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THE GENUS *CHONEMORPHA* G. DON (APOCYNACEAE).

D. CHATTERJEE.

The earliest plant referable to the genus *Chonemorpha* was found in Rheede's Hortus Malabaricus 9 (1689), 7, tab 5 and 6 under the only name "Belutta-Kaka-Kodi." In 1812, M. R. Smith from Sylhet, Assam, sent to the East India Company's Botanic Garden in Calcutta a plant or plants known as "Harkee" in Bengali. This was a climber with sweet-scented white flowers. Roxburgh flowered this and left a drawing. He described it as *Echites macrophylla*,^{1,2} and identified it as the same as Rheede's figure (1.c). In 1837 G. Don proposed the genus *Chonemorpha*,³ from the funnel-shaped corolla of this and some other plants. He included a number of species under this new genus but all of them are not really referable to it as is shown at the end of this paper. Horsefield was in Java at this time and found and figured a similar plant (no. 476 of his collection of drawings at Kew). The figure agrees with his plant no. 259 from Java in the Kew Herbarium. Miquel called Horsefield's plant *Chonemorpha mollis*.⁴ Wallich's Catalogue refers to a number of *Echites* which are nothing but *Chonemorpha macrophylla* (Roxb.) G. Don (Wall. Cat. 1656, 1657, 1658). In 1911, Ridley⁵ proposed the name *C. rheedii* for the Ceylon plant and the name *C. penangensis*⁶ for a Malayan plant of the same genus. But in 1923 Gamble⁷ regarded the Ceylon and South Indian specimens as the same as Wight's Icones copying of Roxburgh's drawing of the Sylhet plant.⁷

A number of new species have been described from West China, French Indo-China, and the Malay Islands during the past forty-five years, and it is now possible to get a better idea of the genus as a whole than it was prior to 1900. Unfortunately no one has attempted a review of the group excepting Furtado⁸ who has dealt with only four or five species. Of these *C. fragrans* (Moon) Alston and *C. mollis* Miq. have been reduced in this paper to *C. macrophylla* (Roxb.) G. Don, and it is very doubtful whether *C. assamensis* is distinct from *C. macrophylla*.

While working out some sheets of *Chonemorpha* in the Kew Herbarium it was found necessary in view of ampler herbarium materials to differ considerably from Furtado's fragmentary review (l.c.), and it was thought that a review of the genus as a whole should be attempted. I regret I could not see four species (*C. assamensis*, *C. eriostylis*, *C. graciliflora* and *C. yersini*) of the genus, but I have indicated my remarks against each of these in the enumeration.

A Key to the other species is as follows and it is hoped that the species not seen by me may also be fitted in the proposed Key without changing the general plan very much.

¹ Roxb. Hortus Bengalensis, 20 (1814).

² Roxb. Flor. Indica 2, 13 (1832).

³ Don. Gen. Syst. 4, 76 (1837).

⁴ Miq. Flor. Ind. Bat. 2, 444 (1856).

⁵ Agri. Bull. Str. & Fed. Mal. States 10, 146-48 (1911).

⁶ Flor. Madras 2, 818 (1923).

⁷ Wight Icones, 432 (1843).

⁸ Gard. Bull. Str. Settlements 9, 113-117 (1935).

Key to the species of *Chonemorpha* examined.

- Calyx with a distinct tube
 Corolla tube long 4-5 cm. **grandearcana** (5)
 Corolla tube shorter than 4 cm.
 Calyx tube shorter than the lobes **macrantha** (7)
 Calyx tube equalling or longer than the lobes
 Calyx tomentose
 Tube 20 mm. inflated, inflorescence rhachis hirsute **megacalyx** (9)
 Tube 8-14 mm., cylindrical
 Mouth of open corolla 5 cm. in diam. **penangensis** (10)
 Mouth of open corolla 2.5 cm. in diam. **splendens** (11)
 Calyx glabrescent
 Leaves elliptic, base distinctly cordate **elliptica** (2)
 Leaves broadly ovate, base not cordate **macrophylla** (8)
 Calyx deeply 5-partite
 Lobes broadly lanceolate, imbricate, climber **griffithii** (6)
 Lobes narrow conical, valvate, shrub **valvata** (12)

ENUMERATION.

