DEER LODGE VALLEY CONSERVATION DISTRICT
MONTANA ASSOCIATION OF CONSERVATION DISTRICTS
DEER LODGE, MONTANA

and

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
BRIDGER, MONTANA

and

MONTANA AGRICULTURAL EXPERIMENT STATIONS
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA

and

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
RECLAMATION AND DEVELOPMENT GRANT PROGRAM
HELENA, MONTANA

NOTICE OF RELEASE OF PROSPECTORS COMMON SNOWBERRY SELECTED CLASS OF NATURAL GERMPLASM

The Deer Lodge Valley Conservation District, Natural Resources Conservation Service-Bridger Plant Materials Center, Montana Agricultural Experiment Stations-Montana State University, and Department of Natural Resources and Conservation-Reclamation and Development Grant Program announce the release of a selected ecotype of common snowberry (*Symphoricarpos albus* [L.] Blake).

As a selected release this plant will be referred to as Prospectors Germplasm common snowberry. It has been assigned the NRCS accession number 9078388. Prospectors Germplasm is released as a selected class of certified seed (natural track).

This alternative release procedure is justified because existing commercial sources of common snowberry are limited and not intended for mineland reclamation.

Collection Site Information: Prospectors Germplasm was originally collected in Deer Lodge County, Montana (Township 4 North, Range 11 West, NE 1/4 of Section 14) on October 27, 1998, by Leslie Marty. The collection site was on Smelter Hill, approximately 0.5 mi (1 km) southwest of the Washoe smelter stack at an elevation of 6,000 ft (1,829 m). The collection site has a latitude of North 46°06'13" and longitude of West 112°55' 15". Seed was collected from greater than 50 plants growing on an east-facing, –15 percent slope in a loamy textured soil. Other plants growing in the vicinity included basin wildrye (*Leymus cinereus*), redtop (***Agrostis gigantea***), aspen (*Populus tremuloides*), Oregon grape (*Mahonia repens*), and silver buffaloberry (*Shepherdia argentea*). Aerial emissions from past copper smelting operations have resulted in elevated levels of heavy metal and sulfur compounds in the soil at the collection site. Laboratory analyses of two soil samples from the collection site are presented in table 1. The large differences in pH and heavy metal levels between the two soil samples may be a reflection of the variable pattern of soil contamination recognized in this area. Precipitation in the Anaconda area averages 12 to 14 in (305 to 356 mm) annually, with most of the precipitation occurring during the spring and summer months. The average annual maximum and minimum temperatures are 52°F (11°C) and 33°F (0.6°C), respectively.

Table 1. Soil analyses of two soil samples taken at the Prospectors Germplasm collection site on October 27. 1998.

Sample No.	pH *S.U.*	As *mg/kg*	Cd *mg/kg*	Cu *mg/kg*	Pb *mg/kg*	Zn *mg/kg*	Conductivity *mmhos/cm*	Texture
Coll.-site-4A	6.0	260	1	44	17	180	0.93	loam
Coll.-site-4B	4.1	2300	25	2300	1200	890	1.20	loam
Phytotoxic Criteria†	< 5.0	136-315	5.1-20	236-750	94-250	196-240	> 4.0	

† Phytotoxic levels accepted by the EPA (CDM Federal 1997).

Description: Prospectors Germplasm common snowberry has the same general botanical and phenological attributes as the species. Common snowberry, sometimes called buckbrush or waxberry, is an erect, branching, deciduous shrub found throughout the western United States at various elevations. It is a cool season plant with rhizomatous roots and often forms dense thickets about 3 ft (.9 m) tall. The flowers are pinkish to white, bell-shaped and usually less than 0.75 in (19 mm) in size, with the petals fused together over half their length. The berries are pure white (waxlike), tightly clustered, pulpy, and two-seeded. The berries often persist on the branches throughout the winter. It has simple, opposite leaves that are generally oval to elliptical but may have irregular shaped lobes. Prospectors germplasm has an average of 71,844 seeds/lb (32,588 seeds/kg).

Method of Selection: On October 18,2000, a Comparative Evaluation Planting was installed near Anaconda, Montana, testing two accessions of *Symphoricarpos albus* (common snowberry). The study compared the performance of "local" stock, Prospectors Germplasm, originating in Deer Lodge County, Montana, at 6,000 ft (1,829 m) to "nonlocal" stock, originating in Ravalli

County, Montana, at 3,500 ft (1,067 m). The study was arranged in a randomized complete block design replicated 20 times. Plant entries were spaced 4.5 ft (1.4 m) apart within rows and 9 ft (2.7 m) apart between rows. The study was evaluated on May 21 and August 14,2001. Parameters measured included height, vigor, and initial and secondary mortality. Height was measured in centimeters to the top of live foliage. Vigor was rated on a scale of 1 to 5 (1 = best) based on visual assessment of plant health. A plant was considered dead when the cambium tissue was no longer green and plant parts were brittle. Growth was calculated by subtracting plant height measured during the second evaluation by the height measured during the first evaluation. The vigor rating from the second evaluation on August 14,2001 was used for comparison purposes. Percent survival was calculated by dividing the number of live replications evaluated on August 14,2001, by the total of 20 replications. Dead plants were entered as missing values and only the height and vigor results from live replications were averaged.

