

Catalpa Scop.

catalpa

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Growth habit, occurrence, and use. The catalpas include about 10 species of deciduous or rarely evergreen trees native to North America, the West Indies, and eastern Asia (Rehder 1940). Two deciduous species, southern catalpa and northern catalpa (table 1), are native to the continental United States and have been planted quite widely outside their native range, especially northern catalpa. Mature trees of both species attain heights of 9 to 18 m (Little and Delisle 1962; Sargent 1965). Both have been grown to some extent in Europe. Catalpas are used in shelterbelts and ornamental planting and have minor value as timber trees, mainly for posts and small poles. Haitian catalpa, or yokewood, a native of the West Indies, has also been widely planted for forestry and ornamental purposes (table 1).

Flowering and fruiting. Attractive clusters of showy, white perfect flowers with purplish and orange blotches and stripes in the throat are borne in May and June on southern and northern catalpas (Brown and Kirkman 1990; Sargent 1965). Fruits of these species ripen in October, and good crops are borne every 2 to 3 years beginning at about age 20 (Bonner and Graney 1974; Sargent 1965; Vines 1960). Haitian catalpa flowers vary from white to solid rose in color; they appear irregularly throughout the year. Even 6-month-old seedlings flower, and abundant seed crops are borne by the age of 18 months (Francis 1993). Mature fruits are round, brown, 2-celled capsules, 15 to 75 cm long (figure 1). In late winter or early spring, the capsules of northern and southern catalpas split into halves to disperse the seeds (Sargent 1965). Each capsule contains numerous oblong, thin, papery, winged seeds 1 to 5 cm long and about 1 to 6 mm wide (figure 2). Removal of the papery outer seedcoat reveals an embryo with flat, round cotyledons (figure 3). Southern and northern catalpas are separate from each other. The most consistent identification feature is the relative thickness of the fruit walls. Northern catalpa fruit walls are considerably thicker than those of southern catalpa (Brown and Kirkman 1990).

Collection, extraction, and storage. Fruits should be collected only after they have become brown and dry. When dry enough, the seeds can be separated by light beating and shaking. Pods of northern catalpa collected in February and March had seeds of higher quality than those collected in the fall (Bonner and Graney 1974). In terms of size, seeds of northern catalpa are slightly smaller than seeds of southern catalpa, and seeds of Haitian catalpa are by far the smallest of these three (table 2). Seeds of all 3 species dried to about 10% moisture content can be stored under refrigerated conditions. Successful storage for 2 years has been reported for southern catalpa (Bonner and Graney 1974) and 1 year for Haitian catalpa (Francis 1990). Long-term storage has not been studied, but this

genus appears to be orthodox in storage behavior and capable of extended storage at low moisture contents and temperatures.

Germination tests. Seeds of all 3 species germinate promptly without pretreatment. Tests should be made on wet germination paper for 21 days with 20 °C night and 30 °C day temperatures. Other moist media also are satisfactory. Although northern catalpa is known to be photosensitive (Fosket and Briggs 1970), light is not necessary for germination tests (AOSA 1993). Germination in excess of 90% (25+ samples) has been obtained in about 12 days with good quality seeds of southern and northern catalpas (Bonner and Graney 1974). Francis (1993) has reported 40% germination of Haitian catalpa in 8 days on potting mix. Germination is epigeal, and the emerging 2-lobed cotyledons look like 4 leaves (figure 4).

Nursery practice. Catalpa seeds should be sown in late spring in drills at the rate of about 100/linear m (30/ft), and covered lightly with 4 mm (1/4 in) of soil or sown on the surface. A target bed density of 108 to 215 seedlings/m² (10 to 20/ft²) is recommended (Williams and Hanks 1990). Stratification or other pretreatment is not needed. A pine needle mulch has been recommended for southern catalpa (Bonner and Graney 1974). In Louisiana, this species starts germination about 12 days after March sowing and germination is about 80%. In Puerto Rico, Haitian catalpa seeds can be spread thinly on a shaded bed of moist, sterile soil or sand and covered lightly with sand (Francis 1990). This species can also be sown directly into containers; germination begins in about 10 days. Nematodes, powdery mildews, and the catalpa sphinx *Ceratomyxa catalpae* (Boisduval) may give trouble in the nursery. Southern and northern catalpas are normally planted as 1+0 stock (Bonner and Graney 1974). Haitian catalpa seedlings should be ready for planting 10 to 14 weeks after sowing in containers. Untreated woody cuttings can also be used for vegetative propagation of Haitian catalpa (Francis 1990).

