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Synopsis of the genus *Catalpa* (Bignoniaceae) III¹

Special part

by

Jiří PAČLT²

The last general review of the genus *Catalpa* (Bignoniaceae) was published more than fifty years ago by E. BUREAU under the title „*Révision du genre Catalpa*”, where 12 different forms (species and varieties) are enumerated. Since that time (1894) our knowledge has made so much progress that the present paper contains the description of 31 living forms of which 11 belong to the rank of proper species, 2 to that of hybrid species, 5 to that of varieties, together with one hybrid variety, and 13 to that of forms both natural and horticultural.

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A. FOSSIL MATERIALS

Considering the discovery of a few fossil species of *Catalpa* and that of other fossil *Bignoniaceae*, there is reason to believe that the genus is one of the oldest members of this family. It is true that some fossils described as various *Bignoniaceae* from the Cretaceous are apparently older than those of *Catalpa*, *Incarvillea* and other genera known from the Tertiary, but it must be remembered that the Mesozoic "*Bignoniaceae*" were found only in the form of leaves, thus still remaining a source of possible misidentification. On the contrary, the samples of the Cenozoic *Bignoniaceae* do not leave any doubt as to their systematic position (*Catalpa*, *Incarvillea*), as their seeds were found in almost all cases, a circumstance, which allows us to identify those fossils—at least in this case—with relative certainty. The genus *Catalpa* is represented in the French Ludian (Uppermost Eocene), the English Lattorian (Lower Oligocene) and the Japanese Neogene. There is also reason to believe that this genus was more widely distributed in the Cenozoic than it is at present.

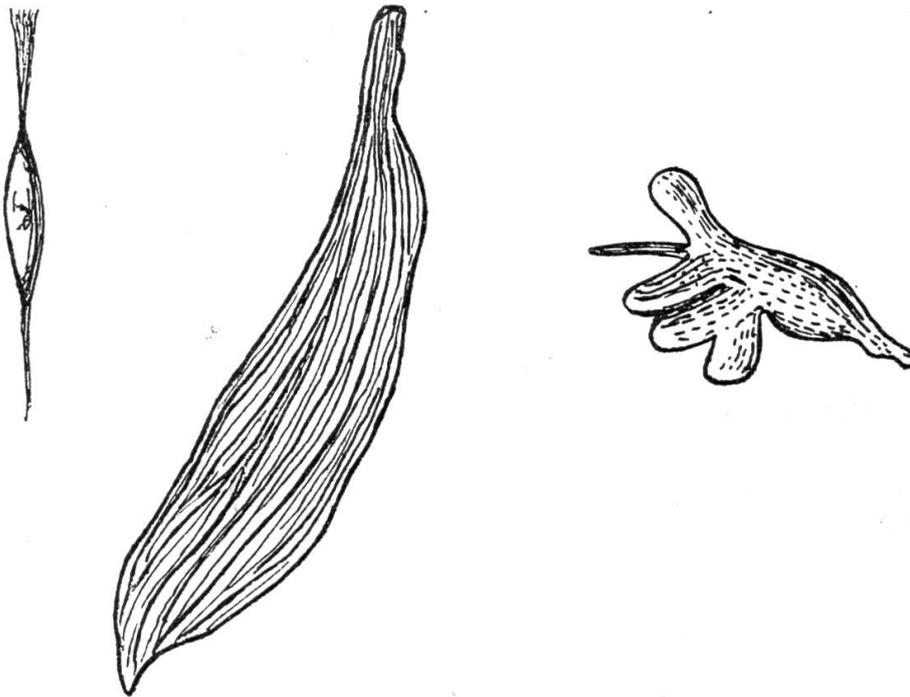


Fig. 5. — *Catalpa tenuiloba* (Saporta) Paclt. Seed, fruit and blossom (After SAPORTA).

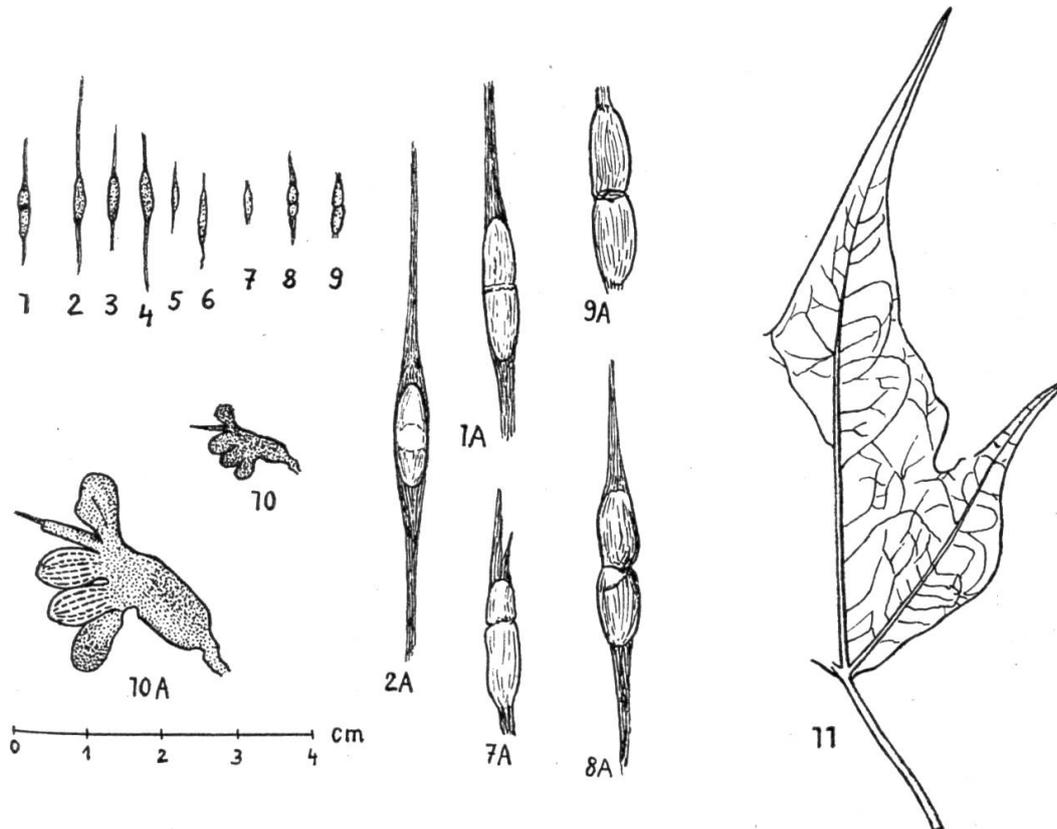


Fig. 6. — *Catalpa tenuiloba* (Saporta) Paclt; 1-6, seeds of SAPORTA'S species *C. microsperma*; 7-9, seeds of «*C. palaeosperma*» of the same author; 10, blossom of SAPORTA'S «*Jasminum palaeanthum*»; 11, leaf of SAPORTA'S «*Sterculia tenuiloba*»; 1A, 2A, 7A, 8A, 9A, 10A are enlargements of drawings 1, 2, 7, 8, 9, 10 respectively (After SAPORTA).

In comparison with the *Bignoniaceae* above mentioned, the genus *Paulownia* of the family *Scrophulariaceae*, to which attention is paid in my study because of its resemblance in habit with *Catalpa*, seems to be geologically more recent. It is represented first—as far as I know—in the Pliocene (cf. LAURENT in *Ann. Mus. Hist. nat. Marseille, Géol.*, 9 : 239, 1904-05).

Descriptions

1. ***Catalpa tenuiloba*** (Saporta) Paclt, comb. nov. = *Sterculia tenuiloba* Saporta in *Ann. Sci. nat.*, 4, 17 : 273 (1862) [folium, tab. 10, fig. 2] ; id., *ibid.*, ser. 7, 10 : 61 (1889) = *Jasminum* (?) *palaeanthum* Saporta in *Ann. Sci. nat.*, ser. 5, 18 : 55 (1873) [flos, tab. 10, fig. 4] ; id., *ibid.*, ser. 7, 10 : 61 (1889) = *Catalpa microsperma* Saporta *Monde Plant.* : 241 (1879) [flos, fructus, semen, fig. 54] ; id. in *Ann. Sci. nat.*, ser. 7, 10 : 62 (1889) [semina, tab. 8, fig. 9-14] ; Schimper & Schenk in *Zittel Hdb. Palaeontol.* (2) : 780 (1890) = *Catalpa palaeosperma* Saporta in *Ann. Sci. nat.*, ser. 7, 10 : 62 (1889) [semina, tab. 8, fig. 7-8 and 15] ; Schimper & Schenk in *Zittel Hdb. Palaeontol.* (2) : 782 (1890) [Syn. nov.].

Folia petiolata, palmato-triloba, tenuiter acuminata, medio longissimo, nervatione radiata, nervis primariis 3, flexuosis, craspedodromis, nervatione secundaria camptodroma arcuum seriem disiectam sistentibus nervatione tertiaria indistincta. Floris corolla tubo brevi, limbi quinquepartiti laciniis patentibus, ovato obtusis, stylo, ut videtur, simplici filiformi exserto. Fructus parvus, siliquosus, rugosus. Semina minuta, compressa, elliptica vel arte ellipsoidea, hilo innotato vel transversim notato, lateraliterque emarginata, in appendicem pilosum, saepe angustissime elongatum, utrinque expansa. — Fig. 5-6.

Strata. FRANCE : Aix-en-Provence, Saint-Hippolyte. Upper Eocene.

Remarks. Found in the clays and marls rich in selenite and classified geologically as forming various parts of the Ludian.

2. ***Catalpa rugosa*** Reid & Chandler in *Cat. Cainoz. Plants Dept. Geol. Brit. Mus.* 1 : 128 (1926).

Semina similia iis *C. tenuilobae*, sed plerumque longiora. Caetera (capsula, flos, folium) ignota.

Strata. ENGLAND : Isle of Wight. Lower Oligocene.

Remarks. Found in the Bembridge series consisting of clays and marls rich in selenite and being classified as a part of the Lattorfian.

3. **Catalpa sp. n.**, aff. *ovatae* G. Don = *Catalpa ovata* Endô & Okutsu in *Bot. Zool. Tokyo* 7 : 573 (1939).

Strata. JAPAN : Sendai. Neogene.

Remarks. This is, no doubt, a new species. The differences between it and the recent *C. ovata* G. Don are unknown to me at the time of writing this paper.

B. LIVING FORMS

Catalpa Scopoli *Introd. Hist. natur.* : 170 (1777) ; Jussieu *Genera Plant.* : 138 (1789) ; DC. *Prodr.* 9 : 226 (1845) ; Bureau *Monogr. Bignon.* : 53 (1864) ; Pfeiffer *Nomencl. bot.* 1, 1 : 624 (1873) ; Bentham & Hooker f. *Genera Plant.* 2 : 1041 (1876) ; Lauche *Dtsche Dendr.*, ed. 2 : 145 (1883) ; Baillon *Hist. Plant.* 10 : 12 and 45 (1888) ; Dippel *Hdb. Laubholzkunde* 1 : 48 (1889) ; Koehne *Dtsche Dendr.* : 520 (1893) ; Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6 : 170 (1894) ; Schumann in *Engl. & Pr., Nat. Pflanzenfam.* 4, 3b : 234 (1895) ; Dode in *Bull. Soc.*

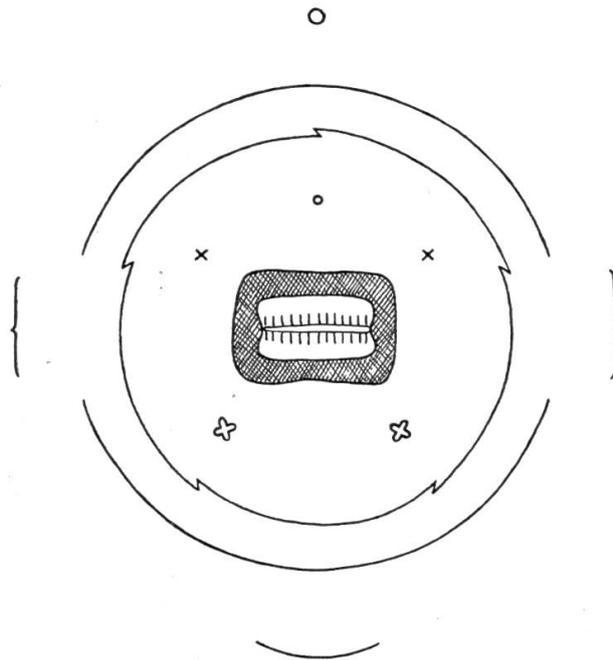


Fig. 7. — Diagram of *Catalpa* Scop. (Orig.)

dendr. France 1907 : 194 (1907) ; Rehder in *Sargent Plant. Wilson.* 1 : 304 (1912) ; Urban in *Ber. dtsh. bot. Ges.* 34 : 735 and 754 (1916) ; Sargent *Man. Trees N. Amer.*, ed. 2 : 870 (1921) ; Lemée *Dict. Genr.*

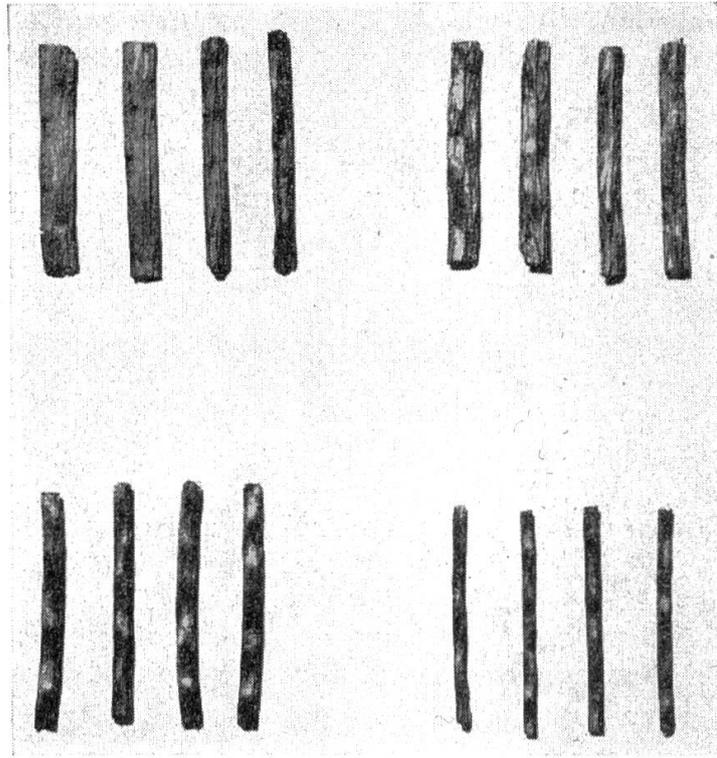


Fig. 8. — Transverse sections of the septa of some critical forms of *Catalpa*; *C. erubescens* Carr. (above left), *C. erubescens* var. *japonica* (Dode) Paclt (above right), *C. ovata* G. Don (below left) and *C. ovata* var. *flavescens* Bean (below right). (Orig.)

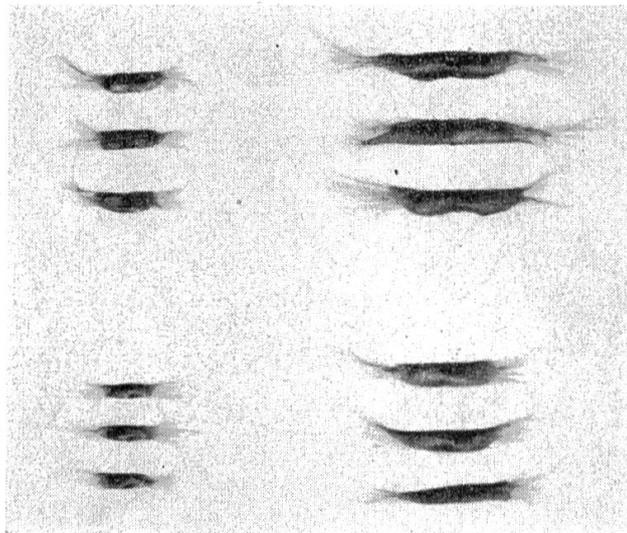


Fig. 9. — Seeds of some critical forms of *Catalpa*; *C. ovata* G. Don (above left), *C. erubescens* Carr. (above right), *C. ovata* var. *flavescens* Bean (below left) and *C. erubescens* var. *japonica* (Dode) Paclt (below right). (Orig.)

