Field Guide to Native Oak Species of Eastern North America

J. Stein D. Binion R. Acciavatti





FHTET-2003-01 January 2003

Front Cover:

Clockwise from top left: white oak (*Q. alba*) acorns; willow oak (*Q. phellos*) leaves and acorns; Georgia oak (*Q. georgiana*) leaf; chinkapin oak (*Q. muehlenbergii*) acorns; scarlet oak (*Q. coccinea*) leaf; Texas live oak (*Q. fusiformis*) acorns; runner oak (*Q. pumila*) leaves and acorns; background bur oak (*Q. macrocarpa*) bark. (Design, D. Binion)

Back Cover:

Swamp chestnut oak (Q. michauxii) leaves and acorns. (Design, D. Binion)

FOREST HEALTH TECHNOLOGY ENTERPRISE TEAM

TECHNOLOGY TRANSFER

Oak Identification

Field Guide to Native Oak Species of Eastern North America

John Stein and Denise Binion Forest Health Technology Enterprise Team USDA Forest Service 180 Canfield St., Morgantown, WV 26505

Robert Acciavatti Forest Health Protection Northeastern Area State and Private Forestry USDA Forest Service 180 Canfield St., Morgantown, WV 26505



United States Department of Agriculture



Forest Service

NORTH AMERICA



100th Meridian

ACKNOWLEDGMENTS

The authors wish to thank all those who helped with this publication. We are grateful for permission to use the drawings illustrated by John K. Myers, Flagstaff, AZ, published in the Flora of North America, North of Mexico, vol. 3 (Jensen 1997). We thank Drs. Cynthia Huebner and Jim Colbert, U.S. Forest Service, Northeastern Research Station, Disturbance Ecology and Management of Oak-Dominated Forests, Morgantown, WV; Dr. Martin MacKenzie, U.S. Forest Service, Northeastern Area State and Private Forestry, Forest Health Protection, Morgantown, WV; Dr. Steven L. Stephenson, Department of Biology, Fairmont State College, Fairmont, WV: Dr. Donna Ford-Werntz, Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV; Dr. Ron Lance, President, International Oak Society, Chimney Rock, NC; and Dr. Fernando Zavala-Chavez, Division of Forest Science, Universidad Autonoma Chapingo, Chapingo, Mexico, for their technical review comments. Their input helped to greatly improve the manuscript. In addition, we thank Claudia Violette, Frost Entomological Museum, Pennsylvania State University, University Park, PA, for her editorial services. We are indebted to the following sources for use of various oak images: Shirley Denton, Biological Research Associates, Tampa, FL; Joyce Foster, U.S. Forest Service, Sumter National Forest, Long Cane Ranger District, Edgefield, SC; Tihomir Kostadinov, Student, University of Richmond, Richmond, VA; Ron Lance, President, International Oak Society, Chimney Rock Park, Chimney Rock, NC; Chuck Milner, U.S. Forest Service, Cibola National Forest, Black Kettle Ranger District, Cheyenne, OK; Gil Nelson, Robert K. Godfrey Herbarium, Florida State University, Tallahassee, FL; Guy Sternberg, Starhill Forest Arboretum, Petersburg, IL; Paul Wray, Department of Forestry, Iowa State University, Ames, IA (photos obtained from Forestry Images web site, University of Georgia); Texas A&M University, College Station, TX; and West Virginia University, Eberly College of Arts and Sciences (Herbarium), Morgantown, WV. Finally, the authors wish to extend their appreciation to Nancy Lough and Sandy Fosbroke, U.S. Forest Service, Northeastern Area State and Private Forestry, Information Management and Analysis, Morgantown, WV, for their advice and formatting of this field guide.

Photo credits: **R. Acciavatti** – *Q. havardii* (habitat), *Q. ilicifolia* (habitat); **D. Binion** – *Q. bicolor* (acorn, bark), *Q. falcata* (bark), *Q. havardii* (leaf), *Q. nigra* (bark), *Q. phellos* (bark); **S. Denton** – *Q. chapmanii* (leaf, acorn), *Q. falcata* (acorn), *Q. geminata* (leaf, immature/mature acorn); **J. Foster** –

O. oglethorpensis (leaf, bark, tree); **T. Kostadinov** – *O. coccinea* (leaf), Q. falcata (leaf), Q. montana (bark), Q. nigra (leaf), Q. velutina (bark); R. Lance – Q. acerifolia (leaf), Q. arkansana (leaf, acorn, bark), Q. austrina (leaf, acorn, bark), Q. boyntonii (leaf, acorn, tree), Q. buckleyi (leaf, acorn, bark), Q. coccinea (acorn), Q. fusiformis (leaf, acorn, bark), Q. georgiana (leaf, acorn), *Q. hemisphaerica* (leaf, acorn), *Q. ilicifolia* (acorn), *Q. incana* (leaf, acorn, bark), Q. laceyi (leaf, acorn), Q. laevis (leaf, acorn, bark), Q. laurifolia (leaf, acorn, bark), Q. lyrata (leaf, acorn), Q. margaretta (leaf, acorn, tree), O. marilandica (leaf, acorn, bark), O. michauxii (leaf, acorn, bark), Q. minima (leaf, acorn, habitat), Q. montana (leaf, acorn), Q. myrtifolia (leaf, acorn), Q. pagoda (leaf, acorn, bark), Q. phellos (leaf, acorn), Q. prinoides (leaf, acorn), Q. pumila (leaf, acorn, habitat), O. shumardii (leaf, acorn), O. similis (leaf, acorn, bark), O. sinuata (leaf, acorn), Q. texana (leaf, acorn), Q. vasevana (leaf, acorn), Q. virginiana (leaf, acorn); C. Milner – Q. havardii (acorn); G. Nelson – Q. inopina (acorn, leaf); J. Stein – Q. ilicifolia (leaf, bark), Q. imbricaria (bark), Q. muehlenbergii (bark), Q. myrtifolia (bark), Q. nigra (acorn), Q. rubra (bark), *Q. stellata* (bark), *Q. virginiana* (bark, trunk, tree); G. Sternberg – *Q. macrocarpa* (trunk), *Q. mohriana* (leaf, acorn, bark, tree), *Q. pungens* (leaf, acorn, habitat); Texas A&M – Q. fusiformis (tree), Q. hemisphaerica (tree), *Q. vaseyana* (tree); West Virginia U. – *Q. coccinea* (bark), Q. shumardii (bark); and **P. Wray** – Q. alba (leaf, acorn, bark), Q. bicolor (leaf), Q. ellipsoidalis (leaf, acorn), Q. imbricaria (leaf, acorn), *O. macrocarpa* (leaf, acorn, bark), *O. muehlenbergii* (leaf, acorn), Q. palustris (leaf, acorn, bark), Q. rubra (leaf, acorn), Q. stellata (leaf, acorn), *O. velutina* (upper/lower leaf surface, acorn). Permission should be obtained from the photographers to receive and use quality images for publication.

The U.S. Forest Service, Forest Health Technology Enterprise Team, Morgantown, WV, published this book with support from the U.S. Forest Service's Northeastern Area State and Private Forestry, Forest Health Protection, Newtown Square, PA; Northeastern Area State and Private Forestry, Information Management and Analysis, Morgantown, WV; and the Southern Region, Forest Health Protection, and Cooperative Forestry, Atlanta, GA.

TABLE OF CONTENTS

Introduction		1
Species Descriptions		5
Q. acerifolia	maple-leaf oak	6
Q. alba	white oak	8
Q. arkansana	Arkansas oak	10
Q. austrina	bastard white oak	12
Q. bicolor	swamp white oak	14
Q. boyntonii	Boynton oak	16
Q. buckleyi	Buckley oak	18
Q. chapmanii	Chapman oak	20
Q. coccinea	scarlet oak	22
Q. ellipsoidalis	northern pin oak	24
Q. falcata	southern red oak	26
Q. fusiformis	Texas live oak	28
Q. geminata	sand live oak	30
Q. georgiana	Georgia oak	32
Q. havardii	Havard oak	34
Q. hemisphaerica	laurel oak	36
Q. ilicifolia	bear oak	38
Q. imbricaria	shingle oak	40
Q. incana	bluejack oak	42
Q. inopina	Florida oak	44
Q. laceyi	Lacey oak	46
Q. laevis	turkey oak	48
Q. laurifolia	swamp laurel oak	50
Q. lyrata	overcup oak	52
Q. macrocarpa	bur oak	54
Q. margaretta	sand post oak	56
Q. marilandica	blackjack oak	58
Q. michauxii	swamp chestnut oak	60
Q. minima	dwarf live oak	62
Q. mohriana	Mohr oak	64
Q. montana	chestnut oak	66
Q. muehlenbergii	chinkapin oak	68

Q. myrtifolia	myrtle oak	70
Q. nigra	water oak	72
Q. oglethorpensis	Oglethorpe oak	74
<i>Q. pagoda</i>	cherrybark oak	76
Q. palustris	pin oak	78
Q. phellos	willow oak	80
Q. prinoides	dwarf chinkapin oak	82
Q. pumila	runner oak	84
Q. pungens	sandpaper oak	86
<i>Q. rubra</i>	northern red oak	88
Q. shumardii	Shumard oak	90
Q. similis	swamp post oak	92
Q. sinuata	bastard oak	94
Q. stellata	post oak	96
<i>Q. texana</i>	Texas red oak	98
Q. vaseyana	Vasey oak	100
Q. velutina	black oak	102
Q. virginiana	southern live oak	104
Ecosystems of Eastern North An	merica	106
Ecoregion Province Legend		107
Species Summary		108
Table 1. Native Red Oaks		109
Table 2. Native White Oaks		114
Key to Leaves of Eastern Native	e Oaks	120
Leaf Characteristics		121
Oak Groups		122
Red Oaks		123
White Oaks		136
Glossary		148
Selected References		151
Index of Common Names		153
Index of Scientific Names		157
Reference Charts for Red and White Oak Leaves		

INTRODUCTION

Oaks are primarily temperate region trees and shrubs numbering approximately 600 species worldwide. Oaks have occupied the nonglaciated landscape of North America since the Cretaceous Period. Fifty oak species are represented in two-thirds of the eastern North American forest cover types and dominate 68 percent of hardwood forests (191 million acres).

Oaks have figured prominently in folklore, construction, food sources, medications, and dyes. Great political events have occurred under "charter oaks," and Native Americans utilized acorns as food (particularly the sweeter white oaks) and the inner bark as medicine (*Q. falcata*, *Q. ilicifolia*, *Q. imbricaria*, *Q. muehlenbergii*, *Q. rubra*, and others). This genus, which includes economically important hardwoods, is also critical for meeting watershed, recreation, and wildlife management goals.

The encroachment of urbanization, agriculture, and hydrologic projects continues to negatively impact oak forest types. Such impacts may necessitate the establishment of conservation districts for vulnerable species. Comments in the text associated with conservation status are based upon information compiled by the World Conservation Monitoring Center and published in association with the International Union for Conservation of Nature and Natural Resources (IUCN) in the 1997 IUCN Red List of Threatened Plants (Walter and Gillett 1998). In the southern United States, forest management practices favor conifers replacing hardwood forests in rich bottomlands. A new source of concern involves the threat of displacement of native oaks by exotic species. Forest types are placed at risk with the introduction of non-native insects, diseases, and plants. In 1997, a fungal pathogen (Phytophthora ramorum) was identified as the cause of Sudden Oak Death (SOD) in California. Screening for potential hosts has identified some susceptible species of eastern red oaks. Additional susceptible hosts include commercial nursery stock (rhododendrons, bay laurel, huckleberry, and others), which increase the probability that SOD will spread to eastern North America.

As the list of susceptible oak and understory hosts expands, this guide will help fill the need to identify and determine the natural occurrence of specific oak species in eastern North America and document any potential loss of species from states or counties.

This field guide provides an illustrated reference for identification of eastern oaks and can be used in several ways. Oak identification can be accomplished by utilizing the leaf keys, cross referencing scientific or local common names in the index, verifying similarities between leaf specimens and the illustrated oak leaf reference charts, and comparing descriptions provided for each species. Distribution maps may also aid in the separation of similar appearing species. The distribution of each oak species can be further defined according to ecoregion. A map of the eastern North American ecoregion provinces is provided (p. 106) and ecoregion provinces associated with each oak species are also included in the summary tables (pp. 109-119). The same common names may be used for different species or many common names may be applied to a single species in more than one location. Therefore, the preferred name is shown in bold with other names cross referenced in the index. Leaf morphology may vary considerably depending upon a combination of hybridization, tree age, position in the crown, and available sunlight. Many oaks are noted for hybridizing with other species in the same subgenus. Such progeny differ from the typical form, are usually isolated individuals or have a limited distribution, and are not included here. Characteristics used in the field identification key are limited to mature leaves with full exposure to the sun. When using the key, it is recommended that species verification be made by reference to other tree characteristics listed in the text.

The genus *Quercus* is generally divided into two major groups: red (Table 1) and white (Table 2) oaks. White oaks are in the *Quercus* subgenus *Leucobalanus* and have leaves lacking bristles on the lobes or leaf apex. Some species (*Q. havardii*, *Q. minima*, *Q. vaseyana*) have lobes modified into short small points called mucronate tips.

Acorns require one growing season (annual) to mature. Cup scales are thick, usually with a keel, and have a callus growth at the base. The cup has a smooth inner surface, lacking pubescence. The heartwood has clogged vessels, making it impervious to liquids, a characteristic utilized for cooperage in the wine and liquor industry.

Red oaks are in the *Quercus* subgenus *Erythrobalanus*. This group of oaks is characterized by having leaves with bristles at the tips of the lobes and the leaf apex. The acorns require two growing seasons (biennial) to mature and the overlap in age should be evident when comparing nut size on current and second-year twig growth. Cup scales are thin, flat, and without a callus growth at their base. The inner surface of the cup has velvety hairs. These oaks have open vessels in the heartwood that allow absorption of liquid, a characteristic utilized in the penetration of wood preservatives.

This field guide includes all native oak species occurring east of the 100th meridian in North America north of Mexico. The nomenclature and treatment of species follows the protocol in the Flora of North America (Jensen 1997). Individual species descriptions are based on several sources (Miller and Lamb 1985, Jensen 1997). Distribution records were obtained from USDA Forest Service data, voucher plant specimens, published state floras, and other literature. Native species in arboreta and landscape plantings outside their natural distribution are excluded from the maps (e.g. Canadian occurrence of scarlet oak (*Q. coccinea*)). The natural distribution of each species is presented at the county level except for Canada and Mexico. There are several species whose range overlaps the 100th meridian or the Mexican border; these are documented on the distribution maps. Seven species of white oaks (Q. fusiformis, Q. laceyi, Q. mohriana, Q. muehlenbergii, Q. pungens, Q. sinuata, and Q. vaseyana) with a Mexican distribution extending from Texas are also noted on distribution maps. The reader is referred to other publications (Muller 1942, Elias 1980, Zavala-Chavez 1989) for details on the oak flora of Mexico

Information on introduced oaks such as the sawtooth oak (*Q. acutissima*), European turkey oak (*Q. cerris*), blue Japanese oak (*Q. glauca*), Chinese evergreen oak (*Q. myrsinifolia*), English oak (*Q. robur*), durmast oak (*Q. petraea*), and oriental oak (*Q. variabilis*) can be found in ornamental and landscape tree publications.





Sawtooth oak

English oak

The leaf shapes of *Q. acutissima* (left) and *Q. robur* (right) are representative of most introduced oak species used as landscape trees. (Images, D. Binion)

SPECIES DESCRIPTIONS



Mature bur oak, Q. macrocarpa (Photo, G. Sternberg)

Quercus acerifolia Stoynoff & Hess

Maple-leaf oak

GROWTH FORM: small to medium tree, which grows to 50 feet (15.2 m). **BARK:** dark gray to black with shallow furrows. **TWIGS and BUDS:** gray to grayishbrown, twigs may have slight pubescence; elliptical terminal buds with coloration similar to twigs. **LEAVES:**



smooth petiole $\frac{3}{4}$ - 1 $\frac{3}{4}$ inches (19 - 44 mm) in length; leaf blade broadly elliptical, 4 - 6 inches (101 - 152 mm) long, 2 $\frac{3}{4}$ - 5 $\frac{1}{2}$ inches (70 - 140 mm) wide, 5 - 7 lobes with acute bristled tips, base truncated to obtuse, apex acute; smooth and green above, paler green with



axillary tomentum beneath, secondary veins prominent on both surfaces. **ACORNS:** biennial; light brown saucershaped cup with pubescent scales, chestnut-brown inner surfaces with pubescent ring around nut scar, covers $\frac{1}{4} - \frac{1}{3}$ of the nut; oblong nut with slight pubescence, $\frac{3}{4}$ inch (19 mm) long. **HABITAT:** limited occurrence on slopes and ridges of mountains. **DISTRIBUTION:** specific to four counties (Logan, Montgomery, Polk, and Sebastian) in Arkansas.



COMMENTARY: The Latin and common names are derived from resemblance of its foliage to that of a maple. Although maple-leaf oak is found in the Ouachita Mountains of Arkansas, there is an unconfirmed report of its occurrence on Rich Mountain, Le Flore County, Oklahoma. Maple-leaf oak is considered endangered by IUCN.

Quercus alba Linnaeus

White oak eastern white oak, stave oak, forked-leaf white oak

GROWTH FORM: popular and long-lived shade tree, which grows to 100 feet (30.5 m), with a widespreading rounded crown and with numerous horizontal branches. **BARK:** light gray, shallow furrows forming scaly ridges or plates. **TWIGS and BUDS:** slender to stout, gray to reddish-green



twigs with star-shaped pith; buds are reddish-brown and broadly oval and hairless. **LEAVES:** petiole $\frac{3}{8}$ - 1 inch (10 - 25 mm) in length; obovate to elliptical leaves, 4 - 8 inches (101 - 203 mm) long, 2 $\frac{3}{4}$ -4 $\frac{3}{4}$ inches (70 - 121 mm) wide, margin with 5 - 9 lobes that are widest beyond middle, deep sinuses extending a third or more to midrib; base acute to cuneate, apex broadly rounded; dull or shiny grayish green above, light green with slight pubescence which becomes smooth



beneath as they mature. **ACORNS:** annual; 1 - 3 acorns on peduncle up to 1 ¼ inch (32 mm) long, light gray pubescent cup, enclosing ¼ of the nut; light brown, oblong nut, up to 1 inch (25 mm) long; germinates in the fall after dropping to the ground. **HABITAT:** dry upland slopes to welldrained loam in bottomlands; may grow as a shrub at 4,500 feet (1,372 m) elevation in the southern Appalachian Mountains and reaches maximum potential height on lower slopes of the Allegheny Mountains and bottomlands of the Ohio Basin.





DISTRIBUTION: eastern Canada and the United States from Quebec and Ontario west to

Minnesota, south to Texas, east to Florida, and north to Maine.



