

Sourwood

Oxydendrum arboreum: The Bitter & Sweet Tree

by Dr. Kim D. Coder, Warnell School of Forestry & Natural Resources, University of Georgia September, 2006

Sourwood is a tree of contrasts. Its sour foliage supports many small summer flowers containing the sweetest of nectar. This nectar is collected by bees and made into one of the premium honeys of the world. The tree was used for both arrows and medicines. Sourwood has little importance to most people until they see it as the earliest red color of fall. The flower stalks and fruit hang onto the tree deep into fall allowing the sourwood to be easily identified and enjoyed as a unique specimen tree. Sourwood is one of the most stolen trees taken from the wild, but the hardest to transplant and grow from cuttings. Sourwood is a special tree in need of care and consideration.

Naming Names

Oxydendrum arboreum is a native tree of the Eastern and Southeastern United States. It is the only member of its genus (*Oxydendrum*) and has no known subspecies, varieties or forms. Common names for *Oxydendrum arboreum* include sourwood, sour-wood, sorrel tree, sorrel-tree, lily-of-the-valley tree, titi, titi tree, arrowwood, elk tree, sorrel gum, sour gum, and tree andromeda. The accepted common name is "sourwood" and will be used here. Sourwood was first scientifically described in 1739(G) and 1753(L) as *Andromeda arborea*, in 1834 as *Lyonia arborea*, and finally in 1839 as *Oxydendrum arboreum*. Sourwood was first noted in a gardening book for plant collectors in 1754.

The name *Oxydendrum* is derived from Greek for a "sour tree." The species name *arboreum* means "tree form." The "sour tree" name comes from the acidic and bitter tasting foliage caused by oxalic acid in the leaf tissues. Note sourwood's scientific name (*Oxydendrum arboreum*) is commonly mis-spelled in some of the best plant books and web sites. Common mis-spellings are "Oxydendron," "arboretum," "arborea." There are currently few cultivars of sourwood available, principally "Chameleon" and "Mt. Charm."

The Relatives

Sourwood belongs to the heath family (*Ericaceae*). The heath family contain roughly 70 genera and about 1,800 species distributed in the temperate and cooler portions of the world. Many species in the heath family are woody shrubs, trees, and perennial herbs. Common species in the heath family include azaleas, blueberries, cranberries, doghobble, fetterbush, heath, heather, huckleberry, Labrador tea, laurel, madrone, manzanita, rhododendrons, snowberry, and staggerbush. Genetically, sourwood's closet relatives are in the genera *Pieris* and *Lyonia*.

There are about 15 native trees and many shrubs of the heath family found in North America. In the Southern and Southeastern United States there are about 22 heath family genera including six with tree forms: *Elliottia*, *Rhododendron*, *Kalmia*, *Lyonia*, *Vaccinium*, and *Oxydendrum*. Sourwood is deciduous and can be differentiated from many of its evergreen tree-form family members. Only about 19% of the species in the heath family are deciduous.

Growth Range

The native range of sourwood is shown in Figure A. This map provides a general range of the contiguous native population. There are several outlying populations which have been identified from herbarium samples and on maps derived from federal agency data, but not shown. Some of the outlying populations had specimen tree origins and are now naturalized. The states with historically identified or disjunct populations of sourwood not included in Figure A include Illinois, Indiana, Maryland, New Jersey, New York, and Texas. Indiana lists sourwood as threatened in the state, and Maryland lists sourwood as endangered. Sourwood grows in multiple counties of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. The altitudinal range is from near sea level along the Gulf and Atlantic Coasts to roughly 4,600 feet (average maximum altitude from 3 sources).

Habitat

Sourwood is usually found as a single tree or rarely as a small single species stand. It requires full to partial sun and becomes less tolerant of stress as it ages. Sourwoods are common but scattered in open mixed hardwood forests on slopes and in coves. Sourwood is found in the understory and midstory of several different forest types. Over time it can attain an intermediate crown class in a closed forest, but usually occupies suppressed or shrub layer canopy positions. Sourwood can rarely reach an overstory / codominant crown position because of site disturbance, competition loss, or overstory tree blow-downs in storms.

