

Oaks of the Chihuahuan Desert Region

by Michael Martin Melendrez
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Presented below are 23 species of white oak, six of black oak, and two intermediate, or golden oaks, found in the southwestern United States (primarily New Mexico, Arizona, and western Texas). These numbers may be disputed by some oaks students. Differences of opinion exist as to the true boundaries of the Chihuahuan Desert, the potential hybrid status of some of the oaks, and their delineation. Also, new oaks not previously known to occur in the area are continually discovered. Counting the additional oaks found in the adjacent Mexican State of Chihuahua, there are more than 60 species. The Chihuahuan Desert Region is truly *The Land of Oaks*.

The production nursery industry of our area has started, on a small scale, the introduction of oaks with a limited species selection.



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Author Michael Melendrez standing below *Q. arizonica* in Catwalk Canyon, Gila National Forest, New Mexico.

Unfortunately, the southern live oak (*Quercus virginiana*) usually is the first one to be grown and sold, and it is commonly promoted as the best oak for the desert cities of the Southwest. The species of oak native to this arid part of the country are much

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better adapted here, and thus make better choices for shade trees than the southern live oak.

At our nursery production program in Los Lunas, New Mexico, at 4,900 feet elevation and USDA Zone 6b, the native oaks outperform the southern live oak in speed of growth, heat tolerance in a container, and over-wintering success. In fact, we are unable to winter the southern live oak outdoors, but with the native oaks we can. We also must be aware of potential problems with live oaks (and red oaks) that have been harvested or collected from areas of Texas where oak wilt has been found, as well as the potential danger of spreading fire ants. The following introduction to the oaks of the Chihuahuan Desert Region of the United States is intended to illustrate the vast diversity of our native oak resource.

White Oaks — Section *Quercus* (formerly *Lepidobalanus*)

This group displays bark that typically is light gray and scaly (but black and furrowed in escarpment live oak). Tyloses are present in summer wood (absent in escarpment live oak), and lobes of leaves are rounded, except for *Q. turbinella* and *Q. hinckleyi* (which both have sharp, mucronate lobes) and *Q. pungens* var. *vaseyana* (with almost bristly tips).



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Acorns of Q. arizonica collected at elevation 5,200 ft. along the Gila River in New Mexico.

1. *Q. arizonica* - Arizona white oak

Description: A medium-sized tree of the southwestern United States and adjacent Mexico, 30 to 60 feet or more in height, and 2 to 3 feet in trunk diameter, with irregular spreading crown of stout branches. Leaves obovate or oblong, 1-3 inches long, short-pointed or rounded at apex, heart-shaped or rounded at base, edges slightly wavy-lobed and toothed toward apex, thick and stiff, above dull blue-green and nearly hairless and with veins sunken, beneath paler and densely hairy and with prominent raised veins, shedding gradually in spring as the new leaves unfold, except in colder parts of its range where it will defoliate in the late fall or early winter. Often, in colder climates, they will display good fall colors resembling burgundy wine. Acorns are

3/4 to 1 inch long, with shallow cups, mild to sweet nut-like flavor, particularly in those found on the east slopes of the Organ Mountains.

Distribution: Common in Arizona and in southwestern New Mexico, grading into gray oak in the south-central highlands of New Mexico, and perhaps in Texas in the Franklin and Hueco Mountains. In the Manzano and Sandia Mountains this species is mixed with gray oak and scrub live oak, which can be quite confusing, with possible hybrid swarms. The habitat is oak woodlands in foothills and mountains from 5,000 to 7,600 feet elevation. Often this species is listed as the largest of the southwestern evergreen-type oaks, but this is not true, because Emory oak becomes a larger tree.

2. *Q. carmenensis* - Delcarmen oak

Recently reported in the Chisos Mountains by Professor Mike Powell of Alpine, Texas, who found only one specimen about 3 feet tall. Cornelius Muller considered this scrub oak a hybrid.



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Foliage of *Q. arizonica* in Cave Creek Canyon, Coronado National Forest, Arizona. Elevation 5,500 ft.

3. *Q. chihuahuensis* - Chihuahua white oak

A tree to 40 feet tall with tardily deciduous leaves, greatly variable. Reported as being in the Quitman Mountains. I've yet to find this species, so I'm unable to offer personal observations.

4. *Q. depressipes* - Mexican dwarf oak

An evergreen shrub to 10 feet, found in high grasslands or montane chaparral. It is found in the United States at the northwest summit of Mt. Livermore in the Davis Mountains of the Trans-Pecos Region of Texas.

5. *Q. fendleri* (*Q. x fendleri?*) - Fendler oak

Also called Capitan blue oak.

Description: Some students of oaks will lump this oak into the undulata hybrid group without much thought given to the gross morphological differences between the two. Fendler oak is an evergreen or tardily deciduous species with oblong, sharply lobed leaves that are a metallic blue green. Bark is smooth and gray on young trees, turning to nearly black and checkered with age.

