

# Southern Catalpa: “The Fish Bait Tree”

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The Southern catalpa (*Catalpa bignonioides*) tree is a common fixture along roadsides and in old yards. The big green leaves and distinctive long dangling fruits are noticeable from hundreds of yards. Although used in the past for a variety of wood-based products, today catalpa is used for shade trees and for growing a special caterpillar. This catalpa “worm” is prized by fishing enthusiasts across the South.

## Family Ties

The catalpa tree is a member of the Bignonia family (*Bignoniaceae*). This family contains more than 700 species scattered around the globe, primarily in tropical and sub-tropical regions. The family is represented by trees, shrubs and vines in North America. The trumpet creeper (*Campsis radicans*), cross vine (*Bignonia capreolata*), and two catalpa trees (*Catalpa* sp.) are the most recognized natives of this family in the Southeastern United States. The exotic Asiatic Paulownia tree is a member of this family and has been widely planted, now reproducing on its own. The catalpa genus (*Catalpa*) has 12 species spread across North America, the Caribbean basin, Eastern Asia and Japan.

There are two common native catalpa trees in the United States. *Catalpa speciosa* is the larger and more northern growing of the two. Common names for this catalpa are Northern catalpa, Western catalpa, and catawba-tree. *Catalpa bignonioides* is the Southern catalpa. Other common names for this species is common catalpa, Eastern catalpa, Indian cigar, Indian bean, catawba, smoking bean, caterpillar tree, cigar tree, and fish bait tree. The name “catalpa” is the native American name for the tree.

## The Tree

The Southern catalpa is a small to medium-sized tree with a wide spreading crown. Catalpa has large showy flowers presented in large clusters in late Spring. The native range of Southern catalpa is unclear because it was planted all over the Eastern United States starting in the late 1700's. The original native range of Southern catalpa was thought to be southwest Georgia, south Alabama, and south-central and southeast Mississippi. Southern catalpa produces significant amounts of fruits and seeds, and has escaped to reproduce in the wild anywhere it was planted. There are a number of selected cultivars, closely associated species, and dwarf varieties available for landscape use.

Southern catalpa reaches 40-50 feet in height and spread. The largest trees found measure 70 feet tall by 70 feet wide in Texas, and 75 feet by 75 feet in Mississippi. Old trees can reach 2-3 feet in stem diameter. Southern catalpa is known for its rapid growth rate, relatively short life span (70 years), and messy litter dropped onto its surroundings.



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## Leaves

Two to three leaves grow from each node (opposite or whorled leaf arrangement). The leaves are large, deciduous, and simple. Leaves are broadly heart-shaped with veins radiating from a common point at the base (palmate venation). Leaf margins are smooth, entire or slightly wavy. The leaf tip has an abruptly sharp point. The leaf base is heart-shaped and can occasionally have two small basal lobes. The leaf is connected to the twig with a long petiole (3-6 inches long). The leaves produce an unpleasant aromatic odor when crushed.

Leaf size is 5-10 inches long and 3-8 inches wide. Leaves are a bright medium green color and smooth on the top, and paler green and slightly hairy (trichomes) on the underside. Undersides of leaves are especially hairy on veins with leaf hairs turning black by fall. As the leaves senesce in fall, they turn a bright yellow color.

## Flowers

Flowers of Southern catalpa are large, white, and showy, blooming just after the leaves have expanded. Individual flowers are perfect (having both sexes), slightly fragrant, and 1 to 1.5 inches long and wide. Each flower has a variety of yellow to orange, and purple to purple-brown lines, markings, or spots on its inner surfaces. Flowering occurs from May to June in large upright, pyramid-shaped flower clusters 7-11 inches tall and wide.

The flowers are predominately white with a bell or tube shape. The flower tube has five unequal, rounded, and fringed lobes with the two upper lobes larger than the three lower lobes. The lowest or bottom-most lobe is not notched. The flower has two visible ridges and presents two rows of yellow-orange spots (or stripes) as well as many purple spots on the inner side of the flower tube and lower lobe. There are two fertile stamens present.

## Fruit

Southern catalpa fruit are long, slender, thin-walled, pod-like, two-celled capsules which dangle from the ends of twigs. They look like long, thin, cylindrical pencils or cigars about 1/3 inch in diameter and 6-16 inches long. The fruit dries to a brownish color and eventually splits along two lengthwise seams. The fruits mature by October and are held on the tree until Spring. Inside each fruit are many papery, thin, flat seeds with two long-pointed wings which have tufts of fringe hairs on each end. Seeds with wings are 1-2 inches long and 1/4 inch wide.

Trees begin to flower by age seven and are usually producing good seed crops by age 10. Good seed crops can be expected every 2-3 years. Seeds are naturally shed in late winter as the drying fruits split. Collection should only occur after the fruit has dried and turned brown. If ten pounds of air-dried fruit are collected, expect 2-3 pounds of seed, which is approximately 40,000 individual seeds. Seeds can be stored under cold, dry conditions for up to two years. Sow seeds in Spring under 1/8 soil and a light mulch. Once sowed, seeds germinate quickly (within 2 weeks) with 90% germination potential.