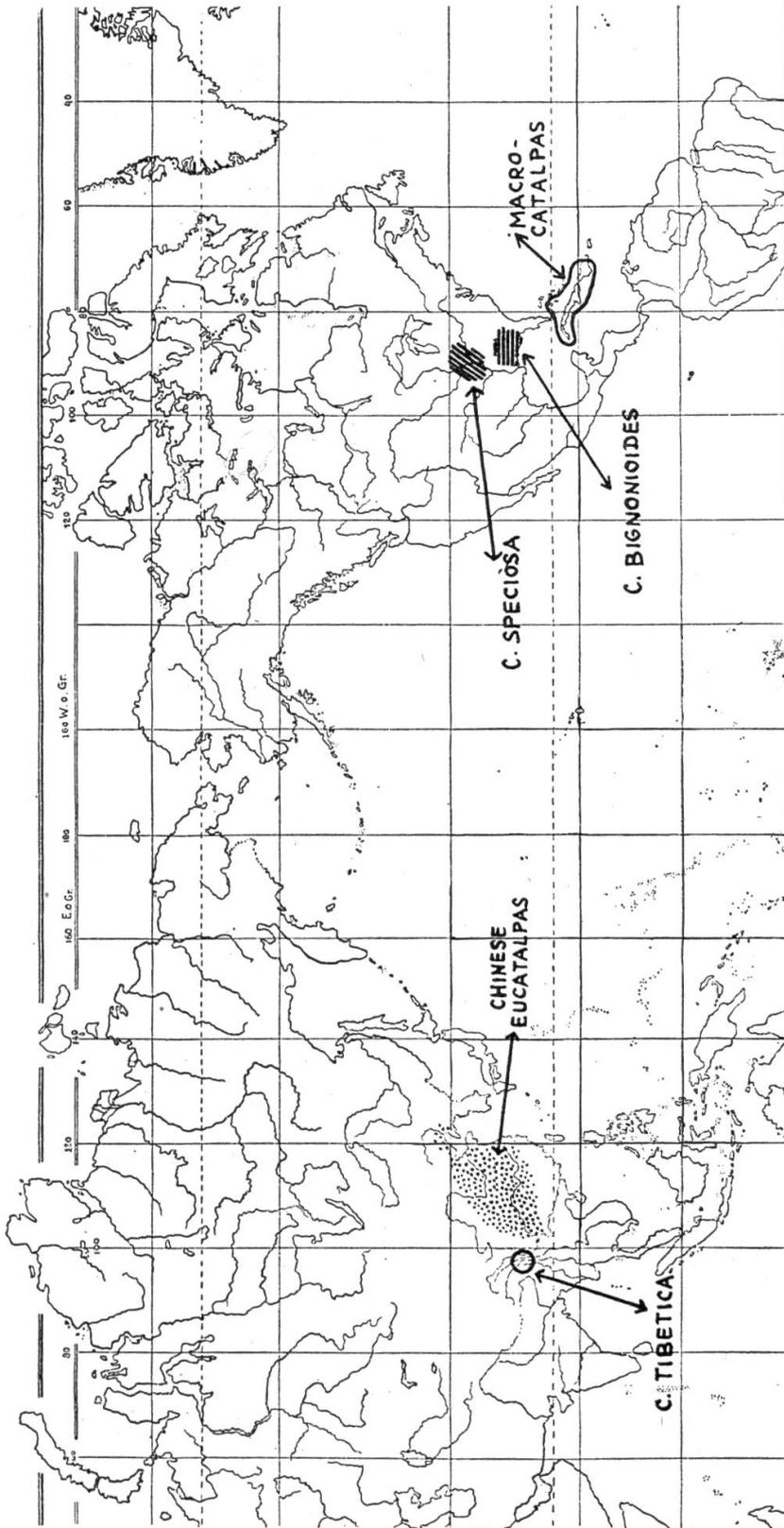


Fig. 10. — Areas of distribution of *Catalpa*. (Orig.)

Plant. Phanérog. 1 : 872 (1929) ; Rohrhofer in *Oesterr. bot. Zschr.* 80 : 4, 6, 7 and 21 (1931) ; Rehder *Man. cult. Trees Shrubs*, ed. 2 : 821 (1940) ; Lemée *Dict. Genr. Plant. Phanérog.* 8 B : 716 (1943) ; Rehder *Bibliogr. cult. Trees Shrubs* : 595 (1949) = *Bignonia* L. *Gen. Plant.*, ed. 5 : 273 (1754) [p. p.] = *Cumbalu* Adanson *Fam. Plant.* 2 : 199 (1763) = *Catalpium* Rafinesque *Princip. fond. Somiol.* : 27 (1814) ; id. in Robin & Raf. *Florula Ludov.* : 139 (1817) ; id. in *Amer. monthly Mag.* 4 : 190 (1819).

Typus generis : *Bignonia Catalpa* L. = *Catalpa bignonioides* Walter.

Plantae lignosae foliis simplicibus oppositis vel ternatim verticillatis. Inflorescentia axibus secundariis ramosis vel simplicibus (cf. tabulam terminologicam annexam). Calyx membranaceus, primum clausus subglobosus, dein bipartitus. Corolla gamopetala quinquefida tubo inflato, lobis margine sinuatis et undulatis, duobus posticis labium posticum constituentibus, tribus anticis labium anticum efformantibus. Stamina staminodiaque basi tubi inserta. Stamina antica 2, filamentis incurvis superne \pm conniventibus, antheris introrsis bilocularibus. Pollen tetradymum. Staminodia postica 3, lateralia filamentis longioribus. Ovarium ovato-ellipticum, biloculare. Placentae in utroque loculo 2, septo annatae. Ovula anatropa, horizontalia, in utroque loculo pluriseriata seriebus in longitudinem dispositis. Stylus linearis ovario longior. Stigma bilamellatum. Capsula valvis 2, septo contrariis. Septum cicatricibus minutis in depressionibus sparsis. Semina ∞ inordinate in capsulis imbricata, compressa, multo latiora quam longiora, alata alis lateralibus, forma varia, lanuginosa, hilo minimo. Embryo axile, endospermate destituto, cotyledonibus multo latioribus quam longioribus. — Hab. : Asia temperata, America septentrionalis et India Occidentalis (fig. 10).

Note. It is not surprising that a gradation between two kinds of inflorescence may be found in certain forms of *Catalpa*. As the terminology of the two inflorescence types is often confused in literature, it may be useful to compare the terms in question in the following table.

Tabula terminologica Catalpae inflorescentiae typorum

Typus axibus secundariis ramosis

... inflorescentia thyrsoformis seu paniculata

[errore i. corymbiformis (DODE, 1907) ; « corymbose inflorescence » (REHDER, 1912)]

Occurrit in *C. tibetica*, *C. ovata*, *C. bignonioidi*, *C. speciosa*, *C. longissima*, *C. purpurea*.

Typus axibus secundariis simplicibus

... inflorescentia corymbiformis seu racemosa

[errore i. thyrsiformis (DODE, 1907); « racemose inflorescence » (REHDER, 1912)]

Occurrit in *C. Bungei*, *C. Fargesii*, *C. brevipedes* (var.).

Mixtio typorum praecedentium axibus secundariis aut simplicibus aut ramosis.

Occurrit in *C. Fargesii* f. *Duclouxii*, *C. obovata*, *C. punctata*.

Enumeration of the recent forms

Catalpa Scopoli

Sectio I. **Eucatalpa** Paclt

1. *C. tibetica* Forrest
2. *C. ovata* G. Don
— var. *flavescens* Bean
3. *C. Bungei* C. A. Meyer
— — f. *heterophylla* C. A. Meyer
4. *C. Fargesii* Bureau
— — f. *Duclouxii* (Dode) Gilmour
5. *C. bignonioides* Walter
— — f. *Rehderi* Paclt
— — f. *nana* Bureau
— — f. *Koehnei* (Hesse) Dode
— — f. *aurea* Bureau
— — f. *variegata* Bureau
— — f. *pulverulenta* (G. Paul & f.) Bean
6. × *C. erubescens* Carrière (= *C. ovata* × *C. bignonioides*)
— — f. *purpurea* Dode
— var. *japonica* (Dode) Paclt
— — f. *adina* Paclt
7. *C. speciosa* (Warder ex Barney) Engelman
8. × *C. Galleana* Dode (= *C. ovata* × *C. speciosa*)

Sectio II. **Macrocatalpa** Grisebach

9. *C. longissima* (Jacquin) Dumont-Courset
10. *C. punctata* Grisebach
— — f. *pubescens* Grisebach
— var. *domingensis* (Urban & Ekman ex Urban) Paclt
— — f. *Urbanii* Paclt
11. *C. brevipes* Urban
— var. *oblongata* (Urban & Ekman ex Urban) Paclt
— var. *Ekmaniana* (Urban) Paclt

12. *C. obovata* Urban
 13. *C. purpurea* Grisebach
 — — f. *denticulata* (Urban) Paclt

Key to the species

- Leaves herbaceous, deciduous ; seeds bearing a tuft of long hairs on each end, otherwise nearly hairless.
- Flowers yellowish, striped inside yellow and spotted dark violet, composing paniculate inflorescences ; leaves mostly lobed.
- Leaves glabrous on the underside ; corolla 1,5-2,3 cm. long ; pods linear, produced at times in large numbers ; valvae of pods 4-5 mm. broad **C. ovata**
- Leaves pubescent on the underside ; corolla about 2,5 cm. long ; pods cylindric ; valvae of pods 12-13 mm. broad **C. tibetica**
- Flowers white or rosy-pink, striped inside yellow and spotted purplish brown, composing paniculate or racemose inflorescences.
- Flowers white in many-flowered panicles ; pods more or less cylindric, usually not longer than 40 cm. ; leaves more or less densely pubescent, with simple hairs, or nearly glabrous beneath.
- Corolla 4-5 cm. long ; leaves densely pubescent on the underside ; valvae of pods 13-18 mm. broad.
- Leaves usually unlobed, rarely lobed, nearly constant in form **C. speciosa**
- Leaves more or less lobed, very variable in form and size × **C. Galleana**
- Corolla 2,5-3,5 cm. long ; leaves more or less densely pubescent, and/or glabrous beneath ; valvae of pods 7-15 mm. broad.
- Valvae 9 mm. broad or more ; corolla 3-3,5 cm. long ; leaves more or less densely pubescent **C. bignonioides**
- Valvae usually less than 9 mm. broad ; corolla 2,5-3 cm. long ; leaves glabrous beneath or only slightly pubescent × **C. erubescens**
- Flowers more or less suffused with pink, composing nearly racemose inflorescences ; pods linear, frequently much longer than 40 cm. ; leaves tomentose or pubescent, with branched hairs, or glabrous beneath.
- Leaves either stellately downy or pubescent or glabrous on the underside ; valvae of pods 5-5,5 mm. broad **C. Fargesii**
- Leaves still glabrous beneath ; valvae of pods about 4 mm. broad **C. Bungei**
- Leaves subcoriaceous to coriaceous, semi-persistent ; seeds clothed dorsally with long hairs.
- Leaves elliptic-lanceolate ; valvae of pods about 3 mm. broad ; flowers white, striped inside yellow and spotted purplish brown **C. longissima**
- Leaves broadly elliptic or ovate or obovate ; valvae of pods 4-5 mm. broad.
- Corolla up to 2 cm. long ; leaves nearly smooth or netted-veined on the upside.

- Leaves mostly smooth or only a little netted-veined on the upside **C. punctata**
 Leaves usually pronouncedly netted-veined on the upside . . . **C. brevipes**
 Corolla more than 2,5 cm. long ; leaves still netted-veined on the upside.
 Leaves elliptic-ovate ; petioles up to 35 mm. long ; flowers pink, striped and
 spotted inside **C. purpurea**
 Leaves obovate ; petioles up to 7 mm. long **C. obovata**

Sectio I. — **Eucatalpa** Paclt

Paclt in *Věda přír.* **22** : 61 (1943) ; id. in *Ber. schweiz. bot. Ges.* **57** : 115 (1947) = *Extra-tropicae* Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, **6** : 174 and 175 (1894) = *Thyrsoideae* + *Corymbosae* Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, **6** : 174, 175 and 195 (1894) ; Schneider *Ill. Hdb. Laubholzkd.* **2** : 623 and 626 (1911) ; Paclt in *Věda přír.* **22** : 63 (1943) ; id. in *Ber. schweiz. bot. Ges.* **57** : 115 (1947).

TYPUS SECTIONIS : *Catalpa bignonioides* Walter.

Plantae lignosae foliis caducis lamina molliter herbaceis, seminibus alis lateralibus in pilos longos solutis, sed non dorso lanuginosis. Hab. : Asia temperata et America septentrionalis.

1. **Catalpa tibetica** Forrest in *Not. roy. bot. Gard. Edinb.* **13** : 155 (1921).

Frutex foliis quoad formam magnitudinemque iis *C. ovatae* similibus, supra glabrescentibus, subtus molliter pubescentibus. Inflorescentiae forma ei *C. ovatae* congruit, calycibus 8-9 mm. longis, corollis 2,5 cm. vel paulo ultro longis. Capsulae 13-18 cm. longae, valvis 1,2-1,3 cm. latis. Semina quam in *C. ovata* duplo majoria, 15-25 mm. lata ¹, 3-6 mm. longa.

TYPE : *Forrest* 18950, 18926 (Asia — Tibet) ; in hb. E ! ²

¹ Semina semper sine pilis metior.

² The herbarium abbreviations, indicating where specimens are deposited, are as proposed in the report « On the standardization of herbarium abbreviations » published in the *Chronica bot.* **5** : 142-150 (1939). Only those where special mention of specific collections has been found necessary are listed below :

- B. Botanisches Museum, Herbarium Krug & Urban, Berlin-Dahlem.
 PR. Národní museum, Bot. oddělení, Herbarium Paclt, Praha (Czechoslov.).
 PRCD. Botanický ústav Karlovy university, Praha (Czechoslovakia).
 S. Naturhistoriska Riksmuseet, Bot. avdeln., Herbarium Regnell, Stockholm (Sweden).
 UPS. Botaniska Museet, Uppsala Universitet, Herbarium Thunberg, Uppsala (Sweden).

DISTRIBUTION. — TIBET, Salween-Kiu-chiang, Tsarong, in mixed forests, 28° 40' N. lat., 98° 15' E. long., *Forrest* 18950 in hb. E!, K.; *Forrest* 18926 in hb. E!, in fruit.

2. **Catalpa ovata** G. Don *Gen. Syst. Gard. Bot.* 4: 230 (1837); Schneider *Ill. Hdb. Laubholzkd.* 2: 625 (1911); id., *ibid.* 2: 1054 (1912); Rehder in *Sargent, Plant. Wilson.* 1: 303 (1912); id. in *Bailey Standard Cycl. Hort.* 2: 684 (1914); *Bean Trees Shrubs brit. Isl.* 1: 313 (1914); *Bailey Gentes Herb.* 1: 6 and 44 (1920); Nakai *Fl. sylv. Kor.* 14: 79 (1923); Rehder *Man. cult. Trees Shrubs*: 791 (1927); *Chow Familiar Trees Hopei*: 366 (1934); Börner *Laubgehölze*: 345 (1938); Schenck *Fremdländ. Wald- u. Parkbäume* 3: 182 (1939); Rehder *Man. cult. Trees Shrubs*, ed. 2: 821 (1940); Paclt in *Ber. schweiz. bot. Ges.* 57: 121 (1947) [in fig. 4 series superiora ad varietatem *flavescentem* pertinet]; Teng in *Bot. Bull. Acad. Sinica* 1: 191, 241, 242 (1947) = *Bignonia catalpa* Thunberg *Fl. Jap.*: 251 (1784) = *Catalpa bignonioides* β ? *Kaempferi* DC. *Prodr.* 9: 226 (1845) = *Catalpa Kaempferi* Siebold & Zuccarini in *Abh. phys.-math. Cl. Akad. München* 4, 3: 142 (1846); Miquel in *Ann. Mus. bot. Lugd.-Bat.* 3: 122 (1867); *Sargent Silva N. Amer.* 6: 84 (1894); Mouillefert *Traité Arbr. Arbriss.*: 932 (1896); Penhallow in *Amer. Natural.* 39: 120 (1905); *Shirasawa Icon. Ess. forest. Jap.* 2: tab. 71 (1908); Garman in *Kentucky agr. exp. Sta. Bull.* 164: 218 (1912) [excl. fig. 5 c]; Urban in *Ber. dtsh. bot. Ges.* 34: 754 (1916); *Traverso Bot. Ortic.*: 767 (1926); L. Späth *Späth-Buch (1720-1930), Laubgehölze*: 207 (1930) = *Catalpa Bungei* Decaisne in *Rev. hortic.*, ser. 3, 5: 406 (1851); Jacques in *Fl. Serres* 10: 188 (1855) [floris descr.]; Mouillefert *Traité Arbr. Arbriss.*, Atlas tab. 17 (1892-98) = *Catalpa Henryi* Dode in *Bull. Soc. dendr. France* 1907: 199 (1907); Schneider *Ill. Hdb. Laubholzkd.* 2: 625 (1911).

Vernacular names. See Appendix (Oriental names of Catalpas).

