

Plant Propagation Protocol for *Catalpa bignonioides*

ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2021/CABI8.pdf>



Image Credits: Dr. Kim D. Coder (left)¹, Jim Robbins (right)¹¹

TAXONOMY	
Plant Family	
Scientific Name	Bignoniaceae
Common Name	Trumpet-creeper family
Species Scientific Name	
Scientific Name	<i>Catalpa bignonioides</i>
Varieties	N/A
Sub-species	N/A
Cultivar	<i>Catalpa bignonioides</i> cv.: Aurea, Nana ³
Common Synonym(s)	<i>Catalpa catalpa</i> ¹⁴
Common Name(s)	catalpa, southern catalpa, katalpa, American catalpa, eastern catalpa, catawba, bean tree, Indian bean, Indian cigar tree, Shawnee wood, caterpillar tree, worm tree, fish bait tree, fisherman's tree ³
Species Code (as per USDA Plants database)	CABI8
GENERAL INFORMATION	

Geographical range

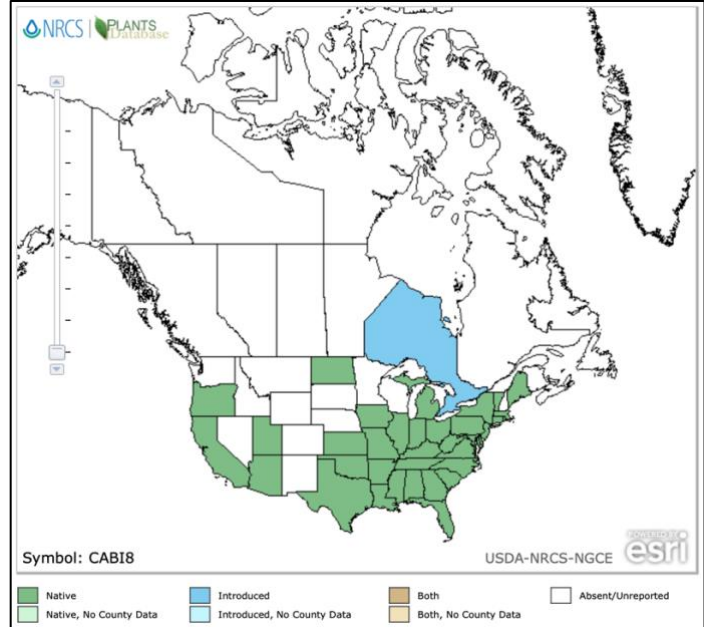


Image Credit: USDA PLANTS Database ³

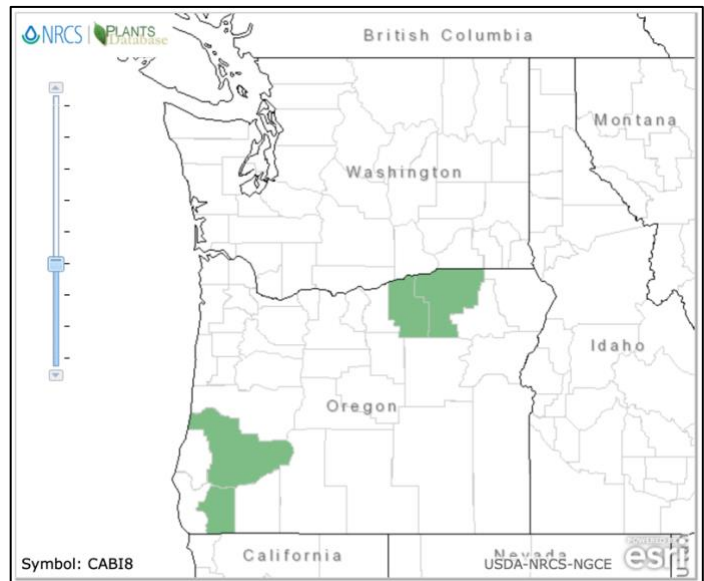


Image Credit: USDA PLANTS Database ³

Native to mostly South-eastern North America. First encountered in Florida, Georgia, Alabama, Mississippi, and Louisiana. Established in areas east of the Rocky Mountains, California, and Oregon.³ It is also planted as an ornamental species in Washington. Pictured below are the specimens located on the University of Washington Seattle campus, indicated by the dark circles.



