



white sagebrush

Artemisia ludoviciana, Nutt.

Alternate Common Names

white sage, prairie sage, western mugwort, Louisiana sage, prairie wormwood, cudweed, mugwort, dark-leaved mugwort, sagewort, western sage, sailor's tobacco, sagebrush

Scientific Synonym

Artemisia vulgaris var. *ludoviciana* (Nuttall) Kuntze

Functional Group

forbs (wildflowers)

Family

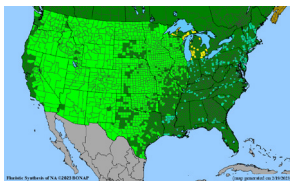
aster or sunflower family (Asteraceae)

Description

- » **Life cycle/growth form:** Perennial, spreading by rhizomes to form large colonies that exclude some other plants.
- » **Height:** 1-3 ft
- » **Leaves and stem:** Alternate leaves, aromatic when crushed, of variable shape but mostly narrow, elongated ellipses up to 1 in wide and 3.5 (occasionally up to 5) in long, short-stalked or sessile, with silvery-white hairs on leaves and stems giving them a felt-like texture; stems may be branched or unbranched.
- » **Flower:** Individual florets are inconspicuous within silvery, barrel-shaped, 1/8 in heads arranged in clusters in upper leaf axils or in spike-like to open, branched arrays up to 17 in in length; at full flowering, yellow stamens and minute, yellow to reddish corollas may be visible; wind-pollinated.
- » **Fruit/seed head:** Roughly cylindrical in shape, approximately 1/8 in long, pappus is absent, heads open to release seed (achenes) when mature.



Habitat and Range



Dry to mesic soil; full sun; sandy or rocky prairies, roadsides. Wetland Indicator Status is Obligate Upland (UPL) for the Midwest.

Conservation Status

Global- G5, secure; Michigan- S1, critically imperiled (NatureServe)

General Comments

All above ground parts of the plant have a distinctive sage-like fragrance when rubbed or crushed. This species has traditional medicinal and ceremonial uses among numerous Native American tribes. Because it is wind-pollinated, white sagebrush is not considered a resource for pollinators, though it is a larval host for at least one species of moth caterpillar, *Phaneta argenticostana*. Its mode of vegetative spread produces a dense network of rhizomes and roots that function in erosion control.

Establishment for Seed Production (Appendix A)

Direct seeding:

We do not have experience with direct seeding this species for seed production.

Greenhouse:

- » **Seed pre-treatment:** 60 days cold-moist stratification (fine silica sand).
- » **Sowing:** Surface (seed is small and must not be buried too deeply); seed directly onto plug flats or start seedlings in germination trays and dibble into plugs when seedlings have first true leaves; start in greenhouse about 8-10 weeks prior to transplanting.
- » **Transplanting:** Harden off seedlings 1-2 weeks prior to transplanting; transplant with 12 in plant spacing in plasticulture plots or into bare soil in 36 in rows, after danger of frost; cut or remove plastic after the first full growing season to allow plants to spread by rhizomes.
- » **Note:** Also readily propagated through division or rhizome cuttings (see NRCS Plant Guide referenced below).

Stand Management

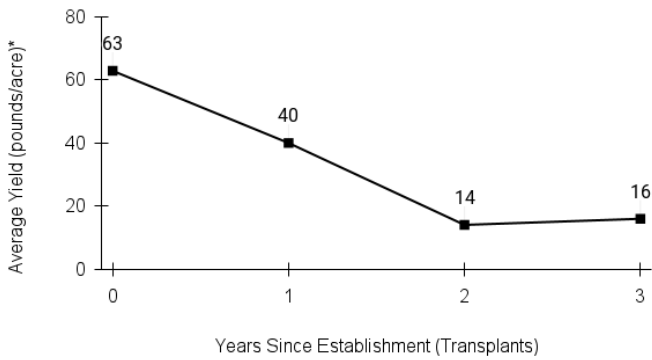
- » **Weeds:** Few issues as dense, young colonies tend to exclude weeds; other small-seeded members of the aster family (e.g., frost aster, *Symphotrichum pilosum*, and marestail, *Erigeron canadensis*) could contaminate seed and should be rogued out before harvest.
- » **Pests:** None noted.
- » **Diseases:** None noted.

