

Sassafras albidum (Nutt.) Nees

Sassafras

Lauraceae Laurel family

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Sassafras (*Sassafras albidum*), sometimes called white sassafras, is a medium-sized, moderately fast growing, aromatic tree with three distinctive leaf shapes: entire, mittenshaped, and threelobed. Little more than a shrub in the north, sassafras grows largest in the Great Smoky Mountains on moist well-drained sandy loams in open woodlands. It frequently pioneers old fields where it is important to wildlife as a browse plant, often in thickets formed by underground runners from parent trees. The soft, brittle, lightweight wood is of limited commercial value, but oil of sassafras is extracted from root bark for the perfume industry.

Habitat

Native Range

Sassafras (fig. 1) is native from southwestern Maine west to New York, extreme southern Ontario, and central Michigan; southwest in Illinois, extreme southeastern Iowa, Missouri, southeastern Kansas, eastern Oklahoma, and eastern Texas; and east to central Florida (8). It is now extinct in southeastern Wisconsin but is extending its range into northern Illinois (5).

Climate

Average annual rainfall varies from 760 to 1400 mm (30 to 55 in) within the humid range of sassafras. Of this, 640 to 760 mm (25 to 30 in) occur from April to August, the effective growing season. At the northern limits of the range, the average annual snowfall is between 76 to 102 cm (30 to 40 in), while in the southern limits there may be only 2.5 cm (1 in) or less. The average frost-free period is from 160 to 300 days. In January average temperatures are -7° C (20° F) in the north and 13° C (55° F) in the south; the average July temperatures vary from 21° to 27° C (70° to 80° F).

Soils and Topography

Sassafras can be found on virtually all soil types within its range. It grows best in open woods on moist, well-drained, sandy loam soils, but is a

pioneer species on abandoned fields, along fence rows, and on dry ridges and upper slopes, especially following fire. In the South Atlantic and Gulf Coast States where sites are predominately sandy soils, mature sassafras seldom exceeds sapling size. On the Lake Michigan dunes of Indiana, it grows on pure, shifting sand (5). It is also found on poor gravelly soils and clay loams. Sassafras is most commonly found growing on soils of the orders Entisols, Alfisols, and Ultisols. Optimum soil pH is 6.0 to 7.0 (14). The species is found at elevations varying from well-drained Mississippi River bottom lands and loessial bluffs to 1220 m (4,000 ft) in the southern Appalachian Mountains (10,11).

Associated Forest Cover

Sassafras is included in only two forest cover types; however, scattered trees of the species are found in many eastern forest types (13). Sassafras-Persimmon (Society of American Foresters Type 64) is a temporary type common on abandoned farmlands throughout the range of sassafras, especially in the lower Midwest and, to a limited extent, the mid-Atlantic States. It is also present as successional stands on old fields in the Southeastern States where pine usually predominates. Sassafras is a minor component in Bear Oak (Type 43), a scrub type appearing on dry sites along the Coastal Plain from New England southward to New Jersey, and from northwestern New Jersey southward to scattered localities in western Virginia and eastern West Virginia. It is also prevalent in eastern and central Pennsylvania.

Additional common associated tree species are sweetgum (*Liquidambar styraciflua*), flowering dogwood (*Cornus florida*), elms (*Ulmus* spp.), eastern redcedar (*Juniperus virginiana*), hickories (*Carya* spp.), and American beech (*Fagus grandifolia*). In fields with deeper soils it grows with elms, ashes (*Fraxinus* spp.), sugar maple (*Acer saccharum*), yellow-poplar (*Liriodendron tulipifera*), and oaks (*Quercus* spp.).

Noteworthy minor tree associates are American hornbeam (*Carpinus caroliniana*), eastern hophornbeam (*Ostrya virginiana*), and pawpaw (*Asimina triloba*). On poorer sites, particularly in the Appalachian Mountains, it is frequently associated with black locust (*Robinia pseudoacacia*), red maple (*Acer rubrum*), sourwood (*Oxydendrum arboreum*), and several oaks. At the northern edge of its range, sas-