Arbor foliis deltoideis vel cordatis, acuminatis, basi cordatis, aut margine integris, aut lobatis lobis lateralibus 1-5, junioribus utrinque puberulis, subtus adultis glabrescentibus, glandulosis maculis \pm bruneis. Inflorescentia thyrsiformis, calycibus labiis integris, corollis pallide flavicantibus cum maculis flavis et purpureis 2-2,3 cm. longis. Capsulae lineares usque 32 cm. longae, valvis 4-5 mm. latis. Semina elliptica 8-10 mm. lata, 2,5-3 mm. longa.

TYPE: *Thunberg* [« *Bignonia Catalpa* » α , β , δ] (Japan, cult.) in hb. UPS!

DISTRIBUTION. — CHINA: Prov. Liaoning: without locality (teste Chow). — Prov. Hopeh: Western Hills and Pei An-ho near Peiping, T'a Fang-shan of the Fang-shan Hsien (teste Chow). — Prov.

Shantung : Meng-shan, Fei Hsien, alt. 700 m., *Cheo & Yen 245* in hb. G ! [Delessert]. Lau-shan, *F. N. Meyer 296* in hb. A. and K. — Prov. Honan : Chi-kung-shan (teste Bailey). — Prov. Hupeh : Ichang, alt. 600-1000 m., *E. H. Wilson 2198*, p.p. in hb. A., BM. and K. ; *Henry 1391* in hb. P !, BM. and K. ; *Henry 1684* in hb. P ! and G ! [Boissier]. Chang-lo Hsien and Hsing-shan Hsien, alt. 800 m., *E. H. Wilson 2198*, p.p. in hb. A., BM. and K. Chi-kung-shan (teste Bailey). Paokang Hsien, *E. H. Wilson 1631* in hb. A. and K. — Prov. Hunan : Yang-shan, Changning Hsien, alt. 560 m., *Fan & Li 356* in hb. A., BM., G ! [Delessert] and L ! [= 836-26]. — Prov. Kweichow : Chenyuan, *Bodinier 2309* in hb. P ! — Prov. Kansu : without locality (teste Teng). — Unclassified materials ; *Baenitz* in hb. G ! [Delessert] ; *Ching 2887* in hb. K ; *A. De Candolle* in hb. G ! [Delessert] ; *Faurie 880, 1170, 1205, 7460* in hb. P ; *Hugh* in hb. BM ; *Isiba* in hb. G ! [Delessert] ; *Koehne 192* in hb. G ! [Delessert] ; *Licent 2941* in hb. K ; *Maire* in hb. G ! [Delessert] and K ; *Maximowicz* in hb. G ! [Delessert atque Boissier], K., L ! [= 836-20] and P ! ; *F. N. Meyer 1724* in hb. K ; *Mills 168* in hb. K ; *Oldham 632* in hb. K., L ! and P ! ; *Oldham 782* in hb. G ! [Boissier] ; *Paclt 12* in hb. PR ! ; *Read 1148* in hb. BM ; *Savatier 2091* in hb. P ; *Serre A 734* in hb. G ! [Delessert] ; *Thunberg* [« *Bignonia Catalpa* » α , β , δ = type] in hb. UPS ! ; *L. F. Tsu 715* in hb. K ; [No. 836-18, 19, 21, 22, 23, 24, 27, 28, 29, 30] in hb. L ! ; 7727, p.p. in hb. PRCD !

Remarks. The habitat of *C. ovata* is primarily China, where it may ascend to an altitude of 2500 m. (*Maire* in hb. G.). According to SARGENT (1894), the species was, brought at about the beginning of the Christian era by buddhist priests, introduced from China to Japan and since it is much planted there, especially around temples. Yet it is in Japan, where the supposed precursor of *C. ovata* in the Neogene was discovered (*Catalpa* sp. n., see Fossil Materials). The Tertiary flora of Japan being very different from the recent one, many of the fossil plants described from that country rather resemble living species from China and North America. Thus, the fossil species *Glyptostrobus europaeus* (Brongn.) Unger from Japan is related to living ones from China (*G. pensilis* K. Koch) and Alaska (*G. Ungeri* Heer). It is true that probably a much warmer climate existed in Japan during the Tertiary (cf. YOKOYAMA in *J. College Sci. imp. Univ. Tokyo* 32 : 1, 1911), but why these Japanese species of that epoch disappeared later on and continued to live in other regions, remains unexplained.

Key to the variety

Flowers creamy white (yellowish), 2-2,3 cm. long, septum about 2,5 mm. thick, seeds 8-10 mm. broad and 2,5-3 mm. long **C. ovata**

Flowers suffused markedly with yellow, 1,5-1,9 cm. long, septum about 1,6 mm. thick, seeds 6-7 mm. broad and about 2 mm. long var. **flavescens**

Var. **flavescens** *Bean Trees Shrubs Brit. Isl.* **1**: 313 (1914); Rehder *Man. cult. Trees Shrubs*, ed. 2: 822 (1940); id., *Bibliogr. cult. Trees Shrubs*: 595 (1949) (« forma »).

Arbor foliis iis formae typicae valde similibus, sed pallidioribus. Inflorescentia ut in *C. ovatae* forma typica, sed corollis expresse flavescens (colore affini ei pictae sub n° 320, E. Séguy, *Code universel des couleurs*, 1936), minoribus 1,5-1,9 cm. longis. Capsulae lineares usque 22 cm. longae, valvis 3-4 mm. latis. Semina elliptica 6-7 mm. lata, circa 2 mm. longa.

Remarks. A cultivated variety the origin of which is properly unknown. *Paclt* 7, 19, in hb. PR!; *Reuter* in hb. G! [Boissier—16, 17, 20, 21, 22 et etiam 10?]. The latter items (*Reuter*) have been collected at the Botanical Garden, Geneva, in 1863 and 1864! Since the species *C. ovata* was unknown to European gardeners before 1849 it may be concluded that the variety came to Europe from China.

3. **Catalpa Bungei** C. A. Meyer in *Bull. Acad. Sci. St. Pétersb.* **2**: 49 (1837); DC. *Prodr.* **9**: 226 (1845); Franchet in *Nouv. Arch. Mus. Paris*, ser. 2, **6**: 100 (1883); id. in *Mém. Soc. Sci. natur. Cherbourg* **24**: 236 (1884); Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, **6**: 197 (1894); Mouillefert *Traité Arbr. Arbriss.*: 934 (1896) [excl. Atlas tab. 17, (1892-98)]; Dode in *Bull. Soc. dendr. France* 1907: 202 (1907) [p.p.]; Schneider *Ill. Hdb. Laubholzkd.* **2**: 626 (1911); Rehder in *Bailey Standard Cycl. Hortic.* **2**: 685 (1914); *Bean Trees Shrubs Brit. Isl.* **1**: 312 (1914); Urban in *Ber. dtsh. bot. Ges.* **34**: 754 (1916); Rehder *Man. cult. Trees Shrubs*: 792 (1927); Chow *Familiar Trees Hopei*: 368 (1934); Schenck *Fremdländ. Wald- u. Parkbäume* **3**: 179 (1939); Rehder *Man. cult. Trees Strubs*, ed. 2: 822 (1940); Teng in *Bot. Bull. Acad. Sinica* **1**: 191, 241 and 242 (1947); Komarov *Opera Selecta* **2**: 71 and 72 (1947) (index p. 372 « *C. sinensis* ») = *Catalpa syringifolia* Bunge in *Mém. Div. Sav. Acad. Sci. St. Pétersb.* **2**: 119 (1835).

Vernacular names. See Appendix (Oriental names of *Catalpas*).

Arbor foliis ovato-subtriangularibus vel trapeziformibus, acuminatis, basi ± cordatis, margine integris, subtus glabris vel minute ad nervos puberulis. Inflorescentia corymbiformis pauciflora, calycibus labiis plurimucronatis, corollis ± roseis cum maculis bruneo-purpureis et flavis 3,0-3,2 cm. longis. Capsulae lineares usque 100 cm. longae (an usque 150 cm.? — teste Dode), valvis circiter 4 mm. latis. Semina elliptico-linearum 10 mm. lata, 1 mm. longa.

TYPE : *Bunge*, p.p. (China borealis) in hb. LE.

DISTRIBUTION. — CHINA : Prov. Shantung : without locality (teste Chow). — Prov. Hopeh : near Peiping, *Bunge*, p.p. in hb. LE. and G ! [Boissier — 15] and K ; *Bretschneider* in hb. BM ! ; Western Hills near Peiping, T'a Fang-shan of the Fang-shan Hsien (teste Chow) ; Tsing-yuan near Peiping, *Licent* 1034 in hb. BM. and P. — Prov. Shansi : Feng-men K'ou, *Licent* 1727 in hb. BM., K. and P. — Prov. Honan : without locality (teste Chow). — Prov. Shensi ; without locality (teste Chow, Komarov). — Prov. Kansu ; without locality (teste Teng). — Unclassified materials ; *Bretschneider* 150, 567 in hb. K ; *Carles* 544 in hb. K ; *Hancock* 38 in hb. K ; *Licent* 1333 in hb. BM ; *Liu* 335 in hb. K.

Remarks. The species is usually confounded with *C. ovata*. To avoid further confusion, all sources where a discreditable mention appears, i.e. that *C. Bungei* has "yellowish green" flowers, are disregarded and omitted in the above list of references. *C. Bungei* is rarely cultivated outside China.

Key to the form

Leaves mostly unlobed **C. Bungei**
 Leaves mostly lobed f. **heterophylla**

Forma **heterophylla** C. A. Meyer in *Bull. Acad. Sci. St. Pétersb.* 2: 49, 1937 («β»); DC. *Prodr.* 9: 226 (1845) («β»); Rehder in *Bailey Standard Cycl. Hort.* 2: 685 (1914); id., *Man. cult. Trees Shrubs*: 792 (1927); id., *ibid.*, ed. 2: 822 (1940) = *Catalpa heterophylla* Dode in *Bull. Soc. dendr. France* 1907: 203 (1907).

Arbor foliis deltoideis, longe caudato-acuminatis, basi truncatis, irregulariter dentatis vel lobatis, rarius integris, omnino glabris; caetera similia ut in forma typica.

TYPE : *Bunge*, p.p. (China borealis) in hb. LE.

DISTRIBUTION. — Occurring together with the typical form, especially in cultivation. Thus, it has been collected near Peiping (*Bunge*, p.p. in hb. LE and G ! [Boissier — 18] and K ; *David* in hb. BM., cult. ; *Fischer* in hb. G ! [Delessert], cult.) and at the Botanical Garden in St. Pétersbourg ([No. 836-15] in hb. L !, cult.).

4. **Catalpa Fargesii** Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 195 (1894); Dode in *Bull. Soc. dendr. France* 1907: 204 (1907);

Schneider *Ill. Hdb. Laubholzkd* 2: 627 (1911); Rehder in *Sargent Plant. Wilson*. 1: 305 (1912); id. in *Bailey Standard Cycl. Hortic.* 2: 685 (1914); *Bean Trees Shrubs Brit. Isl.* 1: 313 (1914); Rehder *Man. cult. Trees Shrubs*: 792 (1927); Schenck *Fremdländ. Wald- u. Park-bäume* 3: 181 (1939); Rehder *Man. cult. Trees Shrubs*, ed. 2: 822 (1940) = *Catalpa vestita* Diels in *Engler Bot. Jahrb.* 29 [= 1900]: 577 (1901); Rehder in *Sargent Plant. Wilson*. 1: 305 (1912); Urban in *Ber. dtsh. bot. Ges.* 34: 754 (1916) = *Catalpa Bungei* var. *intermedia* Pampanini in *Nuov. Giorn. Bot. Ital.*, ser. n., 17: 715 (1910) [Syn. nov.] = *Catalpa Duclouxii* W. J. B. in *Gardener's Chron. London* 67: 303 (1920).

Arbor foliis ovali-ovatis vel deltoideo-cordatis, acuminatis, basi subcordatis vel truncatis vel cuneatis, margine integris vel interdum lobatis parvis lobis lateralibus 2 rarissime 1, subtus \pm dense pubescentibus. Inflorescentia corymbiformis, corollis roseis cum maculis bruneo-purpureis et flavis circa 3,2 cm. longis. Capsulae lineares usque 55 cm. longae, valvis 5,5 mm. latis. Semina elliptico-linearia 9 mm. lata, 2,5 mm. longa.

TYPE: *Farges 495*, p.p. (China — Szechwan) in hb. P!

DISTRIBUTION. — CHINA: Prov. Hupeh; Fang Hsien, alt. 1000-1300 m. *E. H. Wilson 636* in hb. A., BM. and K.; Hsing-shan Hsien, alt. 1300 m. *E. H. Wilson 748* in hb. A., BM. and K.; *E. H. Wilson 4556* in hb. A.; along Yang-tze Kiang, alt. 700 m., *Silvestri 2221* in hb. K. and P! (“*C. bungei* var. *intermedia*”). — Prov. Szechwan; without locality, *Farges 495*, p.p. in hb. P!; *Henry 5856 A* in hb. A. and K., transitio ad f. *Duclouxii*. — Unclassified materials (including those of f. *Duclouxii*); *Cavalerie 101, 175* in hb. K; *Chanet 532* in hb. BM., K. and L! [= 836-16]; *Ducloux 384* in hb. K; *Giraldi* in hb. K; *Hers 568* in hb. K; *Hosie* in hb. K; *Jackson* in hb. BM; *Licent 3038* in hb. K; *F. N. Meyer 1708* in hb. K; *Monbeig* in hb. K.

Key to the form

Leaves stellately downy or pubescent on the lower surface **C. Fargesii**
 Leaves glabrous on the lower surface f. **Duclouxii**

Forma **Duclouxii** (Dode) Gilmour in *Curtis Bot. Mag.* 159, tab. 9458 (1936); Rehder *Man. cult. Trees Shrubs*, ed. 2: 823 (1940) = *Catalpa Duclouxii* Dode in *Bull. Soc. dendr. France* 1907: 201 (1907); id., *ibid.* 1909: 154 (1909); Schneider *Ill. Hdb. Laubholzkd* 2: 625 (1911); id., *ibid.* 2: 1054 (1912); Rehder in *Sargent Plant. Wilson*. 3: 433 (1917); *Bailey Gentes Herb.* 1, fasc. 1: 44 (1920); Rehder *Man.*

cult. Trees Shrubs: 792 (1927); Börner *Laubgehölze*; 344 (1938); Schenck *Fremdländ. Wald- u. Parkbäume* 3: 180 (1939) = *Catalpa sutchuenensis* Dode in *Bull. Soc. dendr. France* 1907: 204 (1907); Schneider *Ill. Hdb. Laubholzkd* 2: 627 (1911); L. Späth *Späth-Buch (1720-1930), Laubgehölze*; 207 (1930) = *Catalpa Fargesii* Wilson *Arn. Arbor. Exped. China, 1910-11, fig. No. 0192 (1912).*

Arbor foliis etiam junioribus subtus paene glabris a forma typica *C. Fargesii* praesertim diversa. Inflorescentia corymbiformis vel thyrsiformis. Capsulae usque 60 cm. longae; valvis quam in *C. Fargesii* forma typica angustioribus?

TYPE: *Delavay 3352* (China — Yunnan) in hb. P!

DISTRIBUTION. — CHINA: Prov. Hupeh; Fang Hsien, alt. 1200-1400 m., *E. H. Wilson 640*, p.p. in hb. A., BM. and K. — Prov. Szechwan; South Wushan, *E. H. Wilson 976* in hb. A. and K.; Wushan Hsien, *Henry 5856* in hb. A., BM. and K. ("Elaeococca cordata Muell. Arg."); Ching-chi Hsien, alt. 1000 m., *E. H. Wilson 640*, p.p. in hb. A. and K.; without locality, alt. 900 m., *E. H. Wilson 4289* in hb. A., BM. and K.; without locality (*Farges 495*, p.p. in hb. P!). — Prov. Yunnan; Mo-so Yu, *Delavay 3352* in hb. P!; prope Yunnansen, *Ducloux 187* in hb. P!; prope Yunnan, ad pagodas, alt. 1900 m., *Schoch 2* in hb. G! [Delessert] and K., cult. ?; prope Haut-Mékong, *Soulié 1422* in hb. P!; Tali valley, 25° 40' N. lat., alt. 2000-2500 m., *Forrest 4679* in hb. E! and BM.; Tengyueh valley, 25° N. lat., alt. ca. 1700 m., *Forrest 7490* in hb. E! and K. — Unclassified materials; see under *C. Fargesii*.

