American Oaks in the Landscape

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We — the American members of the International Oak Society — are very excited about a national survey of tree professionals which recently nominated the proposed new National Tree of the United States: the genus *Quercus*! If you are concerned about global warming, you probably know that planting more trees is something that we all can do to help. However, even with massive reforestation efforts, our climate situation will deteriorate further before it begins to stabilize. During the potential lifetime of the shade trees that you might plant next spring, our anthropogenic greenhouse effect may force the natural ranges of many mesic tree species north into Canada, if they survive at all. So, if you live in an area where such trees may be in jeopardy, increase your odds by planting tougher species that are adapted to the projected shift in climate isopleths — plant oaks!

Oaks are an ancient and diverse tribe comprised of species that collectively will thrive in the best, but handle many of the worst, planting sites we have to offer. As early as 1924 the famous oak student William Trelease had recorded 371 *Quercus* species in the Western Hemisphere. Most of them occur in the Nearctic Realm, chiefly in the United States and Mexico. The genus includes ecological generalists that are broadly adapted as well as ecological specialists tailored to some of our most severe sites. From a landscape horticulture perspective, let’s review some of the better known and most promising examples.

An Oak From Yesterday

In the past, “oak” unfortunately has meant “pin oak” (*Quercus* contd. on pg. 12)
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Quercus palustris) to many people in the United States. *Q. palustris* is a nurseryman’s tree: easy to propagate; easy to transplant; fast growing; and naturally blessed with a marketable, excurrent growth habit. However, the tree must be pruned into a lollipop to fit in the average yard without having its entire lawn. Its twiggy lower branches are easy to propagate; easy to transplant; fast growing; and naturally blessed with a marketable, excurrent growth habit. How­ever, the tree must be pruned into a lollipop to fit in the average yard without having its entire lawn. Its twiggy lower branches.

**Oaks for Today — The Black Oaks**

(Subgenus Erythrobalanus, syn. Subgenus Quercus Section Lobatae)

The black (or red) oak group to which *Q. palustris* belongs is purely American, being endemic to the Western Hemisphere. It includes many of the fastest growing and most colorful species of *Quercus*. One of the earliest oaks to follow *Q. palustris* into popularity throughout much of the United States has been *Q. rubra*, the northern red oak. It is a handsome, pollution-resistant species with a clean branching pattern, good crimson or ochre fall color, and attractive dark bark that develops smooth ridges which almost appear as stripes on vigorous specimens. The tree is relatively easy to transplant (in the early spring, as with most oaks) and if moved when two inches or less in diameter it recovers quickly. Once established, it is quite drought resistant.

The fast-growing *Q. rubra* can become one of our largest deciduous trees in a relatively short time. It is amenable to most average soils, but will respond best to its favorite: rich, well drained, soil, moist, cool clay-loam. The acorns are variable in size and shape from provenance to provenance and from tree to tree. I currently am testing progeny at Starhill Forest from individual trees with large acorns (for mast production) as well as from some with small acorns (for smaller birds and for landscape use with minimal litter problems), and several researchers are making selections for timber production as well.

This species is one of our hardiest oaks, growing naturally (with somewhat reduced stature) as far north as Lake St. John, Quebec. For more southerly regions, and especially where poor soil or imperfect drainage is a concern, *Q. shumardii* (shumard oak) is an almost identical substitute with more deeply cut foliage. Another closely related, beautiful southern species useful in poor, dry soils is *Q. falcata*, the southern red oak, which has particularly attractive foliage on selected individuals. For dry soil conditions back up north, *Q. velutina* (eastern black oak) is a hardy tree with spectacular foliage, from scarlet budbreak through glossy maturity to amber senescence. It is more prone to decay than some others, though, and should be trained when young into a strong growth form with a single dominant leader. It has a very similar counterpart in California, *Q. kelloggii*, the California black oak.

