

**UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
IDAHO PLANT MATERIALS CENTER
ABERDEEN, IDAHO**

NOTICE OF RELEASE OF AMETHYST GERMPLASM HOARY TANSYASTER

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Idaho Plant Materials Center, Aberdeen, Idaho, announce the release of Amethyst Germplasm hoary tansyaster [*Machaeranthera canescens* (Pursh) A.Gray], a selected class natural track germplasm for conservation plantings in the Intermountain U.S. It will be identified by NRCS accession number 9076670. Amethyst Germplasm hoary tansyaster is a native forb collected near St. Anthony sand dunes in Fremont County, Idaho. This forb flowers and produces seed in the first growing season and provides late summer and early fall blossoms for native pollinators. It is recommended for pollinator plantings, wildlife areas and rangeland rehabilitation seedings in arid to semi-arid plant communities where native forb diversity is desirable.

Justification

At present conservationists and land managers have relatively few native forbs from which to choose for conservation seedings (Walker and Shaw, 2005). Native forbs improve ecosystem resiliency by increasing plant species diversity, improving wildlife habitat and providing food for numerous birds and mammals. Within the area of recommended use, sage-grouse (*Centrocercus urophasianus*), a potentially threatened upland bird, depend on native forbs and the insects they attract for ecological services (Connelly et al., 2000). Native forbs also provide pollen and nectar for native pollinator species (Mader et al., 2011)

In the Intermountain Western region of North America there is a need for native forbs adapted to arid and semi-arid habitats, particularly species that blossom during the first growing season and provide nectar and pollen quickly after planting (Ogle et al., 2011). Mass disturbances such as wildfire deplete food sources for native pollinators, many of which have limited range and are unable to travel long distances to find alternate food sources. Releases of native forbs that flower during the first growing season are necessary to sustain native pollinators until other perennial forbs reach flowering maturity (Cane 2008).

This germplasm selection addresses the need for a late blooming forb which blossoms during the establishment year. It is suitable for use in rangeland restoration on arid and semi-arid sites throughout much of the Intermountain West.

Description

Hoary tansyaster is a short-lived perennial forb with pale to dark purple flowers. Plants are 15 to 75 cm (6 to 30 in) tall with diffuse branching. The leaves are about 5 cm (2 in)

long and 6 mm (0.25 in) wide, oblong or lance shaped with entire to sharply toothed margins. Flower heads have many subtending bracts which are white and membranous at the bottom and green at the tip, that reflex away from the flower at the tip (Welsh et al., 2003). The flower heads and vegetation are very sticky and heavily scented. The fruit is an achene, 3 to 4 mm (0.12 to 0.16 in) in length (Cronquist et al., 1994). The pappus of the achene is dirty white and hair-like. There are approximately 1.3 million seeds/lb based on seed counts conducted by Aberdeen Plant Materials Center.

Hoary tansyaster occurs naturally in a variety of plant communities from shadscale saltbush [*Atriplex confertifolia* (Torr. & Frém.) S. Watson] and Wyoming big sagebrush [*Artemisia tridentata* ssp. *wyomingensis* (Beetle and Young)] shrub communities on the valley floors to mountain big sagebrush [*Artemisia tridentata* ssp. *vaseyana* Rydb. (Beetle)], aspen (*Populus tremuloides* Michx.) and lodgepole pine (*Pinus contorta* Douglas ex Loudon) communities at higher elevations (Welsh et al., 2003). It is recommended in pollinator and wildlife plantings in areas receiving 200 to 380 mm (8 to 15 in) mean annual precipitation (Ogle et al., 2011). Hoary tansyaster is very common in low seral degraded and disturbed sites and has been considered by some as a weedy species in meadows and rangelands (Whitson et al., 1996).