## Twigs

Southern catalpa twigs are thick, stout, and brittle. Twigs are minutely hairy and pale orange to brownish-grey in color. Many short crooked twigs and branches support a wide-spreading, irregular crown. Lenticels are clearly present, being large, pale and numerous. The terminal bud is absent and the lateral buds are small (1/16 inches long), sunken, brown, and solitary with six overlapping bud scales. The twig pith is solid and white in color.

Leaf scars on twigs are large, elliptical to circular with a raised margin and a sunken center. Usually 10-12 vascular bundle scars are clearly visible in a circle-shape within the leaf scar. Leaf scars

occur 2-3 per node. Neighboring leaf scars on the same node are not connected by lines and there are no stipular scars. Southern catalpa stem bark is light reddish brown to grey in color. Bark on young trees begins smooth and thin, eventually flaking off into thin, narrow scales.

## Wood

Southern catalpa heartwood is extremely rot resistant. In the past it was used for fence posts and rails. Catalpa wood was utilized for a number of uses where its soft, straight-grained, and low shrinkage properties were valuable. Occasional wood pieces and furniture parts were fashioned from catalpa. The sapwood is pale grey in color while the heartwood is greyish-brown with a hint of lavender color. The wood is faintly aromatic.

## Growth Characters

Southern catalpa is a fast growing and moderately short-lived tree (70 years). It is hardy in lowest winter temperature zones 6A through 9A. It requires full sun but can handle limited amounts of shade especially when young. Catalpa does not react well to competition from trees, shrubs, and ground covers, but does handle environmental stress well. Catalpa produces a set of allelopathic chemicals which affect soil microorganisms and other plants. These chemicals generate catalpa seed germination and growth problems which keeps catalpas separated from each other in the wild. Allelopathic problems can be serious under plantation conditions.

Catalpa naturally grows on well-drained but moist, clear areas. Stream banks, gravel bars, and road cuts are prime habitat. It is easily damaged by ice and wind storms which usually destroy crown shape and break crowns out of trees over time. Catalpa is very susceptible to fire. The successful distribution range of Southern catalpa has more than quadrupled due to human plantings and associated natural seeding.

## Pests

Compared to most trees of North America, Southern catalpa has few pests of any consequence. The top five pest problems include the catalpa sphinx moth caterpillar defoliation, leaf spot anthracnose, assorted leaf spots, powdery mildew, and verticillium wilt-caused branch die-back. In addition to these pests, drought initiated leaf scorch and leaf chlorosis in high pH soil are stress related problems common in catalpa.

## Catalpa Sphinx Moth

Catalpa trees are the only host for the catalpa sphinx moth (*Ceratomia catalpae* – Lepidoptera, Sphingidae family.) This moth is found across the Eastern United States. It consumes the leaves of catalpa and often completely defoliates the trees at least once per season when moth larvae populations are high. The adult moths have a heavy, spindle shaped body with narrow, long wings. They are strong flyers with a wingspan of three inches. The front wings and body are gray colored with irregular light and dark markings. The back wings are brownish gray. Adult moths are seldom seen because they fly only at dusk and during the night.

Adults usually first appear in March to April. Eggs are deposited in masses of from 100 to 1,000 on the underside of leaves. Occasionally smaller egg masses are laid on twigs. Eggs hatch in 5-7 days and young larvae feed together as leaf skeletonizers. The older, larger larvae feed alone and consume whole leaves. Full grown larvae are about three inches long. Older larvae generally have a black head with a black stripe running down its length with a black curved horn near the end. There are two color forms of large larvae observed: 1) a dark phase with black colors dominant on top and pale yellow below; and, 2) a light phase of pale yellow color all over with irregular black markings on top. Some years the large larvae will be heavily parasitized by a hymenopteron – a small wasp (Apanteles congregatus).

Larvae molt 5 times over a 3-4 week period with the last molt generating a pupa without a cocoon. The pupa is reddish-brown in color and slightly longer than an inch. The pupal stage lasts for about two weeks in the soil and then an adult emerges. The last pupa stage of the season overwinters in the soil beneath catalpa trees. At any one time in a single growing season, all three life-stages of the moth can be present (pupa, larvae, and adult). In any one year, 3-4 generations may develop (approximately 6 week life-cycle length). Seek the expertise of an entomologist for identification, life history, management and production of this moth.

#### Tree Reactions

Different individual catalpa trees have different reactions to moth larvae feeding. Some trees are consistently not attacked. Other trees are heavily defoliated almost every year. In some trees, once the tree detects significant leaf damage, the leaf is abscised (falls) from the tree. Constantly defoliated trees can develop branch die-back and in severe cases, decline and die. The year to year fluctuations in moth larvae populations are associated with selected bird predation and with parasite infestations.