Distribution: Native elevation range is 5,500 to 6,000 feet near the Capitan Mountains of south-central New Mexico. Under cultivation, Fendler oak is rapid growing and very ornamental, able to grow well in high pH clays. Fendler oak

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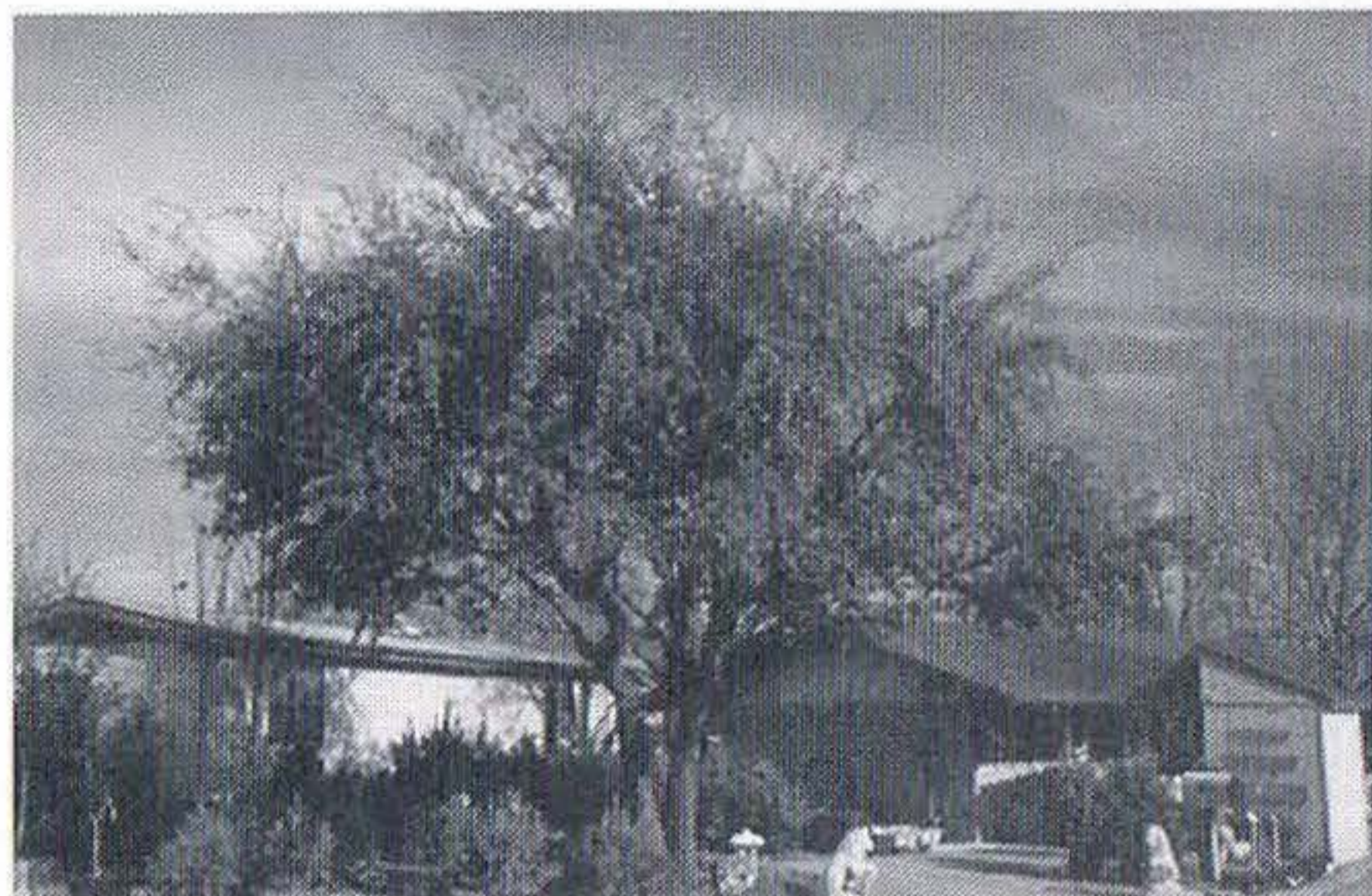
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can grow into a 40 to 50 foot single-stem tree, with no habit of suckering.

6. *Q. fusiformis* - escarpment live oak
Also called New Mexico live oak.

Description: Evergreen to semi-evergreen small tree, usually to 25 feet in the



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Q. fusiformis, a cultivated tree in Tulsa, Oklahoma. North of the natural range.