1. ***Chonemorpha assamensis*** *Furtado* in Gard. Bull. Str. Settlements **9**, 115 (1935). I have not seen the type. The original description (l.c) is very meagre. The plant differs from *C. macrophylla* as stated in the text in having a shorter and glabrous calyx. I have seen two sheets of *C. macrophylla* from Lushai Hill, Assam (*Mrs. Parry* 333), where the calyx has a structure similar to that stated by *Furtado* as occurring in his species *C. assamensis*. I do not consider *Mrs. Parry's* sheet different from *C. macrophylla* and I have my doubts whether *C. assamensis* can have an independent existence on the characters stated unless supported by other distinct characters. It may ultimately prove to be just a variation of *C. macrophylla*.

2. ***Chonemorpha elliptica*** (*Blanco*) *Merrill et Rolfe* in Philipp. Journ. Sci. **3**, 121 (1908). *C. blancoi* *Merrill* in Enum. Philipp. Fl. Plants **3**, 335 (1923). *C. macrophylla* *Vidal non G. Don* Cat. Pl. Prov. Manila **36** (1880). *Tabernaemontana elliptica* *Blanco* in Fl. Filip. **115** (1837) non *Thunb.* This species is endemic in the Philippines. The leaves are elliptic and with cordate base. It resembles *C. macrophylla* in having a glabrescent calyx but the flowers are much smaller.

DISTRIBUTION. Philippine Islands: Luzon, Manila, *Vidal* 3265; *Loher* 3881; *Rizal*, *Merrill* 2704; *Maximo Ramos* 1065; *Merrill* 482.

3. ***Chonemorpha eriostylis*** *Pitard* in Flor. Gen. Indo-Chine **3**, 1247 (1933).

This appears to be a good species but I have not seen any specimen.

DISTRIBUTION. Indo-China: Annam.

4. **Chonemorpha graciliflora** Pitard in Flor. Gen. Indo-Chine **3**, 1248 (1933).

I have not seen the type but from the description I am convinced it is a good species.

DISTRIBUTION. Indo-China : Laos.

5. **Chonemorpha grandeareana** Pierre ex Spire in Planch. Prodr., 296 (1894), nomen ; Spire, Caout. Indo-Chine, 72 (1906) ; Flor. Gen. Indo-Chine **3**, 1252 (1933) ; Flor. Siam. Enum. **2**, 474 (1939).

This is a species with very long corolla tube. The plant is distinct in the genus because of this character and can be easily identified in the Herbarium.

DISTRIBUTION. Indo-China ; Annam, Laos. Cochinchina. Siam.

6. **Chonemorpha griffithii** Hook. f. Flor. Brit. Ind. **3**, 662 (1882).

This is also a very distinct species of the genus and is found in East Himalaya and Assam. It differs from almost all other species in having a 5-partite calyx in distinction from others where the calyx has a distinct tube. This peculiar calyx was noticed in Hooker's description and he doubted whether this species can remain in the genus.

I have examined most of the species belonging to *Chonemorpha* and find that the calyx is very variable in this genus, and extreme and intermediate forms occur. The calyx is deeply 5-partite and *valvate* in *C. valvata*. It is 5-partite and *imbricate* in *C. griffithii*. The next stage, where a short and distinct calyx tube is formed, is seen in *C. macrantha*. In *C. megacalyx* the tube is best developed, and is united and about 20 mm. long but with distinct lobes. Lastly in *C. penangensis* the tube is so well developed that the calyx lobes are almost reduced to small teeth-like structures. In view of such a variation *C. griffithii* may well remain in the genus.

DISTRIBUTION. East Himalaya. Sikkim : Permeakley, *T. Anderson* 837 ; *T. Anderson* 302 (2 sheets) ; Kurseong, *C. B. Clarke* 28094, 11782A ; Kurseong, *Gamble* 3221 A & B ; Rungoo Valley, *Gamble* 793A ; Patea-bong, *Gamble* 8209.

Assam : Khasia, *Griffith*, without number ; *Simon* 60 ; Naga Hills, Kilomi, *N. L. Bor* 4489.

7. **Chonemorpha macrantha** Pitard in Fl. Gen. Indo-Chine **3**, 1249 (1933) ; Craib in Flor. Siam. Enumer. **2**, 474 (1939).

