UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
ABERDEEN, IDAHO

and

THE IDAHO AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF IDAHO
MOSCOW, IDAHO

NOTICE OF RELEASE OF NORTHERN COLD DESERT WINTERFAT GERMPLASM SELECTED CLASS GERMPLASM

The Natural Resources Conservation Service, U.S. Department of Agriculture and the Idaho Agricultural Experiment Station announce the release of a selected ecotype of Northern Cold Desert winterfat (*Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit) for the intermountain west region.

As a selected release, this plant will be referred to as Northern Cold Desert Germplasm winterfat to document its original collection location. It has been assigned the NRCS accession number 9067481. Northern Cold Desert Germplasm is released as a selected class of certified seed (manipulated).

This alternative release is justified because it is was selected for cold hardiness and should be better adapted to the northern regions of the natural range of winterfat and existing commercial sources of winterfat are inadequate.

Collection Site Information: Northern Cold Desert Germplasm is a composite of 9007812, 9007813, 9007816, 9007825 and 9007855. 9007812 was collected in 1974 southeast of Price, Carbon County, Utah. 9007813 was collected in 1974 near Castle Dale, Emery County, Utah. 9007816 was collected in 1975 six miles east of Kanab, Kane County, Utah on a loamy, deep, alkaline soil, 0-8 percent slope and elevation of 4925 feet. 9007825 was collected in 1976 at the Northfork Road, Highway 15, Washington County, Utah and was noted for its heavy, woody stems. 9007855 was received from the Upper Colorado Environmental Plant Center in 1977 and was originally collected in Rio Blanco County, Colorado. No other specific collection site information is available.

Description: Winterfat, *Krascheninnikovia lanata* is an erect shrub that can grow to three feet tall. 9067481 under irrigated conditions at Aberdeen, Idaho grows to about 2 feet wide by three feet tall. Under dryland conditions near Grantsville, Utah it grows to about 2 feet wide by 1.5 feet tall. 9067481 is mostly monecious. Leaves are alternate, narrowly linear, flat, with rolled under edges and densely hairy. Seed is a utricle

surrounded by silky, white hairs 1/8 to 1/4 inch long arranged in dense spreading tufts. It produces abundant seed.

Method of Selection: Northern Cold Desert Germplasm was selected from a collection of 45 accessions assembled and evaluated at the Aberdeen Plant Materials Center from 1978 to 1986. The five accessions were selected for their tolerance to cold temperatures and then were planted in a seed increase block that was not reproductively isolated. The seed from the increase block was bulked and given the accession number 9067481. Off-Center testing was conducted near Grantsville, Utah from 1995 to 2000 and near Boise, Idaho from 1998 to 2000 to evaluate the accession under field conditions.

Ecological Considerations and Evaluation: This release is from a species native to the intermountain region with one previous release made in 1985 ('Hatch'). This selection is from a species that is well documented as having beneficial qualities and no negative impacts on wild or domestic animals. The test plots supporting this release were in close proximity to natural and induced plant ecosystems. There was no evidence of negative impacts or invasion into those ecosystems. Northern Cold Desert Germplasm was documented as "OK to release" when evaluated through the "Worksheet for Conducting an Environmental Evaluation of NRCS Plant Releases".

Anticipated Use: The anticipated uses of Northern Cold Desert winterfat are rangeland restoration, erosion control, and for livestock and big game browse in arid to semi-arid and alkaline/saline areas. Its shape and root system provides excellent erosion control especially in areas where very little other vegetation can survive. Winterfat is especially useful as a winter browse for wildlife and livestock.

Area of Adaptation: Northern Cold Desert winterfat is potentially adapted to the colder, northern portions of the Intermountain western United States. Winterfat is most common on rangeland receiving 7 – 13 inches of annual precipitation. It can tolerate highly alkaline/saline areas as well as soils derived from limestone parent materials and very droughty conditions. Soil textures range from clay loams to gravelly loams, stony loams and rocky outcrops.

Availability of Plant Materials: G0 and G1 seed will be maintained by the Aberdeen Plant Materials Center. Growers may produce two generations (G2 and G3) from the G1 seed.

Prepared by: This notice of Release of Northern Cold Desert winterfat was prepared by Loren St. John, Team Leader, Aberdeen Plant Materials Center, and Dan Ogle, Plant Materials Specialist, USDA Natural Resources Conservation Service, Boise, Idaho for joint release by the Natural Resources Conservation Service in Idaho, Nevada, Oregon, Utah and Washington; and the Idaho Agricultural Experiment Station, University of Idaho.