#### Plantations For Caterpillars

A few catalpa trees along a fence row are usually enough to supply moth larvae for fish bait at a family level. Commercial production for local sales require more trees as well as a management plan. Consult with a forester, entomologist, and state regulatory agencies for commercial production, marketing, sales and transportation requirements.

There are many ways to successfully grow catalpas and their pests. Below are a number of conservative recommendations for growing catalpas specifically for catalpa sphinx moth larvae. These are general recommendations and your specific site will require a careful examination for suitability and chance of success.

**Sites:** Choose moist, moderately well-drained soils with loam to sandy loam textures. Poorer drained soils and finer soil textures can be used if drainage can be assured. If the soil does not drain effectively, select sites with small slopes or plant trees on raised mounds (bedded) to gain moist and well-drained soil. Loosen the planting site soil with harrows, plows, or tillers. The planting site should be cleared of all woody plant materials. If a whole-site treatment is not warranted, clear spots 10 feet in diameter and assure no plants shade the spot for most of the day. Herbaceous weed control should be used (chemical or mechanical weeding). Continued woody weed control is essential. Each seedling must be completely free to grow without competition. Wind protection provided by other trees or forest edges is valuable as long as catalpas are not shaded. Full open-grown, field trees tend to have more caterpillar crop failures than forest edge or wind-sheltered trees.

**Seedlings:** Gather seeds from trees proven to support moth larvae over many years. Seeds can be planted in a garden area and grown until they are 1-2 years old. Sow the seeds at a wide spacing and thin seedlings to greater than a six inch spacing between stems. Protect the seedlings from wild and domestic animals with a hardware cloth screen. Transplant seedlings during the winter once they are larger than 18 inches tall and the field has been prepared. Hand planting of immediately dug seedlings is best. For large fields, soil can be gently shaken off seedlings with each dipped in a hydro-gel slurry to retain moisture. These seedlings can then be machine planted using a standard hardwood planting process. Seedlings are also available from select nurseries, although information regarding genetic background and suitability may not be available.

**Nutrition:** Once planted firmly (not packed) into the soil, cover the planting site to within 3-4 inches of the stem with a coarse, organic mulch 1-2 inches thick. This mulch layer will need to be

replenished yearly and expanded with expanding tree crown size. A slow release nitrogen and phosphorus containing fertilizer can be added in small amounts over the top of the mulch in late Spring each year. The addition of calcium and magnesium through applications of dolomitic limestone can also be beneficial in highly acid soils (pH below 5.4). Soil pH should be adjusted to 6.4. A soil essential element test should be completed and recommendations followed to maintain good nutrition on the site. Be careful of insecticides or any treatment which might adversely affect the moth pupas in the soil and caterpillars on leaves.

**Spacing:** Because of tree allelopathy concerns and predation on moth larvae, as well as parasite problems, large solid blocks of plantings should be avoided. Many small clusters, or small linear plantings with large edges (linear, forest or field-edges, wavy-edged, highly convoluted, and irregular-sided plantings) should be designed. Final spacing when the trees are 10 years old should be approximately 35 feet between stems in an open, full-sun area protected from wind as much as possible. Seedlings should be trained into a single stemmed tree-form with new stem and basal sprouts removed as soon as noticed. Branches should be encouraged to grow laterally but not touch (recline on) the ground when wet with rain.

**Tree Forms:** Strive for 25 feet tall trees with 35 feet wide crown spreads. Use proper crown reduction and primary stem subordination pruning techniques to control height. Raise the crown (prune-up lower branches) 5-8 feet to help with operations around and under trees. As the trees age and grow more massive, installation of small metal cables in the upper 2/3s of the crowns to support weak branch connections (crotches) may be needed. Ground props of metal or ground-contact, pressure-treated wood can also be used to hold weak branches. Branch breakage is a serious problem in older trees. Attempt to have wide-spreading but short trees.

#### Problems & Risks

Success in growing trees and caterpillars together means little if a marketing plan is not developed. Caterpillars are fresh, easily damaged, living products which do not store or ship well. Spot markets and distributors are difficult to support over time. Gathering larvae from many trees at many times during the growing season is labor intensive. Climatic and pests problems on the trees or caterpillar populations can cause seasonal crop failures. Capital may not be available to support your business plan because of the significant risks.

This publication is not intended to suggest a viable business is possible. This publication is an educational product to better inform interested people about the catalpa tree and its use. It is critical to seek expert advise regarding any venture. An essential recommendation is to visit a successful producer.

#### Conclusions

Many people dream of selling catalpa moth larvae to fishing enthusiasts. Unfortunately, the risks associated with tree culture and moth culture can be immense. Most people settle for a few trees which dependably serve a single family. Catalpas make fine and unique yard trees. The flowers are beautiful and the wood can be used outdoors or indoors. Catalpas represent a Southern tradition at many levels. Plant a piece of cultural history — the Southern catalpa.

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