Field Key to Southern Arizona Oaks
(Arizona South of the Mogollon Rim/Salt River)

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The genus *Quercus* comprises about 400 species of oaks, most of which grow in the Northern Hemisphere, with 90 species in the U.S. and Canada. The greatest diversity of oak species is found in Mexico, with at least 125 species. A second center of oak diversity is in China, also with over 100 species. Oak-grasslands, oak woodlands, and oak forests are some of the most common habitat types in the American Southwest below 6500 ft elevation. The IUCN (World Conservation Union) global "Red List for Oaks" cites 13 critically endangered, 16 endangered, 27 vulnerable, 22 near threatened species. The Red List includes two dozen species from the U.S./U.S.-Mexico Borderland/Sonoran Desert Region. None of the oaks in this key are listed by the U.S. Endangered Species Act.

Oak leaf morphology can be highly variable, even on the same tree; especially variable is leaf margin and leaf size. Examine a number of leaves (from both the N and S sides of the tree) to get a sense of the range of the leaf structure; disregard anomalous leaves. Also, many oak species hybridize; hybrid trees cannot be distinguished by this key.

1 Leaves elongate, lanceolate, usually with smooth margins (damaged plants will often regrow scalloped leaves); leaf underside uniformly hairy-wooly and silver; leaves 2-4.5 inches long; bark dark; 4500-8500 ft elevation …….. Silverleaf oak (*Q. hypoleucoides*)

Silverleaf oak (with galls)

Silverleaf oak (with acorns)

1’ Leaves not lanceolate; leaf underside not uniformly hairy-wooly and silver; leaf margin variable—smooth, scalloped, incised, or toothed; leaves 0.5-6.0 inches long; bark variable ……. 2

2 Leaves dark green (light green in very young trees & early leaves) and very shiny above (shiniest of all oaks in this key); young leaves with light green fuzz underneath, gradually disappearing as leaf grows until eventually only two small patches of brownish or greenish-white fuzz remain where petiole meets leaf (and in about 30% of the leaves, even this fuzz disappears); leaf margin usually deeply scalloped and with spiny teeth (some leaves may have no scallops or teeth except at tip, others may have 6 or more teeth); 4000-7000 ft elevation ……. Emory oak (*Q. emoryi*)


Emory oak (*Q. emoryi*) (note gall in right photo)

Emory oak (*Q. emoryi*), leaf

2' Leaves typically dull green or blue-green above (if shiny, margin not scalloped); underside of leaf without patches of fuzz where petiole meets leaf; leaf margin smooth, incised, or toothed, not scalloped or weakly scalloped ……. 3

3 Leaf broad, deeply and distinctly lobed, broadly rounded at tip (resembling Eastern oaks); leaves large, to 6 inches long; winter deciduous; 6000-10,000 ft elevation …… …… Gambel oak (*Q. gambelii*)

Gambel oak (*Q. gambelii*)

Gambel oak (*Q. gambelii*), with young acorns

3' Leaf not deeply and distinctly lobed, tip narrowly rounded or pointed; leaves smaller, to 4 inches long; mostly evergreen …… 4

4 Leaf very small, 0.5-1 inches long; leaf ovate, margin simple, without spines (although tip may be pointed); 3500-7000 ft elevation (a Mexican species that is found just north of the border; fairly common in the Chiricahuas, Huachucas, Mule and Dragoons; not reported from Pinaleños or Catalinas) …….. Toumey oak (*Q. toumeyi*)

Toumey oak (*Q. toumeyi*)

4' Leaf at least one inch long, or longer; leaf ovate or elongate, margin simple or with spines or teeth …….. 5

5 Leaves mostly more than 2 inches (to 4 inches) long, although occasionally leaves can be small, 1 to 2 inches long; veins of underside of leaves raised and prominent, yellow-green, the minor veins anastomosing and net-like …….. 6

