

# *Quercus virginiana* Mill. Live Oak

Fagaceae Beech family

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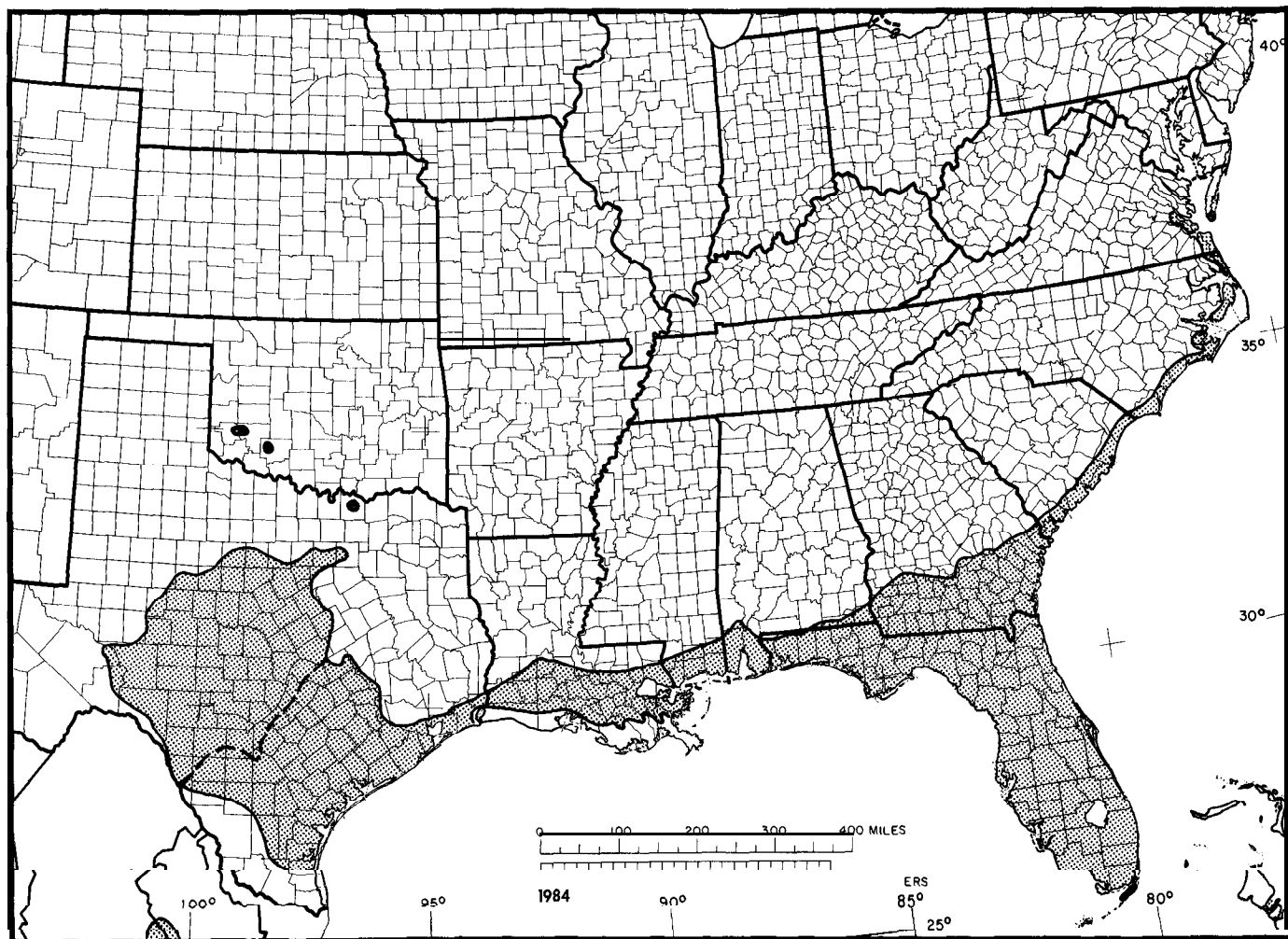
Live oak (*Quercus virginiana*), also called Virginia live oak, is evergreen with a variety of forms, shrubby or dwarfed to large and spreading, depending upon the site. Usually live oak grows on sandy soils of low coastal areas, but it also grows in dry sandy woods or moist rich woods. The wood is very heavy and strong but is little used at present. Birds and animals eat the acorns. Live oak is fast-growing and easily transplanted when young so is used widely as an ornamental. Variations in leaf sizes and acorn cup shapes distinguish two varieties from the typical,

Texas live oak (*Q. virginiana* var. *fusiformis* (Small) Sarg.) and sand live oak (*Q. virginiana* var. *geminutu* (Small) Sarg.) (4).

## Habitat

### Native Range

Live oak (fig. 1) is found in the lower Coastal Plain of the Southeastern United States from southeastern Virginia south to Georgia and Florida including the



**Figure 1**—The native range of live oak, represented northwest of the broken line and in Mexico by a variety, Texas live oak.

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## *Quercus virginiana*

Florida Keys; west to southern and central Texas with scattered populations in southwestern Oklahoma and the mountains of northeastern Mexico (4).

### Climate

The climate is humid. Annual precipitation varies from 810 mm (32 in) in Texas to 1650 mm (65 in) along the Gulf Coast to 1270 mm (50 in) along the Atlantic coast and Florida. During the growing season, March through September, rainfall averages from 460 mm (18 in) in the west to 660 to 760 mm (26 to 30 in) in the east and south, with summer droughts more common in the western part of the range than elsewhere. The average summer temperature is 27° C (80° F). The average winter temperature ranges from 2° C (35° F) in the east and west to 16° C (60° F) in the south. The frost-free period is 240 days in the east and west and more than 300 days in southern Florida (5).