Literature Cited

- AOSA [Association of Official Seed Analysts]. 1993. Rules for testing seeds. *Journal of Seed Technology* 16(3): 1B113.
- Bonner FT, Graney DL. 1974. *Catalpa*, catalpa. In: Schopmeyer CS, tech. coord. *Seeds of woody plants in the United States*. Agric. Handbk. 450. Washington, DC: USDA Forest Service: 281B283.
- Brown CL, Kirkman LK. 1990. *Trees of Georgia and adjacent states*. Portland, OR: Timber Press. 292 p.
- Fosket EB, Briggs WR. 1970. Photosensitive seed germination in *Catalpa speciosa*. *Botanical Gazette* 131(2): 167B172.
- Francis JK. 1990. *Catalpa longissima* (Jacq.) Dum. Cours., yokewood. *Silvics Manual SO-ITF-SM-37*. New Orleans: USDA Forest Service, Southern Forest Experiment Station. 4 p.
- Francis JK. 1993. *Seeds of Puerto Rican trees and shrubs: second installment*. Res. Note SO-374. New Orleans: USDA Forest Service, Southern Forest Experiment Station. 5 p.
- Little EL Jr. 1979. *Checklist of United States trees (native and naturalized)*. Agric. Handbk. 541. Washington, DC: USDA Forest Service. 375 p.
- Little EL, Delisle AL. 1962. Flowering, size, growth rate and life span: forest trees, North American. In: Altman PL, Dittmer DS, eds. *Biological handbook on growth*. Washington, DC: Federation of American Societies for Experimental Biology: table 103.
- Rehder A. 1940. *Manual of cultivated trees and shrubs*. 2nd ed. New York: Macmillan. 996 p.

- Sargent CS. 1965. Manual of the trees and of North America (exclusive of Mexico). 2nd ed., corrected and reprinted. New York: Dover. 934 p.
- Vines RA. 1960. Trees, shrubs, and woody vines of the Southwest. Austin: University of Texas Press. 1104 p.
- Williams RD, Hanks SH. 1976. Hardwood nurseryman's guide. Agric. Handbk. 473. Washington, DC: USDA Forest Service. 78 p.

Figure 1 *Catalpa bignonioides*, southern catalpa: capsule and leaf, $\times 2$.

Figure 2 *Catalpa speciosa*, northern catalpa: seed, $\times 4$.

Figure 3 *Catalpa speciosa*, northern catalpa: longitudinal section through a seed, $\times 3$.

Figure 4 *Catalpa bignonioides*, southern catalpa: seedling development at 1, 5, 8, and 20 days after germination.

Table 1 *Catalpa*, catalpa: nomenclature and occurrence

Scientific name & synonym(s)	Common name	Occurrence	Year first cultivated
<i>C. bignonioides</i> Walt. <i>C. catalpa</i> (L.) Karst.	southern catalpa , common catalpa, Indian-bean, catawba, cigar-tree	SW Georgia & Florida to Louisiana; naturalized to New England, Ohio, Michigan, & Texas	1726
<i>C. longissima</i> (Jacq.) Dum.-Cours.	Haitian catalpa , yokewood, roble de olor, chenn	Hispaniola & Jamaica; naturalized in Martinique, Guadeloupe, & the Grenadines; planted in Florida, Hawaii, & the West Indies	C
<i>C. speciosa</i> (Warder) Warder ex Engelm. Catawba-tree,	northern catalpa , hardy catalpa, western catalpa, naturalized in SE US Indian-bean, catawba	SW Indiana & Illinois to NE Arkansas & W Tennessee; widely	1754 western

Sources: Bonner and Graney (1974), Francis (1990), Little (1979).

Table 2C *Catalpa*, catalpa: seed data

Species	Place collected	Wt yield of seeds/100wt fruit	Range /kg	Cleaned seeds/wt		
				/lb	Average /kg	/lb
<i>C. bignonioides</i>	Florida	C	32,600B40,10	14,800B18,200	36,400	16,500
		35	30,900B81,600	14,000B37,000	44,100	20,000
<i>C. longissima</i>	Puerto Rico	C	572,000B618,000	259,460B280,325	600,000	272,160
<i>C. speciosa</i>	Minnesota Prairie States	C	29,450B48,300	13,359B21,910	C	C
		10B25	30,000B80,700	13,600B36,600	C	C
		25B35	35,300B66,150	16,000B30,000	46,300	21,000

Sources: Bonner and Graney (1974), Francis (1990).