

YELLOW-POPLAR

by Deborah B. Hill and John R. Shelly*

University of Kentucky • College of Agriculture
Cooperative Extension Service
Agriculture • Home Economics • 4-H • Development

Yellow-poplar (*Liriodendron tulipifera*) is common throughout the United States east of the Mississippi River. Although called "poplar" this species has no biological relationship to the true poplar genus, *Populus*.

Yellow-poplar was probably named because of the yellow color of the wood from old trees. Also called "tuliptree" or "tulip-poplar" because of the flower and leaf shapes, it is one of only two species of the *Liriodendron* genus which survived the last Ice Age. (The other species is a native of China.)

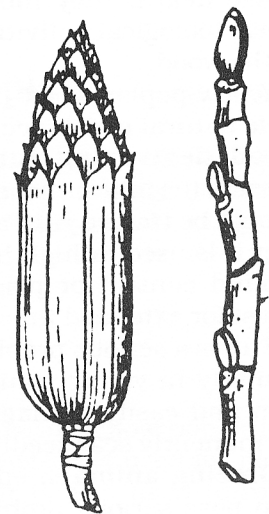
American pioneers found yellow-poplar trees as tall as 190 ft and up to 10 ft in diameter which they cut for house timbers and other purposes; today trees taller than 150 ft or larger than 3-4 ft in diameter are seldom seen in the second-growth forest. Yellow-poplar is native to all of Kentucky, but is most common in the eastern part of the state.

Species Characteristics

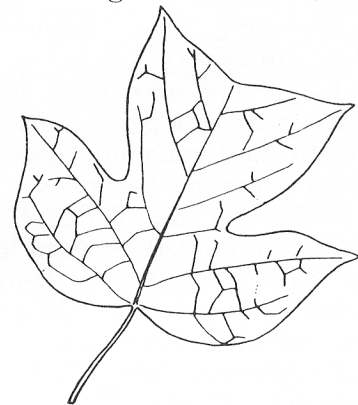
The outstanding physical characteristics of yellow-poplar are its tulip-shaped leaves, its yellow-orange, tulip-like flowers and the straightness of its bole. The trees grow both tall and straight, easily attaining heights of 80 to 100 ft and often are clear of lateral branches for



two-thirds or three-quarters of that height. The bark is thin in the early years of growth, but develops a thick ridged appearance in later years, marked with distinctive white areas between the ridges. The winged seeds (samaras) are similar to those of maple trees, but the samaras are clustered together in upright fruiting bodies that resemble conifer cones.



The leaves are 5-6 in. long and wide, and their truncated tips distinguish them from any other kind of leaf. Alternately arranged along the twigs, they are smooth-edged and usually four-lobed.



Dark green during the growing season, they turn yellow in the fall, while in spring, pale green new foliage is among the first visible. In the winter, the buds are reddish purple and are shaped something like a duck's bill or cupped folded hands. The tulip-like flowers usually appear in May.

*This publication is based on an earlier version of FOR-2 published in 1960 by James A. Newman

Damaging Agents

Yellow-poplar trees have few insect or disease problems. There are four major **insect pests**: the tuliptree scale, the yellow-poplar weevil, the root-collar borer and the Columbian timber beetle. The first two feed on buds, leaves and twigs, while the latter two bore into the wood. None is fatal, but they will cause stress to the trees and the latter two reduce the wood's value by degrading its quality.

Several **fungal diseases** affect yellow-poplar; most are rots of one kind or another (e.g., heart-rot, stem canker). Although these factors may cause death, they more commonly stress the trees' biological activities or degrade the quality of the wood.

Yellow-poplar wood currently in use has very little natural resistance to attack by the common **wood destroying fungi** (decay) and **boring insects** (termites, carpenter ants, etc.). The wood should be treated with a wood preservative whenever it is used in high hazard conditions such as ground contact or places where it will remain moist for extended times.

Fire is a serious problem for yellow-poplar, particularly in young stands when the bark is still thin and easily damaged. Even a light fire will permanently scar seedlings or saplings.

Grazing animals, either wildlife or livestock, also pose serious problems for yellow-poplar. If the animals do not kill seedlings and saplings outright by feeding on them, they affect tree growth by trampling the seedlings or by compacting the soil around the tree roots, thus restricting healthy root growth.

Vines, including grape, Japanese honeysuckle and kudzu, can be very destructive to yellow-poplar trees by growing over them, shading out the tree crowns, competing for moisture, nutrients and sunlight, and causing physical damage by breaking off upper tree branches.

Climatic factors can also affect yellow-poplar adversely. Accumulated ice from ice storms can break the tops of larger trees. Unusual frosts or frost pocket locations can affect early growth of seedlings and ultimately cause "shake" where the wood separates along the annual growth rings when cut.