COMMENTARY: White oak is one of the most important species in the white oak group. The wood is used for furniture, flooring, and specialty items such as wine and whiskey barrels. Used for shipbuilding in colonial times. Continues to be displaced in the market place by several species of red oaks. Acorns are a favorite food source for birds, squirrels, and deer. Used as medication by Native Americans. The largest known white oak specimen had a circumference of 32 feet and grew in the Wye Oak State Park, Talbot County, Maryland. It was destroyed during a storm on June 6, 2002.

Quercus arkansana Sargent

Arkansas oak Arkansas water oak, water oak

GROWTH FORM: a medium sized tree with a narrow crown, growing to 95 feet (28.9 m). **BARK:** black with deep furrows, inner bark orangish-red. **TWIGS and BUDS:** brown twigs with gray pubescence and prominent yellowish-brown lenticels; chestnut-brown, ovoid buds with slightly ciliate scale margins. **LEAVES:** obovate



shape, 2 - 6 inches (51 - 152 mm) long, 1 ³/₈ - 4 inches (35 - 101 mm) wide; margin entire with 3 lobes and up to 10 bristle tips, shallow sinuses with rounded lobes; smooth and yellowish-green above,



paler green with axillary tufts of pubescence beneath. **ACORNS:** biennial; thin, brown, goblet-shaped cup with pubescent scales, inner surface sparse to conspicuously pubescent, covers $\frac{1}{4} - \frac{1}{2}$ of the nut; elliptical nut $\frac{5}{6}$ inch (16 mm) long, mature nut is brown to black with faint stripes. **HABITAT:** occurs sporadically on welldrained sandy soils in hardwood stands. **DISTRIBUTION:** Arkansas and Louisiana east to Georgia and Florida.





COMMENTARY: The Latin and common names are derived from its initial discovery in Arkansas. The IUCN considers Arkansas oak rare in Arkansas, endangered in Florida, and vulnerable in Alabama, Georgia, and Louisiana. The largest known Arkansas oak grows in Covington County, Mississippi.

Quercus austrina Small

Bastard white oak bluff oak

GROWTH FORM: large tree growing to 75 feet (22.9 m). **BARK:** pale gray, mature bark developing into broad ridges. **TWIGS and BUDS:** dark brown twigs with corky white lenticels; chestnut-brown ovoid bud with pubescent scales, pointed apex. **LEAVES:** very short petiole up to ¹/₄ inch (6 mm) long; leaf blade narrowly obovate, up to 4 inches (101 mm)



long, 2 inches (51 mm) wide; margin entire with 3 - 9



rounded lobes, shallow sinuses; base



cuneate or attenuate, rounded apex; smooth, shiny, dark green above, grayish-green and smooth with slight axillary pubescence below; secondary veins prominent on both surfaces. **ACORNS:** annual; 1 - 2 acorns on a stout peduncle up to $\frac{5}{6}$ inch (16 mm) in length; goblet-shaped cup with gray scales, covers $\frac{1}{3} - \frac{1}{2}$ of the nut; brown ovoid nut, $\frac{5}{6}$ inch (16 mm) long. **HABITAT:** well-drained, rich bottomland soils along streams and next to river bluffs. **DISTRIBUTION:** Mississippi east to North Carolina.





COMMENTARY: Bastard white oak is a widespread species, mostly sporadic, but may be abundant in localized areas. Leaf shape is variable and can be similar to *Q. sinuata* and *Q. nigra*.

Quercus bicolor Willdenow

Swamp white oak white oak

GROWTH FORM: large tree that grows to 100 feet (30.5 m) with an irregular crown. **BARK:** dark gray, deep furrows forming scaly or flat-ridges. **TWIGS and BUDS:** smooth, light brown twigs; buds light orangish-brown, smooth, ovoid and blunt. **LEAVES:** petiole from $\frac{3}{8}$ - 1 inch (10 - 25 mm) long; leaves are narrowly elliptical to obovate,





varies up to 7 inches (178 mm) long and 4 % inches (111 mm) wide; base cuneate to acute, rounded apex; margin with 10 - 20 lobes with shallow

> sinuses, distal half of blade may have teeth; glossy dark green above with white velvety pubescence beneath.



ACORNS: annual; 1 - 2 acorns on peduncle up to 4 inches (101 mm) long; grayish-green cup with scales covered with fine gray tomentum, cup rim often has spinose bristles, cup covers ½ to ¾ of the nut; oblong or ovoid, light brown nut, up to 1 ¼ inches (32 mm) long. HABITAT: poorly-drained mineral soils. DISTRIBUTION: Minnesota south



to Nebraska, east to North Carolina, and north to Quebec and Maine.



COMMENTARY: The scientific name refers to the difference in coloration between upper and lower leaf surface. Swamp white oak produces a hard wood that has been used for construction, cabinet making, boat building, railroad ties, fencing, and cooperage. The Iroquois peoples used this oak as medicine. The two largest known specimens grow in Highland County, Virginia, and Washington County, Ohio.

Quercus boyntonii Beadle

Boynton oak

GROWTH FORM: semievergreen deciduous or rhizomatous shrub, which grows to a height of 6 ½ feet (2 m), occasionally to a height of 19 feet (5.8 m). **BARK:** brown and scaly. **TWIGS and BUDS:** light brown pubescent twigs; reddishbrown buds, ovoid with a rounded apex and sparsely



pubescent scales. **LEAVES:** petiole up to ³/₈ inch (10 mm) long; obovate or narrowly obovate leaves, up to 4 inches (101 mm) long and



2 % inches (60 mm) wide, base is cuneate; margin with 3 - 5 irregularly rounded lobes; apex triangular-lobed; shiny dark green above, grayish pubescence beneath. **ACORNS:** annual; 1 - 2 acorns on a peduncle up to % inch (10 mm) long, pubescent gray cup covers up to $\frac{1}{2}$ of the nut; light brown, ovoid nut with rounded tip, up to % inch (16 mm) in length. **HABITAT:** localized occurrence associated with sandstone outcrops. **DISTRIBUTION:** rare with a restricted occurrence in Alabama

occurrence in Alabama and Texas; found on the summit of Lookout Mountain, Etowah County, Alabama.





COMMENTARY: Boynton oak is rare and rated as endangered by the IUCN. The Texas distribution record is questionable and may have resulted from taxonomic confusion associated with early collections.

Quercus buckleyi Nixon and Dorr

Buckley oak Texas red oak, Spanish oak, spotted oak

GROWTH FORM: considered a small tree that grows to 60 feet (18.3 m). **BARK:** varies from gray and smooth to black and furrowed. TWIGS and BUDS: twigs are smooth and vary from gray to brown; terminal buds vary from gray to reddishbrown with ciliated apical scales, $\frac{1}{4}$ inch (6 mm) in length. **LEAVES:** smooth petiole $\frac{3}{4}$ - 1 $\frac{3}{4}$ inches (19 - 44 mm) in





lobes, 12 - 35 awns, lobes may be distally expanded, apex acute to acuminate; glossy green above, light green to coppery-green below with tomentum. veins raised on both leaf

> surfaces. ACORNS: biennial; cup scales smooth to sparsely pubescent,

inner surface smooth, covers $\frac{1}{3} - \frac{1}{2}$ of nut; smooth or slightly pubescent, broadly ovoid nut, $\frac{3}{4}$ inch (19 mm) long. **HABITAT:** restricted habitat associated with limestone ridges, slopes and creek bottoms. **DISTRIBUTION:** limited range in central Oklahoma and Texas.





COMMENTARY: This species was named for Samuel B. Buckley, botanist and state geologist of Texas. Buckley oak leaves are similar to the Texas red oak, *Q. texana*, but the two species do not overlap in their distributions. This species should be considered a conservation concern. The largest known Buckley oak grows in Travis County, Texas.

Quercus chapmanii Sargent

Chapman oak Chapman white oak, scrub oak

GROWTH FORM:

deciduous or semi-evergreen shrub, which grows to 10 feet (3 m), often rhizomatous, or a small tree to 45 feet (13.7 m). **BARK:** grayish-brown with irregular scales. **TWIGS and BUDS:** twigs are grayish-tan to yellowish-tan with patches



of fine tomentum, terminal buds are reddish-brown with smooth distal scales. **LEAVES:** small smooth petiole $\frac{1}{8}$ inch (3 mm) long; leaves are obovate, 1 $\frac{1}{2}$ - 3 $\frac{1}{2}$ inches (38 - 89 mm) long and $\frac{3}{4}$ - 1 $\frac{1}{2}$ inches (19 - 38 mm) wide, margins are minutely wavy and many have shallow irregular lobes toward tip of leaf, apex rounded, base cuneate; upper surface is glossy dark green, and light gray or yellow with yellowish pubescence beneath. **ACORNS:** annual; 1 - 2 acorns on a peduncle



up to $\frac{1}{2}$ inch (13 mm) in length; cup has gray tomentum on scales, covering $\frac{1}{3} - \frac{1}{2}$ the nut; light brown nut is oval with a rounded apex, and may have

pubescence. **HABITAT:** on xerophytic sandy soils of open pine forest and oak scrublands on sand ridges and coastal dunes in the lower coastal plain near sea level. **DISTRIBUTION:** sporadic occurrence near the coast of Alabama, Florida, Georgia and South Carolina.





COMMENTARY: Named for A. W. Chapman who first described this species in his *Flora of the Southern United States*. Chapman oak is abundant along the west coast of Florida from Tampa Bay north to Panama City. The largest known specimen grows in the Ocala National Forest east of Ocala, Florida.

Quercus coccinea Muenchhausen

Scarlet oak black oak, red oak, Spanish oak

GROWTH FORM: fast growing large tree that can obtain a height of 120 feet (36.6 m), with frequent downward arching branches, trunk usually enlarged at the base, and usually retains dead branches. **BARK:** brown with fine fissures and scaly ridges, inner bark is red to orangish-pink. **TWIGS and BUDS:** twigs are smooth



reddish-brown; clustered terminal buds are ovoid and reddish-brown with pubescence near the apex, 5-angled in cross section. **LEAVES:** smooth petiole $\frac{3}{4} - 2$ $\frac{3}{8}$ inches (19 - 60 mm) in length; leaves are elliptic to obovate, 2 $\frac{3}{4} - 6$ $\frac{1}{4}$ inches (70 - 159 mm) long, 3 - 5 $\frac{1}{8}$ inches (76 - 130 mm) wide, margins with 5 - 9 lobes extending more than $\frac{1}{2}$ the distance to the midrib, base truncate, apex acute; upper surface a glossy light green, with tufts of axillary tomentum beneath,



secondary veins raised on both surfaces. **ACORNS:** biennial; cup is a glossy dark reddishbrown, inner surface is smooth and light brown, covering $\frac{1}{3} - \frac{1}{2}$ the nut; bluntly oblong nut, $\frac{1}{2} - \frac{7}{8}$ inches (13 - 22 mm) in length, smooth with concentric rings at apex. **HABITAT:** found in a variety of habitats including poor soils in mixed forests, especially on upland ridges; this oak is probably a climax tree on dry soils. **DISTRIBUTION:** range extends from Maine west to Michigan, south to Missouri and Mississippi, and east to South Carolina and the eastern Atlantic coast.





COMMENTARY: Scarlet oak lumber is marketed as red oak but is of poorer quality than *Q. rubra* or *Q. velutina*. This species is very susceptible to fire damage because of its thin bark. Such injuries often result in heart rot. Grows rapidly and begins to bear fruit at age 20. Acorns provide food for squirrels, chipmunks, mice, deer, wild turkey, bluejays, and redheaded woodpeckers. Extensively planted as an ornamental tree because of its brilliant autumn color, and has been introduced into Canada and Europe. The largest known scarlet oak grows in Powell County, Kentucky.

Quercus ellipsoidalis Hill

Northern pin oak jack oak, Hill's oak, black oak

GROWTH FORM: medium tree grows to 66 feet (20.1 m), rarely to 130 feet (39.6 m), with a narrow crown. **BARK:** dark gray-brown with shallow fissures producing thin plates, inner bark orange in color. **TWIGS and BUDS:** twigs are first covered with hairs and then become smooth and reddish-brown; terminal buds are a shiny reddish-



brown with scales ciliated along the margin, slightly angled in cross section. **LEAVES:** smooth petiole $\frac{3}{4}$ - 2 inches (19 - 51 mm); leaves are elliptical, 2 $\frac{3}{4}$ - 5 $\frac{1}{8}$ inches (70 - 130 mm) long, and 2 - 4 inches (51 - 101 mm) wide, the base is truncate and the apex is acute, margins



have 5 - 7 deep lobes extending more than ¹/₂ the distance to midrib with bristlepointed teeth, upper surface is a shiny light green and paler below with minute axillary tufts of tomentum along the midvein. **ACORNS:** biennial; outer surface of cup is grayish-brown or reddish-brown and pubescent, inner surface is light brown and smooth, cup covers $\frac{1}{3} - \frac{1}{2}$ of the nut; elliptical to ovoid nut $\frac{1}{2} - \frac{3}{4}$ inches (13 - 19 mm) long, concentric apical rings are infrequent. **HABITAT:** dry sandy soils sites in the northern and central boreal forest region; found



associated with species of pine, oak, hickory, aspen, and black cherry. **DISTRIBUTION:** occurs from Ontario south to northern Missouri, and east to Ohio and Michigan.



COMMENTARY: Northern pin oak is reduced to shrubby growth at the edge of its range. The largest known specimen grows in Bay Village, Cuyahoga County, Ohio.

Quercus falcata Michaux

Southern red oak Spanish oak, swamp red oak, water oak, turkey-foot oak

GROWTH FORM: moderately fast growing, medium to large tree, which grows to 150 feet (45.7 m); tree with a short bole and a globe shaped crown. **BARK:** dark gray, developing furrows produce ridges and scaly plates; inner bark is orange. **TWIGS and BUDS:** pubescent reddish-brown twig with star shaped pith; reddish-brown terminal bud is ovoid and pubescent. **LEAVES:**



petiole ³/₄ - 2 ³/₈ inches (19 - 60 mm) in length, smooth to sparsely



pubescent; leaves are elliptical to ovate, 4 - 11 $\frac{3}{4}$ inches (101 - 298 mm) long and 2 $\frac{3}{6}$ - 6 $\frac{1}{4}$ inches (60 - 159 mm) wide, u-shaped base, margin has 3 - 7 deeply divided lobes with 1 - 3 bristle-tipped teeth, apex longer than



lateral lobes; upper surface a glossy green often with some pubescence along midrib, lower surface covered with gray or tawny pubescence, secondary veins raised on both surfaces. **ACORNS:** biennial; thin, reddish-brown cup with pubescent inner and outer surface, usually covers up to $\frac{1}{3}$ of the nut; rounded, brown nut, $\frac{3}{6} - \frac{5}{6}$ inch (9 - 16 mm) long, may be striated at the tip with pubescence. **HABITAT:** dry upland sites of sandy or clay loam throughout the southeastern



United States. **DISTRIBUTION:** occurs from New Jersey and Florida west to Oklahoma and Texas.



COMMENTARY: Southern red oak lumber is marketed as red oak for construction and furniture. This oak is common throughout the South and often called Spanish oak because of the association with early Spanish settlement. The largest known southern red oak grows in Upson County, Georgia.

Quercus fusiformis Small

Texas live oak scrub live oak, live oak

GROWTH FORM: evergreen shrub or small tree, which grows to 40 feet (12.2 m) with a spreading crown. **BARK:** dark gray, developing furrows produce ridges and scaly plates; inner bark is orange. **TWIGS and BUDS:** light gray pubescent twigs, slender and stiff; bud reddish to dark brown, ovate with smooth or pubescent scales. **LEAVES:** petiole less than $\frac{3}{6}$ inch (10 mm) long; leaves are thick elliptical or narrowly ovate 1 $\frac{1}{8}$ - 3 $\frac{1}{2}$ inches



(29 - 89 mm) long, and ³/₄ - 1 ¹/₂ inches (19 - 38 mm) wide, base cordate, leaf margin entire and slightly revolute (rolled under), may be irregularly toothed at tip or along sides, apex usually obtuse or rounded and may end in a tiny point, upper surface a glossy light to



dark green, grayishgreen beneath with dense pubescent bloom that rubs off.
ACORNS: annual; peduncle $\frac{1}{6} - \frac{1}{8}$ inches (3 - 29 mm) supporting 1 - 5 nuts, cup has narrow base, light gray scales with reddish-tips may be smooth or pubescent encloses $\frac{1}{4} - \frac{1}{2}$ of nut; dark brown, narrow and oblong nut with light brown stripes, $\frac{5}{6} - 1$ inch (16 - 25 mm) long. **HABITAT:** limestone or



calcareous loam soils. **DISTRIBUTION:** limited to Oklahoma, Texas and the mountains of northeastern Mexico (Coahuila, Nuevo Leon, and Tamaulipas).



COMMENTARY: The largest known Texas live oak grows in Real County, Texas.

Quercus geminata Small

Sand live oak

GROWTH FORM:

evergreen rhizomatous shrub or medium tree to 50 feet (15.2 m), occasionally to 95 feet (28.9 m). **BARK:** dark brown or black with scaly plates. **TWIGS and BUDS:** light tan to light gray pubescent twigs becoming smooth the



second year; dark brown ovoid buds, scale margins may be pubescent. **LEAVES:** short petiole $\frac{1}{8}$ - $\frac{3}{8}$ inch (3 - 10 mm) in length, leaf blade narrowly elliptic, 1 $\frac{3}{8}$ - 2 $\frac{3}{8}$ inches (35 - 60 mm) long $\frac{3}{8}$ - 1 $\frac{1}{8}$ inches (10 - 29 mm) wide, cupped beneath, base cuneate, margins entire



revolute (wavy); upper surface is shiny, light to dark green with impressed secondary veins, lower surface covered with dense whitish bloom (glaucous) that rubs off. **ACORNS:** annual; produced in clusters of 1 - 3 on long peduncles $\frac{3}{6}$ - 4 inches (10 - 101 mm) in length; cup with whitish or gray scales that are smooth or pubescent, covers $\frac{1}{3}$ of nut; smooth, dark brown, ovoid or barrel-shaped nut, $\frac{5}{6}$ - 1 inch (16 - 25 mm) long. **HABITAT:** deep sandy soils in mixed pine or hardwood stands.



DISTRIBUTION: Louisiana to North Carolina on the coastal plain.



COMMENTARY: Sand live oak is utilized as lumber and landscape plantings. The largest sand live oaks (co-champions) are both located in Gainesville, Alachua County, Florida.

Quercus georgiana Curtis

Georgia oak

GROWTH FORM: small, slow growing tree with a compact crown reaching a normal high of 26 feet (7.9 m), occasionally reaches 75 feet (22.9 m). **BARK:** gray to light brown, mature bark becomes scaly. **TWIGS and BUDS:** smooth red twigs with prominent light brown lenticels; buds are reddish-brown, ovoid with smooth scales that may be ciliated. **LEAVES:** petiole ¼ - ⅛ inch (6 - 22 mm) long, usually with a few hairs; leaf blade broadly elliptical and thin,



1 $\frac{1}{2}$ - 5 $\frac{1}{8}$ inches (38 - 130 mm) long, $\frac{3}{4}$ - 3 $\frac{1}{2}$ inches (19 - 89 mm) wide, with a cuneate or obtuse base, margin with 3 - 5 pointed bristletipped lobes; surface is a shiny green above, pale green below with axillary tufts of tomentum. **ACORNS:** biennial; short-stalked cup, thin walled and saucer-shaped, outer surface slightly pubescent with



smooth inner surface, covering $\frac{1}{3}$ of the nut; brown subglobular nut, $\frac{3}{8} - \frac{1}{2}$ inch (10 - 13 mm) in length. **HABITAT:** restricted to granitic outcrops and dry slopes in the Piedmont Plateau at approximately 1700 feet (518 m) elevation; found in the oak-pine forest types associated with *Q. montana, Q. marilandica*, and *Q. stellata*. **DISTRIBUTION:** Alabama east to South Carolina.