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Q. fusiformis near Quartz Mountain, Oklahoma. This is at the northernmost natural population of the species.

wild with a crown spread of 30 to 35 feet. Leaves lance-shaped, 2 to 3 inches long and 1/2 to 1 inch wide, with short, spiny lobes on young, fast-growing trees. Fall color can occur on trees in colder climates, and can continue as winter color. Acorns are small and much like those of the Emory oak, 1/2 to 1 inch long and narrow, forming in clusters (southern live oak has a larger, bulb-shaped acorn borne singly or in pairs). Bark is dark gray on young, fast-growing trees, turning a rough black with age, as is typical of many black oaks.

Distribution: Not always distinguished from the southern live oak in the literature. Lacking the tyloses of other white oaks, this species sometimes is assigned to the black oak group. This distinctive evergreen tree is perhaps most ecologically suitable for the high, cold desert. Provenances of greater cold tolerance can be found in eastern New Mexico (on the Caprock formation east of Roswell, at 4,000 feet elevation), in Garza County, Texas (at 2,200 feet elevation), and in Greer County, Oklahoma (in the Quartz Mountains). A common failure of growers in the Southwest is not being careful with the seed source of this species, resulting in growing southern live oak and calling it escarpment live oak in error. If planted in the Alberquerque-

que (USDA Zone 7a) area, only the New Mexico material will prove to be evergreen and dependable.

7. *Q. gambelii* - Gambel oak

Also called Utah white oak or Rocky Mountain white oak. Names sometimes considered as synonyms include *Q. carmenensis*, *Q. confusa*, *Q. gunnisonii*, *Q. leptophylla*, *Q. media*, *Q. novomexicana*, *Q. obtusifolia*, *Q. pauciloba*, *Q. rydbergiana*, *Q. submollis*, *Q. undulata*, *Q. utahensis*, *Q. venustula*, *Q. vreelandii*.

Description: A deciduous tree to 60 feet in wild stands and 80 feet under cultivation. A rare component of the Madrean oak woodlands and more common in the Pine Transitional and Mixed Conifer zones. The largest trees are found at 8,000 feet in the grassland parks of the Gila National Forest of southwestern New Mexico, with trees commonly 60-100 feet in size. In Texas it occupies only the highest altitudes. I've found it difficult to locate in Texas, except in the Guadalupe Mountains and a small population in the Franklin Mountains near El Paso. In the Organ Mountains, near Las Cruces, it is common from 8,900 feet elevation on down to 5,700 feet. In the Mogollon

Mountains of the Gila National Forest, it can be found as low as 4,700 feet, with large, healthy populations. It occurs from the Mexican States of Chihuahua and Coahuila north to Colorado, west to southwestern Wyoming, Utah, and southern Nevada. Gambel oak is the only native oak of Colorado and is the only common tree oak in the northern parts of New Mexico (excluding the Sandia, Zuni and Manzano Mountains). Another interesting note on this species is that it will occur at lower elevations in the southern part of its range than it can

up in Colorado or Wyoming. Gambel oak is easily recognized by the deeply lobed leaves, which are larger than those of the evergreen to semi-evergreen Southwestern oaks. It is quite polymorphic and according to many authors is involved in the parentage of many hybrids. Some of the oaks with which it crosses are *Q. arizonica*, *Q. grisea*, *Q. havardii*, *Q. mohriana*, *Q. muhlenbergii*, and *Q. turbinella*. The resulting hybrid grex is called *Q. xundulata* - wavy leaf oak. When we have attempted propagating the so-called

wavy leaf oak, the progeny do not hold true, which suggests the hybrid theory



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International Oak Society members Michael Melendrez (left), Guy Sternberg (center), and Tom Burlison with a large Q. gambelii at Iron Creek in the Mimbres Mountains of New Mexico. Elevation 6,800 ft.

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Foliage of Q. gambelii in Catwalk Canyon, Gila National Forest, New Mexico.

is valid. It's important to note that some of the larger Gambel oaks found in southern New Mexico do not have the habit of suckering or forming clonal groves, and progeny grown from seed collected from those single trees hold true to the parent. Likewise, seed collected off the lignotuberous types also hold true, having a suckering habit.

8. *Q. grisea* - gray oak

Description: Usually a small, low, scrubby evergreen tree or shrub, or in better sites a medium-sized tree to 65 feet in height with deciduous leaves when occurring at higher and colder sites. It occurs with Emory oak in the Madrean Oak Woodlands of the desert edge. I've found gray oak in the mountains of central New Mexico with nearly evergreen

habit, and leaves that are so hairy that you could say they are furry. Others, near Glenwood, New Mexico could easily be mistaken for *Q. oblongifolia*. It is a common oak of the desert grasslands, chaparral and oak woodlands of the Chihuahuan Desert, becoming less common in the Transitional Pine Forest of central New Mexico at elevations above 8,400 feet. Gray oak can grow in a wide range of soil types, from heavy saline clays to gravel or sand conditions. It seems always to be a rapid grower under cultivated conditions. Gray oak is perhaps the most widespread oak species of the desert edge in New Mexico, occurring as far north as the Zuni, Sandia and Manzano Mountains and south into all the southern mountain ranges. In the Zunis it occurs with



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Michael Melendrez among the trunks of a large Q. grisea in the Tularosa Mountains of New Mexico. Elevation 7,000 ft.