5. ***Catalpa bignonioides*** Walter *Fl. Carol.*: 64 (1788); DC. *Prodr.* 9: 226 (1845); Gray *Man. Bot. N. U. States* ed. 2: 279 (1856); Bureau *Monogr. Bignon.*, Atlas tab. 25 (1864); Gray *Synopt. Fl. N. Amer.* 2 (1): 319 (1878) [p.p.]; Sargent in *Gdnr's Chron.* (ser. n.) 12: 784 (1879); id. in *Rep. Forest N. Amer.* (10): 115 (1884); Gray *Synopt. Fl. N. Amer.* 2, 1, Suppl.: 456 (1886); Millspaugh *Amer. Med. Plants*, tab. 109 (1887); Gray *Man. Bot. N. U. States* (ed. 6): 399 (1890); Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 175 (1894); Mouillefert *Traité Arbr. Arbriss.*: 931 (1896); Lochman *Phot. Med. Plants*, tab. 198, (1898); Rehder in *Bailey Cycl. Amer. Hortic.* 1: 258 (1900); Fiori & Paoletti *Icon. Fl. Ital.* 2: 362 (1902); id., *Fl. Ital.* 3: 487 (1903-04); Penhallow in *Amer. Natural.* 39: 126 (1905); Dode in *Bull. Soc. dendr. France* 1907: 194 (1907); Schneider *Ill. Hdb. Laubholzkd* 2: 623 (1911); Garman in *Kentucky agr. exp. Sta. Bull.* 164: 213 (1912); Lamb in *Proc. Soc. Amer. Foresters* 7: 80 (1912); Otis *Michig. Trees*: 226 (1913); Rehder in *Bailey, Standard Cycl. Hortic.* 2: 684 (1914); Bean *Trees Shrubs Brit. Isl.* 1: 311 (1914); Urban in *Ber. dtsh. bot.*

Ges. **34** : 754 (1916) ; Sargent *Man. Trees N. Amer.*, ed. 2 : 871 (1921) ; Camus *Arbr. Ornem.* : 89 (1923) ; Traverso *Bot. ortic.* : 767 (1926) ; Rehder *Man. cult. Trees Shrubs* : 791 (1927) ; Börner *Laubgehölze* : 344 (1938) ; Schenck *Fremdländ. Wald- u. Parkbäume* **3** : 178 (1939) ; Rehder *Man. cult. Trees Shrubs*, ed. 2 : 822 (1940) ; Paclt in *Ber. schweiz. bot. Ges.* **57** : 121 (1947) = *Bignonia Catalpa* Linnaeus *Spec. Plant.* : 622 (1753) [excl. syn. P. Browne, Plumier, Kaempfer, Rheede] ; Catesby *Carol.*, ed. 3, **1** : 49 (1771) ; Lamarck *Encycl. Méth.*, Bot., **1** : 417 (1783) [excl. var. β] ; Aiton *Hort. Kew.*, ed. 1, **2** : 346 (1789) ; Gmelin in *Linnaeus, Syst. Natur.*, ed. 13, **2**, 2 : 940, 1791 ; Willdenow in *Linnaeus, Spec. Plant.*, ed. 4, **3**, 1 : 289 (1800) [excl. syn. Kaempfer] ; Vietz *Icon. Plant. Med. Oec. Techn.* **4**, tab. 334 (1817) = *Catalpa cordifolia* Mönch *Meth. Plant.* : 464 (1794) [excl. syn. Cumbalu Rheede] ; Nuttall *Genera N. Amer.* **1** : 10 (1818) ; Elliott *Sketch Bot. S. Carol. and Georgia* **1** : 24 (1821) = *Catalpa communis* Dumont-Courset *Botaniste Cultivateur*, ed. 1, **2** : 189 (1802) = *Catalpa ternifolia* Cavanilles *Descr. Plant. Lecc. Publ.* : 26 (1802) = *Catalpa syringifolia* Sims in *Bot. Mag.* **27** : sub no. 1094 (1806) ; Aiton *Hort. Kew.*, ed. 2, **1** : 24 (1810) ; Sprengel in *Linnaeus, Syst. Veg.*, ed. 16, **1** : 70 (1825) ; Loddiges *Bot. Club* **13** : tab. 1285 (1827) ; A. Dietrich in *Linnaeus, Spec. Plant.*, ed. 6, **1** : 451 (1831) ; G. Don *Gen. Syst. Gard. Bot.* **4** : 230 (1837) ; D. Dietrich *Synops. Plant.* : 82 (1839) ; Ovsjannikov *Listven. Porody*, ed. 2 : 250 (1930) ; L. Späth *Späth-Buch (1720-1930), Laubgehölze* : 207 (1930) = *Catalpium amena* [sic!] Rafinesque *Fl. Ludovic.* : 139 (1817) = *Catalpa arborea* Baillon in Payer *Leç. Fam. Natur. Plant.* : 214 (1872) = *Catalpa Catalpa* Karsten *Dtsche Fl. Pharm.-Med. Bot.* : 927 (1882) ; Sudworth in *Gard. and Forest* **2** : 166 (1889) ; Sargent *Silva N. Amer.* **6** : 86 (1894) ; Britton & Brown *Ill. Fl. N. St. and Canada* **3** : 199 (1898) ; Sargent *Man. Trees N. Amer.* : 794 (1905) ; Hough *Hdn. Trees N. St. and Canada* : 404 and 405 (1907) ; Britton & Shafer *N. Amer. Trees* : 833 (1908) ; Britton & Brown, *Ill. Fl. N. St. and Canada*, ed. 2, **3** : 238 (1913).

Vernacular names. Common Catalpa, Eastern Catalpa ; Catawba (name of the Indians of Carolina and Georgia—cf. “Catawba-River” in Carolina—of which “Catalpa” is a derivative) ; Indian Bean, Bean Tree, Smoking Bean ; Indian Cigar (p.p.) ; Bois Puant (p.p.) ; Trompetenbaum (Germ. ; p.p.) ; Brissagobaum, Bois trompette (Helv.) ; dohánylevéllii fa [= «tabakblättriger Baum»] (Hung.).

Arbor foliis cordatis vel cordato-ovatis, acuminatis, margine integris, rarius lobatis lobis lateralibus 1-2, subtus \pm dense et breviter pubescentibus. Inflorescentia thyrsiformis multiflora ramosissima, corollis pure albis cum maculis purpureis et flavis 3-3,5 cm. longis. Capsulae cylindricae usque 35 cm. longae, valvis 9-15 mm. latis. Semina longe elliptica 20-25 mm. lata, 4-7 mm. longa.

TYPE : *Linnaeus* [?] in hb. BM. (Herb. Hort. Cliffort.), actually missing.

DISTRIBUTION. — U.S.A. : Alabama. — Mississippi. — Louisiana. — Florida. — Georgia. — Unclassified materials ; *Augustin* 5112 in hb. BM. and G ! [Delessert] ; *Baenitz* 111 in hb. G ! [Delessert], L ! [= 836-6] and PRCD ! ; *Catesby* 1955 in hb. BM ; *J. Clark* in hb. BM ; *Eggleston* 4640, 4839 in hb. G ! [Delessert] ; *Dr. Friedley* in hb. G ! [Delessert] ; *E. Hall* in hb. G ! [Boissier] ; *Linnaeus* [?] in hb. BM. [= type] ; *Matthes* 61 in hb. G ! [Boissier] ; *Moricand* in hb. G ! [Delessert] ; *Paclt* 5, 14, 15 in hb. PR ! ; *Pavon* [?] in hb. G ! [Boissier] ; *Reuter* in hb. G ! [Boissier — 7, 8, 31, 32, 33] ; *Rugel* in hb. BM. and G ! [Delessert atque Boissier] ; *P. Simmler* in hb. G ! [Boissier — 35 ; “ C. Wallichiana ”] ; *Stuckert* 20369 in hb. G ! [Delessert] ; *Thunberg* [“ Bignonia Catalpa » γ] in hb. UPS ! ; *Vincent* in hb. G ! [Delessert] ; *Biltmore Herb.* 385 B in hb. BM., L ! [= 836-2] and PRCD ! ; [No. 836-1, 7, 9, 10, 11, 12, 13, 14] in hb. L ! ; *Herb. Chapman* in hb. G ! [Boissier].

Remarks. It is characterized by a smaller septum than in *C. speciosa*, the thickness of this being 4-7 mm. (average value 4,2 mm.) in *C. bignonioides*, and 5-9 mm. (average value 7,6 mm.) in *C. speciosa*.

Key to the forms

Leaves normally green all the season

Leaves almost unlobed ; petioles usually shorter than the midribs of the blades.

A tree or a shrub ; leaves \pm pubescent on the underside . . . **C. bignonioides**

A dense, round bush, sometimes grafted high ; leaves relatively small, only slightly pubescent on the underside f. **nana**

Leaves prominently lobed, with caudate points ; petioles frequently subequal to the midribs of the blades f. **Rehderi**

Leaves yellow in the spring, but becoming greenish to green as the season advances

f. **aurea**

Leaves dichromatic

Leaves greenish in the centre, with yellow margin f. **Koehnei**

Leaves blotched with yellowish white f. **variegata**

Leaves densely spotted with white f. **pulverulenta**

Forma **Rehderi** Paclt, f. nov.

Arbor foliis deltoideis, junioribus saepe elliptico-ovatis, longe caudato-acuminatis, plurimum lobatis lobis lateralibus 1-2 maximam partem tenuiter caudatis, acuminatissimis, majoribus petiolis longissimis

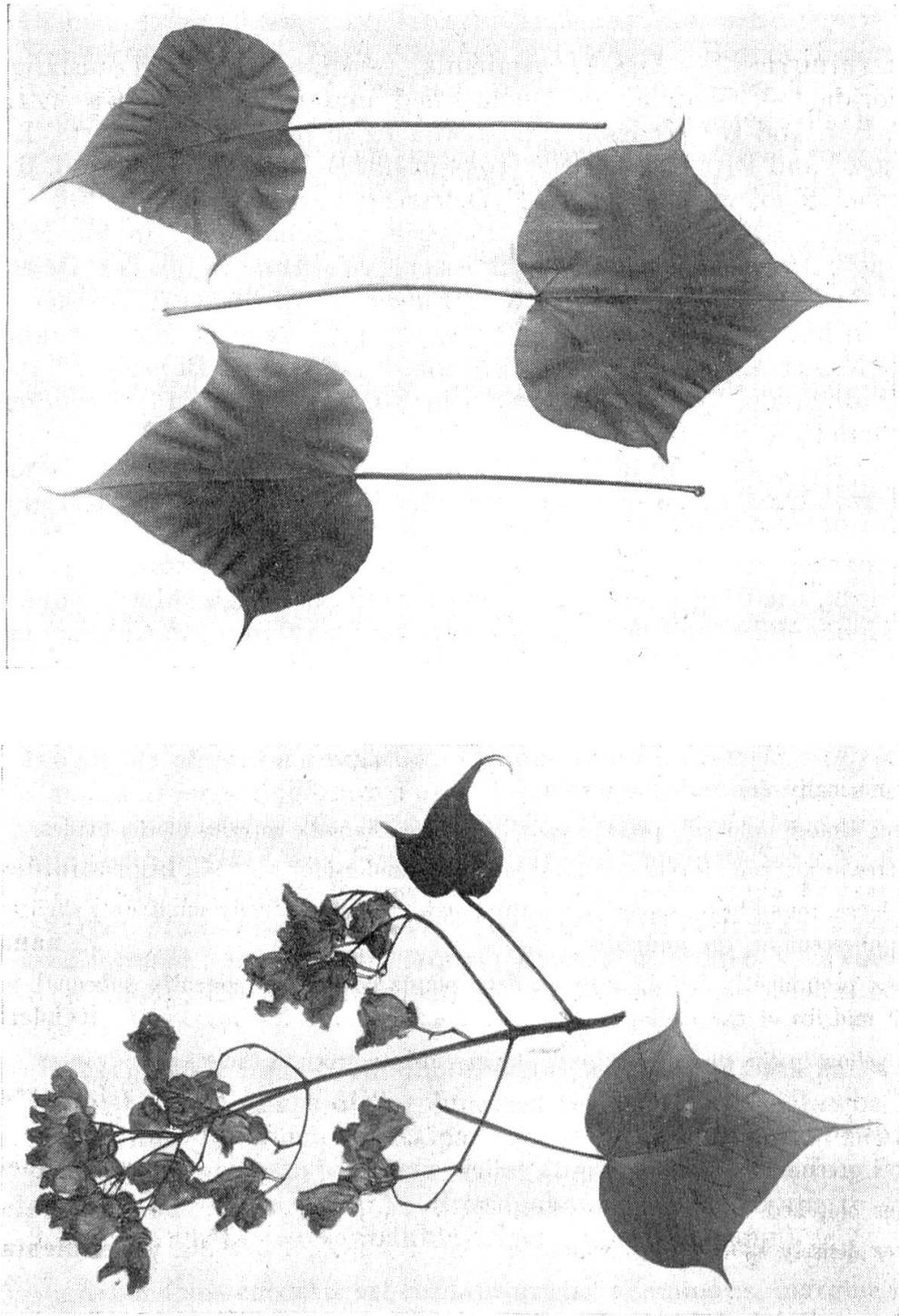


Fig. 11-12. — *Catalpa bignonioides* f. *Rehderi* Paclt. Průhonice near Prague.

(usque 155 mm.), nervis mediis petiolo frequenter brevioribus vel petiolum subaequantibus sicut 143 : 145 mm., 143 : 150 mm., 142 : 150 mm., 135 : 142 mm. — Fig. 11-12.

TYPE: *Paclt* 3 in hb. PR ! In cultura arboreti průhoniciani, Bohemia centr., dist. Praha ; alt. ca. 290 m., in solo humido.

Remarks. A new form which is named in honour of Professor Alfred Rehder of the Arnold Arboretum, Jamaica Plain, U.S.A., deceased on 21st July, 1949. The tree on which the description is based, is about 8 m. high and produces flowers, annually beginning in August.

Forma **nana** Bureau in *Nowv. Arch. Mus. Paris*, ser. 3, 6 : 183 (1894) (" δ "); Schneider *Ill. Hdb. Laubholzkd* 2 : 624 (1911) ; Rehder in *Bailey Standard Cycl. Hortic.* 2 : 684 (1914) ; Bean *Trees Shrubs Brit. Isl.* 1 : 312 (1914) ; Sargent *Man. Trees N. Amer.*, ed. 2 : 872 (1921) ; Rehder *Man. cult. Trees Shrubs* : 791 (1927) ; id., *ibid.*, ed. 2 : 822 (1940) = *Catalpa syringifolia nana* Hort. ex *Allg. Gart.-Ztg. (Otto & Dietrich)* 19 : 112 (1851) ; Hort. ex *Kirchner, Arbor. Musc.* : 520 (1864) ; Hort. ex Hartwig & Rümpler in *Vilmorin, Ill. Blumen-gärtnerei* 3, Suppl. : 135 (1875) ; Hort. ex Nietner & Rümpler in *Schmidlin, Gartenbuch*, ed. 4 : 217 (1887) ; L. Späth *Späth-Buch (1720-1930), Laubgehölze* : 207 (1930) = *Catalpa umbraculifera* Hort. ex Ugolini in *Bull. Soc. Tosc.ortic.* 13 : 330 (1888) = *Catalpa nana* Hort. ex Dode in *Bull. Soc. dendr. France* 1907 : 202 (1907) = *Catalpa Bungei* Hort. ex Dode in *Bull. Soc. dendr. France* 1907 : 202 (1907) ; Hort. ex Apgar *Ornam. Shrubs U.S.* : 283, fig. 492 (1910) ; Traverso *Bot. ortic.* : 789, fig. (cliché Ingegnoli) (1926).

Vernacular names. *Catalpa a ombrello* (Ital.) ; *Umbrella Catalpa*.

Planta lignosa (frutex vel arbor parva) a basi ramosissima ramis confertis rectis divergentibus, foliis quam in forma typica *C. bignonioidis* minoribus, subtus ad nervos minute pubescentibus. Planta fertilis vix nota. — Fig. 13.

Remarks. A dwarf form being propagated by grafting on the stems of one of the tree *Catalpas*. In 1875, HARTWIG & RÜMPLER, and, in 1887, NIETNER & RÜMPLER wrote respectively that it possesses flowers "tinged with blue" (*C. coerulescens* Hort. !). This is evidently an inexact observation. It rather seems that it has not yet flowered anywhere. However, even if it has been found in flower formerly in any cultivation, the colour of its flowers must have been different from a bluish colour. The form appeared in Europe for the first time in the nursery of Mr. Masson in France, who raised it some years before 1850. It is abundantly planted in U.S.A., where it serves for decoration of the popular "Italian gardens". *Plouvier* in hb. PR ! [*Paclt* — 16] ; *Paclt* 17 in hb. PR !