Management of Yellow-Poplar

A fast-growing tree, yellow-poplar grows best in deep, moist but well-drained soils along streams and in mountain coves. It does not grow well in

dry, poor soils and in wet, poorly-drained sites. In the best sites, its height growth out-competes any tree species associated with it; on poorer sites, it is less competitive with its associates.

Yellow-poplar needs full sunlight to grow and develop. In dense woods, newly-germinated seedlings will survive only a few weeks. Harvesting trees by selection cutting, where only a few trees are removed from a stand, will gradually eliminate yellow-poplar as a major forest species because this practice does not open up the forest canopy enough to provide adequate sunlight to seedlings. Forest managers need to use different forms of harvesting to encourage the establishment and development of yellow-poplar and similar shade-intolerant species. Group selection or patch clear-cutting of areas larger than a half-acre will favor light-demanding trees in the new forest stand.

Since yellow-poplar seeds are wind-borne, dense stands often become established in abandoned fields. Many pure stands of yellow-poplar in Kentucky occur on old corn field sites. When the trees are too closely spaced, tree farmers should cut some of the poorer stems to give the better quality trees more room to grow, a practice known as thinning. Remember, however, that making several thinnings over the years is better than cutting too many trees at one time. When pole-size (4 to 10 in. in diameter) yellow-poplar is mixed with lower value species such as black gum, removing the trees competing closely with the yellow-poplar will improve the value of the forest stand.

Wood Properties

Yellow-poplar was one of the first trees to be harvested and sold in Kentucky. Early settlers favored it for constructing log buildings because of the abundant long, straight logs available, its relatively light weight and because it seemed to resist insect attack and decay. Many old yellow-poplar log structures can still be found around the state. The younger growth logs available today are **not** considered to be decay or insect resistant (see Damaging Factors).

Yellow-poplar is not as strong as Douglas-fir and southern pine, but is stronger than many other softwood structural species such as spruce, fir and most other pines. It also has excellent resistance to splitting during nailing and is rated fair in nail and screw-holding ability.

Yellow-poplar is still one of the major hardwood species utilized today. In 1977, the estimated harvested log volume of yellow-poplar was 62 million



board feet (Doyle scale) or 15% of the total hardwood log volume harvested for that year. Because of its favorable wood properties, it can be used in a wide variety of products. It is generally described as a straight-grained, medium-textured,

diffuse-porous hardwood with a whitish colored sapwood (outer portion of tree) and yellow-green heartwood (central portion of tree).

Yellow-poplar is considered a low density hardwood. The density of the wood when air dried (moisture content of 12%) is approximately 29 lb/ft³ which ranks it denser than basswood (25 lb/ft³), but less dense than the oaks (40-50 lb/ft³) and about the same density as cottonwood (28 lb/ft³). Because of its low density, yellow-poplar is moderately soft, light weight and intermediate in strength compared to other hardwood species. It also has the advantages of machining well with both hand and power tools and is ranked high in its paintability.

Uses of Yellow-poplar

Bees collect nectar from the yellow-poplar flowers in the spring and produce large quantities of honey from them. The foliage, buds, twigs and tender bark furnish food for rabbits, deer, and livestock.

Furniture

The main commercial use of yellow-poplar is in the furniture industry where it is used for parts, core stock and frames. It is also used to make boxes, crates and pallets for transporting other products. Another use is in window sashes, door frames, molding and other trim. Veneer (rotary peeled) is also used as a core ply for some decorative hardwood plywoods. Low grade yellow-poplar is also a major pulp species in the state. Other minor products manufactured from yellow-poplar include mine props, barn lumber, picture frames and wooden toys.

Building

The "favored species" status of yellow-poplar for building construction by early settlers has been largely replaced by softwood species from the Southern pine region and the Pacific Northwest and Canada. Its decline was primarily due to the abusive over-harvesting practices of the early 1900's which virtually eliminated the large, commercially desirable trees. Today, however, ample yellow-poplar is available and is beginning to be used as a structural lumber once again. It has the added advantage of growing closer to the eastern population centers than the more common structural species. Although the young growth yellow-poplar being harvested today has a tendency to warp when sawn into lumber, new technology

has been developed (Saw-Dry-Rip) to overcome this problem. Yellow-poplar has a strong potential to become a major species for structural purposes in the future.

A possible future structural use of yellow-poplar is as a raw material for composition boards such as waferboard, 4ft x 8ft panels (similar to plywood) made from wafer-sized wood particles.

The relative abundance of yellow-poplar in the eastern United States combined with its favorable wood properties indicate its increasing importance as a commercial species. The present situation where timber growth is greater than harvesting removals also assures a future of improving timber value and quality for yellow-poplar.

Suggested References

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Charles E. Barnhart, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort.

Issued 5-60; rev 4-72; 13M to 6-72; rev. 10-85, 3M