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## SYNONYMS

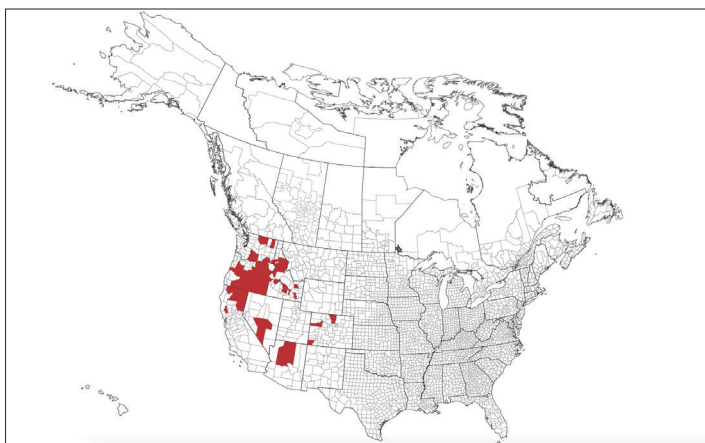
African sage

## CLASSIFICATION

RANKING	SCIENTIFIC NAME	COMMON NAME
Kingdom	Plantae	Plants
Subkingdom	Tracheobionta	Vascular plants
Superdivision	Spermatophyta	Seed plants
Division	Magnoliophyta	Flowering plants
Class	Magnoliopsida	Dicotyledons
Subclass	Asteridae	
Order	Lamiales	
Family	Lamiaceae	Mint family
Genus	<i>Salvia</i>	Salvia
Species	<i>Salvia aethiopsis</i> L.	Mediterranean sage

## HISTORY AND DISTRIBUTION

Mediterranean sage is native to Europe and western Asia. It was introduced to North America (California) by 1892, likely as a contaminant in alfalfa seed, though it has also been intentionally planted as a garden flower. It subsequently spread throughout the western USA and is currently present in seven U.S. states (Fig. 1), but is absent in Canada.



**Figure 1.** Mediterranean sage reported distribution in North America (Credit: EDDMapS, eddmaps.org accessed 12 August 2022; W. DesCamp pers. comm.)

## IMPACT

Mediterranean sage competes with other plants for limited resources, displacing more desirable species. It is unpalatable to livestock and is especially problematic in overgrazed areas, where it reduces range and pasture production. It's been estimated that in Oregon alone, this species could result in \$1.13 million losses in annual rangeland production if allowed to spread.

