Plant Propagation Protocol for *Artemisia nova*

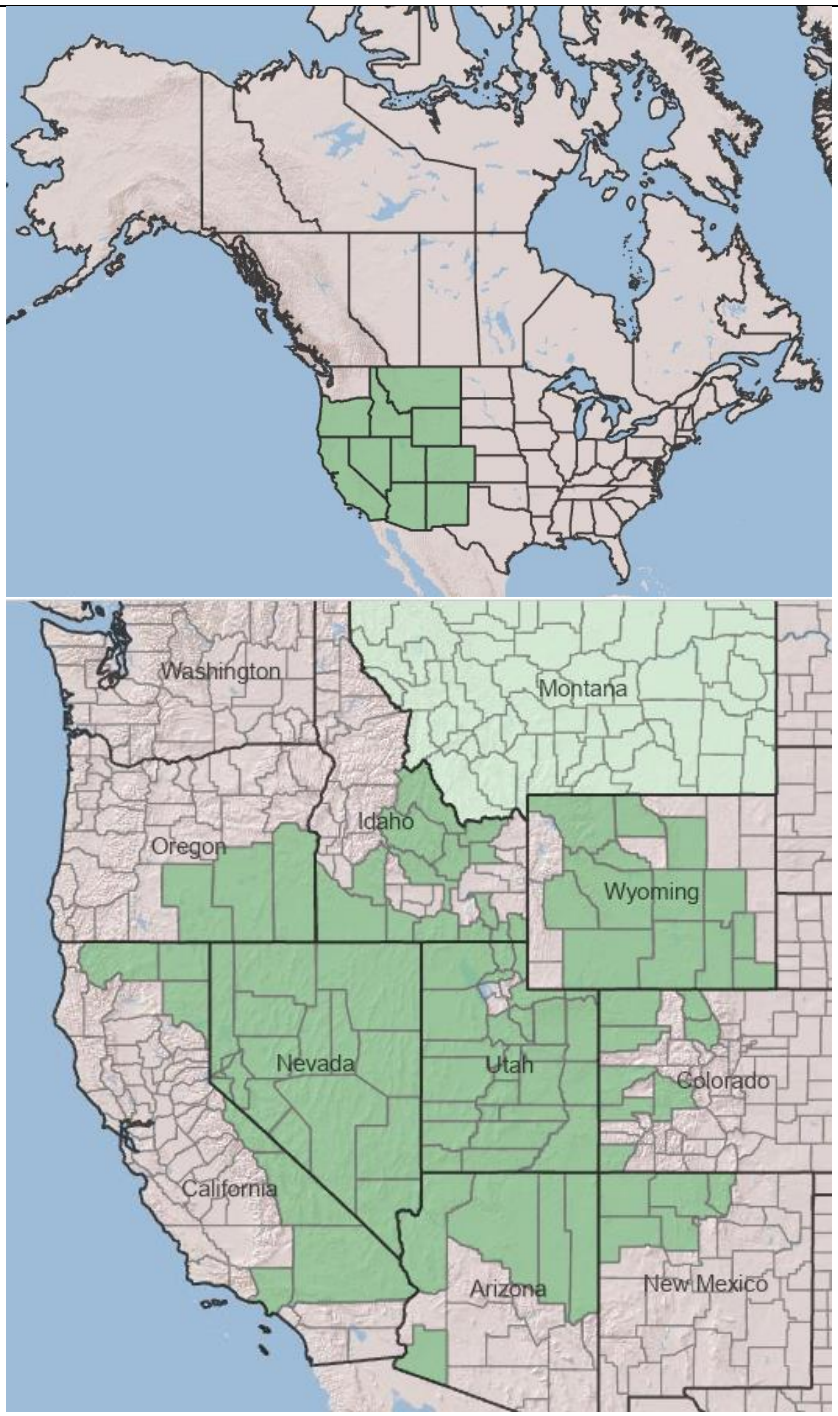
ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/2024/ARNO4.pdf

(Photo Credit: Kirsten Olmon)[13]

(Photo Credit: Stan Stebs)[14]