COMMENTARY: Georgia oak was originally described from specimens collected on Stone Mountain in Georgia. This species is a conservation concern and listed as threatened by the Smithsonian Report. The largest known Georgia oak grows in Clarke County, Georgia.

Quercus havardii Rydberg

Havard oak shin oak, shinnery

GROWTH FORM: rhizomatous shrub with a normal height of 3 feet (0.9 m) and exceptional speciments to 30 feet (9.1 m). **BARK:** papery, light gray. **TWIGS and BUDS:** brown pubescent twigs, becoming smooth with age; ovoid terminal buds are a dark reddishbrown. **LEAVES:** short petiole to $\frac{1}{4}$ inch (6 mm); leaves are ovate or elliptical, 2 - 4 inches (51 - 101 mm) long, $\frac{3}{4}$ - 2 inches (19 - 51 mm) wide; thick and with a rounded or cuneate base, margins generally have deep lobes with 2 - 3 rounded teeth on each



side, apex rounded; upper surface shiny light green, lower surface has densely tawny tomentum. **ACORNS:** annual; solitary or paired on a



peduncle up to $\frac{3}{6}$ inch (10 mm), a pubescent reddishbrown cup, which covers $\frac{1}{3}$ - $\frac{1}{2}$ of nut; brown, ovoid nut, 1 inch (25 mm) long. **HABITAT:** sandy soils and sand dunes; grows in areas devoid of almost all other trees. **DISTRIBUTION:** New Mexico, Oklahoma, and Texas.



COMMENTARY: This species was named for the U.S. Army surgeon and botanist, Valery Havard. Because Havard oak thrives in a harsh environment, it functions as a sand dune stabilizer and provides critical habitat for the endangered sand dune lizard (*Sceloporus arenicolus*). Although the acorns are an important food source for wildlife, the leaves are toxic to livestock. Use of herbicides to eradicate Havard oak has resulted in habitat loss and a drastic decline in sand dune lizard populations. The largest known Havard oak grows in Yoakum County, Texas.

Quercus hemisphaerica Bartram ex Willdenow

Laurel oak Darlington oak

GROWTH FORM: short-lived evergreen, medium to large tree that can grow to heights of 100 feet (30.5 m). **BARK:** dark brown with deep furrows producing flat ridges. **TWIGS and BUDS:** smooth, brown to dark red twigs; reddish to purplish-brown ovoid buds, scale margins smooth or ciliated. **LEAVES:** short smooth petiole up to $\frac{1}{4}$ inch (6 mm) in length; leaf blade narrow ovate or elliptical, 1 $\frac{1}{8}$ - 4 $\frac{3}{4}$ inches (29 - 121 mm) long, $\frac{3}{8}$ - 1 $\frac{1}{2}$ inches (10 - 38 mm) wide, leathery, base





obtuse or rounded, margin entire or with shallow lobes near apex. Both surfaces are smooth, or rarely with minute axillary tufts or tomentum beneath. **ACORNS:** biennial; sessile; cup has fine pubescence on scales and on inner surface, covering up to $\frac{1}{3}$ of nut; ovoid to hemispherical nut, dark brown to black, $\frac{1}{2}$ inch (13 mm) long.



HABITAT: moderately dry sandy soils. **DISTRIBUTION:** Texas east to Virginia.



COMMENTARY: Laurel oak is fast growing and matures in about 50 years. Used for firewood and as an urban shade tree. The largest known laurel oak grows near Wrens, Jefferson County, Georgia.

Quercus ilicifolia Wangenheim

Bear oak scrub oak

GROWTH FORM:

deciduous shrub or small tree, which normally grows to a height of 18 feet (5.5 m) and occasionally to 41 feet (12.5 m). **BARK:** dark gray, thin mature bark becoming scaly. **TWIGS and BUDS:** pubescent yellowish-brown to brown twigs when young, dark brown and smooth when older; terminal buds ovoid



and $\frac{1}{8}$ inch (3 mm) long. **LEAVES:** smooth petiole up to 2 $\frac{3}{8}$ inches (60 mm) in length; leaves are ovate to elliptical, 2 - 4 $\frac{3}{4}$ inches



(51 - 121 mm)long, 1 $\frac{1}{8} - 3 \frac{1}{2}$ inches (29 - 89 mm) wide, base cuneate (wedge shaped), 3 - 7 lobes separated by shallow sinuses and ending in 1 - 3 bristle-tipped teeth, apex usually has 3-tipped lobe, thick



and leathery, upper surface shiny dark green, lower surface pale green to gray with dense woolly pubescence, secondary veins raised on both surfaces. **ACORNS:** biennial; cup is reddish-brown with pubescent scales, inner surface pubescent, covers up to $\frac{1}{2}$ of the nut; ovoid, light brown nut with faint stripes and minute pubescence, up to $\frac{5}{8}$ inch (16 mm) long. **HABITAT:** often found in pure stands associated



with dry sandy, barren, and rocky hillsides, or mountainous terrain. DISTRIBUTION: Maine to North Carolina. **COMMENTARY:** Bear oak is a transition species that depends upon stand disturbance. Fire promotes this species. Acorns provide food for wildlife, especially turkey and grouse. The Iroquois peoples used bear oak for treating gynecological problems. The largest known bear oak grows near Romney, Hampshire County, West Virginia.

Quercus imbricaria Michaux

Shingle oak laurel oak

GROWTH FORM: medium tree which normally grows to 65 feet (19.8 m), occasionally to 105 feet (32 m), and has a rounded crown. **BARK:** grayish-brown with shallow fissures becoming scaly ridges, pinkish inner bark. **TWIGS and BUDS:** twigs are smooth and brown or slightly pubescent; large terminal bud is brown and 5-angled in cross-section, scales are pubescent with ciliated edges. **LEAVES:** smooth petiole to ³/₄ inch (19 mm); ovate and widest near the middle,



3 $\frac{1}{8}$ - 8 inches (79 - 203 mm) long, $\frac{5}{8}$ - 3 inches (16 - 76 mm) wide, margin entire and may be slightly wavy and turned under, base obtuse, apex obtuse and tipped with one bristle, shiny dark green above, light whitish-green with uniform pubescence below. **ACORNS:** biennial;



1 - 2 formed on stout peduncle, cup minutely pubescent on outer surface, inner surface is



smooth and tan to reddish-brown, enclosing up to $\frac{1}{2}$ of nut; nearly round nut, $\frac{3}{6} - \frac{3}{4}$ inch (10 - 19 mm) long, chestnut-brown with faint stripes, and concentric rings around apex. **HABITAT:** moderately dry to moist soils. **DISTRIBUTION:** Iowa south to Louisiana, east to North Carolina, and north to Massachusetts.





COMMENTARY: The common name of this oak refers to the use of its wood as shingles by early settlers. The Cherokee people used the bark of shingle oak as medication. The largest shingle oak grows in Cincinnati, Hamilton County, Ohio.

Quercus incana Bartram

Bluejack oak sandjack oak, upland willow oak, cinnamon oak, shin oak, turkey oak

GROWTH FORM: shrub or small tree that grows up to 55 feet (16.8 m), with irregular spreading open crown, often forming thickets. **BARK:** thick dark gray to black, wide furrows forming rough square plates. **TWIGS and BUDS:** brown twigs, densely pubescent when young; reddish-brown buds, narrowly ovoid and 5-angled in cross-section, often with hairs at apex. **LEAVES:** short, pubescent petiole less than $\frac{3}{8}$ inch (10 mm) long; leaf is narrowly ovate to elliptical, 1 $\frac{1}{8}$ - 4 inches (29 - 101 mm) long $\frac{1}{2}$ - 1 $\frac{3}{8}$





inches (13 - 35 mm) wide, base acute to rounded, apex acute with a bristle-tip, margin is entire (juvenile foliage may have 2 - 3 shallow lobes), thick and leathery, upper surface shiny bluishgreen with raised veins and sparsely pubescent along midrib, pubescence beneath with axillary



tufts of hair. **ACORNS:** biennial; 1 - 2 nuts sessile or on peduncle of less than $\frac{1}{4}$ inch (6 mm); cup with pale pubescent reddishbrown scales, inner surface pubescent, cup usually bowl shaped, covering up to $\frac{1}{2}$ of nut; oval, brown nut with faint stripes, $\frac{3}{6}$ - $\frac{5}{6}$ inches (10 - 16 mm) long. **HABITAT:** welldrained sandy soils of barrens and ridges. **DISTRIBUTION:** Texas and Oklahoma east to Florida and Virginia.



COMMENTARY: Bluejack oak acorns provide food for birds, squirrels, raccoons, and deer. The largest known specimen grows in Pasco County, Florida.

Quercus inopina Ashe

Florida oak

GROWTH FORM:

evergreen shrub that grows to 16 feet tall (4.9 m). **BARK:** light gray. **TWIGS and BUDS:** light to dark purplish-brown, twigs may have slight pubescence, terminal buds somewhat ovoid with a blunt tip,



5-angled in cross section. **LEAVES:** smooth or sparsely pubescent petiole $\frac{1}{8}$ - $\frac{3}{8}$ inch (3 - 10 mm) in length; leaves are elliptical to ovate or spatulate, 1 $\frac{1}{2}$ - 3 $\frac{3}{8}$ inches (38 - 86 mm) long and 1 - 1 $\frac{3}{4}$ inches (25 - 44 mm) wide, base is acute to rounded; upper surface is smooth



or rugose, convex with an entire margin, may have scattered hairs along midrib, lower surface with a light scurfy pubescence, often covered with ascocarps of fungi. **ACORNS:** biennial; cup with pubescent scales, inner surface half or more pubescent, cup covering $\frac{1}{3}$ - $\frac{1}{2}$ of nut; oval to elliptical nut, up to $\frac{5}{6}$ inch (16 mm) in length. **HABITAT:** sandhill ridges or upland terraces in scrub communities. **DISTRIBUTION:** restricted to localized areas in central Florida.





COMMENTARY: Florida oak is a conservation concern and rated indeterminate by IUCN.

Quercus laceyi Small

Lacey oak canyon oak, smoky oak, rock oak

GROWTH FORM: small to medium tree, which grows up to 60 feet (18.3 mm). **BARK:** light gray with shallow furrows and scaly ridges. **TWIGS and BUDS:** young twigs are gray and pubescent, mature limbs become smooth and reddish-brown; smooth, brown ovoid buds. **LEAVES:** petiole varies from $\frac{1}{8} - \frac{1}{2}$ inch (3 - 13 mm) long; leaf blade is obovate or elliptical, $1\frac{1}{2} - 3\frac{1}{2}$ inches (38 - 89 mm) long, $1\frac{1}{8} - 2\frac{1}{2}$ inches (29 - 63 mm) wide, margin of the leaf is entire or with shallow lobes, trees growing on moist sites may have leaves with deep



lobes that resemble white oak (*Q. alba*), secondary veins often end in a tooth, apex rounded; smooth, green above, juvenile leaves have a white pubescence beneath, mature leaves become smooth beneath.



ACORNS: annual; 1 - 3 acorns on a short peduncle up to ³/₈ inch (10 mm) in length, saucershaped cup with pubescent scales, covers up to $\frac{1}{3}$ of the nut; oblong or barrel-shaped nut, usually blunt at both ends, up to $\frac{3}{4}$ inch (19 mm) long. **HABITAT:** often found associated with limestone outcrops, woodland, and riparian zones with mixed stands of ash, basswood and other oaks, a component of the pine-juniper-madrone-oak forest type of northern Mexico at elevations between 6,000 - 8,200 feet (1,830 - 2,500 m). **DISTRIBUTION:** restricted to southern and southwestern parts of the Edwards Plateau in Texas and in the Mexican states of Coahuila, Nuevo Leon, and Tamaulipas.



COMMENTARY: Named for Howard Lacey, who first collected specimens on his property near Kerrville, Texas. Lacey oak has no commercial value but does provide habitat for wildlife, and is sometimes used for fuel. The largest known Lacey oak grows in Blanco County, Texas.

Quercus laevis Walter

Turkey oak Catesby oak, Coastal Plain scrub oak, scrub oak, turkey-foot oak

GROWTH FORM: shrub or small tree normally growing to 43 feet (13 m), occasionally to 72 feet (21.9 m) in height; tree has irregular open crown with crooked branches. **BARK:**



gray to dark gray, mature bark is deeply furrowed with irregular ridges, reddish inner bark. **TWIGS and BUDS:** dark chestnut-brown twigs with a gray cast, sparsely pubescent, chestnut-brown bark with pubescence; narrowly ovoid buds. **LEAVES:** smooth petiole $\frac{1}{4}$ - 1 inch (6 - 25 mm) long; leaf blade broadly ovate or triangular in outline; 4 - 8 inches (101 - 203 mm) long, 3 $\frac{1}{8}$ - 6 inches (79 - 153 mm) wide near middle, base is acute or rounded and decurrent on petiole, margin with 3 - 7 lobes which looks similar to a turkey's foot, usually with 1 - 3 bristle-tipped teeth, sinuses between lobes are deep; leaf surface



is smooth and light green above, paler green below with axillary tufts of reddish hair, raised veins on both surfaces. **ACORNS:** biennial; nearly sessile short-stalked peduncle; cup has pubescent scales with red margins, pubescent inner surface, goblet-shaped cup covering ¹/₃ of nut; broadly elliptical, light brown nut with faint stripes, ³/₄ - 1¹/₈ inch (19 - 29 mm) long, tip often covered with short



white pubescence. **HABITAT:** dry sandy and well-drained soils on ridges in the southeastern coastal plain. **DISTRIBUTION:** Louisiana east to Florida and north to Virginia.



COMMENTARY: Turkey oak is well adapted to drought stress and fire. It has no commercial value, but acorns provide food for turkey, deer, and small mammals. This species is similar to *Q. falcata* in leaf shape and can be distinguished by the tapered leaf base and axillary tufts, whereas the southern red oak leaves have a u-shaped base and pubescence covering the entire lower leaf surface. The largest known specimen of turkey oak grows in Pasco County, Florida.

Quercus laurifolia Michaux

Swamp laurel oak laurel oak, Darlington oak, diamond-leaf oak, laurel-leaf oak, water oak, obtuse oak

GROWTH FORM: semi-evergreen with leaves retained until the following spring; short-lived medium tree that grows up to 80 feet (24.4 m) with a dense rounded crown. **BARK:** dark brown, mature bark turning black with deep furrows and broad flat ridges. **TWIGS and BUDS:** smooth reddishbrown twigs; buds are ovoid, pointed and covered with shiny chestnut-brown scales. **LEAVES:** short, smooth petiole up to ¼ inch (6 mm) long; leaf blade broadly elliptical and thin, 1 ¼ - 4 ¾



inches (32 - 121 mm) long, ⁵/₈ - 1 ³/₄ inches (16 - 44 mm) wide, base cuneate, bristle-tipped acute apex, may be irregularly 3-lobed, shiny



green upper surface and pale green below with a yellow midrib, both surfaces are smooth.



ACORNS: biennial; nearly sessile, saucer-like cup with pubescent scales and pubescent inner surface, enclosing up to ¼ of nut; nearly round dark brown nut, 5% inch (16 mm) in length. HABITAT: moist soils of the southeastern coastal plain and associated with typical mesic hardwoods. DISTRIBUTION: Texas east to Florida and north to Virginia.





COMMENTARY: Swamp laurel oak is often used as an ornamental in the South. President L. B. Johnson planted one at the White House in Washington, DC. The largest known specimens of swamp laurel oak are growing in Norfolk County, Virginia, and Okaloosa County, Florida.

Quercus lyrata Walter

Overcup oak swamp post oak, water white oak, swamp white oak

GROWTH FORM: medium to large slow growing tree up to 80 feet (24.4 m), occasionally to 155 feet (47.2 m), with a rounded crown. **BARK:** gray with deep furrows and scaly ridges or plates. **TWIGS and BUDS:** grayish pubescent twigs becoming smooth with



age; ovoid buds with light brown pubescent scales. **LEAVES:** petiole $\frac{3}{4}$ inch (19 mm) in length; leaf blade narrowly oblong, 4 - 6 $\frac{1}{2}$ inches (101 - 165 mm) long, 2 - 4 inches (51 - 101 mm) wide, base cuneate to acute, margins deeply lobed with sinuses greater than $\frac{1}{2}$ way to midrib, lobes rounded with 1 - 3 teeth; surface dark green (may be shiny) above, and pubescent grayish-green below, with a whitish bloom that rubs off. **ACORNS:** annual; 1 $\frac{1}{2}$ inch (38 mm) peduncle with 1 - 2 acorns; spheroid shaped cup with gray pubescent scales,



covering most of the nut; light brown, ovoid or oblong nut, 1 - 2 inches (25 - 51 mm) long, finely pubescent. **HABITAT:** restricted to poorly-drained lowlands of the Southern coastal plain and major rivers of the South and mid West. **DISTRIBUTION:** Delaware and New Jersey south to Florida, west to Texas, and north through the Mississippi Valley and drainages to Iowa, Illinois and Indiana.





COMMENTARY: This oak species is often utilized as white oak lumber. The largest known specimen of overcup oak grows in Bertie County, North Carolina.

Quercus macrocarpa Michaux

Bur oak mossy-cup oak, blue oak, prairie oak, mossy-overcup oak

GROWTH FORM: slow growing, large tree that grows to 100 feet (30.5 m), with a massive trunk, broad crown, and large branches. **BARK:** thick light gray bark, deep furrows producing scaly ridges, fire resistant. **TWIGS and BUDS:** pubescent light brown twigs with corky wings or ridges; ovoid light brown to gray buds, smooth ¼ inch (6 mm) long. **LEAVES:** petiole



 $\frac{5}{8}$ - 1 inch (16 - 25 mm) in length; leaf blade is obovate to narrowly elliptical in outline, 2 $\frac{3}{4}$ - 6 inches (70 - 152 mm) long, 2 - 5 inches



(51 - 127 mm) wide, 5 - 7 lobed with center sinuses nearly reaching midrib, base rounded to cuneate, rounded apex; dark green above, grayish-green with finely dense pubescence below. **ACORNS:** annual; 1 - 3 acorns on stout peduncle $\frac{1}{4}$ - $\frac{3}{4}$ inch (6 - 19 mm)

long; deep cup with grayish pubescent scales, scales near cup rim forming a fringe around the nut, enclosing $\frac{1}{2}$ - $\frac{7}{8}$ of nut; light brown, broadly elliptical nut, finely pubescent, 1 - 2 inches (25 - 51 mm) long. **HABITAT:** widely distributed and capable of withstanding a wide range of harsh conditions (one of the most drought resistant oaks) throughout eastern North America; usually found on limestone or calcareous clay.