## IDENTIFICATION

### AT A GLANCE

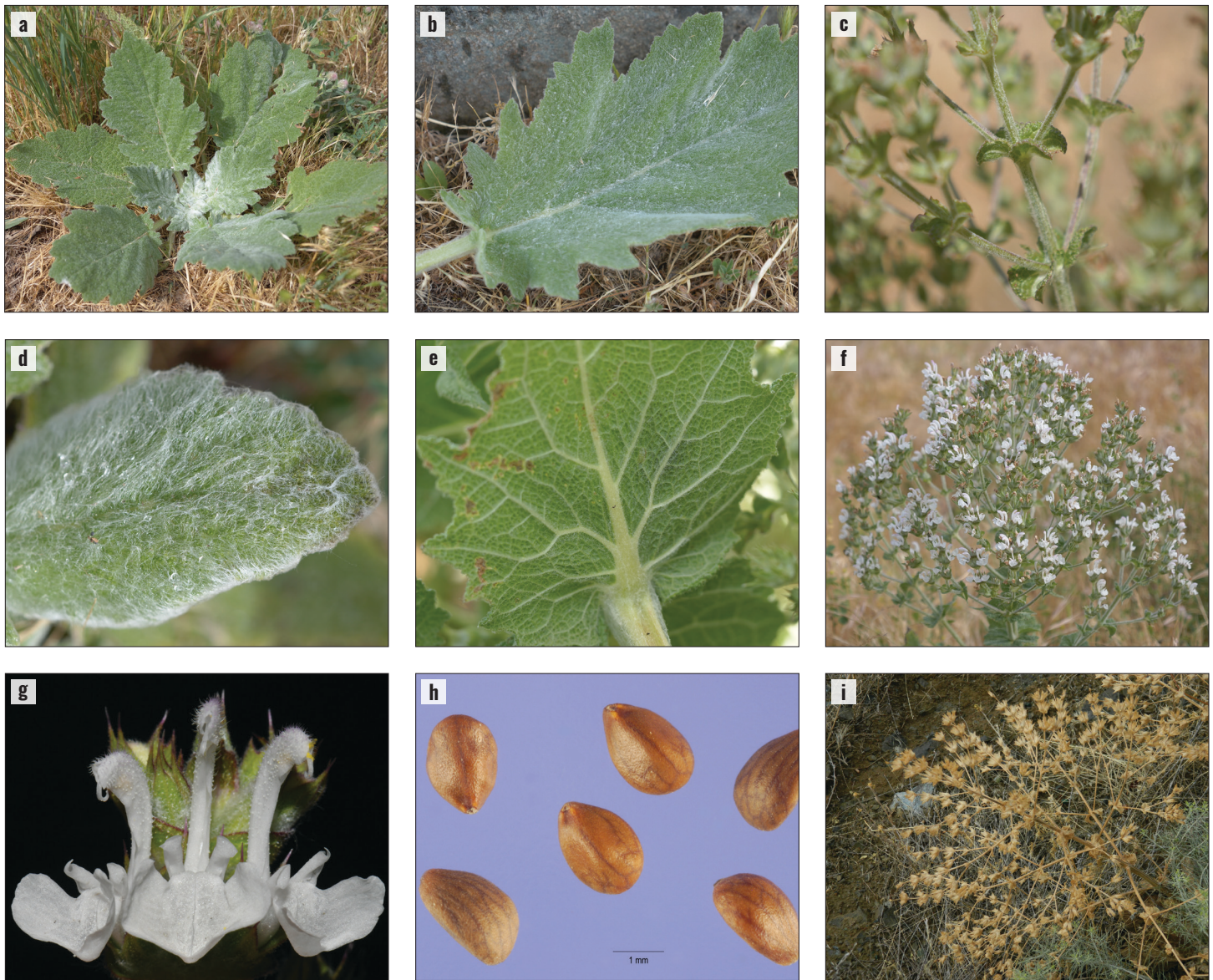
Mediterranean sage (Fig. 2) is an aromatic forb that grows as a biennial or short-lived perennial from a stout taproot. Plants develop rosettes the first year and typically bolt the second year, growing 1–3 ft (30–90 cm) tall with square stems. Rosette leaves are grayish-green, 4–12 in (10–30 cm) long, triangular, and have jagged margins. Stem leaves are opposite and decrease in size going up the stem. The branching inflorescences often resemble candelabras in shape. Each flower is ½–1 in (1–2½ cm) long and has five whitish petals distinctly fused into two lips. Each flower produces four smooth, brown nutlets.

### Roots

Mediterranean sage develops a stout taproot. On average, roots may reach nearly 1 ft (30 cm) deep just one month after germination.



**Figure 2.** Mediterranean sage in flower (Travis McMahon, MIA Consulting)



**Figure 3.** Mediterranean sage often remains as a (a) rosette for the first and sometimes second year. Rosette leaves (b) are hairy, grayish-green, triangular, and have jagged margins. Stems (c) are square, branched, and have opposite leaves. New leaves, stems, and mature leaf undersides are hairy (d) while hairiness decreases on mature leaves (e). Flowers are formed on branched clusters (f) resembling candelabras. Flowers (g) are white and strongly two-lipped. Each flower produces four nutlets (h) that are brown and smooth at maturity. Plants become tumbleweeds (i) after dying back, spreading their seeds. (a–f: Travis McMahon, MIA Consulting; g: Brian Finzel, iNaturalist.org, CC BY-NC 4.0; h: Steve Hurst, USDA NRCS PLANTS Database, Bugwood.org, CC BY-3.0 US; i: MHays, iNaturalist.org, CC BY-NC 4.0)