Prospectors Germplasm common snowberry was collected from seed and grown at the Plant Materials Center in Bridger, Montana. The seed was cleaned and then sown in 10-in^3 (164-ml) Cone-tainers™ containing Sunshine Mix #1™ growing media. The seed was then subjected to a 90-day warm stratification at (75°F) 24°C followed by a 180-day cold stratification at 38°F (3°C). Following stratification the Cone-tainers were transferred to a greenhouse maintained at 75°F day/65°F night (24°C day/18°C night) temperatures. At the three-leaf stage, the seedlings were moved to an unheated hoop house. Bitterroot Restoration, Inc. (BRI) supplied the "nonlocal" stock, referred to as common snowberry (Ravalli Co.), used for comparison. BRI seedlings were also grown in 10-in^3 Cone-tainers™ in an unheated hoop house.

The Comparative Evaluation Planting site is located 2 mi (–3.5 km) southeast of Anaconda on the Glenn Willow Road, east of the Bonneville power station. In 1999, the plot site was plowed to a depth of 6 in (15 cm), rototilled, and packed. Four composite (0-6 in, 0-15 cm) soil samples were taken after tilling. Lab analysis of the samples indicated an average pH of 4.5. Arsenic and zinc levels exceeded EPA's upper range standards for phytotoxicity whereas copper, cadmium, and lead exceeded the lower range as shown in table 2 (CDM Federal 1997).

Table 2. Acid extractable heavy metal levels and pH of (0-6 in) composite samples.

Sample No.	pH *S.U.*	As *mg/kg*	Cd *mg/kg*	Cu *mg/kg*	Pb *mg/kg*	Zn *mg/kg*
A.T. 0-6" NE	4.0	610	7	620	320	370
A.T. 0-6" NW	4.9	360	5	340	120	222
A.T. 0-6" SE	4.6	530	5	340	150	200
A.T. 0-6" SW	4.6	190	7	740	340	440
$\bar{x}$	4.53	422.5	6	510	232.5	308
Phytotoxic Criteria	< 5.0	136-315	5.1-20	236-750	94-250	196-240

Phytotoxic levels accepted by the EPA (CDM Federal 1997).

Results indicated that both accessions of common snowberry had a decrease in height between the first and second evaluation. Prospectors Germplasm decreased in height by 0.25 in (0.63 cm) and common snowberry (Ravalli Co.) by 0.3 in (0.75) cm. Similarly, both accessions decreased in vigor between the first and second evaluations. Prospectors germplasm had a decrease in vigor of 0.42 and common snowberry (Ravalli Co.) by 1.05. Vigor ratings scored during the second evaluation were 2.21 for Prospectors Germplasm and 3.47 for common snowberry (Ravalli Co.). Initial mortality, as evaluated on May 21st, was 5 percent for both accessions. Secondary mortality, as evaluated on August 14th, indicated no additional mortality. Overall, Prospectors Germplasm had the least decrease in growth, superior vigor, and equivalent survival compared to common snowberry (Ravalli Co.).

Ecological Considerations and Evaluation: Prospectors Germplasm common snowberry is a selection of naturally occurring germplasm that has undergone minimal purposeful selection, Common snowberry is native to western North America and adapted to a wide range of soils. It can reproduce from seed or rhizomes. Prospector's Germplasm was "OK to release" when evaluated through the "Worksheet for Documenting an Environmental Evaluation of NRCS Plant Releases."

Conservation Use: Potential uses for Prospectors common snowberry include erosion control, wildlife food/cover, and restoration of acid and heavy metal contaminated soils. The densely branched and shallow root network, in combination with short spreading rhizomes, enable common snowberry to stabilize soil effectively. Dense colonies are often formed, which further increases this species' value in erosion control. Snowberries are an important wildlife food, particularly for grouse and many songbirds. The foliage and twigs are eaten extensively by deer and antelope. The shrub is also useful as nesting cover and protective shelter for gamebirds, rabbits, and other small animals.

Anticipated Area of Adaptation: Prospectors Germplasm performs well on low pH and heavy metal laden, loamy soils in the Anaconda foothills area receiving 12 to 14 in (305 to 356 mm) of average annual precipitation. It is expected to perform well in similar soil, climate, and topographical conditions in the foothills of the Northern Rocky Mountains. It may perform well in other regions of common snowberry's range. Common snowberry is commonly found in the plains, foothills, and montane zones up to 8,000 ft (2,438 m), in low lying or moist areas from British Columbia and Alberta to New Mexico with an average annual precipitation of 12 to 20 in (305 to 508 mm). It is usually not present on dry, south- and west-facing slopes.

Availability of Plant Materials: The USDA-NRCS, Bridger Plant Materials Center maintains Foundation-quality (G_1) seed of Prospectors Germplasm common snowberry. Seed will be distributed through the Seed Stocks Program, Department of Plant Sciences, P.O. Box 173150, Montana State University, Bozeman, MT 59717-3150. Cuttings are available for the establishment of G_0 seed orchards. For cutting information contact the Bridger Plant Materials Center, Route 2, Box 1189, Bridger, MT 59014.

References:

CDM Federal. 1997. Final baseline ecological risk assessment. Report prepared for US EPA, Region VIII, Montana Office, Helena, MT.

Martin, Alexander C., Herbert S. Zim, Arnold L. Nelson. 1961. American wildlife and plants: a guide to wildlife food habits. Dover Publications, Inc., New York.

Stubbendieck, J., S.L. Hatch, C.H. Butterfield. 1997. North American range plants (5th edition).

USDA, NRCS. 2000. The PLANTS database, Version 3.1. (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA USA.

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Signatures for release of:

Prospector's Germplasm common snowberry (*Symphoricarpos albus*)

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