Seed Production (Appendix B)

- » **First harvest:** In fall of first year when started from greenhouse transplants.
- » **Yield:** 15-60 pounds/acre (based on 5 plots)
- » **Stand life:** Peak seed production in the first two years, then declining.
- » **Flowering date:** late August - September
- » **Seed maturity/Harvest date:** Mid-October in northeast Iowa; gauge maturity by sampling heads from several plants and crushing to reveal developing seeds (a hand lens is helpful); mature seed will have a grayish-brown color and separate easily from the receptacle; watch for heads to open and release seed when mature; seed shatters easily and will be lost if harvest delayed.
- » **Harvest date range at TPC (2003-2023):** July 17 - Oct 28
- » **Recommended harvest method:** Combine at maturity or cut/swath stems when about 10% of plants in the plot have open

seed heads and lay to dry in shed, then run through stationary combine.

*data based on 5 plots



Seed Cleaning Process (Appendix C)

Brush (Westrup LA-H) with stiff bristles and #14 screen mantle to release seed from heads, use minimal vacuum; airtscreen several times.

Seed Characteristics (Appendix D)

- » **Seeds per ounce:** 250,000 (IA NRCS)
- » **1000 seed weight:** 0.11 g (Seed Information Database)
- » **Description:** Cypselas (achene), elliptical in outline, about 0.5 mm long, light grayish-brown, without hairs or attached fluff (pappus).



- » **Seed storage:** cool/dry (orthodox)
 - » **Typical seed test:**
 - PLS: 84% (n = 11)
 - Purity: 92% (n = 11)
 - Germination: 30% (n = 10)
 - Dormant: 57% (n = 11)
- (averages obtained from n tests of purchased seed lots)

Released Germplasm

- » **Source Identified material:** Natural Selections/Iowa Ecotype Project Zones 1, 2, and 3
- » **NRCS release:** ‘Summit’ *Artemisia ludoviciana*
- » **Cultivated varieties:** Several named cultivars are available in the horticultural trade.

References

Chayka, K. (n.d.). *Artemisia ludoviciana* (white sage). Minnesota Wildflowers. <https://www.minnesotawildflowers.info/flower/white-sage>

Christiansen, P., & Muller, M. (1999). White sage - *Artemisia ludoviciana* Nutt. Prairie plants of Iowa - *Artemisia ludoviciana* Nutt. https://uipress.lib.uiowa.edu/ppi/display.php?record=Artemisia_ludoviciana

Cochrane, T. S., Elliot, K., & Lipke, C. S. (2014). White sage. In *Prairie plants of the University of Wisconsin, Madison Arboretum* (3rd ed., p. 68). University of Wisconsin-Madison Arboretum.

Flora of North America Editorial Committee. 2006a. Flora of North America North of Mexico. Vol. 19. Magnoliophyta: Asteridae, part 6: Asteraceae, part 1. Oxford University Press, New York. xxiv + 579 pp.

Hilty, J. (2020). White sage - *Artemisia ludoviciana*. Illinois Wildflowers. https://www.illinoiswildflowers.info/prairie/plantx/white_sagex.htm

Kartesz, J.T., The Biota of North America Program (BONAP). 2023. North American Plant Atlas. (<http://bonap.net/napa>). Chapel Hill, N.C. [maps generated from Kartesz, J.T. 2023. Floristic Synthesis of North America, Version 1.0. Biota of North America Program (BONAP). (in press)]

NatureServe. 2024. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available <https://explorer.natureserve.org/>. (Accessed: February 16, 2024).

Runkel, S. T., & Roosa, D. M. (2009). Prairie sage. In *Wildflowers of the tallgrass prairie: The upper Midwest* (Second, p. 237). University of Iowa Press.

Shultz, Leila M. (2020, November 6). *Artemisia ludoviciana* Nuttall. Flora of North America. http://floranorthamerica.org/Artemisia_ludoviciana

Society for Ecological Restoration, International Network for Seed Based Restoration and Royal Botanic Gardens Kew. (2023) Seed Information Database (SID). Available from: <https://ser-sid.org/> (February 2023)

Stevens, M., & Roberts, W. (2000). Plant guide - USDA Plants Database - White sage, *Artemisia ludoviciana* Nutt. https://plants.usda.gov/DocumentLibrary/plantguide/pdf/cs_arlu.pdf

Species Updated: 7/3/2024

Notes