### STEMS AND LEAVES

Plants remain as rosettes (Fig. 3a) the first year and sometimes the second year as well. Rosette leaves are grayish-green, 4–12 in (10–30 cm) long, stalked, and somewhat triangular with jaggedly toothed margins (Fig. 3b). Plants bolt in spring and have square, branched stems (Fig. 3c) that grow 1–3 ft (30–90 cm) tall. Stem leaves are opposite, reducing in size with shorter to no stalks higher up the stem. Stems, new leaves (Fig. 3d), and mature leaf undersides are all densely covered in fine, woolly hairs. Mature plants become less hairy and develop prominent veins on the leaves (Fig. 3e).

### FLOWERS

Flowering stems branch profusely with clusters of flowers along the branches, often resembling a candelabra (Fig. 3f). Flowers are ½–1 in (1–2½ cm) long, and have five petals distinctly fused into two lips (Fig. 3g). Flowers are mostly whitish to pale yellow and can be tinged with pink on their tops.

### FRUITS AND SEEDS

Each flower produces four one-seeded nutlets (Fig. 3h) that are oval-shaped, smooth, and brown at maturity (Fig. 3i). A mature plant can produce between 50 and 100,000 seeds.

## ECOLOGY

Mediterranean sage spreads only by seed. In North America, most seeds germinate in early spring and rapidly develop taproots to ensure their survival during drier summer months. Some seeds may also germinate with autumn rains. Plants remain as rosettes the first year. Rosette leaves die back after autumn frosts and grow again from the root the following spring. Summertime drought sometimes causes rosettes to drop their leaves and become dormant; their growth resumes only with the onset of autumn rains. If rosettes attain a sufficiently large size during the first year, they will bolt and flower the second year. Alternatively, plants will remain as rosettes a second year and flower the third. Flowers are produced throughout summer and are visited by a variety of pollinators (primarily bee species). Plants typically die after flowering and setting seed. Their stout stems become brittle upon drying and frequently break off in the wind, becoming tumbleweeds that spread seeds up to a mile (1.6 km) unless trapped in barriers like fence lines. Seeds are estimated to be viable for up to ten years. All parts of the plant are aromatic, giving off a pungent, sage-like odor when crushed.

