

Quercus laurifolia Michx. Laurel Oak

Fagaceae Beech family

Robert D. McReynolds and E. A. Hebb

Laurel oak (*Quercus laurifolia*) is also called Darlington oak, diamond-leaf oak, swamp laurel oak, laurel-leaf oak, water oak, and obtusa oak. There has been a long history of disagreement concerning the identity of this oak (11). It centers on the variation in leaf shapes and differences in growing sites (5), giving some reason to name a separate species, diamond-leaf oak (*Q. obtusa*). Here they are treated synonymously. Laurel oak is a rapid-growing short-lived tree of the moist woods of the southeastern Coastal Plain. It has no value as lumber but makes

good fuelwood. It is planted in the South as an ornamental. Large crops of acorns are important food for wildlife.

Habitat

Native Range

Laurel oak (fig. 1) is native to the Atlantic and Gulf Coastal Plains from southeastern Virginia to southern Florida and westward to southeastern

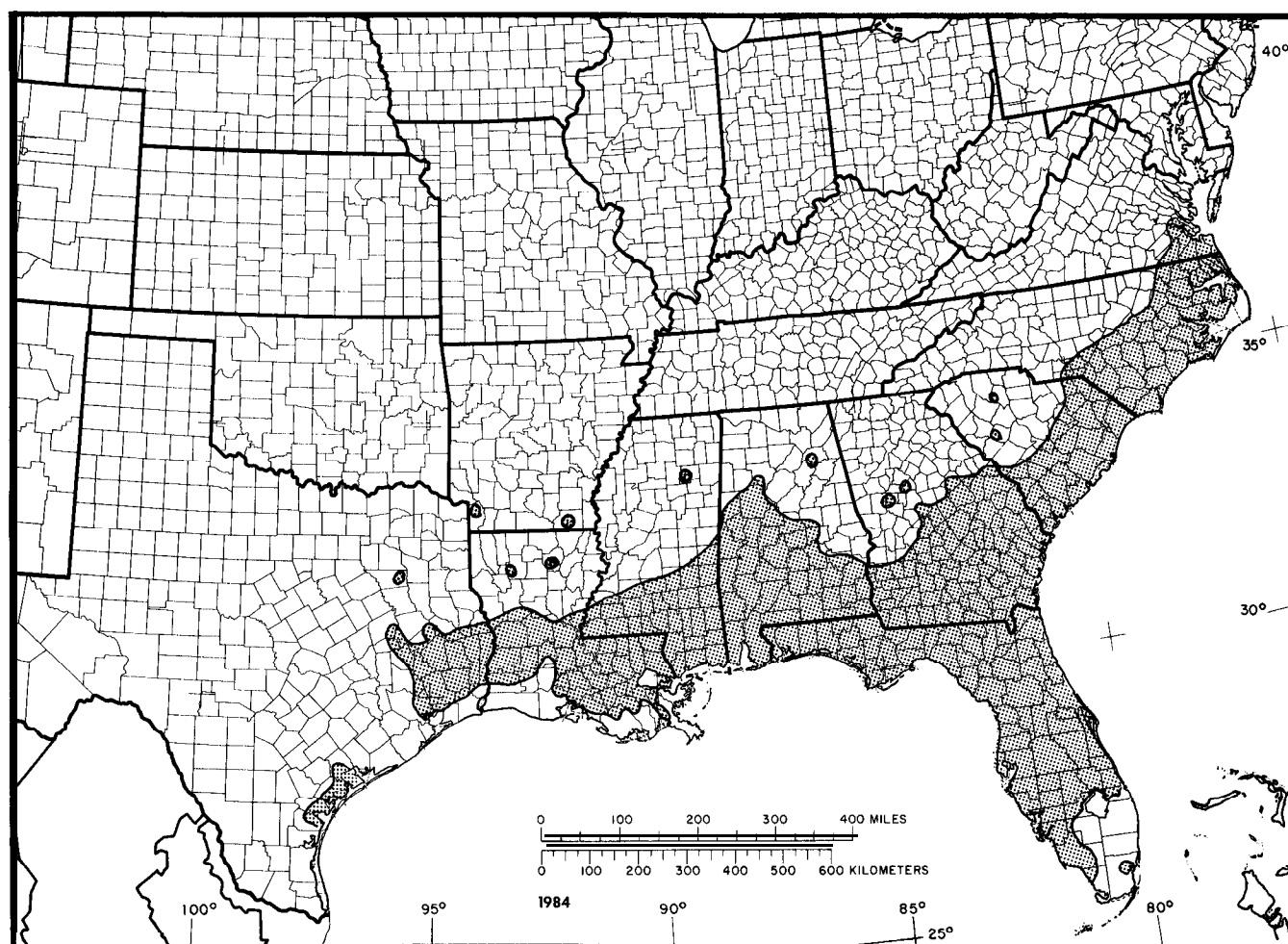


Figure 1—The native range of laurel oak.

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Texas with some island populations found north of its contiguous natural range. The best formed and largest number of laurel oaks are found in north Florida and in Georgia.