This is a species with short but distinct calyx tube. It approaches very closely *C. valvata* where the calyx tube is absent.

DISTRIBUTION. Indo-China. Siam. S.W. China : Yunnan, *Forrest* 24368 (new record).

8. **Chonemorpha macrophylla** (Roxb.) G. Don in Gen. Syst. **4**, 76 (1837). DC. Prodr. **8**, 430 (1844) ; Miq. Fl. Ind. Bat. **2**, 444 (1856) ; Hook. f. Flor. Brit. Ind. **3**, 661 (1882) ; Trim. Flor. Cey. **3**, 138 (1895) ; Kurz For. Fl. Brit. Burma **2**, 187 (1877) ; Gamble Trees etc. of Darjeeling 56 ; Wight Icones Pl. Ind. Or. 432 (1843) ; King & Gamble Mat. Flor. Mal. Penin. **4**, 693 (1907) ; Gamble Flor. Madras 818 (1923) ; Furtado in Gard. Bull. Str. Settlements **9**, 115 (1935).

C. macrophylla var. *grandis* A. DC. Prodröm. 8, 450 (1844). *C. fragrans* (Moon) Alston in Annal. Roy. Bot. Gard. Peraden. 11, 203 (1929); Gard. Bull. Str. Settlements 9, 115 (1935). Flor. Ceylon 6, 192 (1931); Kandy Flora 47 (1938). *Chonemorpha fragrans* (Moon) Alston is the same plant as *C. macrophylla* (Roxb.) G. Don as shown by Alston in Flor. Cey. 6, 192 (1931), and cannot be kept separate as proposed by Furtado (l.c.). This is clear from the examination of herbarium material and also the synonymy given by Alston in Flor. Ceylon (l.c.). It remains to determine which of the two is the correct name. Moon's "Catalogue of Indigenous and Exotic plants of Ceylon" was published after June 1824 and not in 1821 as stated in Flor. Ceylon (l.c.). Roxburgh's Flora Indica Vol. 2 was published in March 1824. Unfortunately, following Alston's synonymy (l.c.), I could not find the description of *Echites macrophylla* in the 1824 edition of Vol. 2, 13. The description of Roxburgh's plant appears in the second edition of Flora Indica Vol. 2, 13, published in 1832. Carey in the preface of the second edition says that the edition is a reprint of the first edition of 1824. I do not know whether Alston made a mistake in quoting 1824 for 1832 in his synonymy for *C. fragrans* (l.c.) or assumed the first date (1824), as the second edition was just a reprint of the first edition. Even on this assumption (which I very much doubt) *Echites macrophylla* Roxb. has a priority of about three months over *Echites fragrans* Moon (nomen nudum)—both being published in 1824. *C. rheedii* Ridley in Agric. Bull. Str. & Fed. Mal. States 10, 146 (1911). *C. mollis* Miq. in Flor. Ind. Bat. 2, 444 (1856); Kurz Journ. As. Soc. Bengal 46, 257 (1877); Furtado Gard. Bull. Str. Settlements 9, 116 (1935), p.p. *C. macrophylla* Kurz in Journ. As. Soc. Bengal 46, 257 (1877). The specific epithet is evidently a printing mistake for *C. macrophylla*. *Echites macrophylla* Roxb. in Hort. Bengalensis 20 (1814), nomen; Flor. Indica 2, 13 (1832), descript.; Wall. Cat. 1657 non *Echites macrophylla* H. B. K. in Nov. Gen. et Spec. 3, 218 (1819). This last is a different plant from South America and is nothing but *Mandevilla hirsuta* (A. Rich.) K. Schum. *E. elegans* Wall. Cat. 1656, nomen. *E. grandis* Wall. Cat. 1658, nomen. *E. latifolia* Wall. Cat. 1657, nomen. *E. fragrans* Moon Cat. 20 (1824), nomen nudum. "Belutta-Kaka-Kodi" Rheede in Hort. Malabaricus 9, 7, tab. 5 & 6 (1689).