Forma **Koehnei** (Hesse) Dode in *Bull. Soc. dendr. France* 1907 : 206 (1907) ("ζ"); Schneider *Ill. Hdb. Laubholzkde* 2 : 624 (1911); *Bean Trees Shrubs Brit. Isl.* 1 : 312 (1914); Rehder *Man. cult. Trees Shrubs* : 791 (1927); id., *Man. cult. Trees Shrubs*, ed. 2 : 822 (1940)

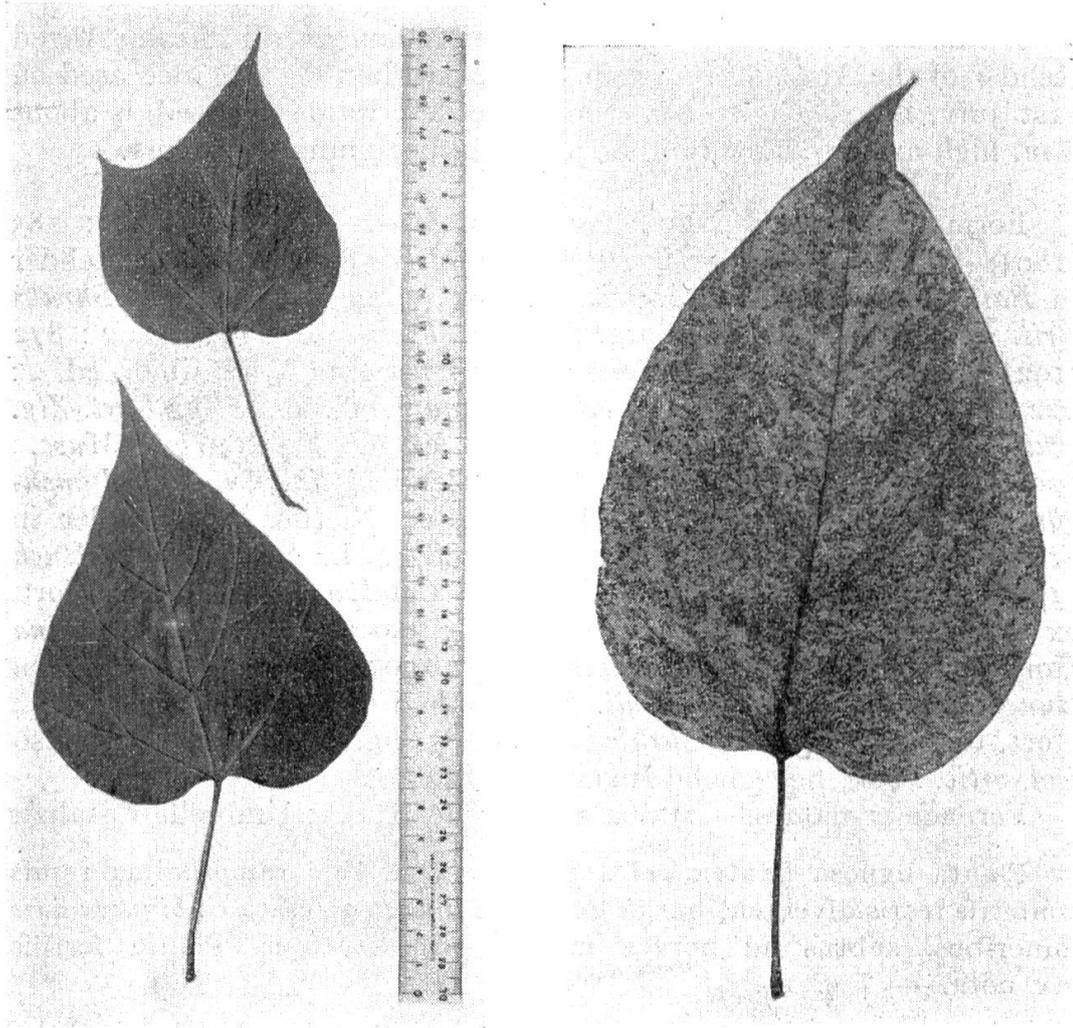


Fig. 13. — *Catalpa bignonioides* f. *nana* Bureau. Bot. Garden, Charles Univ., Prague (formerly cultivated). (Orig.).

Fig. 14. — *Catalpa bignonioides* f. *pulverulenta* (Paul & f.) Bean. Cultivated in France. (Orig.).

= *Catalpa syringifolia* **Koehnei** Hesse in *Gartenfl.* 52 : 47 (1903); Hübner in *Gartenwelt* 19 : 445 (1915) .

Arbor foliis pallide aureis postremo nonnihil virescentibus medio irregulariter ornatis magna macula viridi a forma typica *C. bignonioidis* diversa.

Remarks. A horticultural form.

Forma **aurea** Bureau in *Nouv. Arch. Mus. Paris* (ser. 3) **6**: 183 (1894) ("β"); Dode in *Bull. Soc. dendr. France* 1907: 206 (1907) ("β"); Schneider *Ill. Hdb. Laubholzkd* **2**: 624 (1911); Rehder in *Bailey Standard Cycl. Hortic.* **2**: 684 (1914); *Bean Trees Shrubs Brit. Isl.* **1**: 312 (1914); Rehder *Man. cult. Trees Shrubs*: 791 (1927); id., *ibid.*, ed. 2: 822 (1940) = *Catalpa syringifolia aurea* Hort. ex *Gdnr's Chron.*, 1871: 1322 (1871); Hort. ex L. Späth *Späth-Buch* (1720-1390), *Laubgehölze*: 207 (1930).

Arbor foliis omnino pallide aureis postremo virescentibus, sed etiamtum quam in forma typica *C. bignonioidis* pallidioribus

Remarks. A horticultural form. Its leaves become greenish to green as the season advances. Often planted. *Paclt* 13 in hb. PR!

Forma **variegata** Bureau in *Nouv. Arch. Mus. Paris* (ser. 3) **6**: 183, (1894) ("γ"); Dode in *Bull. Soc. dendr. France* 1907: 206 (1907) ("γ"); Schneider *Ill. Hdb. Laubholzkd* **2**: 624 (1911); *Bean Trees Shrubs Brit. Isl.* **1**: 312 (1914) = *Catalpa speciosa* var. *albo-variegata* Schwerin in *Mitt. dtsh. dendr. Ges.* **19**: 288 (1910); Schneider *Ill. Hdb. Laubgehölze* **2**: 1054 (1912).

Arbor foliis albo- vel flavovariegatis a forma typica *C. bignonioidis* diversa.

Remarks. A horticultural form. Due to the presence of a virus?

Forma **pulverulenta** (Paul & f.) *Bean Trees Shrubs Brit. Isl.* **1**: 312 (1914) = *Catalpa speciosa pulverulenta* Paul & Son ex *Gdnr's Mag. (Hibberd)* **53**: 30 (January 1908); idem ex W. T. in *Gardening Illustr.* **30**: 289 (July 1908); Rehder in *Bailey Standard Cycl. Hortic.* **2**: 684 (1914) (var.).

Arbor foliis cordatis vel elliptico-ovatis, apice in acumen angustum acutum desinentibus, raro lobatis, natu minimis viridibus, posteriorus ± dense lacteo-albo punctatis, subtus in vivo maculis violaceis sparsis. Flores vidi! — Fig. 14.

Remarks. I know of only one living specimen of this horticultural form; it is planted in France (Ecole d'Horticulture du Breuil, Vincennes, Seine). Caused by a virus also? *Plouvier* in hb. PR! [*Paclt* — 8, 9].

6. × **Catalpa erubescens** Carrière in *Rev. hortic.* 1869: 460 (1869); Dode in *Bull. Soc. dendr. France* 1907: 205 (1907) = *Catalpa hybrida* Hort. ex Späth in *Gartenfl.* **47**: 481 (1898); Schneider *Ill. Hdb. Laub-*

holzkd 2 : 625 (1911) ; Rehder in *Bailey Standard Cycl. Hortic.* 2 : 684 (1914) ; Sargent *Man. Trees N. Amer.*, ed. 2 : 872 (1921) ; Rehder *Man. cult. Trees Shrubs* : 791 (1927) ; Börner *Laubgehölze* : 345 (1938) ; Schenck *Fremdländ. Wald- u. Parkbäume* 3 : 179 (1939) ; Rehder *Man. cult. Trees Shrubs*, ed. 2 : 822 (1940) ; Smith in *Arn. Arbor. J.* 22 : 219 (1941) = *Catalpa Teasii* Penhallow in *Amer. Natural.* 39 : 134 (1905) = *Catalpa Teasiana* Dode in *Bull. Soc. dendr. France* 1907 : 205 (1907) ; Bean *Trees Shrubs Brit. Isl.* 1 : 314 (1914) = *Catalpa bignonioides* × *Kaempferi* Jones & Filley in *J. Hered.* 11 : 20 and 22 (1920).

Arbor foliis cordatis vel deltoideis, acuminatis, basi cordatis vel subtruncatis, frequenter lobatis lobis lateralibus 1-2, subtus adultis subglabrescentibus vel minute puberulis, glandulosis maculis virescentibus, non bruneis. Inflorescentia thyrsiformis multiflora, corollis pure albis cum maculis purpureis et flavis magnitudine variis plerumque 3 cm. longis. Capsulae ± anguste cylindricae usque 40 cm. longae, valvis 5-10 mm. (plurimum 7 mm.) latis. Semina longe attenuato-elliptica latitudine valde varia (circa 17 mm. lata), 3-4 mm. longa.

Remarks. A hybrid between *C. ovata* and *C. bignonioides*. Often cultivated both in Europe and North America. — *Paclt* 18 in hb. PR. ! ; *Sintenis* 193 in hb. BM. and G ! [Boissier] ; *Steele* in hb. G ! [Delessert — 26, 27] ; [No. 836-8] in hb. L !

Key to the lower categories

Leaves either normally green, or purple, or dark green ; flowers about 3 cm. long ; septum, average 4 mm. thick

Leaves green almost all the season × **C. erubescens**

Leaves, when young, purple to blackish, becoming dark green later × f. **purpurea**

Leaves of a clearer, more glossy green ; flowers about 2,5 cm. long ; septum, average 3,5 mm. thick

Flowers normal developed, with a quinquepartite androecium . . × var. **japonica**

Flowers with a quadripartite androecium, some elements of which are petaloid
× f. **adina**

× Forma **purpurea** Dode in *Bull. Soc. dendr. France* 1907 : 205 (1907) ("β") = *Catalpa syringifolia* var. *purpurea* Hort. ex *Wien. ill. Gart.-Ztg.* 11 : 40 (1886) = *Catalpa bignonioides* var. *purpurea* Hort. ex *Wien. ill. Gart.-Ztg.* 15 : 315 (1890) ; Hort. ex Rehder in *Bailey Cycl. Amer. Hortic.* 1 : 258 (1900) ; Schneider *Ill. Hdb. Laubholzkd* 2 : 624 (1911) = *Catalpa hybrida atropurpurea* Alb. Späth [Cat.] 124 : 88 (1907) ; L. Späth *Späth-Buch (1720-1930), Laubgehölze* : 206, 207 and 208 (1930) = *Catalpa speciosa* var. *atropurpurea* Hort. ex Schneider *Ill. Hdb. Laubholzkd* 2 : 625 (1911) = *Catalpa ovata* var.

purpurea Bean *Trees Shrubs Brit. Isl.* **1** : 313 (1914) = *Catalpa hybrida* var. *purpurea* Rehder in *Bailey Standard Cycl. Hortic.* **2** : 684 (1914) ; id., *Man. cult. Trees Shrubs* : 791 (1927) ; Börner *Laubgehölze* : 345 (1938) ; Rehder *Man. cult. Trees Shrubs*, ed. 2 : 822 (1940) ; id., *Bibliogr. cult. Trees Shrubs* : 595 (1949) ("forma") = *Catalpa ovata* var. *atropurpurea* Hort. ex Schenck *Fremdländ. Wald- u. Parkbäume* **3** : 182 (1939).

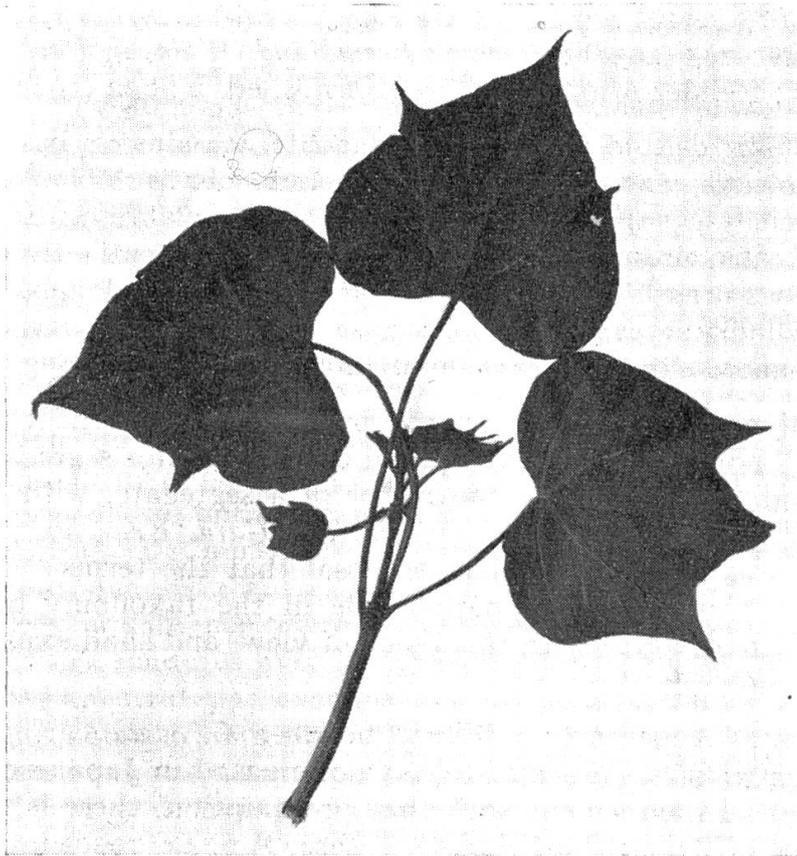


Fig. 15. — *Catalpa erubescens* f. *purpurea* Dode. Cultivated in France. (Orig.).

Arbor foliis praesertim junioribus atropurpureis postremo virescentibus, sed etiamtum quam in forma typica *C. erubescens* fuscioribus. — Fig. 15.

Remarks. This horticultural form is mentioned in *Wien. ill. Gart.-Ztg.* (1886 and 1890) as having been introduced in 1886 by A. Waterer in Philadelphia. However, from a letter from Prof. Rehder I understand that Waterer was an Englishman, while the well-known nursery-

man of Philadelphia was Thomas Meehan. The young leaves—*Plouvier* in hb. PR! [Paclt — 6] —, although having been collected only on August 15, still show a dark purple coloration, and some of them measure along their midribs 8 cm. from base to apex of the blade.

× Var. **japonica** (Dode) Paclt, comb. nov. = *Catalpa japonica* Dode in *Bull. Soc. dendr. France* 1907: 200 (1907); Schneider *Ill. Hdb. Laubholzkd* 2: 625 (1911); *Bean Trees Shrubs Brit. Isl.* 1: 313 (1914) = *Catalpa hybrida* var. *japonica* Rehder in *Bailey Standard Cycl. Hortic.* 2: 685 (1914); id., *Man. cult. Trees Shrubs*: 791 (1927); Börner *Laubgehölze*: 345 (1938); Schenck *Fremdländ. Wald- u. Parkbäume* 3: 179 (1939); Rehder *Man. cult. Trees Shrubs*, ed. 2: 822 (1940).

Arbor foliis deltoideis vel cordatis, acute acuminatis, basi cordatis vel subtruncatis, aut margine integris, aut lobatis lobis lateralibus 1-2 rarissime 3-4, supra nitidulis, subtus adultis glabrescentibus, glandulosis maculis virescentibus, non bruneis. Inflorescentia thyrsiformis, corollis niveis ornatis ut in *C. erubescens* circa 2,5 cm. longis. Capsulae anguste cylindricae usque 29 cm. longae, valvis 5-7 mm. latis. Semina longe attenuato-elliptica 11-13 mm. lata, 2,5-3,5 mm. longa.

General note. Recently, it was proposed to use the taxonomic term of a "nothomorph" as a special designation for segregates from hybrids and back-crosses of the F_1 , or of a segregate, with either of the parent species (*Bull. misc. Inform. bot. Gard. Kew*, no. 7, p. 321, 1939). It was also said in that proposal that the terms "variety" and "form" are properly inapplicable in the taxonomy of hybrid plants. I cannot agree with this point of view, and shall explain mine elsewhere.

Remarks. Apparently a hybrid between *C. ovata* var. *flavescens* and *C. bignonioides*. It seems to have originated in Japanese cultivation (Dode). In agreement with that presumption, there is, perhaps, the account of Bailey (*Gentes Herb.* 1, fasc. 1, p. 44, 1920) in which he referred to two specimens of "*C. hybrida* Spaeth" growing in a plantation in Shanghai (China). Now, it would be desirable to know whether they were the true *C. erubescens* or the var. *japonica*.