Signatures for Release of:

Northern Cold Desert Germplasm winterfat (*Krascheninnikovia lanata*)

Richard W. Sims, State Conservationist, Idaho — 4/5/01 Date

Nicholas Pearson, State Conservationist, Nevada — 4/16/01 Date

Robert J. Graham, State Conservationist, Oregon — 4/25/01 Date

Philip Nelson, State Conservationist, Utah — 4-30-01 Date

Leonard Jordan, State Conservationist, Washington — 5-7-01 Date

for Diane Gelburd, Director, Ecological Sciences Division — 9/14/01 Date

Richard Heimsch, Director, Idaho Experiment Station — 6/12/2007 Date

Release Documentation
For
9067481 Winterfat
Loren St. John, Aberdeen Plant Materials Center

In 1978 a winterfat Initial Evaluation Planting (IEP) was established at the Aberdeen Plant Materials Center (PMC) to evaluate 45 winterfat accessions for adaptation and potential use in rangeland seeding and other revegetation efforts. Evaluation data from the IEP identified 5 outstanding accessions: 9007812; 9007813; 9007825; and 9007855 (parent accessions of 9067481).

In 1983 a winterfat Inter-Center Strain Trial (ICST) was established with transplants at the Coffee Point Off-Center Test Site (located approximately 25 miles northwest of Aberdeen). The ICST included the parent accessions of 9067481 and three other winterfat accessions. Table 1 is a summary of evaluation data collected in 1983, 1984 and 1986.

The vigor of the parent accessions of 9067481 as a group was above the average of all the accessions in 1983 and 1986 and was equal to the average of all accessions in 1984. Plant height of the parent accessions of 9067481 as a group was slightly shorter than the overall average in 1983 and was slightly taller in 1984. Plant width of the parent accessions as a group was above the overall average in 1983 and less than the overall average in 1984. Seed set of the parent accessions as a group was slightly below the overall average.

These same accessions and 'Hatch' winterfat were also direct-seeded at Coffee Point in 1983 and were evaluated for vigor in 1984 and 1985. The accession with the best vigor rating in 1984 was 9007813 and in 1985, 9007855 had the best vigor rating.

The United States Department of Agriculture, Forest Service, released Hatch winterfat in 1985. However, the performance of field plantings of Hatch in the colder regions of the West was less than expected and did not match the cold tolerance of the parent accessions of 9067481. The parent accessions survived the extremely cold winters of 1982 and 1983 at Aberdeen, Idaho where the minimum temperature in 1982 was -24° F and -30° F in 1983. In late January and early February, 1989 a climatic event resulting in a 50° F swing in temperature (32° F to -18° F) over a 48 hour period occurred. The parent accessions of 9067481 were not affected by this unusual climatic event.

A crossing block established from seed of 9007812, 9007813, 9007816, 9007825 and 9007855 was established at the Aberdeen PMC Fish and Game Farm in 1991 and a new accession number 9067481 was established for offspring from the crossing block. Transplants from seed harvested in 1997 from the crossing block were established at the Aberdeen PMC Home Farm in July, 1999.

Accession number 9067481 was seeded at the Grantsville, Utah ICST (approximately 30 miles southwest of Salt Lake City) in April, 1995. The test site is located in a 10 – 12 inch annual precipitation area. The trial was seeded with a hand-pushed belt seeder. Included in the trial were accessions of fourwing saltbush and winterfat. The trial was a complete randomized block

design with four replications. Each plot was 20 feet long consisting of 4 rows spaced 4 feet apart. The seeding rate for all accessions was 15 pure live seeds (PLS) per foot. No supplemental water was provided at any time. Table 2 summarizes evaluation data of the fourwing accessions included in the trial.

Data was collected on plant height, percent canopy cover, plant density and vigor during the evaluation period from 1995 to 2000. Individual plant canopy width data was collected during the May 9, 2000 evaluation.

Accession No. 9067481 was consistently taller than Hatch and 9063535 throughout the entire evaluation period and was approximately the same height as 9028608 Pamirian winterfat (*Kraschennikovia ceratoides*, a non-native species introduced from Kzackastan for testing). The final evaluation showed 9067481 to average 45.0 cm in height as compared to 9028608 (47.0 cm), Hatch (37.3 cm) and 9063535 (26.8 cm).