Method of Selection

Original seed collections were obtained from August through October 2008. A total of 9 accessions were collected at elevations ranging from 1,300 to 2,300 m (4,300 to 7,500 ft) in eastern Idaho and northern Utah (Table 1). Following collection, seed was stored in open collection sacks to dry prior to processing. Seed lots were cleaned using an air-screen cleaner and placed into storage at 10° C (50° F) until planting.

Table 1. Collection locations of hoary tansyaster in Idaho and Utah in 2008.

Accession	Date	State	County	Coordinates
9076661	10/1/2008	ID	Lincoln	43 9' 1", -113 46' 49"
9076662	10/1/2008	ID	Lincoln	43 3' 25", -113 44' 26"
9076663	10/1/2008	ID	Lincoln	43 8' 3", -113 45' 56"
9076664	10/3/2008	ID	Bingham	43 3' 25", -112 57' 20"
9076666	8/26/2008	UT	Cache	41.95214, -111.49615
9076667	9/23/2008	ID	Bingham	43.13556, -112.90076
9076668	9/24/2008	ID	Lincoln	42.94173, -113.75234
9076669	9/24/2008	ID	Butte	43.57076, -113.06772
9076670	9/24/2008	ID	Fremont	44.02512, -111.79420

A common garden study was conducted at the USDA-NRCS Plant Materials Center Home Farm 3.2 km (2 mi) north of Aberdeen, ID. Weed-barrier fabric was laid over a well-prepared bed to reduce weed competition. Each plot consisted of 3 rows of 4, 7.6 cm (3 in) diameter planting holes (12 total) with 23 cm (9 in) plant spacing. The plots were arranged in a randomized complete block design within the fabric in four blocks with each block designated as a replication. The study was hand seeded on November 8, 2008. Each planting hole was seeded with a target of 12 to 25 seeds.

Weather during the first year of establishment was typical for southeastern Idaho with high temperatures averaging near 32° C (90° F) in the summer and dropping into the teens during winter months with occasional dips below -18° C (0° F) (Bureau of Reclamation, 2010). Precipitation for the year was above average. Total accumulated precipitation received was 290 mm (11.45 in) including an abnormal 97 mm (3.82 in) of rain in June. Mean annual precipitation for the site is 238 mm (9.39 in) (Bureau of Reclamation, 2010). Aberdeen received 153 mm (6.06 in) of precipitation during water year 2010. The plots did not receive supplemental irrigation or fertilization in either year of the study.

On June 3, 2009 the plots were evaluated for percent establishment. Establishment was recorded as the number of plant holes per plot containing plants divided by 12. On October 16, 2009, seed production estimates for each plot were assigned a visual rating of 1-9 with 1 being best and 9 being worst. Seed was collected October 16, 2009 from the three top seed producing plots in the trial and used to develop seed cleaning protocols.

Plots were evaluated for percent stand on May 10, 2010, and on August 16, 2010 the plots were evaluated for average plant height and plant vigor. Occasional wind storms caused the dispersal of seed from various plots at different times during the evaluation which complicated seed collection and prevented the comparison of seed yield among accessions. Data was subjected to an analysis of variance in Statistix[®] 8 (Analytical Software 2003) to determine differences among accessions and least significant difference (LSD) test was used to separate significant means at P<0.05.

Results

There were no significant differences in plant establishment or estimated seed yields in 2009 (Table 2). The best average establishment came from accession 9076670 with 87%. The lowest establishment percentage was recorded from accession 9076666 with 41%. The highest estimated seed yields were recorded for accessions 9076669 and 9076661, both with an average rating of 2.

Table 2. Percent stand and seed yield potential of hoary tansyaster accessions in 2009 USDA-NRCS Idaho Plant Materials Center, Aberdeen, Idaho. 2009 evaluation of hoary tansyaster.