DISTRIBUTION: Saskatchewan east to New Brunswick, southwest to Texas, and north to Montana.



COMMENTARY: Bur oak extends farther north than any other oak species and becomes shrubby at the northern and eastern limits of its range. This oak's wood quality is similar to white oak and is often used for construction, flooring, and cooperage. The common name is derived from the bur-like fringe of the acorn cup. Many bur oaks are historically important and one has been designated as a National Historic Landmark in Kansas. Native Americans used bur oak as medication for heart problems and other ailments. The largest known specimen grows near Parris, Bourbon County, Kentucky.

Quercus margaretta Ashe

Sand post oak dwarf post oak, runner oak, scrubby post oak, post oak

GROWTH FORM: shrub or small tree, occasionally rhizomatous, slow growing with dense rounded crown, normally grows to 32 feet (9.8 m), occasionally to 87 feet (26.5 m). **BARK:** light gray, shallow fissures with scaly ridges. **TWIGS and BUDS:** smooth slender gray twigs; reddish-brown terminal bud, ovoid with pointed apex,



smooth or sparsely pubescent. **LEAVES:** short petiole $\frac{1}{6}$ - $\frac{3}{6}$ inch (3 - 10 mm) long; leaf blade cruciform in outline, 1 $\frac{1}{2}$ - 3 inches (38 - 76 mm) long, $\frac{3}{4}$ - 1 $\frac{1}{2}$ inches (19 - 38 mm) wide; moderate to deep 5-lobed margin, base cuneate to rounded, apex broadly rounded,



lobes rounded; shiny dark green above, light green and densely



pubescent below.

ACORNS: annual; 1 - 3 acorns are sessile or produced on a peduncle up to ³/₄ inch (19 mm); globe shaped gray pubescent cup, enclosing ³/₄ of the nut; light brown nut ovoid with rounded apex, ⁵/₈ - 1 inch (16 - 25 mm) long. HABITAT: understory or open-grown species on deep sandy and gravel soils in southern oak-pine forest types. DISTRIBUTION: Texas,





Oklahoma and Missouri, east to Florida, and Virginia.

COMMENTARY: Sand post oak provides a suitable habitat for wildlife species. Acorns provide food for turkeys and other game birds. The largest known sand post oak grows in Florida Caverns State Park near Marianna, Jackson County, Florida.

Quercus marilandica Muenchhausen

Blackjack oak barren oak, black oak, jack oak

GROWTH FORM: small to medium sized tree usually between 15 - 45 feet (4.6 - 19.8 m), occasionally to 95 feet (28.9 m), with an open irregular spreading crown of crooked branches and some dead twigs, slow growing and short lived. **BARK:** thick rough bark, nearly black, with deep furrows,



mature bark forming irregular or rectangular plates, orange inner bark. **TWIGS and BUDS:** light brown twigs, finely pubescent; narrowly ovoid pointed buds, reddish-brown pubescent scales, 5-angled in cross section. **LEAVES:** pubescent petiole $\frac{1}{4} - \frac{3}{4}$ inch (6 - 19 mm) long; leaf broadly triangular and widest near tip, 2 $\frac{3}{4} - 8$ inches (70 - 203 mm) long, 2 $\frac{3}{4} - 8$ inches (70 - 203 mm) wide, leathery, base rounded, thickened blade with 3 - 5 broad lobes, with 1 - 3 bristletipped teeth, apex obtuse; glossy yellowish-green above, pale green with dense brown pubescence (scurfy) below, secondary veins raised



on both surfaces. **ACORNS:** biennial, 1 - 2 acorns on a short stalk, reddishbrown topshaped cup with pubescent scales, inner surface pubescent, enclosing $\frac{1}{3} - \frac{2}{3}$ of the nut; long elliptical nut, $\frac{1}{2} - \frac{3}{4}$ inches (13 - 19 mm) in length, often faintly striped, ends in a stout point at the tip. **HABITAT:** usually exists on rather poor sites with dry sandy or clay soils in the central and southern forest regions.





DISTRIBUTION: Iowa east to New Jersey and Long Island, New York, south to Florida, west to Texas, and north to Nebraska.



COMMENTARY: Blackjack oak is one of the few species of red oaks that shares the white oak group characteristic of vessels blocked by tyloses. This oak is considered a pioneer species. It is not a high value timber species, but the wood is used for railroad ties, fence posts, and charcoal. The Latin name originated from the description of specimens collected in Maryland. Western populations in Texas and Oklahoma are often recognized as *Q. marilandica* var. *asheri*. Choctaw people used blackjack oak as medication to aid in childbirth. The largest known specimen grows in Peach County, Georgia.

Quercus michauxii Nuttall

Swamp chestnut oak basket oak, cow oak

GROWTH FORM: large tree growing to 48 - 100 feet (15 - 30.5 m), occasionally to 155 feet (47.2 m), with a compact rounded crown and chestnut like foliage, often with a limbless trunk to 40 feet (12.2 m). **BARK:** light gray, rough, flaky ridges. **TWIGS and BUDS:** juvenile growth is green, progressing to brown during the first



winter and turning gray during second year; ovoid, reddish-brown bud, apex may be blunt or pointed, sparsely pubescent scales. **LEAVES:** short petiole $\frac{1}{4} - \frac{3}{4}$ inch (6 - 19 mm) long; obovate leaves widest beyond the middle, $2\frac{3}{4} - 11$ inches (70 - 279 mm) long, 2 - 7 inches (51 - 178 mm) wide, wavy margin with 9 - 14 pair of rounded teeth, base acuminate, apex broadly rounded with an abruptly pointed tip; shiny dark green above, grayish-green with dense pubescence (felty to the touch) below. **ACORNS:** annual; 1 - 3 on peduncle $\frac{1}{2} - 1\frac{1}{4}$ inches (13 - 32 mm) long; deep, bowl-shaped cup with brown pubescent scales, enclosing $\frac{1}{2}$ of nut; light to dark brown, ovoid nut,



1 - 1 % inches (25 - 35 mm) long. HABITAT: occurs on a variety of moist soils and welldrained alluvial

floodplains in the central and southern forest regions.



COMMENTARY: Named for French botanist, Frances A. Michaux, who wrote a three volume treatise on the trees of eastern North America. Swamp chestnut oak is considered an early succession species with mature trees retarding growth of understory vegetation due to an allelopathic effect. The acorns are food for humans, cattle, deer, and small mammals. The nuts are sweet enough to eat raw without boiling. Two of these common names were derived from its use for basket material and as food for cows. The largest known swamp chestnut oak grows in Fayette County, Alabama.

Quercus minima (Sargent) Small

Dwarf live oak minimal oak

GROWTH FORM:

rhizomatous shrub, tardily deciduous or evergreen, 3 feet (0.9 m), forming thickets of unbranched stems. **BARK:** smooth, brown to light gray. **TWIGS and BUDS:** light gray, smooth twigs in second year; small globe shaped bud, dark brown to grayish-brown scales. **LEAVES:** very short



petiole $\frac{1}{8}$ - $\frac{1}{4}$ inch (3 - 6 mm) long; obovate or oblanceolate leaf, 1 $\frac{1}{2}$ - 4 $\frac{3}{4}$ inches (38 - 121 mm) long, $\frac{3}{4}$ - 2 inches (19 - 51 mm) wide, base cuneate, apex acute to rounded, margins flat or slightly wavy; glossy light to dark green above, light green with whitish



bloom below. ACORNS: annual: 1 - 3 acorns on peduncle 1/8 - 1 1/8 inches (3 - 29 mm)long, gobletshaped cup with grayish scales, with or without minute pubescence, encloses up to $\frac{1}{2}$ of nut; narrowly



oval, dark brown nut, 5% - 1 inch (16 - 25 mm) long. **HABITAT:** pine and scrub forests on deep sandy soils. **DISTRIBUTION:** Louisiana east to Florida, and north to North Carolina.



COMMENTARY: Dwarf live oak is maintained to provide food and shelter for wildlife in habitats where fire is used as a tool to reduce competing vegetation in longleaf and slash pine management. This oak species can produce acorns at 3 years of age.

Quercus mohriana Buckley

Mohr oak shin oak, scrub oak

GROWTH FORM: evergreen or deciduous shrub, rhizomatous and usually forming thickets, occasionally forms a small tree to 20 feet (6.1 m) with irregular spreading crown. **BARK:** thick gray bark with rough scaly ridges. **TWIGS and BUDS:** densely pubescent grayish-brown twigs, blunt ovoid buds with light brown to chestnut pubescent scales. **LEAVES:** short petiole to ¼ inch (6 mm); thick



and leathery oblong to elliptical, $1\frac{1}{8}$ - 3 inches (29 - 76 mm) long, $\frac{3}{4}$ - 1 $\frac{1}{4}$ inches (19 - 32 mm) wide, rounded base, apex rounded or acute, margin usually entire and wavy, may have a few teeth, shiny dark green above, grayish pubescence beneath with prominent raised secondary veins. **ACORNS:** annual; 1 - 2 acorns produced on a



peduncle to ⁵/₈ inch (16 mm); deep cup with pubescent scales, and



enclosing ¹/₂ of nut; oval to broadly elliptical, brown nut to ⁵/₈ inch (16 mm) in length. **HABITAT:** limestone soils in the Lower


Sonoran Life Zone, at elevations between 2000 -4000 feet (610 - 1219 m).

DISTRIBUTION: Oklahoma and New Mexico south to Texas and northern Mexico (Coahuila and Nuevo Leon).



COMMENTARY: Named for botanist, Charles Mohr, who wrote about the flora of Alabama. Mohr oak provides good habitat for wildlife. The largest known specimen grows in the Guadalupe Mountains National Park, Texas.

Quercus montana Willdenow

Chestnut oak rock chestnut oak, mountain chestnut oak, rock oak, tanbark oak

GROWTH FORM: medium to large tree, 65 - 145 feet (19.8 - 44.2 m), broad open and irregular crown, chestnut like foliage. **BARK:** dark reddishbrown to dark gray, mature bark with deep v-shaped furrows producing broad ridges. **TWIGS and BUDS:** stout twigs, dark green to reddish-brown; light



brown to reddish-brown ovoid bud, pointed apex, bud scales may have slight pubescence. **LEAVES:** yellow petiole $\frac{3}{6}$ - 1 $\frac{1}{4}$ inches (10 - 32



mm) long; leaf blade obovate, $4\frac{3}{4}$ - 8 inches (121 - 203 mm) long, $2\frac{3}{8}$ - 4 inches (60 - 101 mm) wide, margins have 10 - 14 rounded teeth, base subacute, apex broadly acuminate; thick firm blade, shiny dark yellowish-green above,



light green with slight pubescence along veins below. **ACORNS:** annual; 1 - 2 acorns on peduncle

% - 1 inch (10 - 25 mm) long; cup has gray scales with red tips, pubescent inner surface, encloses $\frac{1}{3}$ - $\frac{1}{2}$ of nut; chestnut-brown, long oval nut, $\frac{3}{4}$ - 1 $\frac{1}{2}$ inches (19 - 38 mm) long. **HABITAT:** shallow soils, dry sandy soils, and rocky upland forests. **DISTRIBUTION:** southern Ontario, south to Louisiana, east to Georgia, and north to Maine.





COMMENTARY: The bark of chestnut oak has a high tannin concentration and was once used for tanning leather. Thus the common name 'tanbark oak.' Acorns provide a food source for turkey, rough grouse, songbirds, deer, and small mammals. This species is commonly referred to as *Q. prinus* in forestry literature. The largest known chestnut oak grows in the Great Smoky Mountains National Park, Tennessee.

Quercus muehlenbergii Engelmann

Chinkapin oak chestnut oak, yellow chestnut oak, yellow oak, rock chestnut oak, rock oak

GROWTH FORM: medium to large tree 45 - 110 feet (19.8 - 33.5 m), narrow rounded crown. **BARK:** light gray, thin and scaly. **TWIGS and BUDS:** slender, brown twigs turning gray in second year;



reddish-brown terminal bud, broadly ovate with a blunt apex, sparsely pubescent. **LEAVES:** smooth petiole $\frac{3}{6}$ - 1 $\frac{1}{4}$ inches (10 - 32 mm) long; leaf blade obovate to oblanceolate, 2 - 6 inches (51 - 152 mm) long, 1 $\frac{1}{2}$ - 3 $\frac{1}{6}$ inches (38 - 79 mm) wide, thickened and leathery, margins regularly undulate, numerous parallel side veins, each ending



HABITAT: limestone and calcareous soils in mixed deciduous and pine forests. **DISTRIBUTION:** Vermont west to Ontario and Minnesota, southwest to New Mexico and northeastern Mexico (Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas), east to Florida, and north to Massachusetts.





COMMENTARY: Chinkapin oak was named after the botanist Henry Muehlenberg. This oak's shrubby growth is associated with poor environmental conditions at the extreme edges of its distribution. This oak species is localized throughout its range and seems dependent upon soil type and a pH above 6.0. It can readily reproduce by sprouts. Chinkapin oak can be separated from *Q. prinoides* on the same site by its single stem and sparse acorn production. The largest known chinkapin oak grows in Clark County, Kentucky.

Quercus myrtifolia Willdenow

Myrtle oak scrub oak

GROWTH FORM: evergreen shrub or small tree that grows to 36 feet (11 m), rounded crown has crooked branches and a tendency to form thickets. **BARK:** gray and smooth, becoming furrowed with age. **TWIGS and BUDS:**



pubescent reddish-brown twigs; ovoid buds that narrow to a point, reddish-brown scales, sometimes with pubescent tan tufts at apex. **LEAVES:** very short smooth petiole to $\frac{1}{4}$ inch (6 mm); leaves are narrow to broadly obovate, $\frac{5}{8}$ - 2 inches (16 - 51 mm) long, $\frac{3}{8}$ - 1 inch (10 - 25 mm) wide, base rounded, apex rounded or with a bristle-tipped tooth, thick and leathery, margins with edges turned under and



occasionally wavy; shiny dark green above, light green beneath with axillary tomentum and some specimens have a yellowish scurfy bloom. **ACORNS:** biennial; 1 - 2 acorns on each peduncle, goblet-shaped, pubescent gray cup covering $\frac{1}{4} - \frac{1}{3}$ of the nut, inner surface pubescent; nut almost round, $\frac{1}{4} - \frac{1}{2}$ inch (6 - 13 mm) long, dark brown when mature. **HABITAT:** dry sandy ridges in mixed stands of yellow pines and dry-site hardwoods; usually the most abundant



species in scrub oak forests of *Q. incana, Q. laevis, Q. marilandica, Q. margaretta, Q. geminata*, and *Q. virginiana.*

DISTRIBUTION: South Carolina, south to Florida, and west to Mississippi at sea level on the Coastal Plain.



COMMENTARY: Myrtle oak is most abundant on islands off the coasts of Mississippi, Alabama, and Florida. The largest known specimen of myrtle oak grew in Fort Clinch State Park, Nassau County, Florida, until its recent death.

Quercus nigra Linnaeus

Water oak possum oak, spotted oak, pin oak, red oak

GROWTH FORM: medium to large tree with a slender trunk and rounded crown that can grow to 120 feet (36.6 m); leaves usually retained during the winter. **BARK:** light brown to black with furrows producing scaly ridges on mature bark. **TWIGS and BUDS:** smooth red twigs, chestnut-brown, ovoid bud with pubescent scales and a pointed apex. **LEAVES:** short smooth petiole ¹/₈ - ³/₈ inch (3 - 10 mm) long; obovate or oblong leaves widest near



apex, 1 $\frac{1}{4}$ - 4 $\frac{3}{4}$ inches (32 - 121 mm) long, $\frac{5}{6}$ - 2 $\frac{1}{2}$ inches (16 - 63 mm) wide, base cuneate, margin entire, 2 - 3 bristle-tipped lobes, dull green above, pale green with axillary pubescent tufts below. **ACORNS:** biennial; 1 - 2 acorns with a short peduncle, shallow cup



with pubescent outer and inner surface, covers up to ¼ of nut; nearly round





nut, $\frac{3}{8} - \frac{5}{8}$ inch (10 - 16 mm) long, nearly black at maturity, often with faint stripes. **HABITAT:** found on wet lowland to moist upland soils. **DISTRIBUTION:** New Jersey south to Florida, west to Texas, north to Missouri, and east to Virginia.



COMMENTARY: Water oak is a short to moderately long-lived tree, often used as a rapidly growing shade tree in the South. Not a high value commercial species because of excessive splitting, but its wood is utilized as rough construction lumber. Acorns provide food for turkey, ducks, quail, deer, and other small mammals. The two largest known specimens of water oak are located in Jones County, Mississippi, and near Ferriday, Concordia Parish, Louisiana.

Quercus oglethorpensis Duncan

Oglethorpe oak

GROWTH FORM: medium to large tree, which can grow to 80 feet (24.4 m), straight trunk with occurrence of epicormic branching, crooked-branched crown. **BARK:** light gray, shallow furrows with scaly ridges. **TWIGS and BUDS:** twigs smooth, purplish-brown with conspicuous lenticels; rounded buds with chestnut-brown to dark gray pubescent scales. **LEAVES:** short petiole ½ - ¼ inch (3 - 6 mm) long; narrowly elliptical to obovate, margins entire or slightly undulating near apex,



sometimes wavy, slightly rounded at both ends; dull dark green above, yellowish-green with velvety pubescence below. **ACORNS:** annual; 1 - 2 acorns on a peduncle of ¼ inch (6 mm) or less, short cup has gray scales with tan pubescence, covers up to ⅓ of the nut;





ovoid (egg-shaped) nut, ³/₈ - ³/₄ inch (10 - 19 mm) long, dark grayishbrown with a covering of short fine soft hairs. **HABITAT:** moist soils and drained terraces along streams, and in loblolly pine-hardwood sites. **DISTRIBUTION:** localized populations in South Carolina, Georgia, Mississippi, and Louisiana.



COMMENTARY: Oglethorpe oak is a relatively new species described in 1940 and named after specimens first collected from Oglethorpe County, Georgia. This oak is a poor producer of acorns and subject to fire damage. The IUCN considers this oak a conservation concern and has categorized it as vulnerable. The largest known Oglethorpe oak grows near Lexington in Oglethorpe County, Georgia.

Quercus pagoda Rafinesque

Cherrybark oak bottomland red oak, red oak, swamp red oak, swamp Spanish oak, Elliott oak, scalybark oak

GROWTH FORM: one of the largest and fastest growing of the southern red oaks, often reaching heights of 130 feet (39.6 m). **BARK:** nearly black with short scaly ridges. **TWIGS and BUDS:** light brown pubescent twigs, ovoid bud with light chestnut-brown pubescent scales, 5-angled in cross section.



