



Identifying Selected Oak Trees in Georgia

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Oaks are part of the family Fagaceae, which also includes American beech (*Fagus grandifolia*) and American chestnut (*Castanea dentata*). Over thirty unique oak species (*Quercus* spp.) are found in Georgia. It can be challenging to distinguish between so many kinds of oak trees. This publication uses photos to show the major physical differences between oak leaves and acorns to help Georgians distinguish between oak species. The article focuses on leaves and acorns, rather than other tree parts, because leaves and acorns often demonstrate the most easily observed differences among species. Oaks retain their leaves for much of the year making leaf characteristics relevant identifiable features. It is important to note that leaves can change shape somewhat depending on exposure to sunlight, and some minor variation in leaf shape can occur between individual trees despite being the same species. Like leaves, acorns are present for a major portion of the year, providing additional identification clues - especially for species with similar leaf shapes. Acorn size can vary within the same species, though they are generally within a defined size range.

Understanding basic morphological characteristics of leaves and acorns can help differentiate oak species in Georgia. Figure 1 displays shared characteristics of both unlobed and lobed leaves, including the leaf apex (tip), leaf base, midrib/midvein, leaf margin, and petiole (leaf stem). Lobed leaves have lobes (a usually rounded or pointed projecting part of a leaf separated by a sinus) and sinuses (the space between two lobes). Several, but not all, oak species also possess bristle tips that occur at the leaf apex on un-lobed leaves and at the ends of lobes on lobed leaves. Each of these leaf characteristics and the overall leaf shape can vary greatly between oak species. Figure 2 displays morphological characteristics of an oak tree's fruit, the acorn. Acorns also have a periderm (hard outer shell covering the nut) and the remnant of the flower style at the tip of the periderm. Acorns are primarily distinguished by their overall size and shape, and their cupule, or cap, of scales, which varies considerably in shape and scale-type.