DISTRIBUTION. India. East Himalaya. Sikkim: *Hooker*; *T. Anderson* 307. North Bengal: Tindheria, *Gamble* 3223A, 32238; Buxa Bedul (?), *Gamble* 7698; Rungoo Valley, *Truttler* 144; Duars, Muraghat Forest, *Haines* 5727. Assam: Sylhet, *Wall. Cat.* 1657 (type!); *Jenkins*; *Hooker* 1618; Lushai Hills, *Mrs. Parry* 333 (2 sheets). West Himalaya: Kumaon, *Wall. Cat.* 1558; Kumaon, *Falconer*; Mahargiri, *Strachey et Winterbottom*; Sarjee Valley, *Duthie* 5769. Bombay: *Dalzell*; N. Kanara, *Sedgewick and Bell* 6051, 3960; Gudehalli, Karwar, *Sedgewick and Bell* 6792. South India: Courtalum, *Wall. Cat.* 1656; *Wight* 1880 (2 sheets). Canara, *Hohenacker* 158; *Wight*.

Ceylon: *Mackenzie*; *Mrs. Walker*.

Burma: Lashio, *Lace* 5838; Maymyo, *Lace* 6179; Rangoon, *McClelland*; Moulmein, *Parish*.

Andamans: Winkeolegang, *Parkinson* 619. South Andaman, *Kurz* 1842.

Malay Peninsula: Perak, *Ridley* (type of *C. rheedii*).

Java : *Horsefield* 259 ; *Zollinger* 814 ; *Buitenzorg, Bakh* 7738 ; *Koorders* 20353B.

9. ***Chonemorpha megacalyx*** *Pierre* in *Spire Caout*. Indo-Chine, 75 (1906) ; *Flor. Gen. Indo-Chine* 3, 1250 (1933). This is a species with the longest calyx tube and hirsute inflorescence rhachis.

DISTRIBUTION. Indo-China: Laos, *Spire* 17. S.W. China: Yunnan, *Szema*, *Henry* 12103; 12103A (new record !).

10. ***Chonemorpha penangensis*** *Ridley* in *Agric. Bull. Str. & Fed. Mal. States* 10, 147 (1911). *Flor. Mal. Penin.* 2, 360 (1923). *Gard. Bull. Str. Settlements* 9, 116 (1935). This is a species with long hairy calyx and very short teeth-like lobes.

DISTRIBUTION. Malay Peninsula : Penang, *Curtis* 832 (co-type !) ; Malay, *Maingay* 1074, 1725 ; Pahang Kota Tongkat, *Evans*.

11. ***Chonemorpha splendens*** *Chun et Tsiang* in *Sunyatsenia* 2, 157 (1934). This is a species with smaller flowers and very long acuminate tomentose follicles.

DISTRIBUTION. China : Hupeh, Hainan, *C. Wang* 33364 (type !) ; Hainan, *Dung Ka to Wen Fa Shi, N. K. Chun & C. L. Tso* 43838.

12. ***Chonemorpha valvata*** *Chatterjee* sp. nov. ; *Chonemorpha macranthae* *Pitard* arcte affinis sed pedunculis longioribus, calyce 5-partito segmentis fere liberis valvatis brevioribus angustioribusque differt.

Shrub 2-3 m. *Stem* terete rusty tomentose specially on the younger parts and undersurface of leaves, rugulose with lenticel scars. *Leaves* opposite, petioled, broadly ovate-elliptic, apex variable, usually shortly acute to subobtuse, base narrow to rounded, midrib entire, channelled and hairy above, slightly raised below, midrib and primary veins often of darker colour, primary veins 7-9 pairs diverging from the midrib at regular intervals with slight tendency to form loops near the margin, lamina subcoriaceous and densely tomentose on the lower surface, glabrescent on the upper, 20-25 cm. long, 10-14 cm. wide ; petiole 2-3.5 cm. long, thinly rusty tomentose. *Inflorescence* on long peduncle, 14-20 cm. long, few- to many-flowered, corymbose in the last quarter ; a number of narrow conical to lanceolate bracts 10-12 mm. long are present at the base of the corymbose structure as well as at the base of pedicels ; bracts softly tomentose on both surfaces. *Flowers* large, fleshy, lake purple, with white inside the tube ; fragrant, hypocrateriform, mouth 6-7 cm. in diam., corolla lobes slight and gently twisted to the left in bud. *Calyx* 5-partite ; lobes narrow conical, valvate, thinly pubescent outside, glabrous within, not veined, 12-13 mm. long 2-3 mm. wide, acute to acuminate with 5 irregularly semicircular glands near the base inside, margins of glands undulate. *Corolla* tube slightly inflated near the base, narrower in the middle, 7 cm. long in bud including lobes about 3 cm. in diam., lobes obliquely obovate, glabrous papery, thinly but distinctly multinerved, margin subentire. *Stamens* 5, short, included within the tube, epipetalous, attached to the tube near the base ; anthers long sagittate, tapering gradually from the base to an acuminate apex, introrse, 11 mm. long ; filaments flat, short convex, bristly, almost closing the cavity of the tube by their convex surfaces, except for a small space near the centre through which the style passes. *Carpels* 2 ; ovaries