LEAVES: smooth petiole $\frac{3}{4}$ - 2 inches (19 - 51 mm) in length; leaf ovate or obovate, 3 $\frac{1}{2}$ - 12 inches (89 - 305 mm) long, 2 $\frac{3}{8}$ - 6 $\frac{1}{4}$ inches (60 - 159 mm) wide, base cuneate to rounded, apex acute, margin with 5 - 11 lobes ending in 1 - 3 bristle-tipped teeth, middle



lobes usually spread at right angles to the midrib, shiny dark green above, pale gray pubescence below, secondary veins raised on both surfaces. **ACORNS:** biennial; 1 - 2 acorns on each peduncle, chestnut-brown cup with pubescent scales, inner surface pubescent, covers $\frac{1}{3} - \frac{1}{2}$ of the nut; rounded brown nut with short fine pubescence and faint stripes, ⁵/₈ inch (16 mm) long. **HABITAT:** welldrained lowland soils in the bottomland hardwood types. **DISTRIBUTION:** Maryland south to Florida, west to eastern Texas, and north to southern Illinois.





COMMENTARY: Cherrybark oak is a valuable timber species because of its large size and fast growth, but a tree usually takes 25 years to produce a crop of acorns. Its common name derives from the resemblance of its bark to that of black cherry. The two largest known cherrybark oaks grow in Westmoreland County and Sussex County, Virginia.

Quercus palustris Muenchhausen

Pin oak swamp oak, Spanish oak, swamp Spanish oak, water oak

GROWTH FORM: medium to large tree 50 - 130 feet (15.2 - 39.6 m), somewhat conical crown with horizontal inner branches and lower branches angled downward. **BARK:** gray-brown, smooth juvenile bark, mature bark with broad scaly ridges, pink inner bark. **TWIGS and BUDS:** twigs shiny chestnut-brown; ovoid bud with pointed apex, chestnut-brown scales. **LEAVES:** smooth petiole ³/₄ - 2 ¹/₂ inches (19 - 63 mm) long;



elliptical to oblong leaf, 2 - 6 $\frac{1}{4}$ inches (51 - 159 mm) long, 2 - 4 $\frac{3}{4}$ inches (51 - 121 mm) wide, base truncate, apex acute, margin with 5 - 7 lobes with 1 - 3 bristle-tipped teeth, deep sinuses nearly to the midvein, basal lobes somewhat recurved; glossy dark green above, light green below with axillary tuffs or tomentum next to raised veins.



ACORNS:

biennial, clusters of 1 - 2 acorns on each peduncle, thin reddishbrown cup, smooth scales, enclosing ¼ of the nut; rounded nut, 5% inch (16 mm) in length, light brown and often striped. **HABITAT:** wet-site species found in nearly pure stands on poorlydrained soils; usually tolerates intermittent flooding during the dormant season but not during the growing season; extensive stands



of pin oak are found on glacial till, with

excessive moisture during the winter and spring; not adapted to alkaline soils. **DISTRIBUTION:** Vermont and Ontario, south to North Carolina, west to Oklahoma, and north to Wisconsin.



COMMENTARY: Pin oak is extensively planted as an ornamental in North America and has been introduced into central and western Europe as a shade tree. It is noted for a shallow root system that allows easy transplanting. Native Americans used bark from this tree for medicine. The largest known pin oak grows in Bell County, Kentucky.

Quercus phellos Linnaeus

Willow oak pin oak, peach oak, swamp willow oak, black oak

GROWTH FORM: medium to large trees that grow to 140 feet (42.7 m), with a rounded crown and spur-like branches, long-lived with rapid growth and heavy acorn production. **BARK:** young bark is smooth and dark gray, mature bark with deep furrows and rough ridges, pink inner bark. TWIGS and BUDS: smooth red to chestnut-brown twigs; ovoid bud with pointed apex, smooth chestnut-brown scales. **LEAVES:** short smooth petiole up to $\frac{1}{4}$ inch (6 mm) in length; narrowly oblong or lanceolate, $2 - 4\frac{3}{4}$ inches (51 - 121 mm) long, $\frac{3}{8}$ - 1 inch (10 - 25 m) wide, margin entire with bristle-tipped apex, both base and apex are acute; light green and slightly shiny above, duller pale green below, some





with grayish pubescence. **ACORNS:** biennial; 1 - 2 nearly stalkless acorns, shallow saucer shaped cup with pubescent scales, light brown pubescent inner surface, enclosing up to ¹/₃ of the nut; nearly oval nut, $\frac{3}{8}$ - $\frac{1}{2}$ inch (10 - 13 mm) long, brown with faint stripes. **HABITAT:** moist alluvial soils along streams and rivers. **DISTRIBUTION:** New York, west to Missouri, south to Texas, east to Florida, and north to Delaware.





COMMENTARY: Willow oaks are easily transplanted because of their shallow root system. This oak's acorns are an important food source for wildlife. The largest known specimen of willow oak grows in Thomaston, Upson County, Georgia.

Quercus prinoides Willdenow

Dwarf chinkapin oak scrub chestnut oak

GROWTH FORM: rhizomatous shrub or a small tree to 25 feet (7.6 m). **BARK:** thin gray bark with furrows and scaly ridges. **TWIGS and BUDS:** grayish twigs, broadly rounded bud brown to chestnut-brown with a blunt apex, scales have some pubescence. **LEAVES:** shortpetiole ¼ - 5% inch (6 - 16 mm);



leathery leaves are obovate, $1\frac{1}{2}$ - $5\frac{1}{2}$ inches (38 - 140 mm), $\frac{3}{4}$ - 2 $\frac{1}{2}$ inches (19 - 63 mm), margin undulate or toothed with 3 - 8 pair of short rounded teeth, base cuneate, apex rounded; shiny dark green above, light green below with slight pubescence. **ACORNS:** annual;



1 - 2 acorns on peduncle up to ³/₈ inch (10 mm), thin cup with short gray pubescent scales, covering up to ¹/₃ of nut; oblong to oval light brown nut, up to ³/₄ inch (19 mm) long. **HABITAT:** dry rocky soils such as sandstone or shale outcrops associated with oak pine types. **DISTRIBUTION:** New Hampshire and Florida, westward to Iowa and Oklahoma.



COMMENTARY: Dwarf Chinkapin oak can produce acorns at 3 - 5 years. The largest known dwarf chinkapin oak is growing in Richardson County, Nebraska.

Quercus pumila Walter

Runner oak

GROWTH FORM: small shrub, which grows to 3 feet (0.9 m); often holds its leaves during winter. **BARK:** gray to dark brown. **TWIGS and BUDS:** brown to chestnut-brown twigs with sparse to dense pubescence; chestnut-brown, ovoid buds, scales with ciliated margins. **LEAVES:** very short pubescent petiole up to $\frac{1}{4}$ inch (6 mm); oblong to narrowly oblong leaf, 1 - 4 inches (25 - 101 mm) long, $\frac{3}{8}$ - 1 $\frac{1}{4}$ inches (10 - 32 mm) wide, margin entire with revolute edges, base acute to rounded, apex acute to rounded



with bristle; green above with impressed veins, slightly concave below with grayish-brown pubescence. **ACORNS:** annual; deep saucer-shaped cup with pubescent scales, inner surface pubescent, covers up to $\frac{2}{3}$ of the nut; rounded to broadly oval nut, up to $\frac{5}{6}$ inch (16 mm) in length.



HABITAT: dry sandy soils on the coastal plain. **DISTRIBUTION:**

North Carolina to Florida, and west to Mississippi.





COMMENTARY: Runner oak responds with sprouting and increased acorn production when fire is used as a management tool for longleaf pine.

Quercus pungens Liebmann

Sandpaper oak pungent oak, scrub live oak, encino oak

GROWTH FORM: shrub or small tree that grows to a height of 10 feet (3.1 m), evergreen or subevergreen. **BARK:** thin light brown, papery and flaky. **TWIGS and BUDS:** young gray twigs are pubescent and become smooth with age; buds are dark chestnut-brown with sparse pubescence. **LEAVES:** short petiole up to $\frac{3}{6}$ inch (10



mm) in length; elliptic to oblong leaves, $\frac{3}{8} - \frac{3}{4}$ inch (10 - 19 mm) wide, margins usually wavy and coarsely toothed or with spinose lobes; base rounded, apex acute or obtuse with mucronate tip; thick and leathery leaf blade, shinny yellowish-green with minute hairs



presenting a rough texture above, dense pubescence mixed with stiff hairs beneath, sandpapery to the touch on both surfaces. ACORNS: annual: 1 - 2 sessile or short-stalked peduncle up to ¹/₈ inch (3 mm) long, chestnut-brown, top-shaped cup with gray pubescence, enclosing ¹/₄ of the nut; light brown, ovoid nut, up to 1/2 inch (13 mm) long. **HABITAT:** mountains in the Lower Sonoran Life Zone associated with oak-juniper-pinyon dry woodlands. **DISTRIBUTION:** Arizona east to Texas, and in northern Mexico (Durango, Chihuahua, Coahuila,



Nuevo Leon, Tamaulipas, and San Luis Potosi).



COMMENTARY: The rough surface of the leaves is reflected in the common name. Sandpaper oak acorns provide food for birds, javelinas, mule deer, bighorn sheep, and various small mammals.

Quercus rubra Linnaeus

Northern red oak red oak, gray oak, eastern red oak, mountain red oak

GROWTH FORM: medium to large tree that grows to 100 feet (30.5 m), rounded crown with large branches; fast growing tree that transplants easily, often forming pure stands. **BARK:** mature bark dark gray to black, shallow furrows separating wide scaly ridges, upper trunk has flat, shiny plate-like ridges, inner bark pink. **TWIGS and BUDS:** smooth, reddish-brown



twigs; ovoid buds are pointed with pubescent chestnut-brown scales. **LEAVES:** smooth reddish petiole 1 - 2 inches (25 - 51 mm) long; elliptical leaves, $4\frac{3}{4}$ - 8 inches (121 - 203 mm) long, $2\frac{3}{6}$ - $4\frac{3}{4}$ inches (60 - 121 mm) wide, margin with 7 - 11 lobes, each with 1 - 3 bristle-tipped teeth, sinuses are less than $\frac{1}{2}$ distance to the midrib, base broadly cuneate, apex acute; dull to lustrous dark green above, gray to light yellowish-green below with

short axillary tuffs of brown tomentum.



ACORNS: biennial; 1 - 2 acorns are stalkless or on a very short peduncle, shallow or deep saucer shaped cup enclosing up to $\frac{1}{2}$ of nut, reddish-brown pubescent scales with dark margins, inner surface with ring of pubescence around scar; oblong to nearly oval nut, $\frac{5}{8}$ - 1 $\frac{1}{4}$ inches (16 - 32 mm) long, brown with gray stripes. **HABITAT:** variety of moist soils with a loam texture. **DISTRIBUTION:** Quebec and Nova Scotia, south to South Carolina and Georgia, west to Oklahoma, and north to Ontario.



COMMENTARY: Northern red oak is the most valuable timber species in the red oak group. It has been used in construction, flooring, and furniture. The British Royal Navy once used it in shipbuilding. With some taxonomic treatments, populations of northern red oak that had leaves with red petioles and smaller acorns were given the varietal designation of *Q. rubra* var. *borealis*. A source of food for wildlife, it starts fruiting at age 25 and produces substantial crops after 50 years. Acorns germinate in the spring following seedfall. Native Americans utilized northern red oak as medicine for numerous ailments. The largest known specimen grows in Monroe County, New York.

Quercus shumardii Buckley

Shumard oak spotted oak, swamp oak, Schneck oak, Schneck red oak, Shumard red oak, southern red oak, swamp red oak

GROWTH FORM: one of the largest southern red oaks growing to 150 feet (45.7 m), large round open crown, usually has a clear bole with a buttressed base and shallow root system. **BARK:** dark gray mature bark, Jen Jen

shallow furrows, scaly exposed ridges are lighter gray, inner bark pink. **TWIGS and BUDS:** smooth gray to light brown twigs; ovoid buds with smooth gray scales, 5-angled in cross section. **LEAVES:**



petiole smooth, ³/₄ - 2 ³/₈ inches (19 - 60 mm); broadly elliptical leaves, 4 - 8



inches (101 - 203 mm) long, $2\frac{3}{8}$ - 6 inches (60 - 152 mm) wide, margin with 5 - 9 lobes with 2 - 5 bristle-tipped teeth, deep sinuses more than half way to midvein, base truncate, apex acute; shiny dark green above, slight luster or dull green beneath with axillary tufts of tomentum, veins raised on both surfaces. **ACORNS:** biennial; 1 - 2 acorns on a peduncle, thick saucer shaped cup with blunt scales, inner surface pubescent around scar, covering up to $\frac{1}{3}$ of nut; ovoid to broadly oblong, brown mature nut, $\frac{1}{2}$ - 1 $\frac{1}{4}$ inches (13 - 32 mm) long. **HABITAT:** well-drained soils along streams and rivers. **DISTRIBUTION:** Pennsylvania south to Florida, west to Texas, north to Nebraska, and northeast to Michigan and Ontario.



COMMENTARY: Named after Benjamin F. Shumard, state geologist of Texas in mid-1800s. Shumard oak produces good quality timber for construction, flooring and furniture, and is often considered more valuable than northern red oak. Moderately fast growing with a shallow root system. The largest known Shumard oak grows in Overton Park Forest, Tennessee.

Quercus similis Ashe

Swamp post oak delta post oak, bottomland post oak, Mississippi Valley oak, yellow oak

GROWTH FORM: medium to large tree grows up to 100 feet (30.5 m). **BARK:** gray to brown, shallow furrows with narrow scaly ridges. **TWIGS and BUDS:** pubescent yellowish-gray twigs; round chestnut-brown buds with pubescent scales at the base, smooth scales at apex. **LEAVES:** short petiole of less than $\frac{3}{8}$ inch (10 mm); leaves obovate with 4 - 6 lobes, usually 3 lobes above the middle, 3 - 6 inches (75 - 152 mm) long, 2 - 2 $\frac{1}{2}$ inches (51 - 63 mm) wide, base rounded





alternate, apex rounded; glossy dark green above, grayish-green beneath. **ACORNS:** annual; 1 - 3 acorns on a peduncle; cup is gray, rounded cup-shaped with pubescent scales, covers up to $\frac{1}{2}$ of the nut; ovoid to barrelshaped nut, $\frac{5}{8}$ - $\frac{3}{4}$ inch (16 - 19 mm) long, light brown or chestnut in color. **HABITAT:** wet bottomlands; grows in association with *Q. michauxii, Q. pagoda, Q. shumardii*, ash, hickories, and blackgum. **DISTRIBUTION:** South Carolina west to Texas.





COMMENTARY: The largest known swamp post oak grows in Richland Parish, Louisiana.

Quercus sinuata Walter

Bastard oak

Durand oak, Bigelow oak, bastard white oak, bluff oak, Durand white oak, white shin oak, scrub oak, white oak

GROWTH FORM: var. *breviloba* varies from clonal shrub to small tree with occasional specimen that grows to 55 feet (16.8 m); var. *sinuata* small to large tree that grows to 95 feet (28.9 m), with solitary or multiple trunks. **BARK:** gray to light brown with shallow to



deep furrows and scaly ridges; thin barked trees are susceptible to fire. **TWIGS and BUDS:** twigs vary from light gray to chestnut-brown,



may have warty surface (var. *breviloba*); chestnutbrown, ovoid buds with ciliated margins. **LEAVES:** smooth short petiole up to $\frac{1}{4}$ inch (6 mm) long; thin oblong leaf, 1 $\frac{1}{4}$ - 4 $\frac{3}{4}$



inches (32 - 121 mm) long, 1 - 2 $\frac{3}{8}$ inch (25 - 60 mm) wide, base acute to attenuate-rounded, margin entire or usually with 3 - 9 rounded lobes, apex rounded; dull to shiny dark green above, pubescent grayish-green beneath. **ACORNS:** annual; 1 - 2 acorns on a peduncle up to $\frac{1}{4}$ inch (6 mm) in length, thin shallow saucer-shaped cup with gray scales, encloses $\frac{1}{8}$ - $\frac{1}{4}$ of nut; ovoid or oblong, light brown to chestnutbrown nut, $\frac{1}{4}$ - $\frac{3}{4}$ inch (6 - 19 mm) long. **HABITAT:** rich alluvial and limestone soils in woodlands and prairies. **DISTRIBUTION:** var. *sinuata* species from North Carolina and Florida, west to Oklahoma and Texas, south into Mexico; *Quercus sinuata* var. *breviloba* occurs on the Edwards Plateau of Texas southward into Mexico (along the eastern side of the Sierra Madre Oriental) in the states of Coahuila and Nuevo Leon.



COMMENTARY: The recorded distribution of *Q. sinuata* var. *sinuata* in North Carolina may be due to the misidentification of *Q. austrina*. The largest known specimen of *Q. sinuata* var. *breviloba* grows in Travis County, Texas, and the largest specimen of *Q. sinuata* var. *sinuata* is found in Stewart County, Georgia.

Quercus stellata Wangenheim

Post oak iron oak

GROWTH FORM: shrub to medium sized tree with a dense rounded crown, slow growing up to 85 feet (25.9 m) under good environmental conditions. **BARK:** gray with shallow fissures and scaly ridges. **TWIGS and BUDS:** pubescent yellowish-gray



twigs; chestnut-brown, ovoid buds with pubescent scales and a pointed apex. **LEAVES:** petiole $\frac{1}{6} - \frac{5}{6}$ inch (3 - 16 mm) long; thick and leathery obovate leaf, 1 $\frac{1}{2}$ - 6 inches (38 - 152 mm) long, $\frac{3}{4}$ - 4 inches (19 - 101 mm) wide, margins with 5 - 7 shallow to deep lobes, middle lobes are opposite and resemble a Maltese Cross, base attenuate-rounded, apex rounded; dull or shiny dark green above with rough texture, pubescent yellowish to gray-green beneath, star-shaped hairs.



ACORNS: annual; 1 - 3 acorns on peduncle to ¼ inch (6 mm), top-shaped or saucer-shaped thin cup with gray pubescent scales,





enclosing $\frac{1}{4} - \frac{2}{3}$ of the nut; rounded, light brown nut, may have dark brown faint strips, $\frac{3}{8} - \frac{3}{4}$ inch (10 - 19 mm) long. **HABITAT:** occurs on poor upland clay and sandy soils. **DISTRIBUTION:** Massachusetts south to Florida, west to Texas, north to Iowa, and east to Pennsylvania.



COMMENTARY: Post oak is a valuable timber species marketed as white oak. Post oak is drought resistant and can be used on drier sites in the landscape plantings. The extreme western populations in Oklahoma and Texas, existing in harsh conditions, are usually shrubs or small trees. The common name derives from its use as fence posts. Native Americans used post oak as medication. The largest known specimens are growing in Jackson County, Georgia and Surry County, Virginia.

