

COCHLOSPERMACEAE (C. G. G. J. van Steenis, Buitenzorg)

1. COCHLOSPERMUM

KUNTH, Malvac. (1822) 6; DC. Prod. 1 (1824) 255; PLANCH. in HOOK. Lond. J. Bot. 6 (1847) 139, 294, 311; BOERL. Handl. 1, 1 (1890) 70; Cat. Pl. H. B. 1 (1899) 49; RIDL. Fl. Mal. Pen. 1 (1922) 252; PILG. in E. & P. ed. 2, 21 (1925) 316; STEEN. Bull. J.B.B. III, 13 (1936) 519; BACKER, Bekn. Fl. Java 4a (1942) no 83.

Trees (or shrubs), often deciduous, producing gum and an orange juice. *Leaves* spread, palmatilobed, often with domatia in the axils of the main ribs; stipules caducous. *Flowers* actinomorphic, bisexual, showy, mostly golden-yellow, paniculate or racemose. Sepals 5 imbricate. Petals 5, imbricate or contorted, emarginate. Stamens ∞, with free filaments, equal or subequal; anthers 2-celled, linear, basifixed, opening by introrse, short, often confluent pore-like slits. Ovary 1-celled with laminal placentas projecting into the cell, or perfectly or imperfectly 3-celled, the upper portion remaining 1-celled; ovules ∞, style simple, stigma punctiform. *Capsule* 3-5-valved, valves of the endocarp separating from and alternating with those of the pericarp. Seeds covered by woolly hairs, mostly cochleate-reniform; endosperm copious, rich in oil; embryo large, conforming to the shape of the seed; cotyledons broad.

Distr. *Ca* 15 spp., mostly in trop. and subtropical America, some in trop. Africa and SE. Asia, 3 species in N. Australia, rare in Malaysia; *G. gillivrayi* is possibly the only native Malaysian species.

LAM assumed the genus to belong to the 'antarctic' type (Blumea 1 (1935) 135), but it is manifestly peri-tropical.

Ecol. The species prefer a semi-arid or seasonal climate, and in Malaysia occur only in regions with a dry season. Some African species are fire-resistant through a corky layer on the rhizome.

Notes. The family was formerly often included in *Bixaceae*; HALLIER *f.* referred it to the *Tiliaceae* (Med. Rijksherb. 35 (1918) 18). Several authors describe the sepals of *Cochlospermum* as deciduous; in *C. religiosum* cultivated at Buitenzorg they are decidedly persistent. Domatia are not yet recorded in the genus but in cultivated *C. regium* at Buitenzorg they are present in the basal axils of the main ribs as tufts of hairs, and *Acari* were observed between them. The generic name is preserved against the few years earlier *Maximiliana* MART. & SCHRANK (1819).

KEY TO THE SPECIES

1. Ovary pubescent. Stamens red in the lower half 1. *C. regium*
1. Ovary perfectly glabrous. Stamens yellow.
 2. Leaves entirely glabrous; lobes 5-7, incised for $\frac{5}{6}$ - $\frac{7}{8}$ of the length of the main ribs, 6-7 by 2-3 cm. Fls \pm 6-9 cm across. Stamens \pm 1 cm long with blunt hardly tapering anthers 3-4 mm long, pore rounded-triangular 2. *C. gillivrayi*
 2. Leaves pubescent to tomentose beneath, midribs tomentose above. Blade incised to $\frac{2}{3}$ of its length into 3-5 lobes, middle lobe \pm 5-11 by $4\frac{1}{2}$ -9 cm. Fls \pm 12-14 cm diam. Stamens $1\frac{1}{2}$ -2 cm long, anthers distinctly tapering to the acute apex 6-7 mm long, pore sagittate 3. *C. religiosum*

1. *Cochlospermum regium* (MART. & SCHRANK) PILG. Notizbl. 8 (1924) 716; BACKER, *l.c.*—*Maximiliana regia* MART. & SCHRANK, Flora 2 (1819) 452; BAKH. v. d. BR. Bull. J.B.B. III, 6 (1924) 185.—*C. vitifolium* SPRENG. Syst. Veg. 2 (1825) 596; STEEN. *l.c.* 521.

Small tree 3-12 m, with red-brown branches. *Leaves* \pm orbicular, 10-30 cm wide, cordate, glabrous, incised to $\frac{2}{3}$ - $\frac{3}{4}$, lobes 5, acuminate, crenate-serrate, basal axils of main ribs with domatia; petiole 10-25 cm. *Flowers* in dense panicles at the end of leafless twigs, pedicellate, bright yellow. Sepals 5, tomentose, persistent. Petals obovate, 4-6 cm long. Stamens *ca* 2 cm, inner ones shortest; anther cells with a terminal pore. *Capsule* 5-valvate; partly green partly red, obovoid, 4-8 by 4-6 cm,

apex depressed, finely velvety pubescent, striate-nerved. Pericarp hard, endocarp cream-coloured, parchment-like. Seeds reniform covered with cotton-like white hairs.

Distr. Native in Central & South America, in Malaysia sometimes cultivated as an ornamental tree.

Wood anat. VESTAL, Philip. J. Sc. 64 (1937) 221.

Note. The ovary in *C. regium* is not 3-locular as is often suggested but imperfectly 5-locular.

2. *Cochlospermum gillivrayi* BENTH. Fl. Austr. 1 (1863) 106; F.V.M. Descr. Not. Pap. Pl. 1, 4 (1876) 54 (*gillevraei*); incl. *var. papuanum* BAKER *f.* J. Bot. 61 (1923) Suppl. 4; STEEN. Bull. J.B.B. III, 13 (1936) 522.