Those who seek a tree more reminiscent of the conical *Q. palustris* might try *Q. coccinea* (scarlet oak) on upland or sandy sites, or the fast-growing *Q. nuttallii* (Nuttall’s oak) on heavy soils and low ground. Both trees are brilliantly colored in autumn, and closely resemble *Q. palustris* in form and foliage. A technicality of the rules of nomenclature unfortunately has caused Nuttall’s oak to be renamed *Q. texana*, despite the facts that its Mississippi Valley range barely extends to Texas and that the botanist who originated the name *Q. texana* obviously was referring to another tree, sometimes considered to be a small western variety of *Q. shumardii*. Some specimens apparently were switched in someone’s herbarium years ago, and instead of conserving the appropriate name, we now have confusion! The other *Q. texana* tree, now renamed *Q. buckleyi*, also is a beautiful specimen, but smaller than its cousins, and hardly far north of its Texas range.

Another very good choice within the black oak group for landscape use is *Q. imbricaria* (shingle oak). Admittedly inferior for timber purposes, this species seems to have been created purely for ornamental horticulture. Its uniform, dense, oval growth habit is comparable to that of *Q. palustris*, but more rounded and less pendulous. It usually becomes a medium-sized tree, more suited to the scale of residential suburbia than our largest oaks. Its acorns are small and inoffensive from a litter standpoint, sifting through mulch into its bedroom. The oak of the past.

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squirrels.

Q. imbricaria is as easily transplanted as any oak, and is one of the most adaptable of ecological generalists to a variety of exposures and soil types. Its fall color is interesting but not always outstanding, varying from greenish-gold to crimson to a warm russet-brown. It is one of our most marcescent oaks, so many of its leaves may persist through most or all of the winter, adding to its ornamental, screening, and wildlife value. While Q. imbricaria is hardy throughout most of the central and eastern states, southerners also might try the similar, narrower-leaved Q. phellos (willow oak) or the equally popular and highly variable Q. nigra (water oak). Both are at home in wet, sandy, or tight soils, and have foliage and habit akin to Q. imbricaria.

Q. marilandica (blackjack oak) is a “scrub” species that can be an attractive, dense, round-headed small tree for those who have less room. Although often slow growing and unkempt in its rigorous native habitats, which range from dune sand to adobe clay, this species makes a pleasant, tough little tree when brought into cultivation at a young age or grown from seed. Do not attempt to transplant wild seedlings of any size, though, unless you are equipped to dig to China!

Other small black oaks, including the previously mentioned Q. buckleyi plus Q. ilicifolia (bear oak), Q. georgiana (Stone Mountain oak), and Q. laevis (turkey oak, not to be confused with the Eurasian Q. cerasifera, Turkish oak) also can be domesticated into attractive small trees where they are adapted and available locally. They all have beautiful fall color, ranging from the typical russet-orange of Q. marilandica to scarlet in some of the others, and are impervious to drought. For those so inclined, these diminutive species might serve well as subjects for miniature culture as bonsai or penjing, for topiary, or as anchors for the shrub border.

More Oaks for Today — The White Oaks

(Subgenus Quercus Section Quercus, formerly Subgenus Lepidobalanus or Leucobalanus)

The white oak group, which is considered by many authorities to include several European and Asian sections classified as separate subgenera by others, includes most of the species with the greatest stature, longest life spans, sweetest acorns, most durability, and generally the slowest growth rates of the oaks. Due to the general absence of significant peroxidase enzyme incompatibilities (per research by Dr. Frank Santamour Jr., U. S. National Arboretum), this group is much easier than the black oaks to propagate asexually by grafting, so horticultural selections of some species already are available in the nursery trade.

As Andrew Jackson Downing wrote in 1847 of “our finest and hardest oaks, rich in foliage and grand in every part of their trunks and branches,” his description seems to single out the tree that I consider to be the standard-bearer for the entire white oak group — Q. macrocarpa, the bur oak. An adaptable inhabitant of many landscapes, from prairie groves and savannas to both upland and riparian forests, it ranges from the Texas Gulf Coast to the latitude of Reindeer Island in Lake Winnipeg, Manitoba. Throughout this vast range, Q. macrocarpa is the archetype of permanence and venerability.

