
529
542
539
560
514
549
558
554
547
561
536
540
546
543
532
555
550

R2

532
514
553
533
538
536
546
558
550
542
549
561
548
560
555
540
543
547
539
529
554

R3

555
549
532
538
536
542
540
558
543
548
547
560
550
553
554
529
533
561
546
539
514

R4

543
540
554
558
560
538
548
546
514
536
550
549
542
529
533
555
539
561
553
532
547

*yellow =ERUM

(east)