glabrous, free, but style and stigma united ; style and stigma covered within the dome formed above them by the 5 introrse anthers ; style filiform, glabrous except near the top below the stigma where it is thinly hairy ; stigma flattened and circular, plate-like with a central broadly conical rugulose bifid structure with a constriction between the two parts ; ovary with style and stigma about 16 mm. long. *Disc* cupular, entire, glabrous.

DISTRIBUTION. Burma. Upper Burma, Mogok, 1,300 m., 13.6.1914, A. Rodger 120.

S.W. China : Yunnan, west of Tengyueh, 1,600 m., lat. 25° N., 5.1912, G. Forrest 7590 (type !) ; western flank of Tali Range, lat. 25° 40', 8.1913, G. Forrest 11603 (2 sheets).

Siam : Doi Sutep, 1,700 m., 30.4.1931, Mrs. Cunniff.

C. valvata resembles *C. macrantha* but differs in being a shrub (*C. macrantha* is a climber) with 5-partite (almost free) calyx and longer peduncle.

13. ***Chonemorpha yersini*** Vernet ex Spire in Bull. Econ. Indo-Chine 859 (1902). Flor. Gen. Indo-Chine 3, 1251 (1933). *C. harmandiana* Pierre in Planch. Prod. Apocyn. 296 (1894). I have not seen any specimen of this species.

DISTRIBUTION. Indo-China : Laos.

Doubtful and excluded species of *Chonemorpha*.

- C. antidysenterica* G. Don = ***Holarrhena antidysenterica*** (Roth.)
Wall. ex A.DC.
- C. bantamensis* G. Don = ***Ichnocarpus moluccanus*** Miq.
- C. blancoi* Merrill = ***Chonemorpha elliptica*** Merrill et Rolfe.
- C. convolvuloides* G. Don = ***Calonyction aculeatum*** (L.) House.
- C. coriacea* G. Don = ***Anodendron coriaceum*** Miq.
- C. cristata* G. Don = ***Aganosma marginata*** (Roxb.) G. Don.
- C. densiflora* G. Don = ***Ecdysanthera densiflora*** Miq.
- C. dichotoma* G. Don = ***Aganosma acuminata*** (Roxb.) G. Don.
- C. elastica* Merrill = ***Rhyncodia rhynchosperma*** (Wall.) K.
Schum.
- C. fragrans* (Moon) Alston = ***C. macrophylla*** (Roxb.) G. Don.
- C. grandiflora* G. Don = ***C. macrophylla*** (Roxb.) G. Don.
- C. harmandiana* Pierre = ***C. yersini*** Spire.
- C. inflata* G. Don = ***Ecdysanthera inflata*** (Bl.) K. Schum.
- C. malabarica* G. Don I do not know what plant Don had for this.
I agree with Hooker F.B.I. 3, 662 (1882)
in excluding this from the genus.
- C. mollis* Miq. = ***C. macrophylla*** (Roxb.) G. Don.
- C. mollissima* Boerl. I could not place this in any genus. Boerlage's
Flor. van Ned. Ind. 2, 400 (1899) does
not give a description of the plant.
- C. nouettiana* Pierre = ***Nouettia cochinchinensis*** Pierre.
- C. pubescens* G. Don = ***Holarrhena antidysenterica*** (Roth)
Wall. ex A.DC.
- C. rheedii* Ridley = ***C. macrophylla*** (Roxb.) G. Don.
- C. reticulata* G. Don = ***Cryptolepis buchmanii*** Roem. et Schult.
- C. vestita* G. Don = ***Wrightia tomentosa*** Roem. et Schult.