Gambel oak and the hybrid called *Q. xundulata*, or wavy-leaf oak. The largest trees I have found that can be viewed from a car occur at Cloverdale Park in the extreme southwestern corner of New Mexico, where they reach 50 -70 feet tall and wide. If viewing this grove, please remember that this is private land — stay on the road bed. Leaves are elliptic to ovate, 3/4 to 2 inches long, blunt or short-pointed at apex, rounded or slightly heart-shaped at the base, edges without teeth (except with young seedlings) or with a few teeth toward the apex, thin and firm, gray-green or blue-green, shiny and sparsely hairy above, beneath densely hairy. Bark is fissured and with shaggy plates, light gray.

9. *Q. havardii* - Havard shin oak

Also known as scrub oak, shinnery oak, and sand oak.

Description: A shrub to six feet tall, characteristic of the deep sands and sandy grasslands around the eastern borders of the Chihuahuan Desert in New Mexico, Texas and into Oklahoma. This is a true grassland oak, spreading by extensive rhizomes forming the largest continuous oak “forests” in the western half of the United States. When planted in a soil of decomposed granitic clays, it grows rapidly into a 15-foot tree with little rhizome habit. Of interest are the large, sweet, annual acorns.

10. *Q. hinckleyi* - Hinckley oak

Description: A rare, endangered species of limestone soils in Presidio County,



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*Guy Sternberg picking seed of *Q. hinckleyi* (a federally endangered species) near Shafter, Texas. Elevation 4,100 ft.*

Texas. This small oak, growing to only 3-5 feet tall, is known from only a few locations in the United States, but is believed to be in Mexico also. It is evergreen, spreads underground, and forms thickets on some of the most awful, dry, hot, sloped areas you will ever see in the Southwest. It is an oak of the true desert scrub formation. Leaves are much like those of *Q. turbinella*, with sharp spine-tipped lobes.

11. *Q. intricata* - Coahuila scrub oak

Description: A thicket-forming oak to 10 feet tall under cultivation, with small evergreen leaves having silvery indumentum on the underside. It is a part of the chaparral and the oak woodlands formation. Found in Texas at the Laguna Meadows of the Chisos Mountains and in the Eagle Mountains in Hudspeth County.

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12. *Q. laceyi* (often confused with *Q. glaucoides*) - Lacey oak

Description: A beautiful oak to 25 feet tall with blue-green deciduous leaves. Fall color is a smokey pink with some orange and yellows. A rather rare tree found in the chaparral, grama grasslands, canyon scrub of Texas, and temperate areas of northern Mexico. In the Trans-Pecos Region it is found on hard limestone in Terrell County, in the left-land shut-up of the Solitario and in Mouse Canyon in the Chisos Mountains of Big Bend National Park. In New Mexico there are Lacey-like oaks growing in the south-central mountains that look like non-evergreen Mexican blue oaks. This may be the case with some of the so-called Mexican blue oaks reported to be in Texas. Lacey oak grows well for us in a heavy clay soil, adding two feet or more in height each year. Some fine examples of it can be viewed at the Living Desert Museum in Carlsbad, New Mexico where it grows rapidly into a fine tree. It has high heat and drought tolerance, and is perhaps the best of all the southwestern oaks for landscape use.

13. *Q. macrocarpa* - bur oak

This species is a rare find in New Mexico, with a relict population occurring near the same area that *Q. fusiformis*

can be found.

Description: Bur oak is more often found as a large deciduous tree of eastern and mid-western savannas. In eastern New Mexico it is found in shin oak savanna swells called buffalo wallows. This is a large, fast-growing tree with spectacular leaves of over 12 inches in length. In the Roswell, New Mexico area there are examples of this plant growing in yards of long abandoned homesteads, where the only water is from the natural precipitation of less than 10 inches per year. I suspect these plants were collected from nearby relict stands, giving them the natural adaptation for this high desert climate. If this is not a low-water tree, then I don't know what is!

14. *Q. mohriana* - Mohr oak

Description: A tree to 40 feet tall, characteristic of the grasslands and montane chaparral of the limestone soils of Texas and New Mexico. This is a thicket former and is one of the more widespread of the Chihuahuan Desert oaks in the Trans-Pecos. Leaves are tardily deciduous, gray on top and much lighter on the underside, close to those of the gray oak. Benny Simpson, the famous oak expert from Texas A&M University, felt that Mohr oak was worthy of cultivation as an amenity plant and should be used

more widely. I'm not sure its been used at all, at least on purpose, but it may have useful applications in high and dry landscapes of the desert edge. Where Mohr oak and Havard shin oak grow adjacent to each other, a common hybrid occurs that forms a 20-foot grove which is useful as a wildlife shelterbelt or as a windbreak. Examples of this hybrid can be seen off Interstate Route 40 from Shamrock, Texas heading into western Oklahoma, in areas of deep sand.