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae
Common Name	Aster
Species Scientific Name	
Scientific Name	*Artemisia nova* A. Nelson
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	*Artemisia arbuscula* Nutt. subsp. *nova* (A. Nelson) G.H. Ward *Artemisia tridentata* Nutt. subsp. *nova* (A. Nelson) *Artemisia arbuscula* Nutt. var. *nova* (A. Nelson) Cronquist *Artemisia nova* A. Nelson var. *duchesnicola* Welsh & Goodrich *Seriphidium novum* (A. Nelson) W.A. Weber
Common Name(s)	Black sagebrush
Species Code (as per USDA Plants database)	ARNO4
GENERAL INFORMATION	

Geographical range	 (Photo Credit: USDA PLANTS Database)[11] Black sagebrush grows in the Lower 48, in the states Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming.[11] It covers about 43,300 square miles of rangeland, predominantly in Nevada and Utah. Its distribution extends to foothills and mountain valleys in the Northern Great Plains. Despite human settlement, its

	geographical spread has remained relatively stable.[4]
Ecological distribution	Widely distributed, mostly intermountain.[4] Dry, rocky, windswept plains, mesas & hills.[10]
Climate and elevation range	Depending on the state, black sagebrush has a range of elevations in which it will grow. Below lists the geographic distribution and its associated elevation.[4] Arizona 6,000-8,000 ft California 5,000-11,000 ft White Mts. 7,000-9,500 ft Colorado 7,000-8,200 ft Nevada 5,000-11,000 ft New Mexico 7,000-8,000 ft Utah 4,600-8,500 ft south-central Utah 8,000-9,000 ft southern Utah 4,920-7,870 ft Great Basin 5,000-8,000 ft; most common around 7,000 ft Intermountain West 4,600-8,370 ft
Local habitat and abundance	Occurring in multiple states, black sagebrush has a variety of habitats it can be found it. Black sagebrush dominates cold-desert, dwarf-shrub plant communities, especially in Nevada and Utah. It's often found alongside salt-desert shrublands and merges with pinyon-juniper woodlands at higher elevations. Black sagebrush communities are characterized by scattered shrubs with sparse herbaceous understories, and they often have high cover of biological soil-crust species. They tend to grow in shallow soils over bedrock.[4] This species also interacts with various other plant communities. It's associated with salt-desert vegetation and is common in shadscale communities. In woodlands, it grows alongside species like pinyon, juniper, ponderosa pine, and Douglas-fir, often dominating the understory. Black sagebrush also extends into warm-desert grasslands, where it's typically an associated species but can dominate certain sagebrush steppe communities within the ecosystem.[4]
Plant strategy type / successional stage	Black sagebrush can be described as using a generalist adaptive strategy.[5] It has a taproot that allows it to access deep water in drier climates, as well as wide-spreading lateral roots. Shallow soils tend to prevent deep taproot development, though.[4]

	Seedlings of this shrub are extremely competitive, and once established, they can compete well against annual weeds and grasses.[8] Its fire intolerant.[5]
Plant characteristics	Black sagebrush is an evergreen, aromantic shrub that is low growing. The leaves are typically dark green, short, and narrow. They have pubescence, giving the leaves a darker appearance and are sometimes toothed at the tips. The inflorescence is a long, narrow panicle, typically with 3-5 flowers/flowerhead. It has inconspicuous yellow flowers that bloom during the summer. The fruit is an achene, about 1-2 mm long and its small seeds have a thin, waxy seed coat.[4] It has very similar characteristics to low sagebrush but can be separated by its entire leaves on the flowering stems and stalked flower heads. It's also similar to big sagebrush, but where they differ is how black sagebrush has straw-colored, smooth bracts surrounding the base of the flower heads, while big sagebrush's are green and hairy.[12] There are two morphological varieties of black sagebrush. One morph has gray leaves, while the other has green.[4]
PROPAGATION DETAILS: FROM SEED Done By Jim Barner of Bend Seed Extractory[2]	
Ecotype	BLM, Seeds of Success: BLM land, Cherry Creek Road, foothills of the Ferris Mountains, Carbon County, Wyoming Elevation: 6651 ft.
Propagation Goal	Seeds
Propagation Method	Seeds
Product Type	Propagules (seeds, cuttings, poles, etc.)
Stock Type	N/A
Time to Grow	0
Target Specifications	N/A