× Forma **adina** Paclt in *Ber. schweiz. bot. Ges.* 58: 381 (1948) (*ovata* × *bignonioides*).

Arbor floribus androecio constanter quadripartito staminodiis staminibusque per partes transformatis, rarius omnino petalisatis, filamentis libris vel corollae tubo coalescentibus a forma var. *japonicae* diversa.

TYPE: *Paclt* 11 in hb. PR!

Remarks. I know only two specimens of this double-flowered horticultural form. One is grown at Plzeň (Czechoslovakia), on which is based the original description (for details see the above mentioned paper), the other was observed in Paris in the park of the Buttes Chaumont (cf. *C. R. Acad. Sci. Paris* **224**: 672, 1947). The flowers possess a trend towards cleistogamy. It is of interest to note that the French specimen is much older than the Czech one, and in contradistinction to the latter, produces scarcely any fruits. Finally, I include below an unpublished description of the French tree which I received, in 1949, from Mr. Victor Plouvier of the Muséum d'Histoire Naturelle in Paris:

« Le filet des étamines porte une lame pétaloïde plus ou moins développée : la base souvent tubuliforme s'évase en un cornet parfois conique, parfois élargi en lame ondulée ou repliée ; dans les cas les plus typiques, elle prend l'aspect et la pigmentation d'un pétale : l'une de ses faces montre des ponctuations pourpres qui se retrouvent d'ailleurs sur les cornets et les tubes, même sur les filets. Plus rarement, des taches jaune-orangé viennent compléter l'apparence pétaloïde. Les étamines pétalisées peuvent se souder au tube de la corolle, compliquant ainsi sa forme primitive.

L'évolution staminale dans le sens pétaloïde n'est pas identique pour toutes les fleurs ni pour les 4 étamines d'une même fleur : on trouve tous les intermédiaires entre l'étamine non pétalisée et le pétale parfaitement constitué. De nombreuses fleurs montrent 2 étamines bien pétalisées alors que les 2 autres ont leur filet défaut. Les 4 étamines bien pétalisées ou l'absence totale de pétalisation sont des cas extrêmes plutôt rares. Les soudures avec la corolle sont irrégulières, non symétriques ; elles affectent par exemple une ou deux étamines pétalisées tandis que les autres restent libres. Les fleurs récoltées en 1944 présentaient de nombreux cas de soudure ; celles de 1949 ont été remarquées par le grand nombre de leurs pièces libres ».

Paclt 11 in hb. PR! ; *Plouvier* in hb. PR! [Paclt-10].

2. **Catalpa speciosa** (Warder ex Barney) Engelm. in *Bot. Gaz.* **5**: 1 (1880) ; Sargent *Rep. Forests N. Amer.* **10**: 115 (1884) ; St. Paul in *Jber. schles. Ges. vaterl. Kult.* **61**: 374 (1884) ; Gray *Synopt. Fl. N. Amer.* **2** (1), (Suppl.): 456 (1886) ; id., *Man. Bot. N. U. St.* ed. 6: 399 (1890) ; Carrière & André in *Rev. hortic.* **65**: 318 (1893) ; Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, **6**: 184 (1894) ; Sargent *Silva N. Amer.* **6**: 89 (1894) ; Mouillefert *Traité Arbr. Arbriss.*: 933 (1896) ; Britton & Brown *Ill. Fl. N. St. and Canada* **3**: 200 (1898) ; Rehder in *Bailey Cycl. Amer. Hortic.* **1**: 258 (1900) ; Green in *Bull. Ohio agr. Sta.* **149**: 74 (1904) ; id., *ibid.* **158**: 143 (1905) ; Penhallow in *Amer. Natural.* **39**: 124 (1905) ; Sargent *Man. Trees N. Amer.*: 795 (1905) ;

Hough *Hdb. Trees N. St. and Canada*: 406 (1907); Britton & Shafer *N. Amer. Trees*: 834 (1908); Schneider *Ill. Hdb. Laubholzkd* 2: 625 (1911); Pammel *Man. poison. Plants*: 740 (1911); Garman in *Kentucky agr. exp. Sta. Bull.* 164: 204 (1912); Lamb in *Proc. Soc. Amer. Foresters* 7: 80 (1912); Britton & Brown *Ill. Fl. N. St. and Canada*, ed. 2, 3: 238 (1913); Hayden in *Iowa geol. Surv. Bull.* 4: 634 (1913); Otis *Michig. Trees*: 224 (1913); Rehder in *Bailey Standard Cycl. Hort.* 2: 684 (1914); Bean *Trees Shrubs Brit. Isl.* 1: 311 (1914); Brown in *Mitt. dtsh. dendr. Ges.*, 1920: 80 (1920); Pellett *Amer. Honey Plants*: 60 (1920); Sargent *Man. Trees N. Amer.*, ed. 2: 872 (1921); Traverso *Bot. ortic.*: 768 (1926); Rehder *Man. cult. Trees Shrubs*: 791 (1927); Börner *Laubgehölze*: 344 (1938); Schenck *Fremdländ. Wald- u. Parkbäume* 3: 183 (1939); Rehder *Man. cult. Trees Shrubs*, ed. 2: 822 (1940); Paclt in *Ber. schweiz. bot. Ges.* 57: 121 (1947) = *Catalpa cordifolia* Jaume St. Hilaire in *Duhamel, Traité Arbr. Arbriss.*, ed. 2 [Nouv. Duhamel] 2: 13, (1804) [excl. syn. et loc.; nec *C. cordifolia* Mönch, 1794!]; Nuttall in *Trans. Amer. phil. Soc.*, ser. 2, 5: 139 (1837); Dode in *Bull. Soc. dendr. France* 1907: 195 (1907) = *Catalpa bignonioides* Lesquereux ex Owen in *Rep. geol. Surv. Arkansas* 2: 375 (1860) = *Catalpa bignonioides* var. *speciosa* Warder ex Barney in *Gard. Monthly* (Meehan) 20: 312 (1878); Barney *Add. Facts Inform. Catalpa Tree*: 21 (1878) (var?).

Vernacular names. Shawnee Wood; Bois Chavanon; Hardy Catalpa, Western Catalpa, Northern Catalpa, Early-flowering Catalpa; Indian Cigar (p.p.)

Arbor foliis cordatis vel subcordatis, late et longe acuminatis, margine integris, rarius lobatis lobis lateralibus 1-2, subtus molliter et dense pubescentibus. Inflorescentia thyrsiformis, corollis pure albis cum maculis purpureis et flavis 4-5 cm. longis. Capsulae cylindricae usque 55 cm. longae, valvis plerumque 13-18 mm. latis. Semina longe elliptica 20-35 mm. lata, 4-10 mm. longa.

TYPE: *Schneck* [?] (U.S.A.: Illinois); in hb. MO! (Herb. Engelmann).

DISTRIBUTION. — U.S.A.; Tennessee. — Arkansas. — Kentucky. — Missouri. — Illinois; On the Lower Wabash, Mount Carmel (*Schneck* (?) in hb. MO! and PR! [Paclt — 1] [= type]. — Indiana. — Unclassified materials; *Engelmann* in hb. MO!, G! [Delessert] and K; *Fiori 190* [lignum] in hb. G! [Delessert]; *Paclt 2* in hb. PR!; *Palmer 15320* in hb. K; *Rehder* in hb. K; *C. L. Tso 1381* in hb. K; *Herb. Univ. Nanking* in hb. K; [No. 836-35] in hb. L!; *Anon.* in hb. G! [Delessert — 6,7].

Remarks. *C. speciosa* flowers, as rule, two to three weeks earlier than *C. bignonioides*. *C. speciosa* seems to be less variable in cultivation.

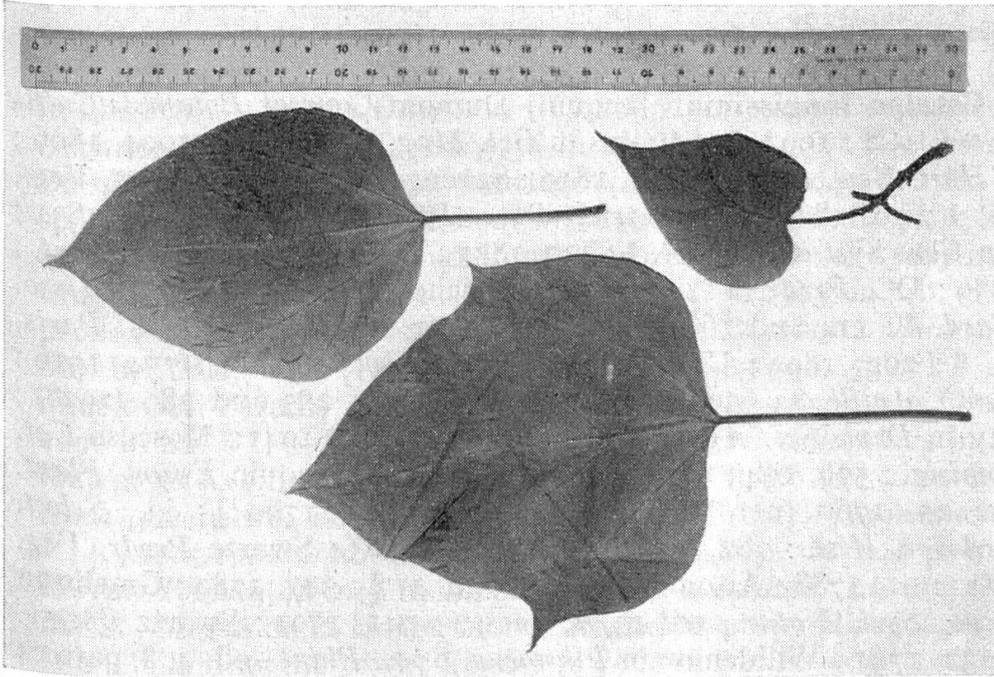
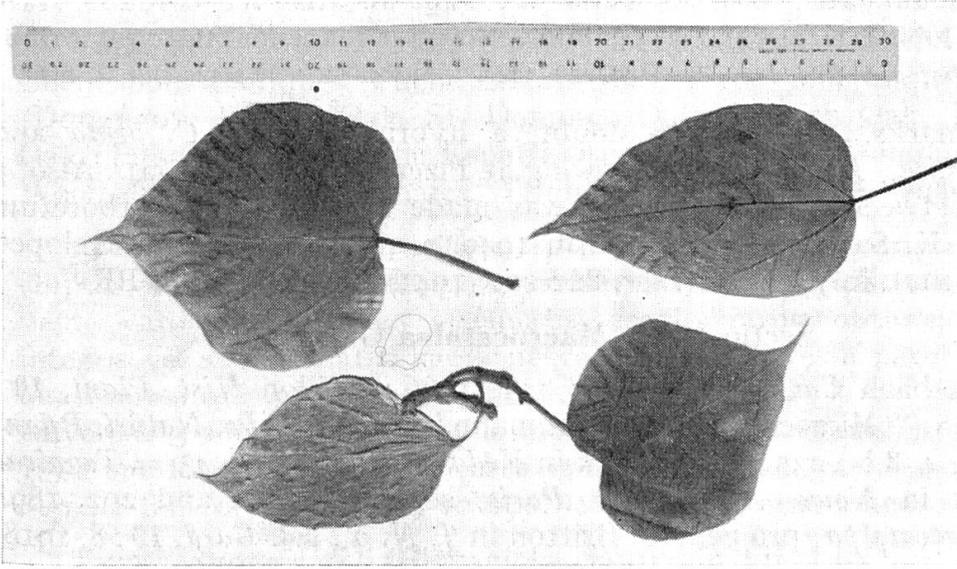


Fig. 16-17. — *Catalpa Galleana* Dode. Plzeň, Bohemia. (Orig.).

8. × **Catalpa Galleana** Dode in *Bull. Soc. dendr. France*, 1907 : 205 (1907) ; Schneider *Hdb. Laubholzkd* 2 : 625 (1911).

Arbor foliis cordatis, junioribus saepe elliptico-ovatis apice attenuato-acuminatis, basi cuneatis vel subtruncatis vel cordatis, raro lobatis lobis lateralibus 1-2, laminis petiolisque foliorum multo minoribus a *C. speciosa* diversa. — Fig. 16-17.

Remarks. This is, no doubt, a hybrid between *C. ovata* and *C. speciosa*. A specimen is growing at Plzeň (Czechoslovakia). Also, a cross between the two species was made in the Arnold Arboretum by Dr. K. Sax, which has set, in 1940, a quantity of well developed seed (SMITH in *J. Arn. Arbor.* 22 : 220, 1941). *Paclt* 4 in hb. PR !

Sectio II. — **Macrocatalpa** Grisebach

Grisebach *Cat. Plant. Cub.* : 191, 1866 ; Baillon *Hist. Plant.* 10 : 46, 1888 (" *Microcatalpa* ") ; Schumann in *Engler & Pr., Natürl. Pflanzenfam.* 4, 3 b : 235, 1895 ; Paclt in *Věda přír.* 22 : 61, 1943 = *Tropicae* Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6 : 174 and 202, 1894 = *Macrocatalpa* [pro genere] Britton in *J. N. Y. bot. Gard.* 19 : 8, 1918.

TYPUS SECTIONIS : *Catalpa punctata* Grisebach.

Plantae lignosae foliis semipersistentibus lamina coriaceis vel chartaceis, seminibus alis lateralibus dorso lanuginosis. Hab. : India Occidentalis.

9. **Catalpa longissima** (Jacquin) Dumont-Courset *Botaniste Cultivateur*, ed. 1, 2 : 190, 1802 ; Sims in *Bot. Mag.* 27 : sub no. 1094, 1806 ; Aiton *Hort. Kew.*, ed. 2, 1 : 25, 1810 ; Sprengel in *Linnaeus, Syst. Veg.*, ed. 16, 1 : 70, 1825 ; A. Dietrich *Spec. Plant.*, ed. 6, 1 : 452, 1831 ; G. Don *Gen. Syst. Gard. Bot.* 4 : 230, 1837 ; D. Dietrich *Synops. Plant.* : 82, 1839 ; DC. *Prodr.* 9 : 226, 1845 ; Hitchcock in *Annu. Rep. Missot. bot. Gard.* 4 : 114 and 168, 1893 ; Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6 : 202, 1894 ; Urban in *Ber. dtsh. bot. Ges.* 34 : 754, 1916 ; id., *Symb. Antill.* 8 : 639, 1921 ; Roig *Dicc. bot.* : 253 and 789 (1928) ; Swabey in *Dept. Sci. Agr. Jamaica Bull.* 29 : 33, 1941 ; Moscoso *Cat. Fl. Doming.* : 579, 1943 = *Bignonia longissima* Jacquin *Enum. Plant. Carib.* : 25, 1760 [nec *B. longissima* Loureiro, 1790 !] ; id., *Select. Stirp. Amer. Hist.* : 182, tab. 176, fig. 78, 1763 ; Swartz *Prodr. Veg. Ind. Occ.* : 91, 1788 ; Aiton *Hort. Kew.*, ed. 1, 2 : 347, 1789 ; Gmelin in *Linnaeus, Syst. Natur.*, ed. 13, 2, pars 2 : 941, 1791 ; Swartz *Observ. Bot.* : 232, 1791 ; Willdenow in *Linnaeus, Spec. Plant.*, ed. 4, 3, pars 1 : 290, 1800 ; Swartz *Fl. Ind. Occ.* 2, sect. 2 : 1037, 1800 = *Bignonia longisiliqua* Jacquin *Select. Stirp. Amer. Hist.* ; 89, tab. 261, fig. 50, 1780 [nec *B. longisiliqua* Bertoloni ex Sprengel non *B. l. Velloso* !] = *Bignonia quercus* Lamarck *Encycl. Méth., Bot.*, 1 : 417 (1783) =

Bignonia pseudo-quercus Tussac *Fl. Antill.* 4: 118, tab. 37 (1827) = *Catalpa longisiliqua* Chamisso in *Linnaea* 7: 720 (1832); Grisebach *Fl. Brit. West Ind. Isl.*: 446 (1864) = *Macrocatalpa longissima* Britton in *J. N. Y. bot. Gard.* 19: 8 (1918).

Vernacular names. Bois Chêne, Chêne, Chêne noir d'Amérique, Chêne noir à siliques, Chêne des Antilles (Haiti, Martinique); Roble (Domingo); French Oak, St. Domingo Oak, Spanish Oak, Jamaican Oak (Jamaica); Encina de España, Encina de Santo Domingo; Mast Wood, Yoke Wood (Jamaica, Trinidad); Randegonde (Guadeloupe).