Sourwood is associated with upland oaks, cove hardwoods, southern yellow pines, upland hickories, and sweetgum. The associated species are not as critical as stand density, where the openness of the forest to light resources is critical. Open, medium to low crown density in the taller trees, and lack of an aggressive shrub layer facilitates sourwood success. If old suppressed sourwoods are released from light competition suddenly, they usually die. When it is found in bottomland areas, sourwood is always above the high water mark in well drained soils.

Best Sites

Sourwood can successfully grow and thrive in a variety of sites and under a wide range of climatic conditions. In keeping with its family tradition it grows best on acid soils in the pH range of 3.7 to 6.5. It does not grow on high pH or limestone derived soils. Sourwood does well on medium to moist, well drained, coarse or gravelly soils on slopes, hillsides and ridges. New road cuts, open mineral soil, and field edges can be colonized if competition is minimal. Sourwood can handle dry sites once established, but intense heat loading and drought cause severe problems. The national heat tolerance zones for sourwood are 5-9. The national cold tolerance or hardiness zones are 5b-8b. Maximum and minimum temperatures for sourwood are 105°F to -15°F.

Growth Form

Sourwood is a slow growing, short lived, woody perennial tree with a slender (usually crooked and leaning) trunk and a narrow to oval shaped, irregular crown with relatively dense foliage. Sourwood usually has a single leader when young, but branching develops early. Branching begins close to the ground and codomi-

nant branches form over time. The branches tend to droop near the ends. The branches and twigs can be crooked, twisted, or zig-zag in their linear form.

Tree Dimensions

Sourwood is a small to medium sized tree, but usually noticed as a small tree. Sourwood's average height is 45-55 feet (n=22 sources). Tree height ranges down to about 20 feet as its range edges are approached. Tree diameter averages 14-16 inches (n=11 sources). Tree diameter ranges down to 7 inches as its range edges are approached. Crown width averages 20-26 feet (n=5 sources). Maximum size of tree is: height of 98 feet (average value of 4 sources); diameter of 25 inches (average value of 4 sources); and, crown spread of 40 feet (average value of 3 sources).

Wood Use

Sourwood does not have sour wood. Sourwood wood has no odor or taste. The wood is diffuse porous, hard, dense, heavy, and close-grained (greenwood specific gravity = 0.5). As such, it is difficult to dry properly and difficult to work. Sourwood heartwood is light brownish grey with tint of red, aging to a dull grey color. Sapwood is yellowish brown with a hint of pink. Heartwood is difficult to find as most of a cross-section of a sourwood trunk is composed of sapwood. Historic European American and Native American uses for sourwood wood was for local craftsman pieces, tool handles, sliding bearings for wheels and machine parts, paneling, butter paddles, pipe stems, arrow shafts, specialty turned items, small craft items, sled runners, and fuel wood.

Tree Use

The greatest use of the tree in modern society, and its claim to fame is the light amber colored sourwood honey. The sap can be collected and evaporated into syrup. The gummy residue can be chewed to alleviate thirst (called sourgum). The second most important use for the tree is as a specimen tree in a landscape setting. It should be placed in protected sites where well-drained soils, good water availability, little compaction, and no foot traffic is present. It does not make a tough urban street or park tree.

Wildlife Use

There are few references and studies available on how various animals make use of sourwood. Sourwood is consistently listed as a moderate deer browse, especially the young shoots. The small seeds, or fruit capsules, are not usually mentioned as providing wildlife food, even though these would be available for small birds and rodents. The greatest use of sourwood is by bees which generate the much coveted sourwood honey. Several butterflies and moths are occasional visitors. The largest sourwoods, in intermediate crown positions within forests, have been cited as providing small cavities for animal nesting or roosting.

