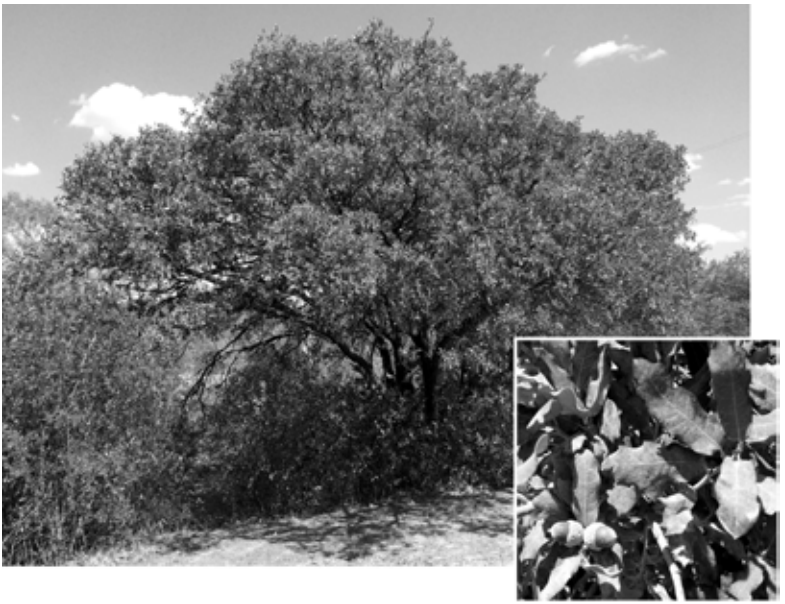
Oaks of the Texas Big Country

(cover image)

David Richardson
1105 Ryan Ave., Carrollton, Texas 75006, USA

A large portion of west central Texas is known as the "Big Country." A little over one hundred years ago this area was the home of Comanche Indians, hide hunters, and buffalo. Today these vast stretches are filled with wind farms as far as the eye can see. Seven species of oak and their hybrids occur in this area. This part of Texas is easily viewed from I-20, the interstate highway running roughly from Abilene in the east as far as Big Spring in the west. One of the major topographic features just south of Interstate Highway 20 is the Callahan Divide. This is the northernmost extension of the region known as the Edwards Plateau. The Callahan Divide is a plateau with rather rugged topography, shallow to deep ravines, and calcareous soils in the northern half. The draws and ravines are wooded, while the hilltops have topography which varies from grassland, to savanna, to woodland. North of this plateau is the Rolling Plains region consisting of low, undulating hills with shallow draws; the soils are predominantly red clay or sandy. There are vast areas in this region filled with mesquite (*Prosopis glandulosa* Torr.) and prickly pear (*Opuntia* spp.).

This is the eastern edge of the range of *Quercus havardii* Rydb. (see cover illustration) and *Quercus mohriana* Buckley ex Rydb., while at the same time the



Quercus mohriana photo©David Richardson

western edge of the range of *Quercus buckleyi* Nixon & Dorr, *Quercus marilandica* Münchh., *Quercus sinuata* var. *breviloba* (Torr.) C.H. Muller, *Quercus stellata* Wangenh. and *Quercus fusiformis* Small. There are some rare occurrences of *Q. buckleyi* and *Q. fusiformis* farther west, but for the most part their continuous distribution ends here. Some other important trees such as *Ulmus americana* L., *Cercis canadensis* var. *texensis* (S. Watson) M. Hopkins and *Populus deltoides* Marsh begin to peter out here as rainfall diminishes to around 500 mm (20 in.) per year. *Juniperus ashei* Buchholz and *Juniperus pinchotii* Sudw. occur here and farther west into the Trans-Pecos region. With the exception of *C. canadensis* var. *texensis, Juniperus* spp., and *Quercus* spp., *U. americana* and *P. deltoides* occur only near the larger creeks.

Near the town of Colorado City, hybrids between *Q. havardii* and *Q. stellata* are numerous. The larger trees grow to about 5 m (16+ feet). These hybrids result from the earlier range of *Q. stellata,* which in ages past occurred farther west. The hybrids occur as a kind of ground cover of 1 m (3+ feet) tall plants, dominating the region of red sandy soils. Most years these plants are loaded with large ripe acorns near mid to late August. Leaf shapes, color, and texture are variable, ranging from dark to blue green, depending on the clone. Many of the hybrids have leaves that are either cruciform like those of *Q. stellata*, or pronounced tendencies in that direction. It is difficult to say whether all of what grows here is of hybrid origin, since this area is transitional to stands of pure *Q. havardii* still farther west near the town of Monahans. Pure *Q. havardii* is the dominant plant in Monahans Sandhills State Park. This dwarf oak easily holds the sand dunes together with roots that grow nearly 13 m deep (42+ feet; 90% or more of the biomass of *Q. havardii* is underground). Some of these clones live as long as 1000 years, although the above-ground stems of the plant are replaced every fifteen years or so. By contrast, the above-ground stems of *Q. havardii* × *Q. stellata* live around 80 years.

The other western oak that occurs in the Big Country is *Quercus mohriana*.

Quercus stellata photo©David Richardson

This oak is associated with calcareous soils; it is one of the most widespread oaks farther west in the Trans-Pecos region. In the Big Country these oaks grow on rocky hillsides on the northern edge of the Edwards Plateau. In habitat, *Q. mohriana* usually is no taller than 5 m (16+ feet). The leaf color ranges from olive green to grayish blue. This oak is very distinctive and stands out from most of the surrounding vegetation. This is certainly an oak that should be considered for landscaping purposes where drought tolerance is sought. In this area *Q. mohriana* occurs with *Q. buckleyi* and *Q. sinuata* var. *breviloba* along with *C. canadensis* var. *texensis, J.* ashi, *J. pinchoti* Sudw., *Juglans microcarpa* Berl, and *Ungnadia speciosa* Endl. In transitional areas between soil types, *Q. mohriana* hybridizes with *Q. havardii* and *Q. stellata*.