Arbor foliis petiolis gracilibus 10-40 mm. longis, subcoriaceis, limbo elliptico-lanceolatis vel ellipticis, rarius obovato-ellipticis, magnitudine valde variis, apice longo attenuatis, acutis, rarius obtusis, margine integris vel subundulatis, supra nervatione subimpressa parum vel vix anastomosanti, utrinque lepidotis. Inflorescentia laxa paniculata, calycibus 5 mm. longis, corollis albis cum maculis flavis et purpureis 1,5-2 cm. longis. Capsulae lineares 35-67 cm. longae, valvis 3 mm. latis. Semina lineari-fusiformia 9-10 mm. lata, circa 1 mm. longa.

TYPE: *Jacquin* [?] (Hispaniola-Haiti); in hb. LINN.!, added to after 1760.

DISTRIBUTION. MARTINIQUE (olim: years 1857, 1865, 1871, 1873); Fort-de-France (*Hahn* 838 in hb. P!, BM., G! [Delessert] and K; spont. ?); without locality (*Bélanger* 351 in hb. P!; No. 7727 in hb. PRCD!, in part). — ST. THOMAS (olim); without locality (*Poiteau* in hb. P!). — SANTO DOMINGO; Tamboril, in campis et fruticetis solo calcario, alt. 250 m., *Eggers* 1938 in hb. B!, BM., G! [Delessert atque Boissier] and L!; prope Santiago (*Rannkraw* 904, 906 in hb. C.; spont. ?); ibidem ad López in sylva, *Eggers* 1938 B in hb. B!; Samaná, Sta. Bárbara de Samaná, ad Punta Corozos, *Ekman* H 15827 in hb. S.; Ciudad Trujillo, Llano Costero, *Ekman* H 12543 in hb. S; cult.; prope San Cristóbal (teste Moscoso); prope Barahona, *Fuertes* 218 in hb. B!, BM., G! [Delessert], K., L! [= 836-32, 33], P! and S.; ibidem ad Paradís ad ostium Río Nizaito in saxosis, v. *Türckheim* 2696 in hb. B! — HAITI; prope Cap Haitien, *C. Ehrenberg* in hb. B!; ibidem ad habitationem Picard, *Eggers* 2838 in hb. B!; Les Gonaïves, *Buch* 302 in hb. B!, L! and S.; Port-au-Prince, *Jacquemont* in hb. P!; *Jäger* 108 in hb. B!, K., P! and S.; Dép. du Sud prope Camp Perrin, *Ekman* H 243 in hb. S.; Roche-à-Bateau, *Ekman* H 295 in hb. S.; Massif de la Hotte, Morne Rochelois prope Miragoâne, in limestone hills near the town, *Ekman* H 7892 in hb. S. — JAMAICA; prope Kingston, in dry coastal plain, *Lehmann* B. T. 591 in hb. K. and L! [= 836-36, 37]. — Unclassified materials; *R. C. Alexander* in hb. K; *Bertero* 309 in hb. B!; *Forster* in hb. K; *W. Harris* 9229 in hb. BM. and K; *Hennecart* in hb. K; *Houston* in hb. BM.; *Jacquin* [?] in hb.

LINN! [= type]; *E. C. and G. M. Leonard 15354* in hb. K; *Mc Nab* in hb. K; *Maxwell 1927* (?) in hb. BM.; *Mayerhoff* in hb. B!; *Nash 154* in hb. K.; *Norman 136* in hb. BM.; *Orcutt 4971* in hb. K.; *Osborne* in hb. BM.; *Poiteau* in hb. B!, P! and G! [Delessert]; *R. Schomburgh 50* in hb. B! and P!; *W. Schumann 348* in hb. B!; *Shakespear* in hb. BM.; *W. Wilson 24* in hb. K.; *Dr. Wright* in hb. K.; ex hort. bot. Paris P! and G! [Delessert].

Remarks. REHDER (in *Bailey, Cycl. Amer. Hortic.* 1: 259, 1900; in *Bailey, Standard Cycl. Hortic.*, ed. 2, 1: 684, 1927) believed *C. longissima* to be planted in Cuba. The species does not occur at all in Cuba. No doubt, this is a tradition due to the erroneous statement of FERNÁNDEZ (*Tratado de la Arboricultura Cubana* [etc.], Habana 1867), who regarded incorrectly the species to be acclimatized in Cuba.

10. ***Catalpa punctata*** Grisebach *Cat. Plant. Cub.*: 192 (1866); *A. Sauvalle Fl. Cub.*: 94 (1873); Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 205 (1894); Schumann in *Engler & Pr., Natürl. Pflanzenfam.* 4, 3b: 235 (1895); Gómez de la Maza & Roig *Fl. Cuba*: 81 (1914); Roig in *Bol. Estac. exp. agr. Santiago de las Vegas* 56 [recte 57?]: 32 (1935); Seifríz in *Bot. Jb. Syst.* 70: 445 (1940); id. in *Ecol. Monogr.* 13: 48 and 51 (1943) = *Echites* (?) *macrocarpa* A. Richard in *de la Sagra, Hist. Fis. Pol. Natur. Cuba*, pars 2, *Bot.* 11: 94 (1850) [nec *Echites macrocarpa* Wallich, ante 1850!] = *Robbia macrocarpa* Miers *Apocyn. S. Amer.*: 108 (1878) = *Catalpa punctata a lepidota* Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 206 (1894) = *Macrocatalpa punctata* Britton in *J. N. Y. bot. Gard.* 19: 8 (1918); Britton & Millspaugh *Baham. Fl.*: 347 (1920) = *Catalpa macrocarpa* Ekman & Urban *Symb. Antill.* 9: 254 (1924); Roig *Dicc. bot.*: 613 (1928); Urban in *Ark. Bot.* 22 A, no. 10: 63 (1929); Caiñas in *Cuba en la mano*: 439 (1940) = *Catalpa longissima* Marie-Victorin & Léon in *Contr. Inst. bot. Univ. Montréal* 41: 434 (January 1942); Léon in *Revista Soc. geogr. Cuba* 15: 39, (June 1942) ("?").

Vernacular names. Roble de olor (Cuba, locally; moreover, a homonym), Roblillo (Cuba — Oriente: Gibara).

Arbor foliis petiolis gracilibus 7-25 mm. longis, coriaceis vel chartaceis, limbo late ellipticis, basi et apice obtusissimis, ad apicem paululum emarginatis, margine integerrimis, supra minute lepidotis postremo glabrescentibus et nitidulis, nervatione vix impressa, subtus lepidotis. Inflorescentia pauciflora subcorymbiformis, calycibus 5-7 mm. longis, corollis flavescentibus maculis bruno-purpureis et flavis ornatis 1,5-2 cm. longis. Capsulae lineares usque 68 cm. longae (an usque 100 cm.?, teste Marie-Victorin & Léon), valvis usque 5 mm. latis. Semina lineari-fusiformia 12-17 mm. lata, 1,5-2 mm. longa.

TYPE: *C. Wright 3035* (Cuba-Oriente); in hb. P!

DISTRIBUTION. — CUBA: Prov. Oriente; prope Santiago de Cuba in collibus calcariis inter urbem et Campo Columbia, *C. Wright 3035* in hb. P!, BM., G! [Delessert atque Boissier] and S.; *Ekman 8956* in hb. S.; Santiago de Cuba in pascuis ad merid. versus, *Ekman 8490* in hb. S.; Papayo prope Sevilla, *Ekman 9436* in hb. S.; U.S. Naval Station at Guantánamo Bay, *Britton 2065* in hb. BM.; Daiquirí in dumetis solo calcario, *Ekman 8367* in hb. S.; Maisí (teste Seifriz, León); Mir prope caverna ad Mijial, *Ekman 4912* in hb. S.; Gibara (teste Roig). — Prov. Santa Clara; Caunao River to Cienfuegos Bay, *Jack 7188, 7533* in hb. A. and S. — Prov. Habana; Río Sta Ana, west of Marianao, in thickets, *Ekman 13649* in hb. S. — Prov. Pinar del Río; Bahía Honda, at Punta Gobernadora, in coastal thickets, *Ekman 12867* in hb. S.; San Cristóbal, *Roig 1106* in hb. SV.; Sábalo, in thickets of the south of Sábalo, *Ekman 11449* in hb. S. — ISLE ANDROS in the Bahamas (teste Britton).

Key to the lower categories

Petioles 7-25 mm. long, seeds 12-17 mm. broad

- Leaves glabrous **C. punctata**
 Leaves pubescent f. **pubescens**

Petioles 2-8 mm. long, seeds 5-6 mm. broad

- Leaves glabrous var. **domingensis**
 Leaves pubescent f. **Urbanii**

Forma **pubescens** Grisebach *Cat. Plant. Cub.*: 192 (1866) („β"); A. Sauvalle *Fl. Cub.*: 94 (1873); Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 206 (1894); Britton in *J. N. Y. bot. Gard.* 19: 8 (1918).

Arbor parva foliis ± dense et breviter pubescentibus a forma typica diversa.

TYPE: *C. Wright 3036* (Cuba-Oriente); in hb. P!

DISTRIBUTION. — CUBA: Prov. Oriente; prope Bayamo, *C. Wright 3036* in hb. P!, BM and G! [Delessert atque Boissier].

Var. **domingensis** (Urban & Ekman ex Urban) Paclt, comb. nov. = *Catalpa domingensis* Urban & Ekman ex Urban in *Ark. Bot.* 22 A, no. 10: 63 (1929) [excl. specim. no. *H 6966* atque no. *H 6953* p.p.]; Moscoso *Cat. Fl. Doming.*: 579 (1943).

Arbor parva foliis petiolis gracilibus 2-4 mm. longis, coriaceis, limbo obovatis vel obovato-ellipticis, utrinque obtusis vel rotundatis,

marginis integris, supra obscure viridibus, nervatione subimpresca, subtus paulo pallidioribus, lepidotis. Inflorescentia calycibus 5 mm. longis, corollis ignotis. Capsulae lineares usque 22 cm. longae, valvis 4 mm. latis. Semina anguste lanceolata 5-6 mm. lata, circa 0,8 mm. longa.

TYPE : *Ekman H 7011* (Hispaniola — S. Domingo) ; in hb. S !

DISTRIBUTION. — SANTO DOMINGO : Barahona ; ad Cabo Falso solo calcario, *Ekman H 7011* in hb. S ! ; ibidem prope Mare-à-Chat, *Ekman H 6253* in hb. S !, transitio ad f. *Urbanii*.

Forma **Urbanii** Paclt, f. nov. = *Catalpa domingensis* Urban & Ekman ex Urban in *Ark. Bot.* 22 A, no. 10 : 63 (1929) [excl. specim. no. *H 7011* atque no. *H 6953* p.p.] ; Moscoso *Cat. Fl. Doming.* : 579 (1943).

Arbor parva foliis petiolis usque 8 mm. longis subtus breviter pubescentibus a forma typica var. *domingensis* diversa.

TYPE : *Ekman H 6966* (Hispaniola — S. Domingo) ; in hb. S !

DISTRIBUTION. — SANTO DOMINGO : Barahona ; Massif de la Selle, Morne des Commissaires prope Anse-à-Pitre, *Ekman H 6966* in hb. S !

II. **Catalpa brevipes** Urban in *Fedde Repert.* 24 : 12 (1928).

Arbor parva foliis petiolis 4-10 mm. longis, crasse et rigide coriaceis, limbo obovatis, basi obtusis, ad apicem leviter et latiuscule emarginatis, margine integris, supra nitentibus flavo-bruneis, nervatione sicut medio impressa et reticulatim anastomosanti, subtus opacis brunescens praesertim ad nervos pubescentibus. Caetera ignota.

TYPE : *Ekman 16166* (Cuba — Oriente) ; in hb. S !

DISTRIBUTION. — HAITI ; Massif de la Hotte, Morne Rochelois, Miragoâne, in limestone cliffs towards Anse-à-Veau, *Ekman H 7290* in hb. S. — CUBA : Prov. Oriente ; Cabo Cruz prope Niquéro ad austr. versus in calcariis litoralibus, *Ekman 16166* in hb. S !

Key to the varieties

- Leaves generally oblong var. **oblongata**
 Leaves other than oblong
 Leaves elliptical, or ovate, or rarely obovate var. **Ekmaniana**
 Leaves generally obovate **C. brevipes**

Var. **oblongata** (Urban & Ekman ex Urban) Paclt, comb. nov. = *Catalpa oblongata* Urban & Ekman ex Urban in *Ark. Bot.* 22 A, no. 10 : 61 (1929) ; Moscoso *Cat. Fl. Doming.* : 580 (1943).

Arbor parva foliis petiolis gracilibus 4-10 mm. longis, rigide coriaceis, limbo oblongis, basi rotundatis, apice obtusiusculis vel obtusis, margine integris, supra minute lepidotis glabris nitentibus, nervatione subimpressa parum vel vix anastomosanti non reticulatim conjuncta, subtus dense et breviter pilosis. Inflorescentia racemosa, calycibus 5 mm. longis, corollis albis cum maculis bruneo-purpureis et flavis circa 1,5 cm. longis. Capsulae lineares 18-21 cm. longae, valvis 4 mm. latis. Semina linearia 9-10 mm. lata, 0,8 mm. longa.

TYPE : *Ekman H 4495* (Hispaniola — Haiti) ; in hb. S !

DISTRIBUTION : HAITI ; Môle St.-Nicolas ad Cap Les Anglais, *Ekman H 4495* in hb. S !

Var. **Ekmaniana** (Urban) Paclt, comb. nov. = *Catalpa Ekmaniana* Urban in *Ark. Bot.* **22** A, no. 10 : 61 (1929) ; *Moscoso Cat. Fl. Doming.* : 579 (1943).

Arbor parva foliis petiolis gracilibus 3-15 mm. longis, coriaceis, limbo ovalibus vel ovatis, rarius obovatis, magnitudine valde variis, basi rotundatis vel truncatis vel obsolete cordatis, margine integris, supra minute lepidotis postremo glabrescentibus et nitidulis, nervatione sicut medio impressa anastomosanti et minute reticulato-conjuncta, subtus pallide bruneis, dense et breviter pilosis. Inflorescentia pluriflora racemosa, calycibus 5 mm. longis, corollis albis cum maculis flavis et purpureis circa 1,7 cm. longis. Capsulae lineares 32 cm. longae, valvis 5 mm. latis. Semina linearia 6-7 mm. lata, 0,5-0,6 mm. longa.

TYPE : *Ekman H 6476* (Hispaniola — Haiti) ; in hb. S !

DISTRIBUTION. — HAITI ; Massif de la Hotte, Morne Rochelois prope Miragoâne in collibus calcariis prope urbem ad orientem versus, *Ekman H 6476* in hb. S !

12. **Catalpa obovata** Urban in *Ark. Bot.* **22** A, no. 10 : 62, 1929 ; *Moscoso Cat. Fl. Doming.* : 580, 1943.

Arbor parva foliis petiolis gracilissimis 2-7 mm. longis, coriaceis, limbo obovatis, basi ima obtusiusculis vel acutis, margine integris, supra parce et minute lepidotis caeterum glabris, nervatione impressa et subimpresso-anastomosanti, subtus breviter praesertim ad nervos pilosis. Inflorescentia racemosa vel ramulo infimo 3-floro paniculata, corollis 2,7 cm. longis. Capsulae lineares usque 27 cm. longae, valvis 4 mm. latis. Semina ignota.

TYPE : *Ekman H 7897* (Hispaniola — Haiti) ; in hb. S !

DISTRIBUTION. — HAITI ; Massif de la Hotte, Morne Rochelois prope Miragoâne in collibus calcariis prope urbem, *Ekman H 7897* in hb. S !

Remarks. A doubtful species. Since the seeds of this form are unknown, it is impossible to form an opinion relative to its systematic position. There may be felt some suspicion as to the fact that it has been found in the same locality as *C. brevipes* var. *Ekmaniana*. It must also be remembered that flowers of *C. obovata* were collected in March, those of *C. brevipes* var. *Ekmaniana*, however, in July. In this connection it may be noted that, contrary to the non-tropical Catalpas, the "Macrocatalpas" usually flower twice a year (March-July, and September-October).

13. **Catalpa purpurea** Grisebach *Cat. Plant. Cub.*: 192, 1866; Bureau in *Nouv. Arch. Mus. Paris*, ser. 3, 6: 207, 1894; Schumann in *Engler & Pr., Natürl. Pflanzenfam.* 4, 3 b: 235, 1895; Urban in *Ber. dtsh. bot. Ges.* 34: 754, 1916; id. in *Ark. Bot.* 22 A, no. 10: 61, 1929 = *Macrocatalpa purpurea* Britton in *J. N. Y. bot. Gard.* 19: 9, 1918.