15. *Q. muhlenbergii* - chinquapin oak

Description: This is a tree growing to 60 feet tall in the Chihuahuan Desert, but much larger in the more humid areas to the east. This is one of America's most regal oaks, and seed from this desert provenance should be widely planted in Arizona, New Mexico and western Texas. *Distribution:* In our area it is a tree of the oak woodlands and montane chaparral, and it has the broadest natural geographic and habitat range of any of the Temperate-Zone oaks of the United States. Chinquapin oak ranges in the United States from northwestern Florida north to Vermont, west to Wisconsin and Iowa, and South to Texas. It is very rare and local in mountain canyons of southeastern and south central New Mexico, bordering the eastern plains. In New Mexico this species is found growing in the Capitan and Guadalupe Mountains associated with the bigtooth maple, alligator juniper, sandpaper oak, and sotol. Its elevation range in New Mexico is from 4,000 feet up to 7,000 feet, with a

precipitation range of 12 - 18 inches per year. It is not found in Arizona, but can be found in small numbers in the Davis Mountains and the Chisos Mountains of West Texas. It is noteworthy because of its unusual distribution and isolated New Mexico localities westward of the limits of continuous distribution in western Oklahoma and central Texas. Leaves are oblong or broadly lance-shaped, 3 to 10 inches long and 1 to 6 inches wide, short or long-pointed, usually rounded at the base; edges wavy to slightly lobed with curved teeth, dark glossy green above, paler and finely hairy beneath. Acorn 1/2 to 1 1/4 inches long, oblong, half enclosed by a deep cup, dark chocolate brown. Bark thin, fissured and flaking on stems greater than 3 inches in diameter, light gray to a creamy white.

16. *Q. oblongifolia* - Mexican blue oak

Description: A small tree to 30 feet with trunks up to 1.5 feet in diameter and with a spreading, rounded crown, or a shrub at higher elevations.

Distribution: In Arizona and in New Mexico this oak is a part of the canyon desert scrub-grassland formation, as well as the montane chaparral and oak woodlands associations. In the low-elevation mountains of extreme southwestern New Mexico (the Gray Ranch area of the New Mexico panhandle) this is a common oak of the Coronado National Forest from 4,500 feet to 6,000 feet

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in elevation. It also occurs in the northern Mexico states of Chihuahua and Sonora. This is a confusing tree in Texas because few of the major floras listed it. Yet Sargent described it in 1905 as being in the Chisos Mountains of western Texas, but comparatively rare in this area.



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Author Michael Melendrez stands under a large *Q. organensis* in the arroyo below Dripping Springs, in the Organ Mountains of southern New Mexico. Elevation 6,100 ft.

It has been reported in the Bofecillos Mountains of Texas which are adjacent to the Chisos. The only oaks that I've seen in the Bofecillos or the Chisos that look like Mexican blue oak are in fact Lacey oaks, which are not evergreen. Large examples of this oak can be found at Cloverdale, New Mexico, with some trees growing up to 70 feet tall. Leaves are oblong, 1-2 inches long, rounded at both ends or heart-shaped at the base, edges without teeth (except on fast-

growing juvenile growth), thin and firm, without hairs, blue-green in summer and turning more blue during winter months. The bark is unique among all the western white oaks, with small, fissured, square plates, and is light gray in color.

17. *Q. organensis* (*Q. xorganensis*?) -

Organ Mountain white oak

See *Q. polymorpha* below. Found growing in only one small population on the west slope of the Organ Mountains east of Las Cruces, New Mexico. In the wild, the parent plants have large evergreen leaves (up to 5 inches x 2 inches), smaller than those of the Mexican *Q. polymorpha*, but much larger than either the Arizona white oak (*Q. arizonica*) or gray oak (*Q. grisea*). It has been suggested that it is a natural hybrid of *Q. arizonica* x *Q. grisea*, but our work in propagating it suggests the progeny are more similar to *Q. polymorpha*. Unlike most other oak hybrids, the Organ Mountain white oak is very stable, with the progeny holding true.

18. *Q. polymorpha* - Monterrey white oak

This is a newly discovered oak for the United States and the Chihuahuan Desert at Dolan Falls, Texas.

Description: A tree to 70 feet tall with irregular crown. Leaves are evergreen to tardily deciduous, large, glossy above,

rusty floccose beneath. Distribution: a wide distribution in Mexico, and south to Guatemala. Found in Val Verde County, Texas in only one location thus far, near Dolan Falls on the Dolan Falls property of the Texas Nature Conservancy. There are three large trees that appear pure and several up and down a rocky creek that could be hybrids. Young, vigorous growing trees in our nursery resemble an evergreen chinquapin oak, but with a more hooded, waxy leaf. Seedlings of the Organ Mountain white oak look identical to *Q. polymorpha* seedlings of equal age and treatment, even without rapid juvenile growth. Organ Mountain white oak (*Q. organensis*) often has been considered a hybrid of *Q. arizonica* and *Q. grisea*, but the progeny, when given equal treatment with *Q. polymorpha*, suggest to me that it may not be a hybrid of those species, or a hybrid at all.