Climate

Rainfall averages between 1250 and 1500 mm (49 to 59 in) a year over the natural range of laurel oak. From 500 to 1000 mm (20 to 39 in) of this is received during the growing season from April to September, except during occasional years when there is a summer or fall drought lasting 1 to 3 months. Average annual temperatures across the range of laurel oak vary from 16° to 21° C (61° to 70° F). Extreme lows range from -1° to -18° C (30° to 0° F). Extreme highs range from 38° to 43° C (100° to 109° F). Relative humidities seldom fall below 60 percent. The frost-free season extends from 220 days in the north to more than 320 days in south Florida.

Soils and Topography

Laurel oak is most common on alluvial flood plains. It tolerates the wetter sites in association with other oak species but does not withstand continuous or prolonged flooding. It is most often found growing in sandy soil near rivers and along the edges of swamps if not too frequently flooded. Laurel oak grows in the hammocks of central Florida and on sand hills adjacent to swamps in west Florida. It is also planted as an ornamental with little regard to soil type (14). Laurel oak grows best on Ultisols and Inceptisols.

Associated Forest Cover

Laurel oak is a major species in the forest cover type Willow Oak-Water Oak-Diamond-leaf (Laurel) Oak (Society of American Foresters Type 88) (5). Diamond-leaf oak makes up most of the stand in this type where drainage is poor, sometimes forming almost pure stands, while laurel oak grows on the better drained sites such as sandy banks of streams.

Laurel oak is also an associated species in the following forest cover types: Cabbage Palmetto (Type 74), Loblolly Pine (Type 81), Longleaf Pine-Slash Pine (Type 83), Sweetgum-Willow Oak (Type 92), and Baldcypress-Tupelo (Type 102).

Associated tree species may include Nuttall oak (*Quercus nuttallii*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), sweetgum (*Liquidambar styraciflua*), swamp hickory (*Carya glabra*), honeylocust (*Gleditsia triacanthos*); and on wetter sites water hickory (*Carya aquatica*), waterlocust

(*Gleditsia aquatica*), and overcup oak (*Q. lyrata*). On better drained sites laurel oak may be associated with spruce pine (*Pinus glabra*), loblolly pine (*P. taeda*), swamp chestnut oak (*Q. michauxii*), and cherrybark oak (*Q. falcata* var. *pagodifolia*) (5).

In Florida, southern magnolia (*Magnolia grandiflora*), American beech (*Fagus grandifolia*), pignut hickory (*C. glabra* var. *glabra*), Carolina basswood (*Tilia caroliniana*), and scrub hickory (*C. floridana*) are associates.

Around Charleston, SC, laurel oak's tree associates include redbud (*Cercis canadensis*), American beech, yellow-poplar (*Liriodendron tulipifera*), southern magnolia, spruce pine, white oak (*Q. alba*), and Carolina basswood. Associated shrubs and vines include crossvine (*Bignonia capreolata*), sweet rhododendron (*Rhododendron canescens*), sweetleaf (*Symplocos tinctoria*), and muscadine grape (*Vitis rotundifolia*).

Associated shrubs and small trees include American hornbeam (*Carpinus caroliniana*), Virginia-willow (*Itea uirginica*), poison-sumac (*Toxicodendron vernix*), swamp cyrilla (*Cyrilla racemiflora*), littleleaf cyrilla (*C. racemiflora* var. *parvifolia*), Sebastian bush (*Sebastiania ligustrina*), dahoon (*Ilex cassine*), possumhaw (*I. decidua*), swamp dogwood (*Cornus stricta*), sweet pepperbush (*Clethra alnifolia*), tree lyonia (*Lyonia ferruginea*), buttonbush (*Cephalanthus occidentalis*), pinckneya (*Pinckneya pubens*), and rhododendron (*Rhododendron* spp.). Associated vines include coral greenbrier (*Smilax walteri*), laurelleaf greenbrier (*S. laurifolia*), and Alabama supplejack (*Berchemia scandens*) (14).

Life History

Reproduction and Early Growth

Flowering and Fruiting-Laurel oak is monoecious; stamens and pistils are in separate flowers on the same tree. Staminate flowers are borne in naked catkins developing from leaf axils of the previous year. Pistillate flowers are usually solitary, on short, stout, glabrous stalks developing from axils of leaves of the current year. Flowering occurs in February and March, about the time the last of the previous year's leaves are shed (15). Pollen is wind disseminated. Flower crops are abundant almost every year.

Seed Production and Dissemination-Laurel oak acorns are brown to almost black, 13 mm (0.5 in) in both diameter and length, with one-quarter or less enclosed in a thin saucerlike cup (7). Acorn production begins when the trees are 15 to 20 years old;

they soon become prolific bearers. Acorns require 2 years to mature and fall to the ground during late September and October. Some of the acorn caps remain attached to the tree. There are about 1,235 sound, uncapped laurel oak acorns per kilogram (560/lb). Acorn dissemination is mainly by squirrels but is aided by gravity and runoff during rains. Most sound acorns sink but some float and are carried a long distance (14,15).