Canopy cover data shows that 9067481 had greater cover than 9063535 and Hatch but less than 9028608 at the final evaluation. Percent canopy cover for Hatch was substantially lower than the other accessions throughout the evaluation period.

Individual canopy width evaluated on May 9, 2000 found a small difference between 9067481 (60.3 cm) and 9028608 (57.5 cm) but was substantially greater than Hatch (42.5 cm) and 9063535 (35.0 cm).

The difference in plant density between 9067481 and 9028608 was negligible throughout the evaluation period. At the final evaluation 9067481 and 9028608 had identical plant density (1.08 plants per meter^2) as compared to 9063535 (0.94 plants per meter^2) and Hatch (0.30 plants per meter^2).

Vigor, a subjective rating of plant health and growth was also evaluated. The difference in vigor between 9067481 and 9028608 was also negligible during the evaluation period but both accessions had better vigor than 9063535 and Hatch during the evaluation.

Accession number 9067481 was also seed at the Range 26 ICST located approximately 30 miles south of Boise, Idaho in February, 1998. The test site is located in a 7 – 10 inch annual precipitation area. The trial was seeded with a hand-pushed belt seeder. Included in the trial were accessions of fourwing saltbush and winterfat. The trial is a complete randomized block design with four replications. Each plot is 20 feet long consisting of 4 rows spaced 4 feet apart. The seeding rate was 15 PLS per foot. No supplemental water was provided at any time.

Due to very dry conditions following planting (2.27 – 5.51 inches annually) plant establishment and growth is limited. The following summarizes the data collected in 2000:

9067481	35 plants	32.8 cm height
Hatch	18	21.5
9063535	4	12.8

Accession no. 9067481 established nearly twice the number of plants as the next best performing accession (Hatch) and was also 11 cm taller than Hatch.

Table 1.
1983 Winterfat Inter-Center Strain Trial
Coffeepoint, Idaho
Summary of Evaluation Data

	Vigor [1]			Plant Height (cm)		Plant Width (cm)		Seed Set [1]
Accession	1983	1984	1986	1983	1984	1983	1984	(1986)
9007812 *	5.0	7.5	6.8	13.7	8.8	11.7	10.5	2.0
9007813 *	8.8	9.0	9.0	7.6	-	5.0	-	9.0
9007816 *	1.8	7.3	6.8	14.5	7.3	15.0	8.5	9.0
9007825 *	2.2	8.0	9.0	18.0	28.0	14.0	14.0	9.0
9007855 *	7.2	7.6	6.8	10.8	10.0	10.0	8.5	4.0
9007852	6.4	8.8	8.6	10.6	5.0	7.0	9.0	9.0
9028608 [2]	7.6	7.4	7.4	21.6	15.4	10.0	13.4	1.0
PI-478840	6.2	8.0	8.0	11.6	18.0	10.0	20.0	9.0
Average	5.7	7.9	7.8	13.6	13.2	10.3	12.0	6.5

[1] Rated 1-9 with 1 Best, 9 Worst.
[2] Accession number 9028608 *Krascheninnikovia ceratoides* (Pamirian winterfat), is a non-native species introduced for testing from Kazakstan.
* These accessions were later combined and designated no. 9067481.

Table 2
Grantsville Inter-Center Strain Trial
Summary of 1995-2000 Winterfat Evaluation Data
Mean of four replications

Plant Height (cm)

Accession No.	Common Name	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	33.5	25.5	43.3	33.5	40.5	39.8	45.8	42.0	43.5	44.8	47.0
9067481	**Winterfat**	**34.0**	**22.5**	**42.8**	**36.3**	**39.8**	**38.5**	**43.8**	**41.5**	**37.0**	**45.0**	45.0
9063535	Winterfat	23.8	16.3	34.5	24.3	24.0	27.0	30.8	30.0	28.8	32.0	26.8
Hatch	Winterfat	25.8	19.3	36.0	26.8	34.3	29.5	37.0	32.8	34.5	43.8	37.3

Percent Canopy Cover and Individual Plant Canopy Width (cm)