19. *Q. pungens* var. *pungens* - sandpaper oak

This is a tree sometimes reaching 20 feet tall, but usually a shrub, much lower and thicket forming. The evergreen to sub-evergreen leaves are small, undulate, crisped, with mucronate tips and a definite sandpaper feeling, and with a blue-gray cast. This is a shrub-tree of the desert scrub, canyon scrub and montane chaparral associations. It is thicket forming in the grassland and chaparral. The easiest place to see sandpaper oak is to the left of the entrance to the Lincoln National Forest on New Mexico Route 137 out of

Carlsbad. Fall color can be a crimson red that is long lasting. This could be one of the most ornamental high desert trees for the smaller landscapes of cities.

20. *Q. pungens* var. *vaseyana* (synonym *Q. vaseyana*) - Vasey oak

A tree to almost 50 feet, but usually a thicket-forming shrub. Seen in its purest form on the Edwards Plateau and entering the Chihuahuan Desert in Terrell, Crockett and Val Verde counties, Texas, it intergrades with sandpaper oak, especially in Brewster County and Eddy County, New Mexico. The leaves of Vasey oak are not rough like sandpaper, are not nearly as pungently crisped, and are a bright, pea green. Like sandpaper oak its leaves are tardily deciduous, and both species give the appearance of small holly (*Ilex*) trees, not oaks. The Eddy County, New Mexico population of this species will turn a bright crimson late-Fall color it holds all winter. In the lower Blue Creek Canyon of the Chisos Mountains, Vasey oak is seen in pure form weeping over the dry stream bed at 4,500 – 5,000 feet elevation, looking somewhat like a white-oak version of *Q. graciliformis*, which is nearby. Vasey oak is a member of the grasslands, desert scrub, and oak woodlands associations, and is not found in Arizona.

21. *Q. rugosa* - netleaf oak (synonyms: *Q. reticulata* and *Q. diversicolor*)

Description: An evergreen tree to 40

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feet tall with a broad, rounded crown, or a shrub. Leaves are beautiful and rugose, obovate, elliptic, gray-green to bright green. This species can vary quite a lot in the size and shape of the leaves, from a large *Q. polymorpha*-like form, to a small *Q. turbinella*-like form, but without mucronate lobes.

Distribution: An oak of the montane chaparral and oak woodlands at relatively high elevations. It is a rare oak in Texas, but more commonly in the Black Range, Diablo Mountain and the Mogollons of the Gila National Forest of New Mexico and found in all the southeastern mountains of Arizona bordering New Mexico. Acorns are attached to long peduncles. The bark of the netleaf oak is similar to that of the chinquapin oak, with a flaking habit on small branches. *Q. rugosa* may be the most ornamental small evergreen tree in the Southwest, with the potential of being used into USDA Zone 5 of the Midwest. Netleaf oak shares with chinquapin oak the ability to grow well in heavy, moist clay soils of high pH.

22. *Q. toumeyii* - Toumey oak

Description: A tree or shrub up to 30 feet tall. Leaves are small, entire, ovate, and evergreen. Acorns 1/2 to 3/4 inch long, with shallow cups. Bark thin, scaly or flaky, dark brown.

Distribution: 4,000 to 7,000 feet elevation, Mexican Border region, found in the montane chaparral and oak woodlands associations of Arizona and New Mexico. In Arizona it forms an open forest on the Mule Mountains in Cochise County and in Texas Canyon east of Benson; in New Mexico, in the chaparral and oak woodlands of the Peloncillo Mountains in Hidalgo County. I have not seen it in Texas but Cornelius Muller placed it in the Franklin Mountains and the Quitman Mountains. Richard Spellenberg has reviewed those specimens from the Franklins, and does not concur. Van Devender and Riskind found *Q. toumeyii* debris to be very common to abundant in packrat middens at Hueco Tanks State Park, dating back to the late Pleistocene to early Holocene, 13,000-8,000 BP.

23. *Q. turbinella* - scrub live oak

Description: An evergreen shrub to a small tree of 15 feet, with some exceptional trees reaching 30-35 feet. Scrub live oak is an attractive small oak, and one that people in the Southwest are more familiar with because it's found closer to Albuquerque and El Paso than other native oaks. Leaves are small, elliptic or oblong, one-half to one inch long, short-pointed, edges with spine-like teeth, thick and stiff, above blue-green with a bloom and

nearly hairless, beneath yellowish green and finely hairy.