It begins life as a slow-growing, awkward, sparsely branched sapling — the ugly duckling of oaks. Once it attains a diameter of about three inches, it starts a transformation into a rugged, massive monarch with a potential life span of many centuries.

The characteristic corky bark and picturesque form improve as the tree matures, and old age can be associated with immense size in the more hospitable portions of its range. Favorable growing conditions also can coax the tree into episodic flushing (buds breaking summer dormancy and adding a second year’s growth the same year). This tends to compensate to some extent for its usual slow growth rate.

The leaves of Q. macrocarpa are deprived of the brilliance that enlivens many other oaks in autumn, but they are dark and lustrous all summer, with contrasting abaxial surfaces that flash in the wind. Q. macrocarpa is undaunted by heat, cold, drought, flash floods, prairie fires, a wide soil pH range, climbing boys, and city conditions. The only serious threats affecting it are lightning and the “buckdozer blight” which frequently are fatal to old patriarchs.

While local provenances are recommended in general for planting all trees, I am successfully growing Q. macrocarpa individuals from 50 seed sources representing portions of its range many hundreds of miles north and south of my location. Such trees appear quite distinct from their local counterparts, in evidence of the climatic variation (or introgression) for which the species is well known. But they are growing well here in Illinois under cultivation. It will be interesting to compare their sizes and growth forms in a few hundred years!

Q. macrocarpa is named for the tangerine-sized fruit of some southern provenances, such as those in the Watash Valley of Illinois and Indiana. However, like those of Q. rubra, the acorns vary considerably in size among different ecotypes. They can be so sweet that selections have been made for nut-tree orchard planting. Despite their large size, these acorns will not constitute a serious litter problem in the maintained landscape if squirrels and other wildlife, livestock, or health food enthusiasts have access to them.

This species should be grown from seed, transplanted when small, or tended as a spontaneous volunteer if possible. Larger specimens can be moved with a mechanical

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transplanter that will dig a deep, conical rootball, or hand-dug if they were undercut by the nurseryman when young. The root physiologists who claim trees don't have taproots (probably based upon research in claypan soils) probably never dug a Q. macrocarpa grown in well-drained loam; a three-inch caliper tree can have a carrot-like taproot 16 feet long!

If you like Q. macrocarpa but need a tree that's easier to transplant or more tolerant of soggy soil, try some of its first cousins: the southern Q. lyrata (overcup oak) or, in colder climate areas, Q. bicolor (swamp white oak). Q. lyrata is a round-headed, lustrous, southern swamp tree which can be grown at least as far north as central Illinois from northern seed types. The more northerly Q. bicolor reputedly is the easiest of the white oaks to transplant. It has attractive peeling bark on its smaller branches, and color-contrasting ("bicolored") leaves which shimmer in the wind like those of Q. macrocarpa. Along with Q. lyrata, it tolerates tight or wet soil yet thrives on better sites when planted in the landscape; but neither tree shares the tolerance of Q. macrocarpa for high pH.

Q. michauxii, the swamp chestnut oak, is a tree of similar habitats. It has fiery autumn color which shows to advantage against its nearly white bark, and develops into a tall and majestic specimen. If you need one of the chestnut oaks for drier sites, Q. montana (rock chestnut oak, formerly known as Q. prinus) is a tough and colorful tree available at many nurseries. And if extremely high soil pH is your concern, whether wet or dry, choose Q. muehlenbergii, the yellow chestnut oak or chinkapin oak—nothing else will do as well. All of the trees in this group have sweet acorns, attractive bark and foliage, and interesting branching patterns.

The real model of comparison for all white oaks include some species that are scaled down to smaller spaces. Q. stellata (post oak) can become fairly large but usually is a medium-sized tree. It has heavy, glossy foliage that may yield good color over an extended fall season. It has heavy, glossy foliage that may yield good color over an extended fall season. Once established, the species is drought immune, but it is extremely slow to develop and cannot be transplanted easily in larger sizes. Still, a specimen 400-500 years of age is a magnificent sight.