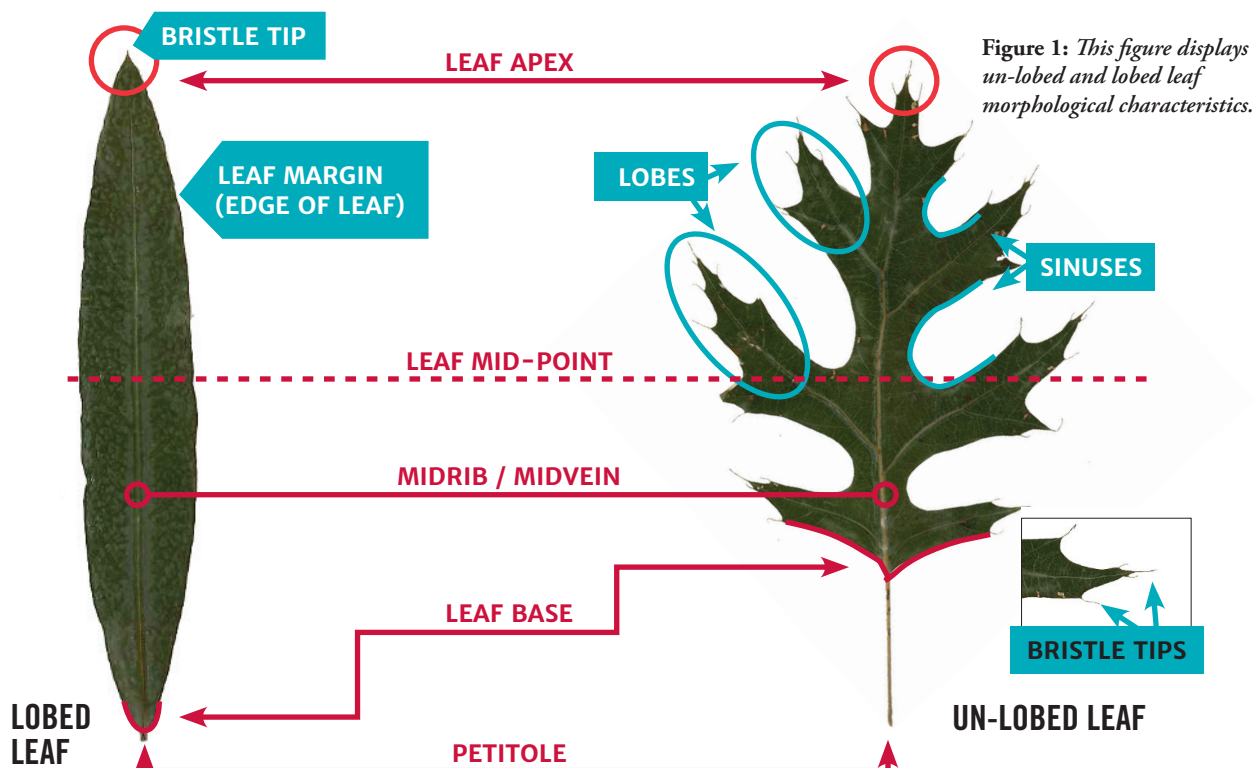


Figure 1: This figure displays un-lobed and lobed leaf morphological characteristics.

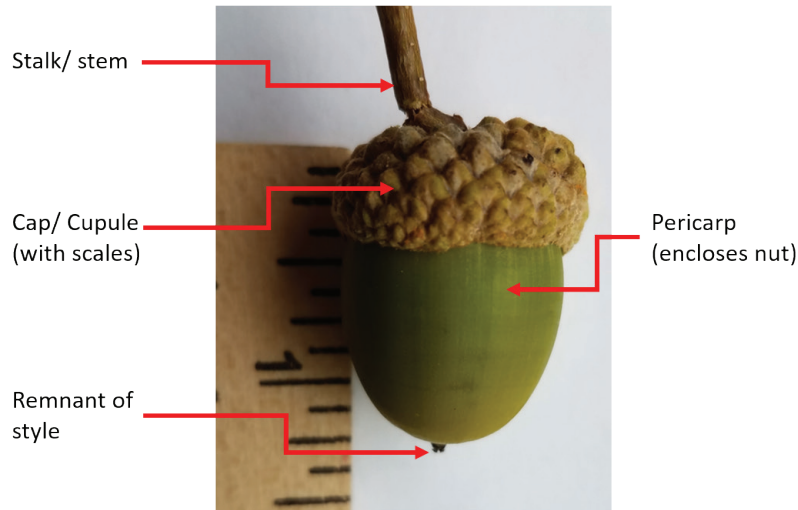


Figure 2: *This figure displays acorn morphological characteristics.*

This article does not use a dichotomous key; rather species are organized as shown in Figure 3, starting with red and white oak subgroups (visually identified by a bristle at the end of the leaf lobe), and then classified according to some of the most common oaks found in the State. Bristle-tipped leaves are almost always in the red oak subgroup while leaves without bristles are almost always in the white oak subgroup. For more information on oaks, and using a dichotomous key, see one or more field guides, such as *Native Trees of the Southeast: An Identification Guide* by Kirkman, Brown and Leopold.