In the hills just southeast of Sweetwater, approaching the Dallas-Fort Worth metro area, *Quercus sinuata* var. *breviloba* is another oak that occurs

Quercus sinuata var. *breviloba* photo©Guy Sternberg

Quercus marilandica photo©David Richardson

Quercus havardii x stellata photo©David Richardson

Quercus buckleyi photo©David Richardson

Quercus fusiformis photo©David Richardson

on rocky calcareous soils. Most people know this as the "Bigelow Oak." It has some disjunct populations in a few places farther north in Oklahoma and it also occurs in the southern part of the Edwards Plateau region as well. *Q. sinuata* var. *breviloba* usually reaches about 7 m (just under 23 feet) in height, but it can get taller if growing near draws where more moisture is available. Many of the hillside trees have gnarled trunks and branches which make them look like ancient relics battered by time. The bark is very scaly, which has prompted the name "scaly-bark oak." This oak commonly grows with *J. ashei* and *Q. buckleyi*. This is

Quercus havardii (see also front cover) photo©David Richardson

another useful tree for drought tolerance and alkaline soil conditions. Bigelow oak sometimes hybridizes with *Q. stellata* and in a few cases forms hybrid swarms.

In roughly the same habitat as *Q. sinuata* var. *breviloba* is the small red oak *Q. buckleyi* which is known to many as the "Texas Red Oak." These trees grow to about 11m (36+ feet) on rocky alkaline soils. There is some variation between individuals in leaf shape and bark color and texture. These trees receive between 500 mm to 900 mm (20 to 36 inches) of precipitation, consonant with the west to east range of the species. Texas red oak is highly ornamental and gives some of the best and most reliable fall color in the state; the color varies from burgundy to fire-engine red. In the eastern part of its range, Texas red oak hybridizes with *Quercus shumardii* Buckley forming the hybrid *Quercus* ×*sternbergii* publ. in prep. These hybrids show variable leaf shapes and forms and usually give great fall color as well. The hybrid population passes through the center of Dallas County and continues farther south all the way to San Antonio. These hybrids perform well on soils which vary from slightly acidic to alkaline. Texas red oak is planted in many commercial and residential developments in Austin, Dallas-Fort Worth, and San Antonio. This tree is also popular in some of the cities in the American Southwest such as Albuquerque, New Mexico and Phoenix, Arizona.

The other red oak that grows in the Big Country near Abilene is *Quercus marilandica,* also known as "blackjack oak." Blackjack oaks grow in the red sandy soils of the Rolling Plains region. In most cases these trees grow to about 4 m (13+ feet). This is the western form of this tree and it occurs with *Q. stellata* , mesquite *(Prosopis glandulosa* Torr.) and juniper species. The soils in this area are slightly acidic. On occasion *Q. marilandica* and *Q. buckleyi* hybridize both here and in the southern part of the Edwards Plateau. This wide-ranging oak is known for occurring on rather dry sites where available moisture is low. This is a tree that is not usually thought of as a landscape tree but I have observed a few that were definitely planted by someone. In some cases this tree gives beautiful golden fall color. In the Western Cross timbers region (the area west of the Dallas-Fort

Worth metroplex), *Q. marilandica* is one of the major components of the native vegetation, along with *Q. stellata*.

One of the most numerous and wide-ranging oaks in Texas is the "post oak," *Q. stellata*. This species occurs in all Texas regions except the High Plains and the Trans-Pecos. In the Big Country the post oak begins to play out near the town of Sweetwater. It grows in sandy areas near draws that hold some moisture. Post oaks in this region grow to about 10 m (32+feet). There are some unusual xeric forms of this tree that appear to be true and not the result of hybridization. Not far from these trees there are definite hybrids with *Q. mohriana*. Some of these hybrids are rather attractive and make small trees to 5 m (16+ feet). The post oak is another oak that is not usually used in home or commercial landscapes due to its slower growth and difficulty in transplanting. Most post oaks that are found in urban settings are a part of the natural landscape that has been preserved. In this area of Texas there must have been a rather large amount of pollen exchange, judging from the large number of hybrids that occur near Colorado City just west of Sweetwater. These hybrids are rather confusing, taxonomically speaking, due to their great morphological variation. Many of these hybrids having similar growth habits as *Q. havardii*.

The last of the seven oaks in the Big Country is *Q. fusiformis,* the "escarpment live oak." *Q. fusiformis* occurs on alkaline to slightly acidic, well-drained soils. Like Q. *stellata,* the escarpment live oak is one of the most numerous and wide-ranging oaks in Texas. *Q. fusiformis* is one of the major landscape trees in Texas and the cities and towns in the southwestern United States. In the natural landscape, these trees grow alone or in clonal clusters called mottes, some reaching up to 15 m (50 feet). The trees are evergreen, with older leaves being replaced in April. In most cases, the trees that occur in mottes are really a single tree with multiple trunks. Some trees take on a reddish or burgundy tint in late winter and early spring. Escarpment live oaks rarely hybridize, but a few hybrids with *Q. stellata* have been found in the Western Cross Timbers region between Fort Worth and Abilene.

The oaks in this portion of Texas have held up well in the exceptional droughts of recent years. As would be expected, acorn production has been low, but it has not been completely absent. Wildfires are another grave threat to oaks and other trees in this portion of the state. Fires were particularly destructive and widespread during the summer of 2011. In view of the species variation, rampant hybridization, and their successful meeting of ecological challenges, the oaks in the Big Country deserve protection and further study.

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