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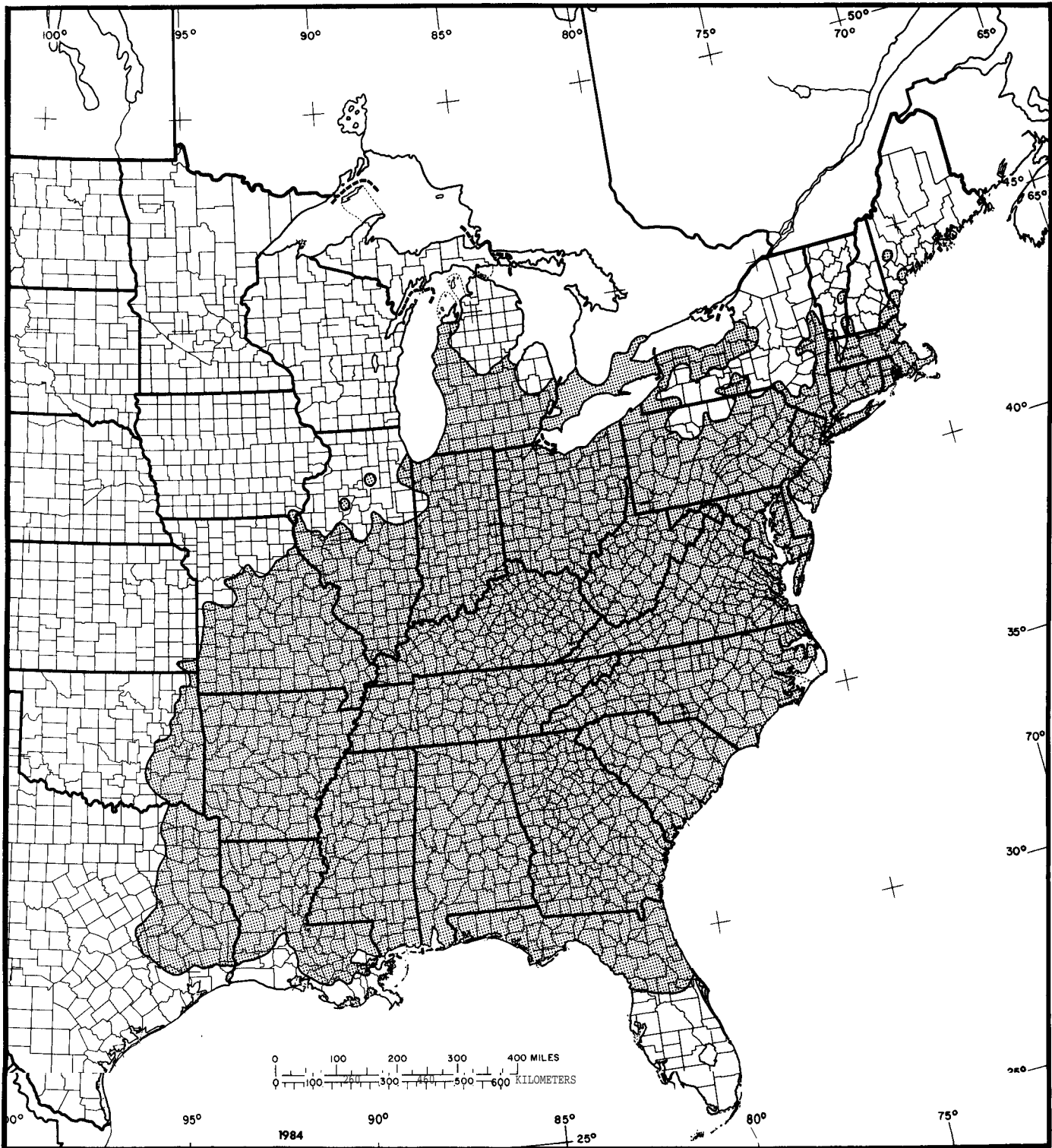


Figure 1-The native range of sassafras.

sassafras is found in the understory of aspen (*Populus* spp.) and northern pin oak (*Quercus ellipsoidalis*) stands (8).

Life History

Reproduction and Early Growth

Flowering and Fruiting-*Sassafras* is dioecious. Greenish-yellow flowers appear in March and April as the leaves unfold. They develop in loose, drooping few-flowered axillary racemes.

The fruit, 8 to 13 mm (0.3 to 0.5 in) long, is a single-seeded dark-blue drupe. It matures in August and September of the first year. The fruit is borne on a thickened red pedicel, and the pulpy flesh covers the seed.

Seed Production and Dissemination-Seed production begins when trees approach 10 years of age and is greatest when trees are 25 to 50 years old. Good seed crops are produced every 1 or 2 years (2). There are 8,800 to 13,200 seeds/kg (4,000 to 6,000/lb)

and soundness is 35 percent. Birds are principal agents of seed dissemination, with water a secondary agent. Some seeds probably are distributed by small mammals.

Seedling Development-*Sassafras* seed usually remains dormant until spring, although some early maturing seed may germinate in fall. The limit for storage of sassafras in the forest floor is about 6 years (15). Stratification for 120 days in moist sand at 5° C (41° F) breaks natural dormancy (2). The best seedbed is a moist, rich, loamy soil with a protective cover of leaves and litter. Germination is hypogeal.