Arbor parva foliis petiolis gracilibus 20-35 mm. longis, coriaceis vel chartaceis, limbo ellipticis vel ovato-ellipticis, basi obtusissimis apice obtusis, rarius acutis, margine integris vel paulum denticulatis, supra obscure viridibus \pm nitentibus, nervatione impressoanastomosanti, subtus parum pallidioribus ad nervos minute pilosulis. Inflorescentia valde laxiflora ramosa, calyce 7-9 mm. longo, corollis purpureis (teste Urban) rubro ornatis (teste Grisebach), sed verisimiliter roseis cum numerosis maculis purpureis et flavis, circa 3,5 cm. longis. Fructus ignotus.

TYPE: *C. Wright 3037* (Cuba-Oriente); in hb. P!

DISTRIBUTION — CUBA; Prov. Oriente; La Catalina in the south of Sagua de Tánamo, *C. Wright 3037* in hb. P!, BM. and G! [Delessert¹ atque Boissier]; Mogote prope Palmarito de Cauto, alt. ca. 300 m., *Ekman 9171* in hb. S.

Key to the form

Leaves completely entire, or only minutely denticulate **C. purpurea**
 Leaves irregularly denticulate f. **denticulata**

¹ One of the two items of «*C. purpurea*» in hb. Delessert [—4] being characterized by ternate-pinnate leaves, campanulate corollas and very long calyces (about 15 mm.) is *Tabebuia* sp. Hence the wrong observation by BUREAU (l.c.: 207) that the corolla of *C. purpurea* has «le tube campanulé, très large, et les lobes obovales, sinués-ondulés, plus courts que le tube». The same material is mixed with also in hb. P. (and BM.?).

Forma **denticulata** (Urban) Paclt, comb. nov. = *Catalpa denticulata* Urban in *Fedde Repert.* **24** : 12 (1928) ; id. in *Ark. Bot.* **22A**, no. 10 : 64 (1929) (" ? ") ; Moscoso *Cat. Fl. Doming.* : 579 (1943).

Arbor parva foliis margine basi excepta irregulariter denticulatis a forma typica diversa.

TYPE : *Ekman 19091* (Cuba — Oriente) ; in hb. S !

DISTRIBUTION. — HAITI ; La Gonave prope Les Abricots ad Les Etroits versus, alt. ca. 200 m., *Ekman H 8763* in hb. S. — CUBA ; Prov. Oriente, Palmarito de Cauto, *Ekman 19091* in hb. S !

C. SPECIES EXCLUSAE

a) Fossil

Catalpa crassifolia Newberry in *N.Y. Lyceum natur. Hist. Ann.* **9** : 56, (1868) = *Paranymphaea crassifolia* (Newberry) Berry, Nymphaeaceae !

b) Recent

Catalpa cassinoides (Lamarck) Sprengel = *Bignonia cassinoides* Lamarck *Encycl. Méth., Bot.* **1** : 418 (1783) = *Tabebuia cassinoides* (Lamarck) DC., Bignoniaceae !

Catalpa hirsuta Sprengel in *Linnaeus, Syst. Veg.*, ed. 16, **1** : 70 (1825) = nomen dubium (Bignoniaceae, gen. ? sp. ?).

Catalpa microphylla (Lamarck) Sprengel = *Bignonia microphylla* Lamarck, *Encycl. Méth., Bot.* **1** : 418 (1783) = *Tabebuia microphylla* (Lamarck) Urban, Bignoniaceae !

Catalpa Pottsii Seemann in *Allg. Gart.-Ztg. (Otto & Dietrich)* **19** : 321 (1851) = *Chilopsis linearis* (Cavanilles) Sweet, Bignoniaceae !

D. NOMINA NUDA ET SUBNUDA

Catalpa arguta Hort. ex [Nicholson in] *Kew Hand-list Trees Shrubs* **2** : 107 (1896) = *C. bignonioides* ?

Catalpa bignonioides var. *argentea* Hort. ex Schelle in *Beissner et al., Hdb. Laubholzbenenn.* : 434 (1903) = *C. bignonioides* f. *variegata* !

Catalpa bignonioides var. *erubescens* Hort. ex Schelle in *Beissner et al., Hdb. Laubholzbenenn.* : 433 (1903) = *C. erubescens* forma ?

Catalpa bignonioides grandiflora Hort. ex *Wien. ill. Gart.-Ztg.* **15** : 315 (1890) = *C. speciosa* ?

- Catalpa bignonioides* var. *semitplena* Plouvier in *C. R. Acad. Sci. Paris* **224** : 672 (1947) = *C. erubescens* var. *japonica* f. *adina* !
- Catalpa Bungeana* Hort. ex Wien. *ill. Gart.-Ztg.* **15** : 316 (1890) = *C. bignonioides* f. *nana* ?
- Catalpa Bungei* var. *nana* (*pumila*) Lavallée *Arbor. Segrez.* : 176 (1877) = *C. bignonioides* f. *nana* ?
- Catalpa Bungei* var. *pumila* Hort. ex Hartwig & Rümpler in *Vilmorin, Ill. Blumengärtnerei* **3** (Suppl.) : 135 (1875) = *C. bignonioides* f. *nana* ?
- Catalpa cassinifolia* Hort. ex [Nicholson in] *Kew Hand-list Trees Shrubs* **2** : 107 (1896) = *C. bignonioides* ?
- Catalpa cassinoides* Hort. gall. ex Wien. *ill. Gart.-Ztg.* **15** : 316 (1890) = *C. bignonioides* f. *nana* ?
- Catalpa catalpa* var. *nana* [Nash] in *J. N. Y. bot. Gard.* **21** : 59 (1920) = *C. bignonioides* f. *nana* ?
- Catalpa coerulescens* Hort. ex Hartwig & Rümpler in *Vilmorin, Ill. Blumengärtnerei* **3** (Suppl.) : 135 (1875) = *C. bignonioides* f. *nana* ?
- Catalpa himalayaca* Hort. ex Dippel *Hdb. Laubholzkde* **1** : 50 (1889) = *C. ovatae* forma ?
- Catalpa himalayensis* Hort. ex Dippel *Hdb. Laubholzkde* **1** : 50 (1889) = *C. ovatae* forma ?
- Catalpa Kaempferi* var. *crassifolia* Hort. ex Goeze in *Mitt. dtsh. dendr. Ges.* **25** : 174 (1916) = *C. erubescens* forma ?
- Catalpa Kaempferi nana* Hort. ex Dippel *Hdb. Laubholzkde* **1** : 51 (1889) = *C. ovatae* forma ?
- Catalpa Kaempferi vera* Hort. ex Dippel *Hdb. Laubholzkde* **1** : 51 (1889) = *C. ovatae* forma ?
- Catalpa Kaempferi Wallichiana* Hort. ex Schelle in *Beissner et al., Hdb. Laubholzbenenn.* : 434 (1903) = *C. ovatae* forma ?
- Catalpa nana* Hort. ex Dode in *Bull. Soc. dendr. France* 1907 : 202 (1907) = *C. bignonioides* f. *nana* ?
- Catalpa Thunbergii* Hort. Späth ex Wien. *ill. Gart.-Ztg.* **15** : 318 (1890) = *C. ovatae* forma ?
- Catalpa Wallichii* Hort. ex Wien. *ill. Gart.-Ztg.* **15** : 317 (1890) = *C. ovatae* forma ?
- Catalpa Wallichiana* Hort. ex Dippel *Hdb. Laubholzkde* **1** : 51 (1889) = *C. ovatae* forma ?
- Bignonia Bungeana* Hort. ex Klinge *Holzgewächse Estland* : 20 (1883) = *C. bignonioides* f. *nana* ?

APPENDIX

ORIENTAL NAMES OF CATALPAS

So as to obtain some clearness in the matter dealt with, I deemed it better to show all oriental names of Catalpas together in the present separate chapter. For the transcription of Chinese symbols I used the system of Gwoyeu Romatzyh ("Official Chinese Latin Script", for which see SIMON), for Japanese, that of HEPBURN.

A. Chinese names (fig. 18)

Bairtzyymuh. Co-ordinates : B,a. A name given to *C. Bungei*. (BUREAU 1894 : 197. Pe tse-mou).

	A	B	C	
a	白 梓 木			a
b	椅		楸	b
c	黃 金 樹			c
d		梓		d
	A	B	C	

Fig. 18. — Oriental vernacular names of *Catalpa*. Further explanation in the text. (Orig.).

23 may also belong hereto. On the other hand, there exists another name of the same spelling (shi) which, however, is of different origin and probably means "Oxalis acetosella" (HEPBURN 1872 : 456).

C. *On the confused Sino-Japanese name tzyy (azusa)*

Under the Chinese character shown in the fig. 15 by the co-ordinates B,d, a number of woody plants may be comprised, including *Catalpa*. Thus : HOFFMANN & SCHULTES (1852 : 326) consider the name Tsè as being applied to *Rottlera japonica* (= *Mallotus japonicus*, Euphorbiaceae) ; DEBESSE (1945 : 429) says that its meaning is that of a *Lindera* (Lauraceae) ("son bois est employé pour la gravure") ; SIMON (1947 : 799) explains the character as being used for *Catalpa* (tzyy, tzyyshuh), and CHOW (1934 : 368) for *Catalpa Bungei* (Tzu-Shu).

The Japanese equivalent of the Chinese name tzyy is azusa. Similarly, it may be applied to different kinds of trees. HOFFMANN & SCHULTES (1852 : 326) mention again *Rottlera japonica* (cf. above) ; they use the transcription adsousa. According to HEPBURN (1872 : 3), the meaning of adzusa is that of a tree the wood of which is used "for block cutting, and making bows". As to the rest, the name is considered to be relative to *Catalpa* ; (MATSUMURA 1912 : 574, azusa ; (ISHIKAWA 1932 : 36, azusa ; KAEMPFER 1712 : 842, adsja ; THUNBERG 1784 : 252, adsja).

D. *Korean names*

According to NAKAI (1923 : 80), the Korean name of *C. ovata* (which is cultivated also in Korea), is *Kai-otong-nam*.

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EXSICCATA CITED

- ALEXANDER : s.n. longissima.
- AUGUSTIN : 5112 bignonioides.
- BAENITZ : s.n. ovata — 11 bignonioides.
- BÉLANGER : 351 longissima — 7727 longissima.
- BERTERO : 309 longissima.
- BILTMORE HERBARIUM : 385 B bignonioides.
- BODINIER : 2309 ovata.
- BRETSCHNEIDER : s.n. Bungei — 150 Bungei — 567 Bungei.
- BRITTON : 2065 punctata.
- BUCH : 302 longissima.
- BUNGE : s.n., p.p. Bungei — s.n., p.p. Bungei f. heterophylla.
- CANDOLLE, A. DE : s.n. ovata.
- CARLES : 544 Bungei.

- CATESBY : 1955 bignonioides.
 CAVALERIE : 101 Fargesii — 175 Fargesii.
 CHANET : 532 Fargesii.
 CHAPMAN HERBARIUM : s.n. bignonioides.
 CHEO & YEN : 245 ovata.
 CHING : 2887 ovata.
 CLARK : s.n. bignonioides.
 DAVID : s.n. Bungei f. heterophylla.
 DELAVAY : 3352 Fargesii f. Duclouxii.
 DUCLOUX : 187 Fargesii f. Duclouxii — 384 Fargesii.
 EGGERS : 1938 longissima — 1938 B longissima — 2838 longissima.
 EGGLESTON : 4640 bignonioides — 4839 bignonioides.
 EHRENBERG : s.n. longissima.
 EKMAN : 4912 punctata — 8367 punctata — 8490 punctata — 8956 punctata — 9171 purpurea — 9436 punctata — 11449 punctata — 12867 punctata — 13649 punctata — 16166 brevipes — 19091 purpurea f. denticulata — H 243 longissima — H 295 longissima — H 4495 brevipes var. oblongata — H 6253 punctata var. domingensis — H 6476 brevipes var. Ekmaniana — H 6953 p.p. punctata var. domingensis — H 6966 punctata f. Urbanii — H 7011 punctata var. domingensis — H 7290 brevipes — H 7892 longissima — H 7897 brevipes var. Ekmaniana — H 8763 purpurea f. denticulata — H 12543 longissima — H 15827 longissima.
 ENGELMANN : s.n. speciosa.
 FAN & LI : 356 ovata.
 FARGES : 495 p.p. Fargesii. — 495 p.p. Fargesii f. Duclouxii.
 FAURIE : 880 ovata — 1170 ovata — 1205 ovata — 7460 ovata.
 FIORI : 190 speciosa.
 FISCHER : s.n. Bungei f. heterophylla.
 FORREST : 4679 Fargesii f. Duclouxii. — 7490 Fargesii f. Duclouxii — 18926 tibetica — 18950 tibetica.
 FORSTER : s.n. longissima.
 FRIEDLEY : s.n. bignonioides.
 FUERTES : 218 longissima.
 GIRALDI : s.n. Fargesii.
 HAHN : 838 longissima.
 HALL : s.n. bignonioides.
 HANCOCK : 38 Bungei.
 HARRIS : 9229 longissima.
 HENNECART : s.n. longissima.
 HENRY : 1391 ovata — 1684 ovata — 5856 Fargesii f. Duclouxii — 5856 A Fargesii.

- HERS : 568 Fargesii.
HOSIE : s.n. Fargesii.
HOUSTON : s.n. longissima.
HUGH : s.n. ovata.
IISIBA : s.n. ovata.
JACK : 7188 punctata — 7533 punctata.
JACKSON : s.n. Fargesii.
JACQUEMONT : s.n. longissima.
JACQUIN [?] : s.n. longissima.
JÄGER : 108 longissima.
KOEHNE : 192 ovata.
LEHMANN : B.T. 591 longissima.
LEONARD E.C. & G.M. : 15354 longissima.
LI vide FAN.
LICENT : 1034 Bungei — 1333 Bungei — 1727 Bungei — 2941 ovata —
3038 Fargesii.
LINNAEUS [?] : s.n. bignonioides.
LIU : 335 Bungei.
MC NAB : s.n. longissima.
MAIRE : s.n. ovata.
MATTHES : 61 bignonioides.
MAXIMOWICZ : s.n. ovata.
MAXWELL : 1927 ? longissima.
MAYERHOFF : s.n. longissima.
MEYER : 296 ovata — 1708 Fargesii — 1724 ovata.
MILLS : 168 ovata.
MONBEIG : s.n. Fargesii.
MORICAND : s.n. bignonioides.
NASH : 154 longissima.
NORMAN : 136 longissima.
OLDHAM : 632 ovata — 782 ovata. .
ORCUTT : 4971 longissima.
OSBORNE : s.n. longissima.
PAULT : 2 speciosa — 3 bignonioides f. Rehderi — 4 × Galleana —
5 bignonioides — 7 ovata var. flavescens — 11 × erubescens f. adina
— 12 ovata — 13 bignonioides f. aurea — 14 bignonioides — 15
bignonioides — 17 bignonioides f. nana — 18 × erubescens — 19 ovata
var. flavescens.
PALMER : 15320 speciosa.
PAVON [?] : s.n. bignonioides.

- PLOUVIER : s.n. bignonioides f. nana — s.n. bignonioides f. pulverulenta
— s.n. × erubescens f. purpurea — s.n. × erubescens f. adina.
- POITEAU : s.n. longissima.
- RANNKRAW : 904 longissima — 906 longissima.
- READ : 1148 ovata.
- REHDER : s.n. speciosa.
- REUTER : s.n. ovata var. flavescens — s.n. bignonioides.
- ROIG : 1106 punctata.
- RUGEL : s.n. bignonioides.
- SAVATIER : 2091 ovata.
- SCHNECK [?] : s.n. speciosa.
- SCHOCH : 2 Fargesii f. Duclouxii.
- SCHOMBURGH : 50 longissima.
- SCHUMANN : 348 longissima.
- SERRE : A 734 ovata.
- SHAKESPEAR : s.n. longissima.
- SILVESTRI : 2221 Fargesii.
- SIMMLER : s.n. bignonioides.
- SINTENIS : 193 × erubescens.
- SOULIÉ : 1422 Fargesii f. Duclouxii.
- STEELE : s.n. × erubescens.
- STUCKERT : 20369 bignonioides.
- THUNBERG : s.n. ovata — s.n. bignonioides.
- Tso : 1381 speciosa.
- TSU : 715 ovata — 7727 p.p. ovata.
- TÜRCKHEIM v. : 2696 longissima.
- UNIVERSITY OF NANKING HERBARIUM : s.n. speciosa.
- VINCENT : s.n. bignonioides.
- WILSON, E.H. : 636 Fargesii — 640 p.p. Fargesii f. Duclouxii — 748
Fargesii — 976 Fargesii f. Duclouxii — 1631 ovata — 2198 p.p.
ovata — 4289 Fargesii f. Duclouxii — 4556 Fargesii.
- WILSON, W. : 24 longissima.
- WRIGHT, C. : 3035 punctata — 3036 punctata f. pubescens — 3037
purpurea.
- WRIGHT, Dr. : s.n. longissima.
- YEN vide CHEO.