Still smaller species include Q. prinoides, the dwarf chestnut oak of the central and eastern states; Q. gambelii (Utah white oak) of the Rocky Mountains, and others from the deep South, Southwest, and far West. Some are mere shrubs or even groundcover plants, like Q. havardii, the shin oak. They make interesting pets for the small garden, and have the same potential for creative pruning as the

of the central range of Q. macrocarpa also.

Q. alba is a superior timber tree and can have excellent fall color, among the best of its group. The tree is limited horticulturally by its notorious slow growth and difficulty in transplanting, and

has a preference for acidic soil; but, like Q. macrocarpa, it will be the living legacy we leave for our great-grandchildren when lesser trees have followed us to the grave.

As with the black oak group, the ranks of the white oaks include some species that are scaled down to smaller spaces. Q. stellata (post oak) can become fairly large but usually is a medium-sized tree. It has heavy, glossy foliage that may yield good color over an extended fall season. Once established, the species is drought immune, but it is extremely slow to develop and cannot be transplanted easily in larger sizes. Still, a specimen 400-500 years of age is a magnificent sight.

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shrubby red oak species.

Around the milder maritime fringes of the United States, several outstanding native oaks are adapted locally. The magnificent Q. virginiana (southern live oak) and its evergreen relatives and some counterparts in California, together with the awesome Q. lobata (valley oak), Q. douglasii (blue oak), and Q. garryana (Garry oak) are white oaks which should be preserved where they occur and planted where they are adapted. There even is a separate taxonomic group of oaks called the golden oaks (Protobalanus) consisting of only a few species confined to the West Coast and northwestern Mexico.

Many interesting oaks, both trees and shrubs, also inhabit semi-arid portions of the southwestern United States and Mexico. Many are evergreen, and some of those which occur at high elevations have potential for selection or breeding for cold tolerance farther north. Perhaps evergreen oaks will be a possibility for mid-latitude areas of the United States in the future!

Oaks for Tomorrow — Cultivars and Hybrids

It seems that horticulturists never are content with plant species, no matter how diverse and useful those species might be. We

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all want to find something special, or be creative and tinker with nature. Now that cloning and grafting problems with oaks are being overcome, *Quercus* can serve as an endless source for such delights.

Individual trees of many species can be highly variable, inviting selection for various horticultural qualities. And within (but not generally between) their respective subgenera, oaks seem to be almost universally interfertile. Spontaneous hybrids are found nearly everywhere, and serious plant breeders can foster thousands more by planting allopatric species in close proximity or by intervening directly with transfer of pollen from distant areas. We are just beginning to explore the possibilities of artificial pollination of oaks.

Hybrid oaks can offer three major advantages:

1. The opportunity to garnish good species with special qualities from related species;
2. The introduction of heterosis ("hybrid vigor") for faster growth, better color, etc. than that expressed by either parent species;
3. The excitement of exploring the unknown and the potential for discovery.

Several oak hybrids are beginning to appear in the nursery trade already as seed or F₂ seedlings. One of the most promising for future release as an F₁ cultivar is a selection of *Q. ×saullii* (*Q. montana* × *Q. alba*) which displays brilliant fall color over an extended season on a tree with outstanding form, foliage, and vigor. Another is a cross of *Q. alba* by *Q. macrocarpa*, possibly backcrossed with *Q. alba*, which exhibits many of the qualities of *Q. alba* on a tree with exceptionally fast growth. Several hybrids of American white oak species with European and Asian species also show tremendous promise.

This introductory article has merely scratched the surface of the horticultural potential of *Quercus*, the proposed United States' National Tree. While it seldom is advisable to encourage exclusive use of any genus as a monoculture, oaks should become a primary component of the Americas' nucleus of trees for the future.

**Editor's note:** Guy Sternberg organized our first conference, coordinated our incorporation, organizes the seed exchanges for our conferences, and has served as our first president. This article originally was prepared as legislation was being considered in the U.S. Congress to name the oak as the National Tree of the United States following an International Society of Arboriculture survey which gave oaks 5995 votes out of 7761 cast by professional arborists and other tree experts. That legislation (the National Tree Bill), as House Joint Resolution 69 and Senate Joint Resolution 113, has not yet been enacted.