Sassafras is intolerant of shade and reproduction is sparse and erratic in wooded areas. Subsequent reproduction is usually vegetative. The dense thickets often found in woods openings or in old fields develop from root sprouts rather than seed. On good sites where competition is not heavy, the sprouts may grow 3.7 m (12 ft) in 3 years and sometimes are abundant (3). Elsewhere growth is slow. Because *sassafras* grows in dense stands and sprouts prolifically, it is a difficult cover type to convert to pine or more desirable hardwoods.

Vegetative Reproduction-*Sassafras* reproduces easily by root sprouts. In parts of its ranges, sprouts rapidly restock abandoned farmlands (3). Sprouting is prolific from the stumps of young trees. *Sassafras* can be propagated fairly well from root cuttings, but not from stem cuttings. Two cutting types—roots with a stem sprout planted vertically and large roots planted horizontally—were found to be superior (9).

Sapling and Pole Stages to Maturity

Growth and Yield-*Sassafras* varies in size from shrubs to large trees with straight, clear trunks. The short, stout branches spread at right angles to form a narrow flat-topped crown (fig. 2). It may attain heights of 30 m (98 ft) on the best sites. On poor sites, especially in the northern part of its range and in Florida, *sassafras* is short and shrubby (12). Mature trees may average only 15 to 20 cm (6 to 8 in) in d.b.h., with a maximum of about 38 cm (15 in). Natural pruning is good in well-stocked stands.

Rooting Habit-*Sassafras* roots are shallow and of the prominent lateral type. The long laterals extend for a distance with little change in diameter, branch occasionally, and form an increasingly complex system (3). The laterals are practically all from 15 to 50 cm (6 to 20 in) deep, rising and falling at various intervals. Lateral spread is at the rate of 74 cm (29 in) per year. The forming of a sucker results



Figure 1-*Sassafras* tree in Mississippi.

in the development of feeding roots that otherwise would not be present on the lateral. These roots arise near the sucker and on the larger part of the lateral. They branch to very fine rootlets that are quite important in the species adaptability to vigorous growth on various types of soil.

Reaction to Competition-Sassafras is classed as intolerant of shade at all ages. In forest stands, it usually appears as individual trees or in small groups and is usually in the dominant overstory. In the understory along the edges of heavy stands it may live, but generally does not reach merchantable size. If it becomes overtopped in mixed stands, it is one of the first species to die. Allelopathy seems to be the mechanism that allows sassafras, when it has invaded abandoned fields, to maintain itself aggressively in a relatively pure and mature forest (4). Field studies revealed that 10 species consistently appear exclusively outside of clump canopies of sassafras, and 7 other species predominated beneath the sassafras canopy. Annual herbs were effectively excluded from the understory flora. The allelopaths produced by sassafras are believed to be 2-pinene, 3-phellandrene, eugenol, safrole, citrol, and s-camphor (4).

Damaging Agents-Sassafras is highly susceptible to fire damage at any age. Light fires kill reproduction and small saplings, and heavier burns injure large trees and provide entry for pathogens. Sassafras may die if not well protected from extremes of winter weather.

Foliage diseases are primarily the main damaging agents to sassafras. *Actinopelte dryina* is largely a southern fungus severely blighting the leaves. *Mycosphaerella sassafras* is one of the most widely occurring leaf spots of sassafras. A *Nectria* canker on trunks is fairly common in the southern Appalachian region. Remarkably, few reports of wood-rot fungi on sassafras have appeared in the literature (6). Mistletoe (*Phoradendron flavescens*) has been reported (8).

At least 15 species of insects attack sassafras, including root borers, leaf feeders, and sucking insects. Except for small local outbreaks, damage is relatively unimportant. From New York to Florida, the larvae of a wood-boring weevil (*Apteromechus ferratus*) kills trees up to 25 cm (10 in) in diameter. Two leaf feeders, the gypsy moth (*Lymantria dispar*) and looper (*Epimecis hortaria*), are found on sassafras in the Northeastern United States and in the Atlantic States, respectively. Sassafras is probably one of the favorite forest tree foods of the Japanese beetle (*Popillia japonica*) (8).

Special Uses

The bark, twigs, and leaves of sassafras are important foods for wildlife in some areas. Deer browse the twigs in the winter and the leaves and succulent growth during spring and summer. Palatability, although quite variable, is considered good throughout the range. In addition to its value to wildlife, sassafras provides wood and bark for a variety of commercial and domestic uses. Tea is brewed from the bark of roots. The leaves are used in thickening soups. The orange wood has been used for cooperage, buckets, posts, and furniture (7). The oil is used to perfume some soaps. Finally, sassafras is considered a good choice for restoring depleted soils in old fields. It was superior to black locust or pines for this purpose in Indiana and Illinois (1).

Genetics

No genetic variation has been reported for sassafras.

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