Small deciduous tree, $4\frac{1}{2}$ -7 m, bark pale-grey,

channeled and scaly (BRASS); branches of the panicle, pedicels, and calyx slightly pubescent otherwise glabrous. *Leaves* 5–11 cm across, on 6–13 cm long petioles; stipules 3–4 cm long, subulate; blade divided to about $1/2$ – $1\frac{1}{2}$ cm from the base; lobes slightly toothed-crenate, 2 outer shortest and very acuminate. Panicles short and loose. *Flowers* yel-

3. *Cochlospermum religiosum* (L.) ALSTON, Handb. Fl. Ceyl. 6 (1931) 14; STEEN. Bull. J.B.B. III, 13 (1936) iv; CORNER, Wayside trees (1940) 174.—*Bombax religiosum* LINNÉ, Sp.Pl. (1753) 552; BAKH. v. d. BR. Bull. J.B.B. III, 6 (1924) 186.—*Bombax gossypium* (non L.) CAV. Diss. Bot. 5 (1785) 297, t. 156.—*C. gossypium* DC. Prod. 1



Fig. 1. *Cochlospermum religiosum* (L.) ALSTON, after the tree cultivated in the Bot. Gardens, Buitenzorg (type of *C. balicum*), $\times 1/2$.

low; pedicels less than $1\frac{1}{4}$ cm, lengthening after flowering. Sepals shortly pubescent, glabrous towards the apex, with very thin edges, outer sepals usually smaller than the inner ones. Anthers oblong, curved. *Capsule* obovoid-oblong, rarely exceeding $7\frac{1}{2}$ cm, depressed-truncate. Seeds enveloped in fugacious wool.

Distr. N. Australia, N. Queensland, Thursday Island and other islands near N. Australia, in *Malaysia*: only known from the Port Moresby area, Terr. of Papua, sometimes planted there, also near Boku (Kemp Welch river area).

Ecol. Mostly in anthropogenic localities but apparently native, common on dry rocky places along the coast, fl. July–Sept.

(1824) 527; STEEN. Bull. J.B.B. III, 13(1936) 522.—*Bombax conga* BURM. f. Fl. Ind. (1768) 145.—‘*Bombax lobatum*’ DESCHAMPS MS., Brit. Mus. t. 57.—*C. balicum* BOERL. Cat. pl. Hort. Bog. 1 (1899) 49.—**Fig. 1.**

Small rather crooked-branched, more or less deciduous tree. *Leaves* cordate, $7\frac{1}{2}$ –20 cm diam., margin undulate or obscurely crenate, apex of the lobes acuminate with blunt tip; petiole articulated 8–25 cm long. Stipules linear-subulate, caducous, 7–8 mm long. *Flowers* in a simple raceme or a loosely branched panicle, terminal, short-hairy, one flower open at a time on each branch, facing side ways. Pedicels ± 2 cm long. Bracts caducous, triangular-acute, short-hairy, 4–5 mm broad at the

base. Corolla yellow, with a distinct odour. Sepals partly purplish, 2–2½ by 1–2¼ cm. Petals thickened at the base. Stamens slightly S-curved, unequal. Anthers orange, falcate, 1 mm broad. Ovary globular. Style glabrous 1½–2 cm. *Capsule* obovate, 5–7 cm long, valves striate-ribbed, 2½–3 cm broad. Seeds reniform to cochleate, brown, 5–6 mm across.

Distr. India, Cambodia, introduced in Siam and Ceylon, in *Malaysia*: Penang Island and Malacca, E. Java and Bali, doubtless introduced.

Ecol. More or less established in Penang and very conspicuous in cultivated ground round the town, near Dato Kramat growing in a native settlement, in Malacca GRIFFITH noted 'near a stream at the foot of... hill'; in N. Bali near a large pagode (TEYSMANN) *pr.* Singaradja. At Buitenzorg flowering throughout the year. In Penang noted as deciduous. All specimens at low alt. It is propagated by cuttings or rather loppings; any branch stuck in the ground will strike in wet weather. Flowers last for 1½ day. If the flower is setting fruit the withered petals remain for a long time (CORNER).

Wood anat. By GAMBLE the wood is defined as 'extremely soft' (Indian Timbers 1902; here also short hand lens description).

Vern. *Bebaru* (Penang), *tjanigarah* (Bali), *buttercup tree*, *yellow cotton-tree*, *yellow silk cotton-tree* (Engl.). The Malay name 'bebaru' is used in confusion with *Hibiscus tiliaceus*.

Notes. Certainly introduced in Penang, never re-collected in GRIFFITH's spot. Among the MS.-plates left by DESCHAMPS no 57 is unmistakably this species, which has never been re-collected in Java after DESCHAMPS figured it (\pm 1793–1802); acc. to his MS. he did not visit Bali Island. The locality near Singaradja was visited by Mr DE VOOGD in 1936; flowering material was collected near the pagodes. The late Mr KERR wrote me, Aug. 1936, that 'there is no good evidence that the species is indigenous in Siam; the only place is a small hill crowned by a small deserted temple where it may quite well have been planted'. In India it is often used as a temple plant, and flowers are used in offerings. In Ceylon TRIMEN found it in the dry districts, but it occurs usually near temples for the sake of its beautiful flowers. For these reasons I am convinced that the species is introduced in Malaysia, that its introduction is due to its religious fame in India, and that it has been brought to Bali by the Hindus.

BOERLAGE described the Balinese specimens erroneously as having subglabrous leaves.