Quercus texana Buckley

Texas red oak Nuttall oak, red oak, Red River oak, pin oak, striped oak

GROWTH FORM: medium to large tree, which grows to 115 feet (35 m), fast growing with an open crown. **BARK:** gray-brown to dark brown with shallow fissures and flat ridges. **TWIGS and BUDS:** smooth, gray to chestnut-brown twigs; grayish-brown, ovoid bud,



often with ciliated scales at bud apex. **LEAVES:** smooth petiole from $\frac{3}{4}$ - 2 inches (19 - 51 mm) long; ovate to obovate leaf margins with 5 - 11 lobes, each lobe with 1 - 3 bristle-tipped teeth; 3 - 8 inches (76 - 203 mm) long, 2 $\frac{1}{4}$ - 5 $\frac{1}{4}$ inches (57 - 133 mm) wide, base almost truncate, apex acute ending in a bristle, lobes separated by deep sinuses, lobes at midleaf are usually opposite; smooth dark



green above, pale green below with axillary tufts of tomentum. **ACORNS:** biennial; solitary or clustered acorns on peduncle, goblet-shaped thin cup with pubescent inner and outer surface, covers $\frac{1}{3}$ - $\frac{1}{2}$ of the nut; chestnut-brown, egg-shaped nut with faint strips, $\frac{5}{8}$ - 1 inch (16 - 25 mm) in length, may be pubescent. **HABITAT:** wet clay soils along streams. **DISTRIBUTION:** lower Mississippi Valley from Alabama west to Texas and Oklahoma, and northeast to Illinois and Kentucky.



COMMENTARY: Prior to 1927, there was confusion regarding the taxonomic status of Texas red oak. *Quercus texana* has been applied to *Q. buckleyi* and *Q. gravesii*, or considered to be *Q. nuttallii*, or varietal forms of *Q. shumardii* and *Q. rubra*. The largest known Texas red oak specimens are growing in Washington County, Mississippi and in Morehouse Parish, Louisiana.

Quercus vaseyana Buckley

Vasey oak shin oak, scrub oak

GROWTH FORM: shrub or small tree, which grows to 50 feet (15.2 m), evergreen or subevergreen. **BARK:** dark brown, furrowed and shedding in long strips. **TWIGS and BUDS:** pubescent red to grayish-brown twigs; reddish-brown or gray, ovoid buds with obtuse apex, sparsely pubescent to smooth scales with ciliated margins.



LEAVES: petiole up to $\frac{1}{4}$ inch (6 mm) in length; oblong to narrowly lanceolate leaves, $\frac{3}{4} - 2\frac{1}{2}$ inches (19 - 63 mm) long, $\frac{3}{6} - \frac{3}{4}$ inch (10 - 19 mm) wide, margin is entire or mucronate-tipped 6 - 10 shallow lobes, lobes acute to obtuse; base obtuse to rounded, apex acute or rounded; leaf blade leathery and may be slightly convex, shiny dark green above, pale densely pubescent beneath. **ACORNS:**



annual; 1 - 2 acorns are sessile or on a short peduncle up to ¹/₈ inch (3 mm) long, reddish-brown cup, enclosing up to ¹/₄ of the nut; shiny light chestnutbrown, ellipsoidal or oblong nut, up to ³/₄ inch (19 mm) long.
HABITAT: limestone slopes and ridges in mesquite and juniper woodlands. **DISTRIBUTION:** the pinyon-juniper forests of western

forests of western Texas and northern Mexico (Coahuila).





COMMENTARY: Vasey oak acorns are a food source for wildlife and the wood is used as fuel. The largest known specimens are growing in Big Bend National Park, Brewster County, Texas and in Val Verde County, Texas.

Quercus velutina Lamarck

Black oak yellow oak, quercitron oak, yellow-bark oak, smooth-bark oak

GROWTH FORM: medium to large tree, 50 - 110 feet (15.2 - 33.5 m) in height, open and wide spreading crown. **BARK:** thick dark brown to black bark with deep furrows, rough ridges, yellow or orange inner bark. **TWIGS and BUDS:** smooth to pubescent chestnut-brown twigs, pith star-shaped; ovoid buds with tan pubescence, 5-angled in cross sections. **LEAVES:** petiole 1 - 2 ³/₄



inches (25 - 70 mm) long, may have sparse pubescence; obovate leaf outline, $4 - 11 \frac{3}{4}$ inches (101 - 298 mm) long, 3 - 6 inches (75 - 153 mm) wide, margin has 5 - 9 lobes ending in 1 - 4 bristle-tipped teeth, base obtuse to truncate, apex acute; glossy dark green to yellow green above, pale green with scurfy pubescence and axillary tomentum beneath, raised secondary veins on both surfaces. The pubescence



is shed during late summer. **ACORNS:** biennial; 1 - 2 short stalked acorns on short peduncle; reddish-brown pubescent cup, thick top-shaped with fringed edge, pubescent inner surface covers up to ¹/₂ of nut; ovoid to elliptical nut, up to ³/₄ inch (19 mm) long, light reddishbrown with faint stripes. Nut germination is in the spring following seedfall. **HABITAT:** dry uplands but grows best on lower slopes in rich well-drained soils.



DISTRIBUTION: Maine west through Ontario to Minnesota, and south to Texas and Florida.



COMMENTARY: Black oak is a valuable timber species marketed as other red oaks. The bark was once used as a source for the yellow dye, quercitron, and for tannins to tan leather. Acorns are a food source for turkey, ruffed grouse, songbirds, deer, squirrels, and other small mammals. Black oaks begin to produce acorns at age 20, with optimum production at 40 - 75 years. The largest known specimen occurs in Westmoreland County, Virginia.

Quercus virginiana Miller

Southern live oak live oak, Virginia live oak, Spanish oak

GROWTH FORM: varies in form from a rhizomatous shrub to a large tree of 80 feet (24.4 m), trees having a dense spreading crown, trunk buttressed at the base, evergreen with leaves dropping after initial growth in the spring. **BARK:** dark brown to black, deep furrows with scaly ridges. **TWIGS and BUDS:** pubescent gray juvenile twigs, smooth older twigs; reddishbrown, ovate buds with gray scale margins may have pubescence. **LEAVES:** short petiole up to $\frac{3}{6}$ inch (10 mm) in length;



thick oblong leaf with a revolute margin, $1 \frac{3}{6} - 4$ inches (35 - 101 mm) long, $\frac{3}{4} - 2$ inches (19 - 51 mm) wide, margin entire, base cuneate to rounded, apex rounded and may have bristled tip; shiny light



ACORNS: annual: 1 - 3 acorns on

peduncle $\frac{3}{8} - \frac{3}{4}$ inch (10 - 19 mm) long; deep gobletshaped cup, scales are light gray with reddish tips and often pubescent, enclosing $\frac{1}{4} - \frac{1}{2}$ of the nut; mature



nut is dark brown to almost black narrowly oblong, ⁵/₈ - 1 inch (16 - 25 mm) in length. **HABITAT:** sandy soils in the lower Coastal Plain. **DISTRIBUTION:** Virginia, south to Florida, and west to Texas.

COMMENTARY: Southern live oak is a valuable timber species



with tough dense wood, difficult to saw and dry, but suitable for construction, shipbuilding, and firewood. The first publicly owned forestland, at the end of the eighteenth century, was for the purpose of preserving the supply of southern live oak for the Navy's shipbuilding needs. Many of these oaks have been designated as 'Historic Trees' throughout the South. The Houma tribe used this oak to cure dysentery. The largest known specimens are growing in Mandeville, St. Tammany Parish, Louisiana and in Ware County, Georgia. Each of these champion trees have canopies that cover approximately ¹/₃ acre.

ECOSYSTEMS OF EASTERN NORTH AMERICA*



* Bailey, Robert G. 1998. Ecoregions map of North America: Explanatory note. Misc. Publ. 1548. Washington, DC: USDA Forest Service. 10 p.

www.fs.fed.us/institute/ecolink.html

Ecoregion Province Legend

132	Taiga (boreal forests)
211	Mixed deciduous-coniferous forests
M211b	Mixed forest - coniferous forest - tundra, high
221a	Broadleaved forests, oceanic
221b	Broadleaved forests, continental
M221	Deciduous or mixed forest - coniferous forest - meadow
M222	Broadleaf forest - meadow
231	Broadleaved-coniferous evergreen forests
M231	Mixed forest - meadow
232	Coniferous-broadleaved semi-evergreen forests
251	Forest-steppes and prairies
252	Prairies and savannas
M311	Steppe or semidesert - mixed forest - alpine meadow or steppe
313	Steppes and shrubs
314	Shortgrass steppes
321	Semideserts
M321	Semidesert - shrub - open woodland - steppe or alpine meadow*
323	Deserts on sand
331	Steppes
332	Dry steppes
M333	Steppe - coniferous forest
411	Open woodlands, shrubs, and savannas
M411	Open woodland - deciduous forest - coniferous forest - steppe or meadow*
R	Riverine or floodplain forest along the banks of a river

* Not shown on map

_

SPECIES SUMMARY



This "Treaty Oak" is a southern live oak (*Q. virginiana*) located at Jessie Ball duPont Park, Jacksonville, Florida. Folklore attributes this oak as a treaty site for Native Americans in northeastern Florida. This tree has a crown that covers approximately 1/4 acre. (Photo, J. Stein)

Table 1. Native Red Oaks

Quercus Species	Comments
<i>acerifolia</i> Maple-leaf oak	Very limited area in state of AR on mountain slopes and ridge tops. Listed as 'endangered' by IUCN [*] . Synonymy: <i>Q. shumardii</i> in part.
<i>arkansana</i> Arkansas oak, Arkansas water oak, water oak	 Rare. Localized on well-drained sandy soils in the states of AR, LA, AL, GA, FL, and TX. Listed as 'endangered' in FL; 'rare' in AR; and 'vulnerable' in AL, GA, and LA by IUCN*. Synonymy: <i>Q. caput-rivuli</i>. 231 232 R
<i>buckleyi</i> Buckley oak, Texas red oak, Spanish oak, spotted oak	 Found on limestone ridges, slopes, and creek bottoms in the states of OK and TX. Synonymy: <i>Q texana, Q. rubra</i> in part, <i>Q. shumardii</i> in part. 252 313 314
<i>coccinea</i> Scarlet oak, black oak, red oak, Spanish oak	Found on poor soils in the eastern United States. Used as a landscape tree. 211 M211b 221a 221b M221 231 232 R
<i>ellipsoidalis</i> Northern pin oak, jack oak, Hill's oak, black oak	Northcentral North America on sandy sites. 211 221b 251

* (IUCN) International Union for Conservation of Nature and Natural Resources

Quercus Species	Comments
<i>falcata</i> Southern red oak,	In dry upland conditions on sandy or clay loam soils in the southern half of the eastern United States. Synonymy: <i>Q. digitata</i> .
Spanish oak, swamp red oak, water oak, turkey-foot oak	221a 221b M221 M222 231 M231 232 252 314 R
<i>georgiana</i> Georgia oak	Small trees on granitic outcrops in the states of GA, AL, and SC.
hemisphaerica	On sandy soils in the southern United States.
Laurel oak , Darling- ton oak	231 232 R
<i>ilicifolia</i> Bear oak, scrub oak	 Small trees/shrubs on disturbed sandy or rocky sites in the northeastern United States. Synonymy: <i>Q. nana.</i> 211 M211b 221a M221
imbricaria	Dry to mesic sites in the mid-eastern and central United States.
Shingle oak , laurel oak	221a 221b M221 M222 231 M231 232 251 R
incana	Small trees on dry sandy soils in the southeastern United States Synonymy:
Bluejack oak , sand- jack oak, upland wil- low oak, cinnamon	Q. cinerea.
oak, shin oak, turkey oak	231 M231 232 252 R

Quercus Species	Comments
inopina	Deep sandy ridges and terraces in central FL.
Florida oak	231
<i>laevis</i> Turkey oak , Catesby oak, Coastal Plain scrub oak, scrub oak, turkey-foot oak	Dry sandy soils in the southeastern United States. Synonymy: <i>Q. catesbaei</i> . 231 232 411
<i>laurifolia</i> Swamp laurel oak, laurel oak, Darling- ton oak, diamond- leaf oak, laurel-leaf oak, water oak, obtuse oak	Southeastern United States. Synonymy: <i>Q. obtusa, Q. rhombica.</i> 221b 231 232 252 314 411 R
<i>marilandica</i> Blackjack oak, bar-	Deep sands and shallow soils in southcentral and eastern North America. 221a 221b M221 M222 231 M231 232
jack oak	251 252 313 314 331
<i>myrtifolia</i> Myrtle oak, scrub oak	Small trees/shrubs on sandy areas in the states of AL, FL, GA, MS, and SC.231 411

Quercus Species	Comments
<i>nigra</i> Water oak, possum oak, spotted oak, pin oak, red oak	On moist or wet soils from the southeastern United States to the state of TX. Synonymy: <i>Q. nana</i> , <i>Q. uliginosa</i> . 221a 221b M221 M222 231 M231 232 252 411 R
<i>pagoda</i> Cherrybark oak, bottomland red oak, red oak, swamp red oak, swamp Span- ish oak, Elliott oak, scalybark oak	On well-drained lowland soil in the southeastern United States. Synonymy: <i>Q. falcata</i> in part, <i>Q. leucophylla</i> , <i>Q. pagodifolia</i> . 221a 221b 231 232 R
<i>palustris</i> Pin oak , swamp oak, Spanish oak, swamp Spanish oak, water oak	Poorly drained, clay soils in mid-central and eastern United States and Canada.211M211b221a221bM221M222231232251R
<i>phellos</i> Willow oak, pin oak, peach oak, swamp willow oak, black oak	On flood plains and moist soils of the central and southern United States. Popular shade tree in the southeastern United States. 221a 221b M221 M222 231 M231 232 252 R
<i>pumila</i> Runner oak , running oak	Shrubs on dry sandy soils in the southeasternUnited States.231 232 411

Quercus Species	Comments
<i>rubra</i> Northern red oak,	On moist soils in eastern North America. Synonymy: <i>Q. borealis</i> , <i>Q. maxima</i> .
red oak, gray oak, eastern red oak, mountain red oak	132 211 M211b 221a 221b M221 M222 231 M231 232 251 252 R
<i>shumardii</i> Shumard oak, spotted oak, swamp oak, Schneck oak, Schneck red oak.	On well-drained soils in the southern half of central and eastern North America. Synonymy: <i>Q. schneckii</i> .
Shumard red oak, southern red oak, swamp red oak	211 221a 221b M221 M222 231 M231 232 251 252 313 R
<i>texana</i> Texas red oak, Nut- tall oak, red oak, Red River oak, pin oak,	Distribution on wet clay soils in the southern United States. Synonymy: <i>Q. buckleyi</i> , <i>Q. gravesii</i> , <i>Q. nuttallii</i> , <i>Q. rubra</i> in part, <i>Q. shumardii</i> in part.
striped oak	Found from dry uplands to rich soils on lower
Black oak, yellow	slopes in central and eastern North America. Synonymy: <i>Q. tinctoria</i> .
oak, quercitron oak, yellow-bark oak, smooth-bark oak	211 M211b 221a 221b M221 M222 231 M231 232 251 252 313 R

Table 2. Native White Oaks

Quercus Species	Comments
alba	On deep, well-drained soils in central and eastern North America.
White oak, eastern white oak, stave oak, forked-leaf white oak	211 M211b 221a 221b M221 M222 231 M231 232 251 R
<i>austrina</i> Bastard white oak, bluff oak	 Well-drained lowland areas and hardwood hummocks in the states of AL, FL, GA, MS, NC, and SC. Synonymy: <i>Q. durandii</i> in part. 231 232 R
bicolor	Moist soils in northcentral and northeastern forests. Synonymy: <i>Q. platanoides</i> .
Swamp white oak , white oak	211 M211b 221a 221b M221 231 232 251 R
<i>boyntonii</i> Boynton oak	Rare; associated with sandstone outcrops in the states of AL and TX. Listed as 'endangered' by IUCN [*] . Synonymy: <i>Q. stellata</i> in part.
chapmanii	Xerophytic conditions on sand near coastal FL, GA, and SC.
Chapman oak , Chapman white oak, scrub oak	231 411

 * (IUCN) International Union for Conservation of Nature and Natural Resources

Quercus Species	Comments
<i>fusiformis</i> Texas live oak, scrub live oak, live oak	On loam or sandy gravel in the states of TX and OK, and in Mexico (Coahuila, Nuevo Leon, Tamaulipas). Synonymy: <i>Q. virginiana</i> in part. 252 M311 313 314 321 323
<i>geminata</i> Sand live oak	 Small trees/shrubs on deep sandy soils in the southern United States. Synonymy: <i>Q. virginiana</i> in part. 231 411
<i>havardii</i> Havard oak, shin oak, shinnery	Low shrubs on deep sand dunes in the states of NM, OK, and TX. 313 314 321 323 331
<i>laceyi</i> Lacey oak, canyon oak, smoky oak, rock oak	On limestone hills, woodlands, and riparian forests in the state of TX and in Mexico (Coahuila, Nuevo Leon, Tamaulipas). Synonymy: <i>Q. breviloba</i> , <i>Q. glaucoides</i> . M311 314 321 323
<i>lyrata</i> Overcup oak, swamp post oak, wa- ter white oak, swamp white oak	Wet lowlands in the southern United States. Synonymy: <i>Q. bicolor</i> in part. 221a 221b M222 231 232 251 252 R

Quercus Species	Comments
macrocarpa	On limestone or calcareous clay soils in central North America. Synonymy: <i>Q. mandanensis</i> .
Bur oak , mossy-cup oak, blue oak, prairie oak, mossy-overcup oak	132 211 M211b 221a 221b M221 M222 232 251 252 313 314 331 332 M333 R
<i>margaretta</i> Sand post oak,	Small trees/shrubs on deep sand or gravel in the southeastern United States. Synonymy: <i>Q. minor</i> in part, <i>Q. stellata</i> in part.
dwarf post oak, run- ner oak, scrubby oak, post oak	221b 231 M231 232 252 313 314 R
<i>michauxii</i> Swamp chestnut	On moist alluvial soils from the state of VA to TX. Synonymy: <i>Q. brayi</i> , <i>Q. houstoniana</i> , <i>Q. prinus</i> in part.
oak, basket oak, cow oak	221a 221b 231 M231 232 252 314 R
minima	Found on deep sandy soils in the southeastern United States. Synonymy: <i>Q. virens</i> in part,
minimal oak	231 411 R
mohriana	Found on limestone hills in the states of NM, OK, and TX, and in Mexico (Coahuila).
Mohr oak, shin oak, scrub oak	313 314 321 323 332

Quercus Species	Comments
<i>montana</i> Chestnut oak, rock chestnut oak, moun- tain chestnut oak, rock oak, tanbark oak	Shallow upland soils in eastern North America.Synonymy: <i>Q. prinus</i> .211 M211b221a221bM221232R
<i>muehlenbergii</i> Chinkapin oak, chestnut oak, yellow chestnut oak, yellow oak, rock chestnut oak, rock oak	Limestone soils in central and eastern North America, and in Mexico (Chihuahua, Coahuila, Nuevo Leon, Tamaulipas). Synonymy: <i>Q. acuminata</i> . 211 M211b 221a 221b M221 M222 231 M231 232 251 252 M311 313 314 321 323 331 R
<i>oglethorpensis</i> Oglethorpe oak	Local distribution on rich soils in the states of SC, LA, MS, and GA. Listed as 'vulnerable' by the IUCN*.
<i>prinoides</i> Dwarf chinkapin oak, scrub chestnut oak	Small trees/shrubs on dry rocky soils from the mid-central United States to the northeastern United States and Canada.211M211b221a221bM221M222231M231232251252313331R

Quercus Species	Comments
<i>pungens</i> Sandpaper oak, pungent oak, scrub live oak, encino oak	Trees/shrubs on dry limestone or igneous slopes in the states of AZ, NM, and TX, and in Mexico (Chihuahua, Coahuila, Nuevo Leon, Tamaulipas). Synonymy: <i>Q. undulata</i> in part. M311 314 321 M321 323 M411
similis Swamp post oak, delta post oak, bot- tomland post oak, Mississippi Valley oak, yellow oak	Found on wet soils in the southeastern United States. Synonymy: <i>Q. ashei, Q. stellata</i> in part.
<i>sinuata</i> var. <i>breviloba</i>	var. <i>breviloba</i> : Limestone hills and prairies in TX and Mexico (Coahuila, Nuevo Leon, Tamaulipas).
var. <i>sinuata</i>	252 M311 314 321
Bastard oak , Durand oak, Bigelow oak, bastard white oak, bluff oak, Durand white oak, white shin oak, scrub oak, white	var. <i>sinuata</i> : Wet and riparian areas in the southeastern United States. Synonymy: <i>Q. annulata, Q. breviloba, Q. durandii</i> in part, <i>Q. obtusifolia</i> in part, <i>Q. san-sabeana</i> .
oak	231 232 252 R
stellata	Poor upland sites in the southern United States. Synonymy: <i>Q. minor</i> , <i>Q. obtusiloba</i> .
Post oak, iron oak	221a 221b M221 M222 231 M231 232 251 252 313 314 331 332 R

Quercus Species	Comments
<i>vaseyana</i> Vasey oak, shin oak, scrub oak	 Small trees/shrubs on dry limestone slopes in the state of TX, and in northern Mexico (Chihuahua, Coahuila, Nuevo Leon). Synonymy: <i>Q. pungens</i> in part, <i>Q. undulata</i> in part. 231 314 321
<i>virginiana</i> Southern live oak, live oak, Virginia live oak, Spanish oak	On loam and clay soils in the southern United States, along the Coastal Plain from TX to VA. 231 232 252 314 411 R

KEY TO LEAVES OF EASTERN NATIVE OAKS



The "Old Senator," a southern live oak (*Q. virginiana*) located at St. Augustine, Florida, is reputed to be a witness to the landing of Juan Ponce de Leon in 1513. When Juan stepped ashore to search for the Fountain of Youth, he was credited with the discovery of Florida and the beginning of the European colonization of the North American continent. (Photo, J. Stein)



Illustrated examples of typical leaf characters used for field identification of oak species. Scanned image of southern red oak (*Quercus falcata*).