Accession No.	Common Name	5/17/95	9/26/95	5/7/96	5/7/97	5/6/98	5/6/99	5/9/00	Canopy Width 5/9/00
9028608	Pamirian Winterfat	27.0	41.3	53.0	44.5	45.8	45.8	64.3	57.5
9067481	**Winterfat**	**19.5**	**34.0**	**37.8**	**37.3**	**43.5**	**43.5**	**49.3**	**60.3**
9063535	Winterfat	16.5	23.3	26.8	23.3	31.0	31.0	46.0	35.0
Hatch	Winterfat	9.5	12.3	10.8	9.8	11.5	11.5	10.8	42.5

Plant Density (plants per m^2)

Accession No.	Common Name	5/17/95	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	2.75	2.48	1.58	1.40	1.21	1.06	1.01	0.91	1.01	1.01	0.93	1.08
9067481	**Winterfat**	**2.89**	**2.49**	**1.67**	**1.37**	**1.16**	**1.10**	**1.14**	**1.03**	**1.04**	**1.14**	**0.84**	**1.08**
9063535	Winterfat	1.50	1.60	1.16	1.04	0.96	0.96	1.08	0.93	0.96	1.08	0.82	0.94
Hatch	Winterfat	0.79	0.84	0.69	0.47	0.39	0.36	0.44	0.39	0.34	0.44	0.24	0.30

Vigor [1/]

Accession No.	Common Name	5/17/95	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	1.8	1.8	1.5	2.0	1.8	2.0	1.8	4.0	2.3	2.5	2.3	2.0
9067481	**Winterfat**	**2.3**	**1.8**	**2.3**	**2.0**	**2.8**	**2.0**	**1.5**	**2.3**	**2.0**	**2.8**	**1.8**	**2.3**
9063535	Winterfat	2.5	2.8	3.0	3.3	4.3	3.8	3.5	4.8	4.3	4.0	3.8	3.0
Hatch	Winterfat	3.3	4.5	5.0	4.8	5.5	4.0	5.0	4.3	5.3	5.8	6.0	4.5

[1/] Subjective rating of plant health and growth. Rated 1-9 with 1 best, 9 worst.

Exhibit 540-31 Worksheet for Documenting an Environmental Evaluation of NRCS Plant Releases

Introduction

This worksheet is used to conduct and document an Environmental Evaluation of Plant Materials releases. Criteria relating to the biological characteristics of a plant, the potential impact on ecosystems, the ease of managing the plant, and conservation need are scored. These scores and their interpretation are used with a decision flowchart to determine the appropriate course of action for making a release. As with any such ranking system, it is necessary to use sound judgement and experience when interpreting the final results.

Understanding this worksheet

The primary purpose for this worksheet is to determine if the plant release has the potential to adversely affect the environment or natural surroundings. It is possible for a plant to rate low on Part 1 (Impact on Habitats), and thus be released without further consideration, and still have a high rating on Part 4 (Biological Characteristics) indicating that the plant has the ability to propagate and maintain itself naturally. Good conservation plants usually need to persist to be able to solve the conservation problem or need for which they were intended. This is even more important for plants used in critical areas, i.e. severely eroding sites. In light of this fact, the most important criteria being used in this worksheet to determine release include those in Part 1 (Impact on Habitats) and Part 2 (Ease of Management). Parts 3 (Conservation Need) and 4 (Biological Characteristics) are used when the decision is not so clear and there is the potential for a high impact on habitats and control may be moderate to difficult.

Instructions

Rate the plant or release based on the following criteria by circling your assessment. If the criteria does not apply to the species or release, then do not rate for that criteria. If you do not have enough information on the species or plant release to complete at least Parts 1, 2 and 4 in Section A, then additional data must be accumulated through literature searches, cooperators, or studies to be able to complete these sections. Additional notes which may be used to clarify or interpret the ranking should be included in the margins of this worksheet. For plant releases which may be considered nearly unacceptable for release it may be helpful to have other PM staff or cooperators complete copies of this worksheet to provide additional documentation.

All rating criteria must be completed, even if it is found in Section A, Part 1 that the plant has a low impact on the environment. Evaluation of all criteria will provide documentation that a thorough evaluation was completed for the plant at the time of release. This documentation may be needed in the future if questions are raised about the potential invasiveness or control of the plant.

When finished with ranking, interpretation, and decision making, record the final decision on the next page of this worksheet. A completed worksheet must be included with the release documentation and a copy sent to the NPMC for filing.