Image Credit: UW Trees Database

Ecological distribution	Floodplains, moist soils near streams and rivers in wetlands and low woodlands. ^{9,10,14}
Climate and elevation range	Hardiness zones 5 to 9 where winter temperatures are ~0-30°F ³
Local habitat and abundance	Catalpa trees are the only known host for the native sphinx moth (<i>Ceratomia catalpa</i>). It is recommended to source seeds from trees that have supported moth larvae. ¹
Plant strategy type / successional stage	This hardy species is both drought and flood tolerant. ⁸ Once established, it can grow in a variety of soil pHs and types. ⁵ However, its growth can be inhibited by competition and shading from other species. This may indicate it is a seral species. ¹ It can be weedy in some regions of the U.S. if not managed properly. ³
Plant characteristics	<p>Perennial deciduous tree with mature heights from 25 to 40 feet. Lives from 40 to 50 years on average, but can reach 70 years of age. Bark contains fissures and reddish-brown scales. Winter twigs have identifying leaf scars arranged in whorls of 3 per node that resemble suction cups.³</p> <p>Simple leaves have a heart base and soft pubescence on the underside. Flowers from May to July. Seed capsules emerge green during summer and grow from 6 to 24 inches long, resembling a cigar. In autumn, they mature, turn brown, and split to release seeds. Capsules can remain attached over winter or drop.³</p>

PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Bareroot
Stock Type	
Time to Grow	1-2 years ¹
Target Specifications	18 inches ¹
Propagule Collection Instructions	Capsules split and disperse seeds from winter to spring. ¹⁴ Germination rate is higher in seeds collected after winter than during fall. ³ Gather entire pods. ¹²
Propagule Processing/Propagule Characteristics	2-3 pounds of seed containing ~40,000 seeds are expected from 10 pounds of dried fruit capsules collected. Seeds remain viable for up to 2 years in cold, dry storage. ¹
Pre-Planting Propagule Treatments	Catalpa seeds have no dormancy and require no pretreatment such as stratification or scarification. ⁴ Cold, dry storage over winter is recommended. ¹⁴ Gibberellic acid may be used to shorten germination time, but is not necessary in achieving high germination rates. ⁶
Growing Area Preparation / Annual Practices for Perennial Crops	Prepare a garden area or nursery bed with fine seeding media that has high moisture capacity and receives full sun exposure. ^{2,12}
Establishment Phase Details	Sow the seeds after frost, during spring or early summer when daytime temperatures are 70-85°F. ¹³ Sow under 1/8 – 1/2 inch of soil with a thin layer of mulch. ^{1,7} Pine needle mulch is recommended to keep seeds moist. ^{7,13} After germination, gently rake the surface of the soil, careful to not disturb the seeds. This will help break up the compacted soil and promote sprouting through the soil. ¹²
Length of Establishment Phase	Within 2 weeks with a 90% germination rate ^{1,13}
Active Growth Phase	Protect young seedlings from herbivory by using a cloth or mesh screen fence. Reduce competition and shading by weeding and relocating seedlings spaced closer than 6 inches apart. ¹ Water every day during growing season. ⁷
Length of Active Growth Phase	4 – 5 months from spring to late summer or early fall ^{7,12}
Hardening Phase	During early fall (e.g., September), allow the plant to dry out completely between watering and reduce

	watering frequency overall. Undercut the taproots to encourage a more fibrous root system that will establish well during outplanting. Natural seasonal cooling will also prepare the plant. ⁷
Length of Hardening Phase	~ 3 months during fall and early winter ⁷
Harvesting, Storage and Shipping	<p>Before transplanting, seedlings are sorted into grades based on size. Grade 1 includes those from 18 inches up. Grade 2 includes 12-18 inches. Grade 3 are those under 12 inches. Those in grade 3 are considered cull seedlings and often fail to survive the first year, so they are discarded.¹²</p> <p>Seedlings can be transplanted from garden after 1-2 years of growth and during winter when they have reached a minimum height of 18 inches¹, but preferably below 24 inches.⁷</p> <p>If bareroots are not planted immediately, they can be kept in moist, cold storage.⁷</p>
Length of Storage	1-2 weeks ⁷
Guidelines for Outplanting / Performance on Typical Sites	Ideal height for mature trees is 25 feet with crown spread of 35 feet ¹ , but can reach more than 40 feet. ⁹ They live up to ~70 years with a maximum diameter of 3 feet. Flowering usually occurs within 7 years of age and can produce quality seeds by age 10. ¹
Other Comments	May be considered a pest in some parts of the U.S. where it escapes cultivation, but is not formally recognized as an invasive species. ³
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Thuy Luu
Date Protocol Created or Updated	05/04/21

References:

¹Coder, K. D. (2016). Southern Catalpa. *Warnell Outreach, Warnell School of Forestry & Natural Resources, University of Georgia*.
<https://bugwoodcloud.org/resource/files/15244.pdf>.