Medicinal Use

Sourwood has been used for millennia for different human ailments. Native Americans used leaf infusions for treating: menstrual and menopause problems, anti-diarrhea, lung and breathing problems, and as a sedative for nerves. The sap, gum, or inner bark was applied for skin irritation and chewed for mouth sores. European Americans used sourwood as a tonic, decoction, solid tree tissues pressed into a pill, and as a tincture. Sourwood products were used to treat urinary problems (increase urine flow / diuretic), enlarged prostate, bowel troubles, diarrhea, dysentery, stomach ache, and fever. The sourwood gum was chewed to alleviate thirst and treat mouth sores, and the green bark was rubbed on itchy skin.

Early colonists used sourwood in brewing a spring tonic (like a root beer) with materials extracted in water or homemade whiskey. The sourwood whiskey tinctures used in tonics were targeted primarily at men's urinary tract problems, leg swelling, and for heart problems. The youngest new leaves have been used to act as a sorrel green (sour / acidic taste) in salads. The medicinal use of sourwood requires careful tree identification because many relatives and plants resembling sourwood have a number of serious poisons in their various plant parts. This historic medicinal use of sourwood is provided for educational purposes only and should not be tried or used in animals or humans.

Forest Regeneration

Regenerating populations of sourwood within forest stands or after harvest require a good number of sourwood stumps to generate sprouts. In the middle of sourwood's native range seedlings regenerated per acre runs an average of 125 seedlings on the richer and moister cove sites, and about 300 seedlings on drier, more open mixed hardwood sites. Little sourwood regeneration tends to occur in pine and oak-pine mixtures. Sourwood has been shown to be susceptible to drought losses within open forest stands. Sourwoods, once established, are stressed by the nitrogen source used in tree or stand fertilization. Only nitrate based fertilizers should be applied as ammonium based fertilizers can cause severe damage.

The species density of sourwood in native forest stands, in the middle of the native range, is about 2 to 4 square feet of basal area per acre. Basal area is greatest in drier, more open mixed oak forest stands. Mortality of young sourwoods inside forests (in the center of its native range) runs about 33% of the stems dead by the time they reach two inches in diameter across most forest types. Mortality is ~94% in shaded and moist forest areas and ~66% in mixed oak-pine forests by the time they reach four inches in diameter. Note that wildlings stolen from forested landscapes and roadsides have a juvenile taproot and most of the active root stripped from them. These wildlings have >90% mortality rate.

Sourwood is susceptible to wild fires. Fire can easily kill stem tissue and girdle the tree. A single event fire usually causes a profusion of sprouts coming from the root crown area of the damaged tree. Multiple fires occurring over several seasons can kill back the sprouts and cause the death of the tree. Because of its strong sprout reproduction, occasional fire events may increase the amount of sourwood in a stand.

Conclusions

Sourwood is a tree deserving of attention for its landscape value. It is well-behaved, easy to care for, and petite. The foliage color of green during Spring and Summer, and the deep early red color of Fall, help present the unique flower stems for all to see. Sourwood should be more carefully conserved and shown in landscapes as a lacy contrast to a lot of bland tree foliage.

FURTHER INFORMATION:

Coder, Kim D. 2006. Field identification of sourwood - *Oxydendrum arboreum*. University of Georgia Warnell School of Forestry and Natural Resources outreach publication SFNR06-12. Pp.4.

Coder, Kim D. 2006. Native tree range in Georgia: *Oxydendrum arboreum* - sourwood. University of Georgia Warnell School of Forestry and Natural Resources outreach publication SFNR06-10. Pp.1.

Coder, Kim D. 2006. Selected references for *Oxydendrum arboreum* / sourwood. University of Georgia Warnell School of Forestry and Natural Resources outreach publication SFNR06-14. Pp.2.

Coder, Kim D. 2006. Stress & pest impacts on *Oxydendrum arboreum* / sourwood. University of Georgia Warnell School of Forestry and Natural Resources outreach publication SFNR06-13. Pp.3.

Figure A: General range map for *Oxydendrum arboreum* - sourwood. Native range found within the dark lines shown. Small pockets of outlying and naturalized populations are possible and do exist away from this native range. Range is based upon herbarium specimens, federal map sources, and personal observations.