Oak Groups*

Leaf blade entire, or lobed with shallow or deep sinuses; lobes and apex armed with bristled tip

Red Oak Group 123





^{*} Characteristics in this key are based upon mature leaves exposed to full sunlight. Oaks normally associated with southwestern species are included in this key if their distributions extended east of the 100th meridian.

1	Leaf petiole less than ³ / ₈ inch long2	
	Leaf petiole greater than ³ / ₈ inch long17	
2(1)	Leaf blade more than 4 times longer than wide (shape lanceolate or narrowly elliptical)	
	Leaf blade less than 4 times longer than wide (shape ovate, obovate, spatulate, broadly elliptical)	
3(2)	Petiole sparse to densely pubescent4	A
	Petiole lacks pubescence; leaf margin entire; shiny light green above; pale green and may have grayish pubescence beneath	
4(3)	Leaf lustrous blue-green with raised veins above; dense woolly pubescence with reddish axillary tufts of hair beneath	
	Leaf dark green with impressed veins above; uniform woolly pubescence, lacks axillary tufts of hair beneath; leaf blade slightly convex and usually revolute	

5(2)	Leaf blade widest beyond midleaf6
	Leaf blade widest at or below midleaf13
6(5)	Leaf petiole lacks pubescences7
	Leaf petiole pubescent10
7(6)	Leaf margin entire and may curl under, lacks prominent lobes
	Leaf margin flat with 2-5 prominent lobes; sinuses extending one-third or more to midvein; smooth leaf surface except for axillary tufts of hair beneath
8(7)	Leaf shape obovate9
	Leaf shape spatulate, base cuneate; may have 2-3 shallow lobes beyond midleaf; smooth leaf blade with axillary tufts of hair beneathQ. nigra

- - Leaf blade flat and broadly triangular; 2-5 lobes with shallow sinuses12
- 11(10) Leaf blade may have yellow scruffy pubescence, axillary tufts of hair beneath; margin somewhat revolute *Q. myrtifolia*









12(10) Leaf blade longer than wide; pubescent with axillary tufts of hair beneath......*Q. arkansana*



	Leaf blade wider than long; scruffy or sparse pubescence beneath, lacks axillary tufts of hair Q. marilandica	A L A
13(5)	Leaf blade without lobes; usually 3 times longer than wide14	
	Leaf blade with lobes; less than 2 times longer than wide16	
14(13)	Leaf petiole lacks pubescence (smooth)15	
	Leaf petiole pubescent; leaf blade densely pubescent with axillary tufts of hair beneath	
15(14)	Leaf blade thin, apex obtuse or rounded; found on moist soil <i>Q. laurifolia</i>	

Leaf blade thick and leathery, apex acute or acuminate; found on dry soil *Q. hemisphaerica*









16(13)	Leaf blade ovate or broadly elliptical and almost as wide as long; 3-7 lobes with deep sinuses; apical lobe elongated, one-third to one-half length of the leaf with 1-3 acute teeth; leaf often looks like a turkey's footQ. laevis
	Leaf blade broadly elliptical and longer than wide; 3-5 lobes with deep sinuses; apical lobe less than one-fourth length of leafQ. georgiana
17(1)	Leaf blade entire or lobed with sinuses less than one-third distance to the midrib
	Leaf blade lobed with sinuses greater than one-third distance to the midrib25
18(17)	Leaf longer than wide19
	Leaf usually as wide as long, circular in outline; resembles a maple leaf



22(21) Leaf petiole smooth with reddish coloration; leaf blade dull green above; smooth with minute axillary

> Leaf petiole pubescent; leaf blade shiny dark green above; pale green and smooth beneathQ. ilicifolia

23(20) Leaf apex obtuse to rounded; widest part of leaf blade near apex gives leaf a

> Leaf apex acute; widest part of

24(23) Leaf blade longer than wide; yellowgreen above; pubescent with axillary tufts of hair beneath......Q. arkansana

> Leaf blade generally as wide as long; vellow-green above; dense reddishbrown scruffy pubescence, lacking axillary hairs beneathQ. marilandica









25(17)	Leaf base acute or rounded (U-shaped)26
	Leaf base obtuse or truncate
26(25)	Leaf apex blunt, rounded, or obtuse27
	Leaf apex acute
27(26)	Leaf petiole lacks pubescence (smooth)Q. georgiana
	Leaf petiole pubescentQ. arkansana
28(26)	Leaf blade dark green above; lacks axillary tufts of hair beneath 29
	Leaf blade is a light green above; pale green with axillary tufts of hair beneath Q. laevis

29(28)	Leaf blade shiny dark green above; pale rusty pubescence beneath; 3-5 lobes with the terminal lobe longer than lateral lobes
	Leaf blade shiny dark green above; pale gray pubescence beneath; 5-11 lobes with terminal lobe shorter than lateral lobes Q. pagoda
30(25)	Leaf blade uniformly pubescent beneath
	Leaf blade usually smooth without uniform pubescence beneath, may have scattered hairs especially along the midvein
31(30)	Leaf base cuneate to truncate
	Leaf base rounded; terminal lobe one-third to one-half length of leaf; lobes near base are usually opposite and gives the appearance of a turkey's foot





- olia
- 34(33) Leaf blade with sinuses extending more than half the distance to midrib......35



Leaf blade with sinuses extending less than half the distance to midrib...... *Q. rubra*

35(34) Leaf blade with minute axillary tufts of hair (visible with magnification)......**36**

36(35) Mature leaf less than 4 inches in length; distally expanded lobes, sinuses C-shaped between major lobes; petiole yellow in color *Q. buckleyi*









37(35)











		W.
41(40)	Leaf with terminal lobe approximately one-third length of middle lobes; deep sinuses with lobes nearly at right angles to midrib; shiny bright green above; pale beneath	
	Leaf with terminal lobe one-half to two-thirds length of middle lobes; deep sinuses with lobes slightly angled toward apex; dark green above; pale beneathQ. texana	
42(39)	Leaf petiole one-third to one-half length of leaf blade43 Leaf petiole less than one-third length	A.
	of leaf blade; shiny dark green above, pale beneath; secondary veins raised on both surfaces Q. shumardii	
43(42)	Leaf shiny light green above; smooth with axillary tufts of hair beneath; lobes distally expanded <i>Q. coccinea</i>	
	Leaf shiny dark green above; scruffy pubescence with axillary tufts of hair beneath, pubescence shed in late summer; lobes without distal expansion; stout petiole twisted to allow leaf to hang perpendicular to the ground <i>Q. velutina</i>	


4(3)	Leaf margin with more than 6 dentate (teeth) on each side 5	
	Leaf margin with 5 or less dentate (teeth) on each side	
5(4)	Width of leaf blade less than half its length, base cuneate; leaf leathery, shiny dark green above; glaucous pubescence (rubs off) beneath <i>Q. prinoides</i>	1
	Width of leaf blade greater than half its length, base cuneate to acute; shiny dark green above; white velvety pubescence beneath	
6(4)	Petiole less than ¹ / ₄ inch long7	
	Petiole more than ¹ / ₄ inch long; leaf margin minutely revolute, usually 3-5 irregular or shallow lobes beyond midleaf (often 3-lobed); shiny dark green with few hairs above; grayish pubescence with minute stellate hairs beneath	2

7(6) Leaf apex rounded; mature leaves smooth beneath with some hair retained along the midvein; juvenile leaves may be uniformly covered with stellate hairs 8(7) Leaf blade narrowly lanceolate to oblong, may be slightly convex, $\frac{3}{4}$ - 2 $\frac{3}{8}$ inches long; leaves may be dimorphic; mature sun-leaves shiny, dark bluishgreen above, dense stellate hairs mixed with minute appressed hairs beneath; shady-leaf margins coarsely toothed with shallow sinuses, mucronate-tipped teeth.....Q. vaseyana Leaf blade obovate to oblanceolate, $\frac{3}{4}$ - 4 $\frac{3}{4}$ inches long; leaves may be

dimorphic with sunny exposure producing an entire margin, mature leaves shiny, light to dark green above, with whitish bloom of densely stellate with minute appressed hairs beneath; shady-leaf margins coarsely toothed with shallow sinuses, mucronate-tipped teeth, and flat, wavy, or minutely







9(3)	Mature leaf blade less than 4 inches long10	
	Mature leaf blade more than 4 inches long 12	
10(9)	Upper leaf surface feels smooth to the touch	
	Upper leaf surface feels rough (sandpapery) to the touch	
11(10)	Leaf blade shiny, light green above; dense gray to yellowish-brown tomentulose or stellate pubescent hairs beneath; leaf thick and leathery	
	Leaf blade shiny, dark bluish-green above, densely stellate with minute appressed hairs beneath Q. vaseyana	

12(9) Leaf blade with rounded base.....13

Leaf blade with obtuse to truncate base, dentate with sharp teeth; shiny yellowish-green to dark green above; silvery-white glaucous pubescence (rubs off) or light green with minute hairs beneath......Q. muehlenbergii

13(12) Leaf blade with minute sparse hairs beneath except for tufts of hair along midvein; margin dentate with rounded teeth......Q. montana

14(2) Leaf blade with rounded base.....**15**

Leaf blade with cuneate to acute base......17







15(14) Leaf blade bluish-green; margin entire or with irregular shallow lobes......**16**



Leaf blade flat.....19





Leaf apex acute or obtuse-rounded21

Leaf apex rounded and broadly

19(17)

20(19) Leaf blade 1 ³/₈ - 2 ³/₈ inches long with sinuate parallel sides; associated with limestone outcrops......*Q. sinuata* var. *breviloba*









21(19) Leaf blade obovate to oblanceolate......22



(_1)	margin antira (iuvanila lagvas
	margin churc (juvenne leaves
	coarsely toothed with shallow
	sinuses); mature tree grows to
	49 feet
	- 0



Leaf blade ³ / ₄ - 4 ³ / ₄ inches long,
margin entire or toothed; mature
shrub less than 5 feet tallQ. minima

23(1) Leaf bluish-green above......24

Leaf green, yellowish-green, or	
grayish-green above24	5

24(23) Leaf apex acute (rarely obtuse); leaf narrowly lanceolate to oblong, margin coarsely toothed with mucronate tips; may be slightly convex above; pubescent beneathQ. vaseyana





Mature leaves conspicuously	
hairy beneath	28



Leaf petiole less than ¹/₄ inch long......**Q.** austrina

27(26) Leaf blade with narrow sinuses, mouth of sinus less than half its length, lobes with rounded tips; apex rounded**Q. alba**









30(29)	Leaf with upper surface rough (sandpapery) to the touch 31
	Leaf with upper surface smooth to the touch
31(30)	Leaf apex acute or obtuse with spine; coarsely toothed with some sinuses extending one-third to midribQ. pungens
	Leaf apex broadly rounded; lobes rounded or spatulate, lobes at midleaf usually form right angles to midrib in cross-shaped pattern, blade thick and stiffQ. stellata
32(30)	Leaf blade width equal to or greater than half its length
	Leaf blade width equal to or less than one-third its length; shiny light green above, dense gray to tawny tomentulose or stellate hairs beneathQ. havardii



Leaf width greatest in apical one-third, 3-lobed beyond midleaf, rarely cruciform in shape; glossy light to dark green above; grayish-green and sparsely glandular with sparse stellate hairs beneath......Q. similis



GLOSSARY

Acorn. A single nut, circular in cross section with a scaly cup attached at the base.

Acuminate. The leaf tip is narrowed abruptly into a tapering point.

Acute. Either the leaf tip or the leaf blade ends in an angle less than 90° and the tip is not prolonged into a point.

Allelopathy. Organic chemicals released by one plant that have a detrimental effect on the germination, growth, or metabolism of a different plant.

Annual. Acorns that mature in one growing season.

Apex. Tip, terminal end, or the narrowed and pointed end.

Appressed. Lying close and flat against.

Ascocarps. Sexual fruiting bodies of ascomycete fungi.

Attenuate. Leaf blade tapering to a long slender point.

Awn. A small pointed process or slender bristle.

Axillary. Situated in or growing from the angle formed by the junction of a vein and the midrib of a leaf.

Biennial. Acorns that mature in two growing seasons.

Bristle-tipped. The leaf tip and lobes are prolonged into a long slender bristle.

Ciliate. Margin fringed with short hairs.

Cordate. Heart-shaped with the base rounded and notched where the blade is attached to the petiole.

Cuneate. The leaf base is shaped like a wedge with straight sides tapering down to a point on the petiole.

Cup. Basal covering of an acorn.

Decurrent. Leaf blade extends down the petiole.

Dentate. The leaf margin has wide-angled teeth pointing outward.

Distal. Far from the point of attachment.

Elliptical. Leaf shaped like an ellipse with both the tip and base sloped uniformly.

Entire. Leaf margin is a smooth, even line with no indentations.

Glabrous. Smooth, not pubescent or hairy.

Glandular. Bearing glands.

Glaucous. Surface is covered with a whitish bloom that rubs off.

Lanceolate. Leaf shape is several times longer than wide and broadest below the middle, shaped like a spear point.

Lateral. Relating to the side.

Lenticel. Lens-shaped corky growths on young bark.

Lobe. The division of a leaf blade.

Margin. The edge of a leaf.

Midrib. The central vein or associated area of the leaf.

Mucronate. Lobe tip ends abruptly in a short, small point.

Nut. In the text, it is a general reference to the acorn, the 1-seeded nut of an oak (see acorn).

Oblanceolate. Leaf shape is somewhat lanceolate but is widest above the middle and tapering toward the petiole.

Oblong. Longer than broad with rounded ends and sides nearly parallel.

Obovate. Leaf shape is broadly egg-shaped and widest above the middle.

Obtuse. The leaf tip tapers abruptly to a blunt or rounded point forming an angle greater than 90°.

Ovate. Egg-shaped in outline; broad end at the base with the tip acute or rounded.

Peduncle. Stalk supporting one or more acorns.

Petiole. Slender stem-like structure that supports the leaf blade.

Pith. Center of a stem.

Pubescent. Covered with fine soft short hairs.

Revolute. Edge of leaf is slightly rolled or turned under.

Rhizomatous. Thickened subterraneous stem producing shoots above and roots below.

Rounded. The leaf tip or leaf base makes a full arc in outline, U-shaped base.

Rugose. Wrinkled.

Sessile. Without a stalk or petiole.

Sinuate. The margin bends in a strong wavy line without producing a sinus.

Sinus. The space between two lobes of a leaf.

Spatulate. Leaf shape is broad and rounded above the middle but with the sides wedge-shaped and tapering toward the petiole.

Stellate. Resembling a star in shape or cross section.

Tomentulose. Slightly pubescent with matted (woolly) hair.

Tomentum. Densely pubescent.

Tooth. An edge or lobe of a leaf blade divided into toothlike projections, usually ending in a slender bristle.

Truncate. Leaf base almost forms a straight line at right angles to the midrib.

Vein. A rib-like thickened tissue in the leaf blade.

Woolly. Covered with long matted hairs.

Xerophytic. Structurally adapted for survival with a limited supply of water.

SELECTED REFERENCES

- Brown, C.L. and L.K. Kirkman. 1990. Trees of Georgia and adjacent states. Timber Press, Portland, OR. 292 p.
- Burns, R.M. and B.H. Honkala, tech. coords. 1990. Silvics of North America: 2. Hardwoods. Agricultural Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. Vol. 2, 877 p.
- Chester, E.W., B.E. Wofford, and R. Kral. 1997. Atlas of Tennessee vascular plants volume 2. Angiosperms: Dicots. Miscellaneous Publication No. 13. The Center for Field Biology, Austin Peay State University, Clarksville, TN. 242 p.
- Elias, T.S. 1980. The complete trees of North America: field guide and natural history. Times Mirror Magazines, Inc., New York, NY. 948 p.
- Farrar, J.L. 1995. Trees in Canada. Canadian Forest Service and Fitzhenry & Whiteside Limited, Ottawa, Canada. 500 p.
- **Gleason, H.A. and A. Cronquist. 1991.** Manual of Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden, Bronx, NY. 910 p.
- Haehnle, G.G. and S.M. Jones. 1985. Geographical distribution of *Quercus oglethorpensis*. Castanea 50(1):26-31.
- Harvill, A.M., Jr., T.R. Bradley, C.E. Stevens, T.F. Wieboldt, D.M.E. Ware, D.W. Ogle, G.W. Ramsey, and G.P. Fleming. 1992. Atlas of the Virginia Flora III. Virginia Botanical Associates, Burkeville, VA. 144 p.
- Jensen, R.J. 1997. 5a. QUERCUS Linnaeus sect. LOBATAE Loudon, Hort. Brit. 385. 1830 Red or black oaks. *In* Flora of North America, North of Mexico, Vol. 3, pp. 447-468. Flora of North America Editorial Committee, editors. Oxford University Press, New York, NY. 590 p.
- Jones, S.B. and N.C. Coile. 1988. The distribution of the vascular flora of Georgia. University of Georgia, Botany Dept., Athens, GA. 230 p.
- Little, E.L. 1980. National Audubon Society Field Guide to North American Trees: Eastern region. Alfred A. Knopf, New York, NY. 716 p.
- Little, E.L. 1996. Forest trees of Oklahoma: How to know them. 14th edition. Publication No. 1, Oklahoma Forest Service, Oklahoma City, OK. 205 p.