5' Leaves usually less than 2 inches long; underside of leaves without prominent, raised, yellow-green veins (more pale, and netting of minor veins not strongly visible) …….. 7

6 Leaves thick and leathery, dark green, underside light greenish-brown, fuzzy, somewhat concave due to curling-under leaf edges; leaves usually ovate and usually widest distally; acorns always on long stalks (to 60 mm long); bark brown and scaly; shrubs or small trees (to 10 ft); 5500-8700 ft elevation …….. Netleaf oak (*Q. rugosa*)

Netleaf oak (*Q. rugosa*). Note the leathery leaves, curling under on the sides, and stalked acorns.

Netleaf oak (*Q. rugosa*). Note the leathery leaves, curling under on the sides.

6’ Leaves coarse, but not leathery, dull green on both surfaces, not with curling edges; leaves usually more elongate (obovate) and widest medially or distally; leaf margins smooth or (rarely) with small teeth; acorns sessile or occasionally on short stalks (to 15 mm); bark light gray, thin and smooth when young, becoming rough and furrowed in older trees; often grows as large tree (to 60 ft); 4500-8000 ft elevation …….. Arizona white oak (*Q. arizonica*)

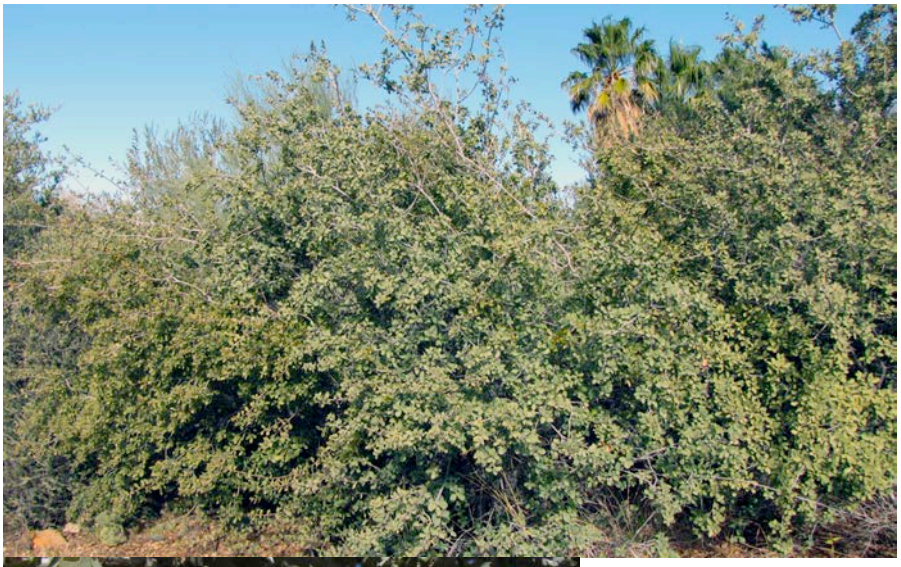
Arizona white oak (*Q. arizonica*)

7 Leaf margins toothed; leaves 0.5-1.5 inches long; leaves tend to be curly, not lying flat; shrubs or small trees < 15 ft in height …….. 8

7’ Leaf margins without teeth, or with a few teeth, or with small teeth; leaves 1-3 inches long; leaf tip blunt or pointed; leaves don’t curl strongly; trees may grow to 50 ft in height …….. 9

8 Leaf margins wavy with widely spaced teeth or sharp-pointed lobes; leaves leathery, upper surface rough with sandpaper texture; acorns never stalked; shrubs to 6 ft in height, often on limestone; 4500-6500 ft elevation (probably not in the Santa Catalina Mountains) ……. …….. Pungent oak (*Q. pungens*)

8’ Leaf margins with many large, prominent, sharp, spine-like teeth, not wavy; leaves not rough on upper surface; acorns occasionally on short stalks; trees grow to just 15 ft in height; 3000-6500 ft elevation …….. ……. Scrub oak/Sonoran shrub oak (*Q. turbinella*) [includes *Q. turbinella* var. *ajoensis*]**