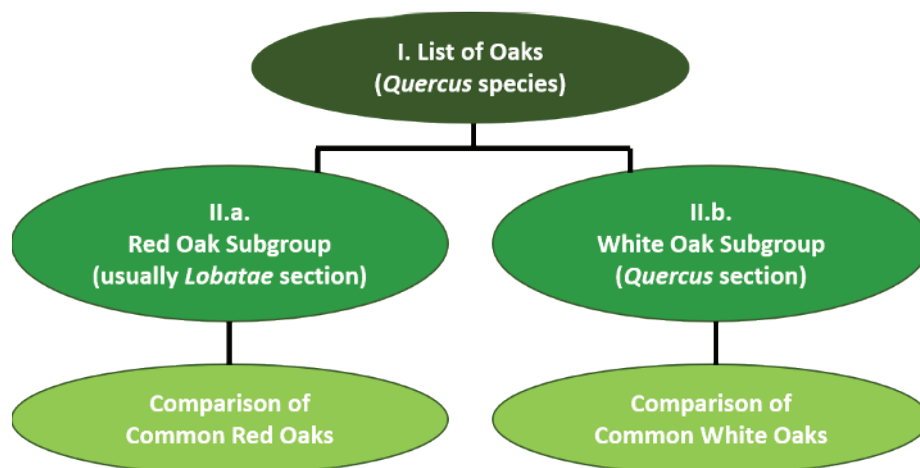


Figure 3: *Article organization.*

TABLE 1: LIST OF OAKS

Scientific Name (page number)	Common Name	Sub-Group
<i>Quercus laurifolia</i> (3)	laurel oak	Red
<i>Q. coccinea</i> (5)	scarlet oak	Red
<i>Q. falcata</i> (6)	Southern red oak	Red
<i>Q. incana</i>	bluejack oak	Red
<i>Q. laevis</i>	turkey oak	Red
<i>Q. marilandica</i> (6)	blackjack oak	Red
<i>Q. nigra</i> (3)	water oak	Red
<i>Q. pagoda</i> (4)	cherrybark oak	Red
<i>Q. palustris</i> (5)	pin oak	Red
<i>Q. phellos</i> (3)	willow oak	Red
<i>Q. rubra</i> (4)	Northern red oak	Red
<i>Q. shumardii</i> (5)	Shumard oak	Red
<i>Q. texana</i> (5)	Nuttall oak	Red
<i>Q. velutina</i> (4)	black oak	Red
<i>Q. acutissima</i> (7)	sawtooth oak (non-native)	Cerris
<i>Q. alba</i> (9)	white oak	White
<i>Q. lyrata</i> (9)	overcup oak	White
<i>Q. macrocarpa</i> (8)	bur oak (non-native)	White
<i>Q. michauxii</i> (8)	swamp chestnut oak	White
<i>Q. montana</i> (8)	chestnut oak	White
<i>Q. muehlenbergii</i> (7)	chinkapin oak	White
<i>Q. stellata</i> (9)	post oak	White
<i>Q. virginiana</i> (3)	Southern live oak	White



bluejack oak (*Q. incana*)



laurel oak (*Q. laurifolia*)



willow oak (*Q. phellos*)



water oak (*Q. nigra*)



Southern live oak (*Q. virginiana*)

OBLONG LEAVES WITH FEW OR NO LOBES

This group of oak species has oblong leaf shapes and small acorns. Major differences among the species occur in leaf size, leaf apex, presence of lobes (occasionally in water oak), widest point of the leaf above the mid-point, presence of a bristle tip, and acorn cap and periderm shape and size. Southern live oak is the only oak in this group that lacks a bristle tip and it also has a revolute (curved) leaf margin and has semi-evergreen leaves.



cherrybark oak (*Q. pagoda*)

Northern red oak (*Q. rubra*)

black oak (*Q. velutina*)

POINTED, LOBED LEAVES WITH SHALLOW SINUSES

This group of oak species have lobed leaves, shallow sinuses (that tend not to extend more than half-way to leaf mid-vein), and medium to large-sized acorns. Northern red and black oaks prefer well-drained soils (upland areas) while cherrybark oak prefers moist bottomland soils. Northern red and black oaks have large leaves (up to 8-9 in long and 5 in wide) that look similar. They can be distinguished by black oak's thicker, leathery leaves and pubescence (soft, downy "hair") on the backside of the leaf, as well as Northern red oaks flat acorn cap compared to black oak's "pixie hat" shaped acorn cap. Cherrybark has a "pagoda-shaped" leaf base with deeper sinuses than black oak. Cherrybark oak has V-shaped lower sinuses compared to C-shaped sinuses of black and northern red oaks. Cherrybark will often have an extended middle lobe and is heavily pubescent on the underside surface. Northern red oak tends to have whitish-gray vertical lines, or "ski trails" on mature stem bark.



scarlet oak (*Q. coccinea*)

pin oak (*Q. palustris*)

Shumard oak (*Q. shumardii*)



Nuttall oak (*Q. texana*)

POINTED, LOBED LEAVES WITH DEEP SINUSES

This group of oak species have lobed leaves, deep sinuses (that tend to extend more than half-way to leaf mid-vein), and small to large-sized acorns. Because the leaves of each of these species look very similar, acorns and other features can be used to distinguish them. Scarlet oak is an upland oak while Shumard oak is often found near streams and rivers. Nuttall and pin oaks are not naturally occurring in Georgia; however both species are commonly planted in urban and suburban areas along with scarlet and Shumard oaks. Scarlet oak leaves occasionally have tufts of hair on the leaf underside, their acorn caps look like “pixie hats,” and, like Northern red oak, they have vertical “ski trails” on the bark of the stem. Shumard terminal buds are large and gray compared with reddish terminal buds of scarlet and pin oaks and small gray/dark brown buds of Nuttall, and the acorns of all three species are very different in shape and size. Pin and Nuttall oaks have incised leaf margins while scarlet and Shumard have cleft margins. Pin oak have small acorns with a beret-shaped acorn cap and often have vertical orange-red “tiger striping”.