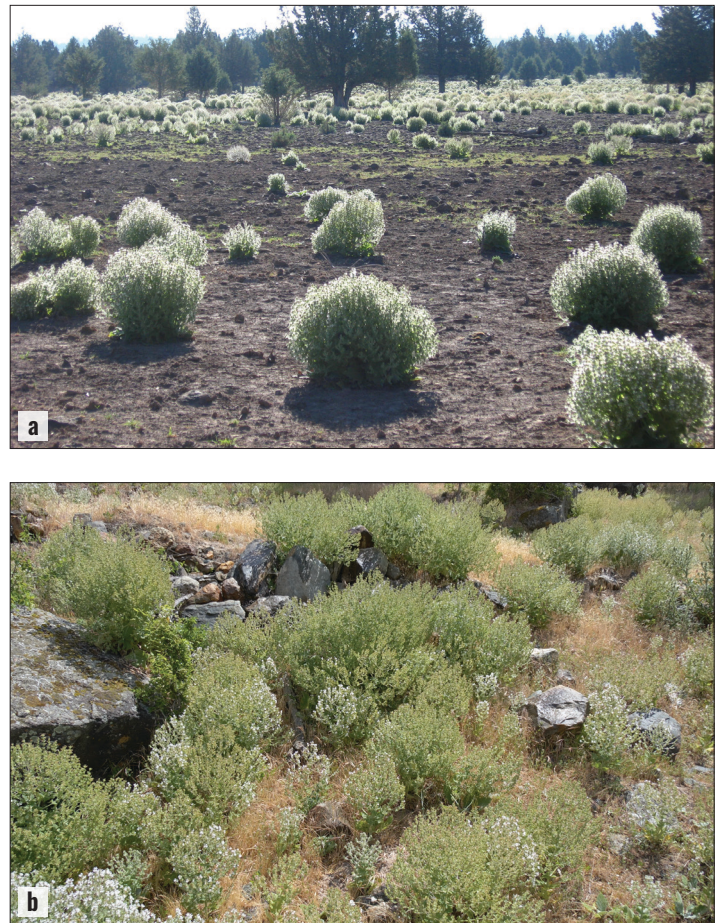
## HABITAT

Mediterranean sage grows well in dry areas and capitalizes on disturbance. In North America, it is frequently found in overgrazed pastures, rangeland, open forests, dry hillsides, and along roadsides (Fig. 4a,b), though it may occasionally be found in hay and other crops. It does well in a variety of soils, ranging from silty to rocky. Mediterranean sage establishes at sites just above sea level to 6,900 ft (2,100 m) and is usually found on warm, south-facing slopes growing in full sun.

## SIMILAR SPECIES

In the rosette stage, Mediterranean sage sometimes resembles common mullein (*Verbascum thapsus*), whose leaves are also large and densely hairy. However, common mullein leaves have smooth margins and are more teardrop-shaped and yellowish-green. In contrast, the leaves of Mediterranean sage are toothed, triangular, and give off a strong sage odor when crushed. After bolting, common mullein is easily differentiated by its alternate leaves and growing much taller (6.6 ft or 2 m) with a single unbranched flower spike covered in yellow flowers. Mediterranean sage's opposite leaves and square stems help differentiate it from most unrelated look-alike species.

Within its family (the Lamiaceae or mint family), there are many native and introduced species of *Salvia* present in North America that resemble Mediterranean sage. Most of these look-alikes do not have white flowers. Those which do are usually not strongly two-lipped. In addition, most






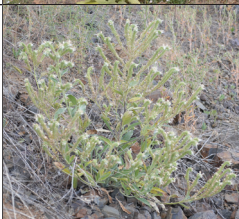









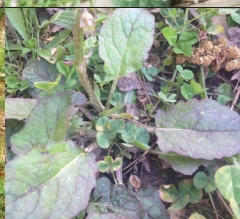




**Figure 4.** Mediterranean sage is often found in (a) overgrazed pastures, rangeland, open forests, (b) dry hillsides, and along roadsides (a: Todd Pfeiffer, Klamath County Weed Control, Bugwood.org, CC BY 3.0 US; b: Travis McMahon, MIA Consulting)

*Salvia* look-alikes also have very different leaves, and their inflorescences are not as large or branched as Mediterranean sage. Species most closely resembling Mediterranean sage are listed in **Table 1**, along with key characteristics that can be used for differentiation.

## REFERENCES

- Coombs, E.M., J.C. Miller, L.A. Andres, and C.E. Turner. 2008. Biological control of Mediterranean sage (*Salvia aethiopsis*) in Oregon. In: M.H. Julien, R. Sforza, M.C. Bon, H.C. Evans, P.E. Hatcher, H.L. Hinz, and B.G. Rector, Eds. Proceedings of the XII International Symposium on Biological Control of Weeds. 22-27 April, 2007, La Grande Motte, France. CAB International. pp. 521-527.
- Howell, J.T. 1942. Plants new to California. Leaflets of Western Botany 3: 79-80.
- Radtke, H. and S. Davis. 2000. Economic analysis of containment programs, damage, and production losses from noxious weeds in Oregon. Technical Report Prepared for Oregon Department of Agriculture, Salem, Oregon.
- Roché, C.T. 1991. Mediterranean sage (*Salvia aethiopsis* L.). Pacific Northwest Extension Publication PNW381.