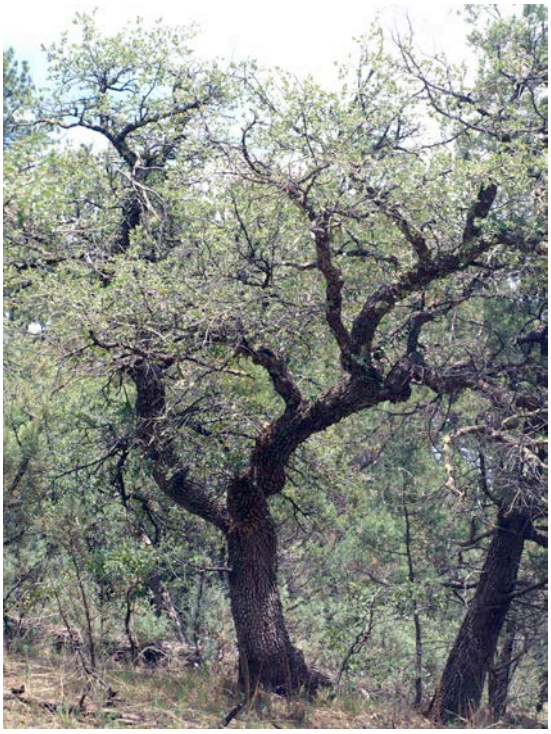
Scrub oak/Sonoran shrub oak (*Q. turbinella*)

9 Leaves distinctly oblong; leaves usually parallel-sided or widest distally; leaf margins smooth or wavy, but not toothed, leaf tip blunt; leaves 1-2 inches long; trees appear bluish-gray from a distance 3500-6000 ft elevation …….…….. Mexican blue oak (*Q. oblongifolia*)

Mexican blue oak (*Q. oblongifolia*)

9’ Leaves ovate or obovate, usually widest medially; leaf margins smooth, not wavy, without teeth, or toothed and leaf tip usually pointed; leaves 1-3 inches long …….. 10

10 Leaves bluish-gray or greenish-gray, usually less than 1.5 inches long; leaf margins slightly rolled inward, and varying from smooth and without teeth, to having several blunt teeth (usually distally); leaves not particularly dense (see below); grows as large shrub or tree, mature trees reach 20 ft; 4500-8500 ft elevation (probably not in the Catalinas) …… Gray oak (*Q. grisea*)**



Gray oak (*Q. grisea*)

10’ Leaves shiny yellowish-green on top, but yellowish and fuzzy on bottom, 0.75-2.75 inches long; leaf margins typically smooth, although young trees (or grazed trees) may develop spiny leaves; leaves numerous and dense; grows as a shrub or small tree (usually less than 20 ft in height); 5000-7500 ft elevation …… Canyon live oak (*Q. chrysolepis*)

Canyon live oak

Canyon live oak, with flowers

Canyon live oak (*Q. chrysolepis*)

** NOTE: *Q. turbinella* and *Q. grisea* can sometimes be difficult to differentiate. Here are some additional differentiating features between the two species.

- The tiny stellate hairs on the undersurface of the leaves (requiring a hand lens to observe) are usually appressed (lying flat) in *Q. turbinella*, but more elevated or semi-erect in *Q. grisea*.
- The undersurface of the leaves in *Q. turbinella* is gray glaucous or can have yellowish glandular hairs; the leaf undersurface in *Q. grisea* is just grayish felty hairs (also on the upper surface).
- The wavy leaf margin and sharp spiny teeth are fairly regularly space in *Q. turbinella*, while, if there are teeth on *Q. grisea*, they are not so pointed and mostly closer to the tip of the leaf.
- *Q. turbinella* has a more cordate (heart shaped) base of the leaf than *Q. grisea*.

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