southern red oak (*Q. falcata*)



blackjack oak (*Q. marilandica*)



turkey oak (*Q. laevis*)

LOBED LEAVES WITH BELL-SHAPED BASE

This group of oak species have leaves with bell-shaped bases and varied sizes and shapes of their acorns. Southern red and turkey oaks have a much more defined bell-shaped leaf base, deep sinuses, and an extended middle lobe that looks like a “turkey-foot” leaf shape. The primary difference between these two species is that Southern red oak has a U-shaped leaf base with rusty-gray pubescence on the underside on the leaf while turkey oak has a tapered base and little or no pubescence. Additionally, Southern red oak’s acorns are ½ in long while turkey oak has 1 in long acorns. Blackjack oak has a thick, leathery leaf with shallow or no sinuses, dense, rusty-yellow pubescence on the leaf underside and a rounded acorn cap rim. All species grow naturally in upland areas, but blackjack oak is usually found on extremely dry, thin soils, Southern red oak is found throughout the state, and turkey oak is only found on dry, sandy soils in the Coastal Plain and. All three species’ leaves have bristle tips. Note that no other species in the red oak subgroup have a bell-shaped base.



sawtooth oak (*Q. acutissima*)



chinkapin oak (*Q. muehlenbergii*)

OBLONG LEAVES SERRATED OR COARSE-TOOTHED MARGINS

Sawtooth oak and chinkapin oak are distinguishable by the bristle tip serrated (saw-like) margins on sawtooth leaves, the pubescence on chinkapin's leaf underside, and differences in both species' acorns. Sawtooth also has a rounded base while chinkapin has an unequal, tapered base. Sawtooth oak, in the *Cerris* subgroup, is from Asia, whereas chinkapin, in the white oak subgroup, is native to North America. Note the difference between the chinkapin oak's leaf margin (dentate, or large sharp teeth) and the next group's (crenate or scalloped) margins.



bur oak (*Q. macrocarpa*)

swamp chestnut oak (*Q. michauxii*)

chestnut oak (*Q. montana*)

OBOVATE LEAVES WITH SHALLOW ROUNDED LOBES OR CRENATE MARGINS

Bur oak leaf is described as “fiddle-shaped” and differs from the other species by being wider on the top part of the leaf compared to the base and by having rounded, shallow lobes. Additionally, bur oak has a large acorn with a cap that covers $\frac{3}{4}$ of the nut and, though a North American species, bur oak is not native to Georgia (planted in urban and suburban areas). Swamp chestnut oak leaves have an acuminate apex and acute base while chestnut oak has an obtuse apex that looks like a lobe and an obtuse base. Chestnut oak leaves are narrower than swamp chestnut oak leaves and chestnut oak bark is dark and deeply furrowed, whereas swamp chestnut oak bark resembles white oak bark (light gray with scaly plates). Swamp chestnut and chestnut oak acorns are both 1-1 $\frac{1}{2}$ in long, but their cap and periderm shapes are different. Swamp chestnut oak tends to grow in bottomlands while the others are found in uplands.



white oak (*Q. alba*)



overcup oak (*Q. lyrata*)



post oak (*Q. stellata*)

ROUNDED, LOBED LEAVES WITH DEEP SINUSES

The true white oak leaf with its rounded lobes that point toward the leaf apex and its deep sinuses stands out among all oaks. White oak also has a distinct “warty” acorn cap and light gray scaly-plated bark. It contrasts with the overcup oak, which has pointed lobes and deep and wide sinuses. Overcup oak is an example of why pointed or rounded lobes (rather than a bristle) should not be used to distinguish oak subgroups. Overcup oak occasionally has pubescence on the back of its leaves and has a unique acorn cap that nearly encloses the nut. Post oak leaves’ lobes are positioned like a cross (hence the name *Quercus stellata*) with large rounded lobes on each side of the upper mid-rib. Post acorns are smaller in size compared to white and overcup oak. Each of these species live in varied habitats. White oak lives in a variety of habitats with well-drained soils, whereas overcup oak lives in bottomlands and post oak prefer dry, upland sites.

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