²Florida Native Plant Society (FNPS). (n.d.). *Catalpa bignonioides*.
<https://www.fnps.org/plant/catalpa-bignonioides>.

³Geyer, W. A., Broyles, P. J., & Row, J. M. (n.d.). *Plant Guide: SOUTHERN CATALPA Catalpa bignonioides Walt.* USDA Plants Database.
https://plants.usda.gov/plantguide/pdf/pg_cabi8.pdf.

- ⁴Hartmann, H. T., Kester, D. E., Davies, F. T., & Geneve, R. L. (2018). In *Hartmann and Kester's plant propagation: principles and practices* (8th ed., pp. 785–785). essay, Pearson Education.
- ⁵Kiani, S., & Perler, R. (2017, April 23). *Catalpa*. Yale Nature Walk. <https://naturewalk.yale.edu/trees/bignoniaceae/catalpa-bignonioides/catalpa-74>.
- ⁶Love, S. L., & Akins, C. J. (2019). Second summary of the native seed germination studies of Norman C Deno: species with names beginning with letters C through E. *Native Plants Journal*, 20(1), 71–71. <https://doi.org/10.3368/npj.20.1.65>
- ⁷Luu, T., & Webb, A. (2021, May 4). Seed Propagation of Southern Catalpa by Superior Trees, Inc.. personal.
- ⁸Missouri Botanical Garden. (n.d.). *Catalpa bignonioides* - Plant Finder. <http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=b962>.
- ⁹The Morton Arboretum. (n.d.). *Southern catalpa*. <https://www.mortonarb.org/trees-plants/tree-plant-descriptions/southern-catalpa-0>.
- ¹⁰Plants for a Future. (n.d.). *Pfaf Plant Search: Catalpa bignonioides - Walter*. <https://pfaf.org/user/Plant.aspx?LatinName=Catalpa%2Bbignonioides>.
- ¹¹Robbins, J. (n.d.). [Flower Form] [Photograph] *NC State University*.
- ¹²Scott, C. A. (1911). *The Hardy Catalpa*. K-State Research and Extension. <https://www.ksre.k-state.edu/historicpublications/pubs/Sc020.pdf>.
- ¹³University of Florida. (2018, July 14). *Catalpa bignonioides*. *Catalpa bignonioides | Landscape Plant Propagation Information | Plant Information Databases | Environmental Horticulture Department | College of Agricultural and Life Sciences | UF/IFAS*. <http://hort.ufl.edu/database/lppi/sp080.shtml>.
- ¹⁴The University of Texas at Austin. (2017, December 12). *Plant Database: Catalpa bignonioides*. Lady Bird Johnson Wildflower Center . https://www.wildflower.org/plants/result.php?id_plant=cabi8.

Other Sources Consulted:

- Arbor Day Foundation. (n.d.). *Northern CatalpaCatalpa speciosa*. Northern Catalpa Tree on the Tree Guide . <https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=805>.
- Klingaman, G. (2013, August 23). *Plant of the Week*. Catalpa, Southern Catalpa. <https://www.uaex.edu/yard-garden/resource-library/plant-week/catalpa-8-23-13.aspx>.

- MacBryde, B. (2021, April 30). *Catalpa bignonioides*. NatureServe Explorer 2.0. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.157448/Catalpa_bignonioides.
- Muñoz-Mingarro, D., Acero, N., Llinares, F., Pozuelo, J. M., Galán de Mera, A., Vicenten, J. A., ... Pérez, C. (2003). Biological activity of extracts from *Catalpa bignonioides* Walt. (Bignoniaceae). *Journal of Ethnopharmacology*, 87(2-3), 163–167. [https://doi.org/10.1016/s0378-8741\(03\)00111-9](https://doi.org/10.1016/s0378-8741(03)00111-9)
- Toogood, A. R. (1999). A-Z of Garden Trees. In *Plant propagation: the fully illustrated plant by plant manual of practical techniques* (pp. 77–77). essay, DK Pub.
- Tredici, P. D. (1986). The Great Catalpa Craze. *Arnoldia*, 46(2), 2–10.
- University of Delaware. (2018, March 9). *Catalpa bignonioides*. UDBG - AGRICULTURE & NATURAL RESOURCES. <https://canr.udel.edu/udbg/?plant=catalpa-bignonioides>.