**Table 1.** Key traits for differentiating Mediterranean sage from similar species present in North America.

SPECIES	SIMILARITIES	DIFFERENCES	PLANT	LEAVES	FLOWER
<b>Common mullein</b> <i>Verbascum thapsus</i> Scrophulariaceae	Biennial, remains as rosette first year; stout taproot; leaves fuzzy, gray-green; stem hairy	Not aromatic; leaves alternate with smooth margins, more yellowish; stems up to 6.6 ft (2 m) tall; flowers occur on solitary spikes; flowers yellow; fruits capsules			
<b>Silverleaf phacelia</b> <i>Phacelia hastata</i> Boraginaceae	Taproot; similar height; leaves gray-green; leaves and stems roughly hairy; white flowers on branched flower stems	Not aromatic; perennial; leaves alternate, smaller, with more parallel veins, smooth margins; flowers in fiddleneck clusters; flowers not two-lipped; stamens protrude			
<b>Bristle sage</b> <i>Salvia vaseyi</i> Lamiaceae	Taproot; similar height; leaves opposite, gray-green, triangular, toothed margins; leaves and stems roughly hairy; white two-lipped flowers; nutlet fruits; aromatic	Perennial; leaves not as large or jagged; inflorescences not highly branched in shape of candelabras; flowers not as strongly two-lipped; stamens protrude			
<b>Clary sage</b> <i>Salvia sclarea</i> Lamiaceae	Biennial or perennial; similar habitat; taproot; leaves opposite, often gray-green, triangular, toothed margins; leaves and stems roughly hairy; two-lipped flowers; nutlet fruits; aromatic	Stems up to 4 ft (1.2 m) tall; leaves not as large or jagged, more green; flowers often tinged purple, subtended by two large purplish bracts			
<b>Lyreleaf sage</b> <i>Salvia lyrata</i> Lamiaceae	Taproot; leaves opposite; white two-lipped flowers; nutlet fruits	Perennial; leaves smaller, purplish, mostly basal, rounded lobes; leaves not densely hairy; flowers on main stem; flowers usually more purplish, not as strongly two-lipped			
<b>Meadow sage</b> <i>Salvia pratensis</i> Lamiaceae	Similar habitat; taproot; similar height; leaves opposite, often gray-green, with toothed margins; leaves and stems roughly hairy; two-lipped flowers; nutlet fruits; aromatic	Perennial; leaves not as large or jagged, more green; flowers violet to bluish-purple			

**Photos:** common mullein plant, leaves, flowers (Travis McMahon, MIA Consulting); silverleaf phacelia plant and leaves (Travis McMahon, MIA Consulting), silverleaf phacelia flower (Catchang, iNaturalist.org CC BY-NC 4.0); bristle sage plant and flowers (Diana, iNaturalist.org CC BY-NC 4.0), bristle sage leaves (Melgert-Carla Hoegen, iNaturalist.org, CC BY-NC 4.0); clary sage plant (Теймуров А.А., iNaturalist.org CC BY-NC 4.0), clary sage leaf (By viridian, iNaturalist.org CCO), clary sage flowers (Alenka Mihoric, iNaturalist.org CC BY-NC 4.0); lyreleaf sage plant (Ann Walter-Fromson, iNaturalist.org CC BY-NC 4.0), lyreleaf sage leaf (Kara Oliver, iNaturalist.org CC BY-NC 4.0), lyreleaf sage flowers (Andyk, iNaturalist.org CC BY-NC 4.0); meadow sage plant (Mihail Knjasev, iNaturalist.org CC BY-NC 4.0); meadow sage leaf (Ольга Конобаилова, iNaturalist.org CC BY-NC 4.0); meadow sage flower (Cepreii, iNaturalist.org CC BY-NC 4.0)

Roché, C.T. and L.M. Wilson. 1994. Mediterranean sage. *In*: R.L. Sheley, Ed. The Identification, Distribution, Impacts, Biology and Management of Noxious Rangeland Weeds. All U.S. Government Documents (Utah Regional Depository). Paper 446. pp. 220–252.  
The Research Group, LLC. 2014. Economic Impact From Selected Noxious Weeds in Oregon. Prepared for Oregon Department of Agriculture Noxious Weed Control Program. 186 pp.

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## SUGGESTED CITATION

Andreas, J.E., J. Price, and E.M. Coombs. 2022. Mediterranean sage (*Salvia aethiopsis*): History and Ecology in North America. In: R.L. Winston, Ed. Biological Control of Weeds in North America. North American Invasive Species Management Association, Milwaukee, WI. NAISMA-BCW-2022-5-MEDITERRANEAN SAGE-P.

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