### Soils and Topography

Live oak nearly always grows on sandy soils belonging to the Ultisols, Spodosols, Histosols, and Entosols (5). Its resistance to salt spray and high levels of soil salinity makes it a dominant species in the live oak woodland on the barrier islands of the Atlantic and Gulf Coasts. In South Carolina it is found in dry sandy woods, moist rich woods, and wet woods. It is present in nearly every habitat in Florida from sandhills to hammocks, where it is generally the dominant species. In Louisiana, live oak is the dominant species on well-drained ridges bordering coastal marshes (3).

### Associated Forest Cover

Live oak makes up the majority of the stocking of the forest cover type Live Oak (Society of American Foresters Type 89) (1). Common associates are water oak (*Quercus nigra*), laurel oak (*Q. laurifolia*), southern magnolia (*Magnolia grandiflora*), and sweetgum (*Liquidambar styraciflua*). On less well-drained sites it is accompanied by sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). On the Atlantic Coast and Florida, common associates also include southern bayberry (*Myrica cerifera*), yaupon (*Ilex vomitoria*), tree sparkleberry (*Vaccinium arboreum*), cabbage palmetto (*Sabal palmetto*), and saw-palmetto (*Serenoa repens*). American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), southern crab apple (*Malus angustifolia*), hawthorn (*Crataegus*

spp.), pignut hickory (*Carya glabra*), Carolina jessamine (*Gelsemium sempervirens*), and Japanese honeysuckle (*Lonicera japonica*) are also common associates.

Live oak is a minor species in seven other forest cover types: Longleaf-Scrub Oak (Type 71), Southern Redcedar (Type 73), Cabbage Palmetto (Type 74), Slash Pine (Type 84), South Florida Slash Pine (Type 111), Ashe Juniper-Redberry Juniper (Type 66), and Mohrs Oak (Type 67).

### Life History

#### Reproduction and Early Growth

**Flowering and Fruiting-Live** oak is monoecious. Flowers are produced every spring, March through May. The acorns, long and tapered and dark brown to black, mature in September of the first year and fall before December.

**Seed Production and Dissemination-Acorn** crops are produced annually, often in great abundance. There is no published information on minimum seed-bearing age or size of the acorn crop. Number of sound acorns averages 776/kg (352/lb). Dissemination is by gravity and animals.

**Seedling Development-!&** acorns germinate soon after falling to the ground if the site is moist and warm. Germination is hypogeal. Probably few acorns remain viable over winter because weevils invade them, and they are eaten by many animals and birds. There is no published information on seedling growth and development.

**Vegetative Reproduction-Live** oak sprouts abundantly from the root collar and roots. When tops are killed or when the tree is girdled, roots near the ground surface send up numerous sprouts. The capacity to sprout makes live oak difficult to kill by mechanical or chemical means.

#### Sapling and Pole Stages to Maturity

**Growth and Yield-Live** oak (figs. 2, 3) never attains great height, but the crown may have a span of 46 m (150 ft) or more. Open-grown specimens may have trunks 200 cm (79 in) in d.b.h. and average 15 m (50 ft) in height. Since the species is of little commercial importance except as an ornamental, growth and yield information has never been developed.



**Figure 2**-A stand of live oak on Jekyll Island along the Georgia coast.



**Figure 3**-Live oak, 500 to 700 years old, in South Carolina.

**Rooting Habit**-There is no published information on rooting habits, but the ability of live oak to grow and mature on sites subject to hurricane-force winds suggests that it is a deep-rooted species.

**Reaction to Competition**-Live oak may be most accurately classed as intermediate in tolerance to shade. In the northern part of its range, live oak assumes dominance only near the coast, where it is freed from competition by the greater sensitivity of all other broad-leaf trees to salt spray. The exclusion of fire has increased its presence in the Lower Coastal Plain. Once established in a favorable habitat, the tree is very tenacious and withstands all competition.

**Damaging Agents**-Young live oak is highly susceptible to fire. Its thin bark is readily killed by even light ground fires, leaving the trunk open to insects and fungi. The species is also susceptible to damage by freezing temperatures.

Live oak decline, a wilt disease attributed to *Cerutocystis fagacearum*, has been reported in Texas where it is killing thousands of trees annually. The disease is also suspected to occur in other Southern States as well and is considered a potentially serious problem (2,3). Leaf blister, caused by *Taphrina caeruleascens*, periodically results in considerable defoliation.

A borer, *Archodontes melanopus*, commonly attacks roots of young oaks on the Atlantic Coast and may prevent the trees from developing normal form.

In some localities, mistletoe (*Phoradendron* spp.) grows on the branches. Spanish moss (*Tillandsia usneoides*), though an epiphyte, may damage trees because it accumulates in great abundance and decreases light reaching the interior and lower parts of the crown (6).

## Special Uses

Because of live oak's habit of forming a low, wide-spreading crown, it is widely used as a shade tree and an ornamental. Its acorns are sweet and much sought as food by birds and animals. During the era of wooden ships it was used extensively in shipbuilding because of its hardness and strength.

## Genetics

Two varieties of live oak are recognized: *Quercus virginiana* var. *fusiformis* (Small) Sarg., Texas live oak, and *Q. virginiana* var. *geminata* (Small) Sarg., sand live oak.

Live oak hybridizes with *Quercus bicolor* (*Q. x nessiana* Palmer); *Q. durandii*; *Q. lyrata* (*Q. x comptoniae* Sarg.); *Q. macrocarpa*; *Q. minima*; and *Q. stellata* (*Q. x harbisonii* Sarg.).

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