Distribution: Lowest elevation occurrence: Organ Mountains at 5,000 feet, Sandia Mountains at 5,700 feet, Gila National Forest at 4,400 feet. It is common in the chaparral and oak woodlands of Arizona and New Mexico. A fine location for viewing this species is on the west slope of the Sandia Mountains (outside of Albuquerque) on the Juan Tabo picnic grounds road. In Texas its greatest occurrence is in the Franklin Mountains, but it can also be found in the Eagle and Quitman Mountains of Hudspeth County. It should be used much more widely in the Chihuahuan Desert and in other areas where drought tolerance is sought. It may be the hardiest of the evergreen oaks in cold winter areas.

BLACK OAKS or RED OAKS

(Section *Lobatae*, or Subgenus *Erythrobalanus*)

Bark black and furrowed, leaves, if lobed, with bristle (aristate) tips, wood without tyloses. Acorns take two years to mature (except for *Q. emoryi* and *Q. canbyi*, that mature the first year, and *Q. hypoleucoides*, which mature either the first or second year), acorn cups tomentose inside, acorns quite bitter compared

to white oaks (except for those of *Q. emoryi*, which are sweet). It has been said that red oaks in general are not as drought resistant as the white oaks, although some claim the reverse is true.



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An old treehouse built in a Q. emoryi located in Glenwood, New Mexico serves as a perch for author Michael Melendrez.

24. *Q. canbyi* - Canby oak

This species of red oak is found at high elevations in the mountains of north-eastern Mexico. It looks a lot like the Langtry oak and the graceful oak (*Q. graciliformis*). The acorns mature in one season. We have a specimen that was grown from an 8,000-foot provenance, and it is performing well at our arboretum. With rapid growth adding about 4 to 5 feet each summer, and the last flush of growth taking place in late September, it still seems

to harden up enough for the first hard frost of October. It is semi-evergreen here and gives a maroon winter color that can last for months. It is reported to grow well on soils of alkaline limestone origin.

25. *Q. emoryi* - Emory oak

Also called bellota (acorn) oak, black-jack oak and black oak.

Description: A tree typically 40 to 60 feet tall, except in western New Mexico where specimens can be found up to 100

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feet tall and with trunks over 7 feet in diameter. Large trees look much like the southern live oak of the Southeast, with large horizontal branches swooping down to the ground, but with taller, domed crowns reaching as high as 100 feet. A typical large specimen may reach 60 feet tall by 100 feet wide. I've counted over 600 annual rings on some branch cuts that are 4 feet in diameter. This slow growth is a result of the aridity of this region. Leaves are evergreen to tardily deciduous, dark green, holly-like, sometimes entire or with heavily toothed tips. Acorns are produced annually and are sweet; they can be eaten out of hand and are valued food of the Apache people and a favorite food of all wildlife. I've planted this species at 8000 feet elevation near Chama, New Mexico at our high elevation test plot (winter temperatures = USDA Zone 4), and it seems to be doing well, remaining evergreen.

Little is known of the cultural needs of this plant and what can be done to speed up its growth. In the wild it can be found



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Melendrez sits in the fork of Q. emoryi near Glenwood, New Mexico. Elevation 5,000 ft. This specimen is 18 feet in circumference, and may become the new national champion for this particular species.

in a wide arrangement of soils or rock types, from fine alluvial fills to gravel and cobble arroyos, limestone to granite, and sandstone hilltops that are excessively draining with no topsoil development. The potential is there for an excellent large tree for the high and dry landscapes of the Southwest and West Coast.

Distribution: Occurring in Catron, Dona Ana, Hidalgo, Luna and Sierra Counties, New Mexico, in open desert scrub/grassland sites starting at 4,000 feet elevation and extending

up into the canyons of the montane chaparral and oak woodlands above 6000 feet elevation. Emory Oak is common in Arizona, southwestern New Mexico, and Trans-Pecos Texas from 4000 to 6500 feet elevation. In the Chisos Mountains of Big Bend National Park this tree apparently has hybridized with the Chisos red oak (*Q. gravesii*), giving us *Q. xrobusta*, a tree with larger leaves than the typical Emory oak and similar to the oracle oak of California.

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and Lamb in *Oaks of North America*. This oak is found in canyons or mountain slopes in montane chaparral and oak woodland at about 5,000 feet or higher in the Chisos, Del Norte and Glass Mountains, in Brewster County, Texas. Also in the Davis and Vieja Mountains, in Jeff Davis County; in the Madera Mountains, in Pecos County; and perhaps in Val Verde County. Chisos red oak can be found on both igneous and limestone soils, and trees from each edaphic provenance do well at the Texas Agricultural Research and Extension Center at Dallas.

28. *Q. hypoleucoides* - silverleaf oak

Also called white-leaf oak.