Seedling Development-Acorns of trees in the black oak group, to which laurel oak belongs, show embryo dormancy and germinate the following spring after fall ripening. Germination is hypogeal (15). Laurel oak acorns exhibit only mild dormancy. Without any cold stratification, germinative capacity in two samples of laurel oak acorns was 50 percent (15). In another test, germination of laurel oak acorns, with one exception, was unaffected or only slightly increased by 30 days' soaking in distilled



Figure 2-A laurel oak, 69 cm (27 in) in d.b.h., open grown as a shade tree in Florida.

water (10). There are few or no published descriptions of laurel oak seedling development after acorn germination.

Vegetative Reproduction-When cut or burned, a young laurel oak produces many sprouts from the base of its stump. Older trees do not sprout vigorously, and their sprouts are more susceptible to decay than those of young trees (14).

Sapling and Pole Stages to Maturity

Growth and Yield-Laurel oak (fig. 2) grows rapidly and usually matures in about 50 years which has led to its wide use as an ornamental (14).

Southeastern Forest Survey data show the largest volume of laurel oak in the 25- to 36-cm (10- to 14-in) d.b.h. classes with average total heights from 18 to 21 m (59 to 69 ft). It has the poorest timber quality of the red and black oaks, producing sawtimber only on the best sites. It is marketed mainly as pulpwood. Considering live volume of trees 13 cm (5 in) in d.b.h. and up from a stump height of 30 cm (12 in) and a top diameter of 10 cm (4 in), laurel oak has an average annual mortality of 1.1 percent, an average annual growth of 4.1 percent, and an average annual removal of 2.0 percent. It shares a high mortality rate with water oak because of their relatively thin bark among oaks and susceptibility to fire. Only about half of laurel oak's growth is harvested each year. In an assessment of aboveground biomass of trees 2.5 cm (1 in) in d.b.h. and larger, laurel oak constituted 3.4 percent of associated hardwood biomass and 8.4 percent of the oak biomass. A conservative estimate of growth is 6.4 cm (2.5 in) in d.b.h. every 10 years (9).

Rooting Habit-Laurel oak develops a large well-defined taproot on upland sands as observed on trees uprooted for road construction (12). No published information on the rooting habits of laurel oak was found.

Reaction to Competition-Laurel oak is classed as shade tolerant from seedling to mature tree and often becomes established and grows up through the dense canopy of a swamp border. Natural pruning is poor and large limbs persist on the bole many years, even under a dense canopy (14).

Damaging Agents-Fire is especially hazardous to laurel oaks. They are frequently killed by even light ground fires and heartrots are common in trees subject to occasional burns (14).

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Laurel oak is host to the general oak-feeding insects but no serious insect problem is mentioned in the literature. Several species of *Curculio* weevils infest acorns, including those of laurel oak (1).

Although not seriously harmed themselves, laurel oak, water oak, and willow oak are the three most susceptible hosts for the alternate stage of fusiform rust (*Cronartium quercuum* f. sp. *fusiforme*) of southern pines. Laurel oak is also susceptible to oak leaf blister (*Taphrina caerulescens*), actinopelte spot (*Actinopelte dryina*), and canker rots by various fungi (8).

Special Uses

Laurel oak has been widely planted in the South as an ornamental, perhaps because of the attractive leaves from which it takes its common name.

Large crops of laurel oak acorns are produced regularly and are an important food for white-tailed deer, raccoons, squirrels, wild turkeys, ducks, quail, and smaller birds and rodents (4). Comparing volumes of the 10 most heavily used fall and winter food items found in 423 rumen samples of deer from Florida, laurel oak acorns rated fifth, sixth, or seventh highest in quantity consumed in a 6-year period (6). Acorns were most frequently consumed and in the largest quantity by 32 wild turkeys whose crops were examined in Florida; of the identified acorns, laurel oak was second only to live oak in quantity and frequency (13).

Genetics

In the past, laurel oak and diamond-leaf oak have been considered by some to be two varieties or even separate species (11). Trees first recognized as laurel oak were on well-drained sandy banks of streams whereas diamond-leaf oak was found on poorly drained flat sites (5).

Burke concluded that laurel oak itself is of hybrid origin, intermediate between and derived from willow oak and water oak (2,3). His work is based on a leaf-shape index applied to seedlings grown from acorns collected on the North Carolina Outer Banks and at Chapel Hill, NC. He states that laurel oak is not found outside the ranges of the two supposed parental species. This would appear true based on most published maps showing the range of willow oak available in 1961 and 1963, when Burke's publications appeared. However, the range map for willow oak published in 1965 (14) shows willow oak to be absent in the southeastern half of Georgia and peninsular Florida where laurel oak grows in abundance,

leaving some doubt that laurel oak is the hybrid between willow and water oak (14).

The following hybrids with *Quercus laurifolia* as one parent have been recognized (11): *Quercus falcata* (*Q. x beaumontiana* Sarg.), *Q. incana* (*Q. x atlantica* Ashe), *Q. laevis* (*Q. x mellichampii* Trel.), and *Q. marilandica* (*Q. x diversiloba* Tharp ex A. Camus).

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