- Martine, C.T. 2000. Trees of New Jersey and the Mid-Atlantic States. 4th edition. New Jersey Forest Service, Trenton, NJ. 112 p.
- Miller, H.A. and S.H. Lamb. 1985. Oaks of North America. Naturegraph Publishers, Inc., Happy Camp, CA. 327 p.
- **Muller, C.H. 1942.** The Central American species of *Quercus*. U.S. Department of Agriculture Miscellaneous Publication 477. 216 p.
- Muller, C.H. 1956. The distribution of *Quercus boyntoni*. Madrono 13: 221-225.
- Nixon, K.C. 1997. Fagaceae. *In* Flora of North America, North of Mexico, Vol. 3, pp. 436-506. Flora of North America Editorial Committee, editors. Oxford University Press, New York, NY. 590 p.
- Nixon, K.C. and C.H. Muller. 1997. 5c. QUERCUS Linnaeus sect. QUERCUS White oaks. *In* Flora of North America, North of Mexico, Vol. 3, pp. 471-506. Flora of North America Editorial Committee, editors. Oxford University Press, New York, NY. 590 p.
- Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. University of North Carolina Press, Chapel Hill, NC. 1183 p.
- Rhoads, A.F. and W.M. Klein, Jr. 1993. The vascular flora of Pennsylvania: Annotated checklist and atlas. American Philosophical Society, Philadelphia, PA. 636 p.
- Sargent, C.S. 1922. Manual of the trees of North America (exclusive of Mexico). 2nd edition. The Riverside Press, Cambridge, MA. 910 p.
- Strausbaugh, P.D. and E.L. Core. 1953. Flora of West Virginia (Part II). West Virginia University Bull. Series 53, No. 12-1:275-570.
- Thomas, R.D. and C.M. Allen. 1998. Atlas of vascular flora of Louisiana. Volume III: Dicotyledons Fabaceae - Zygophyllaceae. Louisiana Dept. of Wildlife and Fisheries Natural Heritage Program, Baton Rouge, LA. 248 p.
- Walter, K.S. and H.J. Gillett, eds. 1998. 1997 IUCN red list of threatened plants. World Conservation Monitoring Centre, Cambridge, UK. 862 p.
- Zavala-Chavez, F. 1989. Identificacion de encinos de Mexico. Division de Ciencias Forestales, Universidad Autonoma Chapingo, Chapingo, Mexico. 150 p.

INDEX OF COMMON NAMES

Recognized or preferred common names are in bold. Common names may be shared by different species in various locations and are prioritized on a regional basis. If preferred usage has been applied to other species, they are referenced. Page numbers in bold refer to the species description.

Arkansas oak, 10, 109 Arkansas water oak, see Arkansas oak, 10, 109 barren oak, see blackjack oak, **58**, 111 basket oak, see swamp chestnut oak, 60, 116 **bastard oak**, **94**, 118 bastard white oak, 12, 114 (also see bastard oak, 94) bear oak, 38, 110 Bigelow oak, see bastard oak, **94**, 118 black oak, 102, 113 (also see blackjack oak, 58; northern pin oak, 24; scarlet oak, 22; and willow oak, 80) blackjack oak, 58, 111 blue oak, see bur oak, 54, 116 bluejack oak, 42, 110 blue Japanese oak, 4 bluff oak, see **bastard oak**, 94, 118 and **bastard white oak**, **12**, 114 bottomland post oak, see swamp post oak, 92, 118 bottomland red oak, see cherrybark oak, 76, 112

Boynton oak, **16**, 114 Buckley oak, 18, 109 bur oak, 5, 54, 116, 161 canyon oak, see Lacey oak, 46, 115 Catesby oak, see turkey oak, 48, 111 **Chapman oak**, **20**, 114 Chapman white oak, see **Chapman oak**, **20**, 114 cherrybark oak, 76, 112 chestnut oak, 66, 117 (also see chinkapin oak, 68) Chinese evergreen oak, 4 chinkapin oak, 68, 117 cinnamon oak, see bluejack oak, **42**, 110 Coastal Plain scrub oak, see turkey oak, 48, 111 cow oak, see swamp chestnut oak, 60, 116 Darlington oak, see **laurel oak**, 36, 110 and swamp laurel oak, 50, 111 delta post oak, see swamp post oak, 92, 118 diamond-leaf oak, see swamp laurel oak, 50, 111

Durand oak, see **bastard oak**, 94, 118 Durand white oak, see **bastard** oak, 94, 118 durmast oak, 4 dwarf chinkapin oak, 82, 117 dwarf live oak, 62, 116 dwarf post oak, see sand post oak, 56, 116 eastern red oak, see northern red oak, 88, 113 eastern white oak, see white oak, **8**, 114 Elliott oak, see cherrybark oak, 76, 112 encino oak, see sandpaper oak, **86**, 118 English oak, 4 European turkey oak, 4 Florida oak, 44, 111 forked-leaf white oak, see white oak, 8, 114 Georgia oak, 32, 110 gray oak, see **northern red oak**, **88**, 113 Havard oak, 34, 115 Hill's oak, see **northern pin oak**, **24**, 109 iron oak, see post oak, 96, 118 jack oak, see **northern pin oak**, 24, 109 and blackjack oak, **58**, 111 Lacey oak, 46, 115

shingle oak, 40 and swamp laurel oak, 50) laurel-leaf oak, see swamp laurel oak, 50, 111 live oak, see **southern live oak**, 104, 119 and Texas live oak, **28**, 115 maple-leaf oak, 6, 109 minimal oak, see dwarf live oak, **62**, 116 Mississippi Valley oak, see swamp post oak, 92, 118 **Mohr oak**, **64**, 116 mossy-cup oak, see bur oak, 54, 116 mossy-overcup oak, see **bur oak**, **54**, 116 mountain chestnut oak, see **chestnut oak**, **66**, 117 mountain red oak, see northern red oak, 88, 113 myrtle oak, 70, 111 northern pin oak, 24, 109 northern red oak, 88, 113 Nuttall oak, see **Texas red oak**, **98**, 113 obtuse oak, see swamp laurel oak, 50, 111 Oglethorpe oak, 74, 117 oriental oak, 4 overcup oak, 52, 115 peach oak, see willow oak, 80, 112

laurel oak, 36, 110 (also see

pin oak, 78, 112 (also see Texas red oak, 98; water oak, 72; and willow oak, 80)

possum oak, see water oak, 72, 112

post oak, 96, 118 (also see sand post oak, 56)

prairie oak, see bur oak, 54, 116

pungent oak, see **sandpaper oak**, **86**, 118

quercitron oak, see **black oak**, **102**, 113

red oak, see cherrybark oak, 76, 112; northern red oak, 88, 113; scarlet oak, 22, 109; Texas red oak, 98, 113; and water oak, 72, 112

Red River oak, see Texas red oak, 98, 113

rock oak, see chestnut oak, 66, 117; chinkapin oak, 68, 117; and Lacey oak, 46, 115

rock chestnut oak, see **chestnut oak**, **66**, 117 and **chinkapin oak**, **68**, 117

runner oak, 84, 112 (also see sand post oak, 56)

running oak, see **runner oak**, **84**, 112

sand live oak, 30, 115

sand post oak, 56, 116

sandjack oak, see **bluejack oak**, **42**, 110

sandpaper oak, 86, 118

sawtooth oak, 4

scalybark oak, see cherrybark oak, 76, 112

scarlet oak, 3, 22, 109

Schneck oak, see Shumard oak, 90, 113

Schneck red oak, see **Shumard** oak, 90, 113

scrub oak, see bastard oak,
94, 118; bear oak, 38, 110;
Chapman oak, 20, 114;
Mohr oak, 64, 116; myrtle
oak, 70, 111; turkey oak, 48,
111; and Vasey oak, 100, 119

scrub chestnut oak, see dwarf chinkapin oak, 82, 117

- scrub live oak, see sandpaper oak, 86, 118 and Texas live oak, 28, 115
- scrubby oak, see sand post oak, 56, 116

shin oak, see **bluejack oak**, **42**, 110; **Havard oak**, **34**, 115; **Mohr oak**, **64**, 116; and **Vasey oak**, **100**, 119

shingle oak, 40, 110
shinnery, see Havard oak, 34,
115

Shumard oak, 90, 113
Shumard red oak, see Shumard oak, 90, 113
smoky oak, see Lacey oak, 46,

115

smooth-bark oak, see black oak, 102, 113

- **southern live oak**, **104**, 108, 119, 120
- southern red oak, 26, 49, 110, 121 (also see Shumard oak, 90)
- Spanish oak, see Buckley oak, 18, 109; pin oak, 78, 112; scarlet oak, 22, 109; southern live oak, 104, 119; and southern red oak, 26, 110
- spotted oak, see **Buckley oak**, **18**, 109; **Shumard oak**, **90**, 113; and **water oak**, **72**, 112
- stave oak, see white oak, 8, 114
- striped oak, see **Texas red oak**, **98**, 113
- swamp oak, see pin oak, 78, 112 and Shumard oak, 90, 113
- swamp chestnut oak, 60, 116
- swamp laurel oak, 50, 111
- swamp post oak, 92, 118 (also see overcup oak, 52)
- swamp red oak, see cherrybark oak, 76, 112; Shumard oak, 90, 113; and southern red oak, 26, 110
- swamp Spanish oak, see cherrybark oak, 76, 112 and pin oak, 78, 112
- swamp white oak, 14, 114 (also see overcup oak, 52)
- swamp willow oak, see willow oak, 80, 112

- tanbark oak, see **chestnut oak**, **66**, 117
- Texas live oak, 28, 115
- **Texas red oak**, 19, **98**, 113 (also see **Buckley oak**, **18**)
- turkey oak, 48, 111 (also see bluejack oak, 42)
- turkey-foot oak, see southern red oak, 26, 110 and turkey oak, 48, 111
- upland willow oak, see **bluejack** oak, 42, 110
- Vasey oak, 100, 119
- Virginia live oak, see southern live oak, 104, 119
- water oak, 72, 112 (also see
 Arkansas oak, 10; pin oak,
 78; southern red oak, 26;
 and swamp laurel oak, 50)
- water white oak, see overcup oak, 52, 115
- white oak, 8, 97, 114 (also see bastard oak, 94 and swamp white oak, 14)
- white shin oak, see **bastard oak**, **94**, 118

willow oak, 80, 112

yellow oak, see black oak, 102, 113; chinkapin oak, 68, 117; and swamp post oak, 92, 118

yellow-bark oak, see **black oak**, **102**, 113

yellow chestnut oak, see chinkapin oak, 68, 117

INDEX OF SCIENTIFIC NAMES

Latin names in bold follow the taxonomy in the *Flora of North America* (Jensen 1997). Synonyms are listed and cross referenced to the standardized names. Page numbers in bold refer to the species description.

- **Q.** acerifolia, 6, 109 Q. acuminata, 117; see *O. muehlenbergii*, 68 *O. acutissima*, 4 *Q. alba*, **8**, 46, 114 *Q. annulata*, 118; see *Q. sinuata* var. breviloba, 94 **Q.** arkansana, **10**, 109 Q. ashei, 116, 118; see Q. similis, 92Q. austrina, 12, 114 **O. bicolor**, **14**, 114 Q. bicolor var. lyrata, 115; see *Q. lyrata*, 52 Q. borealis, 89, 113; see *Q. rubra*, 88 **O. boyntonii**, **16**, 114 Q. brayi, 116; see Q. michauxii, 60 *Q. breviloba*, 118; see *Q. sinuata* var. breviloba, 94 *Q. breviloba* subsp. *lacevi*, 115; see Q. laceyi, 46 **O.** buckleyi, 18, 99, 109 Q. caput-rivuli, 109; see *O. arkansana*, 10 Q. catesbaei, 111; see Q. laevis, 48
- Q. cerris, 4
- **Q.** chapmanii, **20**, 114
- *Q. cinerea*, 110; see *Q. incana*, 42
- Q. coccinea, 3, 22, 109
- *Q. digitata*, 110; see *Q. falcata*, **26**
- *Q. durandii*, 118; see *Q. sinuata*, 94
- *Q. durandii* var. *austrina*, 114; see *Q. austrina*, 12
- *Q. durandii* var. *breviloba*, 118; see *Q. sinuata* var. *breviloba*, 94
- Q. durandii var. san-sabeana, 118; see Q. sinuata var. breviloba, 94
- Q. ellipsoidalis, 24, 109
- *Q. falcata*, 1, **26**, 49, 110, 121
- *Q. falcata* var. *leucophylla*, 112; see *Q. pagoda*, 76
- *Q. falcata* var. *pagodifolia*, 112; see *Q. pagoda*, 76
- Q. fusiformis, 3, 28, 115
- Q. geminata, 30, 71, 115
- **Q. georgiana**, **32**, 110
- Q. glauca, 4
- *Q. glaucoides*, 115; see *Q. laceyi*, **46**

Q. gravesii, 99, 113; see *Q. texana*, 98 Q. havardii, 2, 34, 115 *Q. hemisphaerica*, **36**, 110 Q. houstoniana, 116; see Q. michauxii, 60 *Q. ilicifolia*, 1, **38**, 110 Q. imbricaria, 1, 40, 110 *Q. incana*, **42**, 71, 110 Q. inopina, 44, 111 **Q.** *laceyi*, 3, **46**, 115 **O. laevis**, **48**, 71, 111 Q. laurifolia, 50, 111 Q. leucophylla, 112; see **Q.** pagoda, 76 Q. lyrata, 52, 115 *Q. macrocarpa*, 5, **54**, 116, 161 Q. mandanensis, 116; see Q. macrocarpa, 54 **Q.** margaretta, **56**, 71, 116 Q. marilandica, 33, 58, 71, 111 Q. marilandica var. asheri, 59; see *Q. marilandica*, 58 *O. maxima*, 113; see *O. rubra*, 88 **Q.** michauxii, **60**, 93, 116 *O. minima*, 2, **62**, 116 Q. minor, 118; see Q. stellata, 96 *O. minor* var. *margaretta*, 116; see Q. margaretta, 56 **Q. mohriana**, 3, **64**, 116 Q. montana, 33, 66, 117 Q. muehlenbergii, 1, 3, 68, 117

- Q. myrsinifolia, 4
- Q. myrtifolia, 70, 111
- *Q. nana*, 110; see *Q. ilicifolia*, **38** or *Q. nigra*, **72**
- Q. nigra, 13, 72, 112
- Q. nuttallii, 99; see Q. texana, 98
- *Q. obtusa*, 111; see *Q. laurifolia*, **50**
- Q. obtusifolia var. breviloba, 118;
 see Q. sinuata var. breviloba, 94
- *Q. obtusiloba*, 118; see *Q. stellata*, 96
- Q. oglethorpensis, 74, 117
- *Q. pagoda*, 76, 93, 112
- *Q. pagodifolia*, 112; see *Q. pagoda*, **76**
- Q. palustris, 78, 112
- Q. petraea, 4
- Q. phellos, 80, 112
- *Q. platanoides,* 114; see *Q. bicolor,* 14
- Q. prinoides, 69, 82, 117
- *Q. prinus*, 67, 116, 117; see *Q. michauxii*, 60 or *Q. montana*, 66
- **Q.** pumila, **84**, 112
- *Q. pungens*, 3, **86**, 118
- Q. pungens var. vaseyana, 119; see Q. vaseyana, 100
- *Q. rhombica*, 111; see *Q. laurifolia*, **50**

- Q. robur, 4
- Q. rubra, 1, 23, 88, 99, 113
- *Q. rubra* var. *borealis*, 89, 113; see *Q. rubra*, **88**
- *Q. rubra* var. *buckleyi*, 109; see *Q. buckleyi*, 18
- *Q. rubra* var. *texana*, 113; see *Q. texana*, **98**
- Q. san-sabeana, 118; seeQ. sinuata var. breviloba, 94
- *Q. schneckii*, 113; see *Q. shumardii*, 90
- *Q. shumardii*, *90*, *93*, *99*, *113*
- *Q. shumardii* var. *acerifolia*, 109; see *Q. acerifolia*, 6
- Q. shumardii var. buckleyi, 109; see Q. buckleyi, 18
- *Q. shumardii* var. *texana*, 113; see *Q. texana*, **98**
- Q. similis, 92, 118
- Q. sinuata, 3, 13, 94, 118
- Q. sinuata var. breviloba, 95; see Q. sinuata, 94
- Q. sinuata var. sinuata, 95; see Q. sinuata, 94
- Q. stellata, 33, 96, 118
- Q. stellata var. boyntonii, 114; see Q. boyntonii, 16
- *Q. stellata* var. *margaretta*, 116; see *Q. margaretta*, **56**
- Q. stellata var. paludosa, 118; see Q. similis, 92

- *Q. texana*, 19, **98**, 113; see *Q. buckleyi*, 109
- *Q. tinctoria*, 113; see *Q. velutina*, 102
- *Q. uliginosa*, 112; see *Q. nigra*, 72
- *Q. undulata* var. *pungens*, 118; see *Q. pungens*, **86**
- Q. undulata var. vaseyana, 119; see Q. vaseyana, 100
- Q. variabilis, 4
- Q. vaseyana, 2, 3, 100, 119
- Q. velutina, 23, 102, 113
- *Q. virens* var. *dentate*, 116; see *Q. minima*, **62**
- *Q. virginiana*, 71, **104**, 108, 119, 120
- *Q. virginiana* var. *dentate*, 116; see *Q. minima*, 62
- Q. virginiana var. fusiformis, 115; see Q. fusiformis, 28
- *Q. virginiana* var. *geminata*, 115; see *Q. geminata*, **30**
- *Q. virginiana* var. *minima*, 116; see *Q. minima*, 62

Notes

REFERENCE CHARTS FOR RED AND WHITE OAK LEAVES*



Bur oak *(Q. macrocarpa)* "burial trees" were frequently used for above ground burial by Plains tribes. Aerial burial was believed to assist the soul in its journey to the afterlife. (Photo, David F. Barry, Denver Public Library Old West Collection)

*Bracketed numbers on the following pages are page references for each species description.



Red Oaks







The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities based on race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal employment opportunity provider and employer.