(synonym: *Q. hypoleuca*)

Description: A small to medium tree 35-40 feet in height, with some exceptional trees in the Gila Wilderness being over 80 feet tall. Trunks in the deep canyons of the Gila can be single stem, with clear boles of 30 feet or more and diameters of 3 to 5 feet. It is sometimes a clump-forming shrub 6 to 20 feet tall on dry, south-facing scree slopes. Leaves are lance- to willow-shaped and evergreen, to 1 inch wide and 4 inches long. Leaf edges are revolute (rolled under), and the blades are smooth, blue-green on top and silvery tomentose on the undersides. Acorns are annual (or sometimes biennial), 1/2 to 3/4

inch long, pointed, one-third enclosed in a thick cup that is hairy inside, and colored a light grayish green when ripe.

Distribution: A beautiful oak of the high canyons in the oak woodlands, generally above 7,000 feet, in southeastern Arizona and southwestern New Mexico, but found as low as 4,000 feet and as high as 9,000 feet in New Mexico. Found in Texas only in the Davis Mountains of the Trans-Pecos region.

29. *Q.* (x?) sp.- Langtry red oak

This is a controversial evergreen red oak to about 50 feet tall, found in the head canyons of the Rio Grande River just below the confluence of the Pecos River. When Major Emory did the Mexican boundary survey in the early 19th century, this oak was found in at least one head canyon of the Rio Grande and was reported as *Q. coccinea* var. *microcarpa*. Cornelius Muller said this specimen is clearly representative of *Q. gravesii*, and he postulated that it was probably collected in the mountains farther west. After over 100 years, the oak was found again, and Muller once again tentatively identified it as *Q. gravesii*. However, after growing this oak out in New Mexico and seeing it at the Texas Agricultural Experiment Station at Dallas, it appears to be a completely different species. International

Oak Society member Pat McNeal of McNeal Growers feels that there are several populations of oak that all could be Langtry oaks. Pat has probably seen more examples of this oak (in the wild and under cultivation) than anyone else alive, and feels it is unique when compared to the other red oaks of the region. I trust Pat and accept his opinion that the Langtry oak is a distinct species and not just a hybrid.

GOLDEN OAKS

Section *Protobalanus* (formerly subgenus *Protobalanus*)

30. *Q. chrysolepis* - canyon live oak

Native to the mountains of California, Arizona and southwestern New Mexico, this species is variable in form, size and leaf.

Description: Evergreen shrub to large tree, growing up to 50 feet or taller in the mountains of California but usually a small tree to 25 feet in the Southwest. It can have a tall, pole-like structure with strong apical dominance and short horizontal branches. Larger trees in California may be multi-trunked with a wide spreading, massive structure. Leaves are entire on most mature trees, ovate, 1 to 2 inches long, blunt or short-pointed at the apex, firm, with a dark, shiny green surface and light whitish-green underside. On seedlings or rapid growing juvenile trees, the leaves can be spiny toothed

much like the Palmer oak. Acorns are 5/8 to 1 1/2 inches long, broad, maturing in 2 years. The large cup is a spreading, turban-like cap sometimes reaching 1/4 inch or more out from the acorn surface. The inside surface of the cup is covered with a fine golden coat of hairs. The bark is fissured into narrow scales and flakes, gray or dark gray.

Distribution: *Q. chrysolepis* grows from the coastal and transverse mountains of California into the southwestern mountains of New Mexico in Catron and Grant Counties. It is never common in southeastern Arizona or New Mexico, but can be found easily in California, in areas as cold as the north shore of Lake Tahoe near the Cal-Neva Hotel. In canyons and on mountainsides it often forms low-growing thickets or woodlands, from elevation 3,500 up to 7,000 feet.

31. *Q. palmeri* - Palmer oak

Also called the Canyon live oak.

(*Q. chrysolepis* var. *palmeri*, *Q. dunnii*)

Description: An evergreen shrub or small tree, usually 6 to 25 feet tall and up to 6 to 10 inches in trunk diameter, with a dense, bushy, wide-spreading crown. Leaves are spiny-toothed, elliptic to ovate, 1 to 2 inches long, edges crisp and leathery, shiny yellow-green to dark green above and slightly yellowish to white beneath. Acorns are 5/8 to 1 inch long, broad, maturing in the second year. The

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cup is spreading (but not as turban shaped as that of the canyon live oak), with fine golden hairs covering the inside.

Distribution: Canyons and mountainsides of the Southwest, elevations 3,500 to 6,000 feet; New Mexico in Catron, Hidalgo, Grant, Luna and Sierra Counties; Arizona in the mountains of southeastern and central parts; south and west of the Mogollon Rim. Also found in southern Nevada, southwestern Utah and southern California. Palmer oak has

spiny, evergreen leaves resembling the juvenile foliage of the canyon live oak and spiny forms of the holly oak (*Q. ilex*) of Spain. All three can display entire leaf margins with slower growth at maturity. Under nursery cultivation, they easily can be confused. All can be rapid growers under cultivation, adding 3 feet or more each year.

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Quercus 2000

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