Propagule Collection Instructions	Bend Seed Extractory hand collected their seeds into paper bags. Time to collect: Seeds are first shed in October, with dispersal continuing through winter. Seeds are dispersed by gravity, wind, and water, so it would be best to frequently check for seed dissemination or cover achenes with a very fine mesh bag.[4]
Propagule Processing/Propagule Characteristics	They found that their seed density was 810,000 seeds/lb., but Seeds of Woody Plants in the United States reported that the average value is 907,000 seeds/lb.[3] They didn't test for seed longevity, but in The Woody Seed Manual, they write that sagebrush seeds typically hold full vitality for 2-3 years.[7] They should also be stored in cloth, burlap sacks, or metal containers.[3]
Pre-Planting Propagule Treatments	The seed lot was first processed using a Westrup Model LA-H laboratory brush machine, with a #14 mantel (with pins), at medium speed. Seeds were then air-screened using an office Clipper, with a top screen: #5 triangle, and a bottom screen: 30 x 30 wire, medium speed, low air. For final cleaning and separation, they used an air column separator, Oregon Seed Blower. Storage of Cleaned Seeds: Cold Storage, 33-38° F. Moist-cool stratification, between moist papers at 32° to 38° F. for about 10 days, is a method recommended to break black sagebrush's physiological dormancy; after-ripening in storage also tends to reduce dormancy or light requirement.[7] Seeds exposed to light germinated faster than seeds that were kept in the dark.[3]
Growing Area Preparation / Annual Practices for Perennial Crops	N/A
Establishment Phase Details	From Seeds of Woody Plants in the United States, they state that seeds should be sown into nursery beds during the fall or winter and at a rate that will produce about 50 seedlings per square foot. The seed should be covered with ¼" of soil and a light straw mulch.[3]
Length of	N/A

Establishment Phase	
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Mentioned in Sagebrush Seed and Plant Transfer Guidelines, if there aren't local sources for seeds available, it is recommended to get seeds from a harsher climate or a more northerly location.[10]
Other Comments	Black sagebrush establishes readily and spreads naturally by seed, meaning it may be easier/cheaper to use direct seeding for restoration versus out-planting.[9]
Note: I was unable to find vegetative propagation details for black sagebrush, so I am using one for big sagebrush (Artemisia tridentata Nutt.). They have very similar distribution and growth conditions, though black sagebrush can occupy areas that are unsuited for other sagebrush species.[9] Black sagebrush and big sagebrush have been known to hybridize readily, meaning the techniques used for big sagebrush is a great starting point for black sagebrush propagation.[12]	
PROPAGATION DETAILS: VEGETATIVE For *Artemisia tridentata Nutt. subsp. wyomingensis* (big sagebrush) **Performed by Eduardo Alvarez-Cordero for Journal of Range Management[1]**	
Ecotype	For this experiment, source plants were randomly selected from an area near the experimental revegetation site for two prototype oil shale lease tracts 6 km south of Bonanza, Utah. The selected plants were located on a moderately sloping terrain.
Propagation Goal	N/A
Propagation Method	Vegetative
Product Type	N/A
Stock Type	N/A
Time to Grow	This experiment ran for 40 days.

Target Specifications	N/A
Propagule Collection Instructions	Cuttings were collected four times (March 26, April 10, April 24, and May 8) to encompass the approximate period from growth initiation (bud shoot activation) to active vegetative growth at the end of spring. From the experiment, they found that the stem cuttings collected in winter performed the best in terms of rooting activity.
Propagule Processing/Propagule Characteristics	Cuttings were prepared in the field from terminal and lateral twigs, with intact terminal buds. Hand clippers were used to take the material from the base of the previous season's growth. The cuttings, which ranged in length from 8 to 12 cm, were treated and planted within 36 hours after collection.
Pre-Planting Propagule Treatments	They dipped the cuttings into water, then into a talc-base 2.0% indole butyric acid (IBA) and lightly tapped to remove excess powder.
Growing Area Preparation / Annual Practices for Perennial Crops	The stem cuttings were inserted into a peat pellet that had been rehydrated.
Establishment Phase Details	Information specific to black sagebrush: When planting seedlings – which is recommended for late fall or early winter -- it's extremely important to conserve and utilize available soil moisture. By planting seedlings into water catchments, holding basins, or deep furrows, establishment can be improved.[8] 1 and 2-year-old seedlings should be field-planted early in the spring, as after testing, fall plantings weren't successful.[3]
Length of Establishment Phase	N/A
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A

Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments	N/A
INFORMATION SOURCES	
References	Works Cited Below
Other Sources Consulted	Works Cited Below
Protocol Author	Skye Gearhart
Date Protocol Created or Updated	05/22/24

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Other Resources Consulted:

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