Accession	State	County	Coll. date	3Jun % Stand	16 Oct Seed yield
9076670	ID	Fremont	9/24/08	87^a	3^b
9076669	ID	Butte	9/24/08	81	2
9076663	ID	Lincoln	10/1/08	79	4
9076662	ID	Lincoln	10/1/08	73	5
9076664	ID	Bingham	10/3/08	70	5
9076668	ID	Lincoln	9/24/08	64	3
9076661	ID	Lincoln	10/1/08	62	2
9076667	ID	Bingham	9/23/08	56	5
9076666	UT	Cache	8/26/08	50	3
Mean				69	4
LSD _(0.05)				NS ^a	0.20

^a Not significant ^b Seed yields were assigned a visual rating of 1-9 with 1 being best and 9 being worst.

In 2010, accession 9076670 continued to have the highest percent stand with 70%, significantly higher than any other accession in the trial (Table 3). Accession 9076670 also had the highest vigor rating (2.0) and tallest plants (60.5 cm); however there were no significant difference in vigor and height.

Table 3. Percent stand and seed yield potential of hoary tansyaster accessions in 2009 USDA-NRCS Idaho Plant Materials Center, Aberdeen, Idaho. 2010 evaluation of hoary tansyaster.

Accession	10 May % Stand	16 Aug Vigor ^{a/}	31 Aug Height
	---%---		---cm---
9076670	70 a	2^a	61
9076669	42 b	4	59
9076663	38 b	5	57
9076662	38 b	5	49
9076664	29 b	6	45
9076668	38 b	5	48
9076661	33 b	5	50
9076667	33 b	6	60
9076666	46 b	6	46
Mean	41	5	
LSD _(0.05)	21	NS ^{a/}	NS

^a (NS) - Not significant

^b Plant vigor was assigned a visual rating of 1-9 with 1 being best and 9 being worst.

Discussion

Most accessions performed similarly for stand, vigor, and plant height. Accession 9076670 was chosen for release as a Selected Class Germplasm for having the superior establishment and stand in 2009-2010 and the greatest vigor rating in 2010. This accession also had the tallest plants in the study. Although we were not able to evaluate seed production in 2010 due to loss of seed caused by untimely wind storms, accession 9076670 plots were observed to have above average seed production.

The original source population of accession 9076670 is located near the St. Anthony Sand Dunes in Fremont County, Idaho at 1,524 m (5,000 ft) elevation. This population was brought to our attention by Scott Engle and Nate Matlack, NRCS Idaho. The soil at the collection location is Eginbench loamy fine sand supporting an antelope bitterbrush [*Purshia tridentata* (Pursh) DC.], Indian ricegrass [*Achnatherum hymenoides* (Roem. & Schult.) Barkworth], rubber rabbitbrush [*Ericameria nauseosa* (Pall. ex Pursh) G.L. Nesom & Baird], lemon scurfpea [*Psoralidium lanceolatum* (Pursh) Rydb.] plant community. The location receives approximately 305 mm (12 in) mean annual precipitation (USDA NRCS 1993).

Anticipated Conservation Use

Hoary tansyaster should be considered for use in pollinator plantings and for adding biodiversity in rangelands. It is especially useful for post wildfire seedings where quick establishment of pollen and nectar sources is desired and to enhance sage grouse habitat. The primary intended users are land management agencies or landowners enrolled in USDA conservation programs.

Anticipated Area of Adaptation

It is anticipated that Amethyst Germplasm hoary tansyaster is suited for conservation plantings in MLRA B11, Snake River Plains and B13 Eastern Idaho Plateaus (USDA 2006). It is also likely adapted for use in arid locations throughout the Intermountain West, but has not been tested to that extent.

Availability of Plant Materials

G1 and G2 seed of Amethyst Germplasm hoary tansyaster will be maintained by the USDA Natural Resources Conservation Service, Aberdeen Plant Materials Center, Aberdeen, Idaho in cooperation with the Idaho Agricultural Experiment Station, University of Idaho. Seed through the G5 generation will be eligible for certification. G1 and G2 seed will be made available to commercial growers for distribution by the University of Idaho Foundation Seed Program and Utah Crop Improvement Association.

Small quantities of seed will be provided to researchers by request to the corresponding author.

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