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A TAXONOMIC REVISION OF THE GENUS *GLOSSOCARYA* WALLICH EX GRIFFITH (VERBENACEAE)¹ IN AUSTRALIA

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Abstract

A taxonomic revision of *Glossocarya* in Australia is presented. The following three species are recognised: *G. calcicola*, *G. coriacea* and *G. hemiderma* with *G. coriacea* described as new.

Affinities and distribution are considered for the genus and each species. A key to the species is provided and a detailed description of each species is supplemented by illustrations.

Taxonomic History of the Genus

The genus *Glossocarya* was proposed by Wallich (1829) with one species *G. mollis*, the type of which came from Burma. Due to lack of generic description it remained an invalid name until Griffith (1843) provided a detailed description. It was then placed in the family Verbenaceae without reference to a particular subfamily or a tribe. This position was maintained by many subsequent botanists. In 1838, however, Endlicher placed the then invalid genus among "Genera Dubia" in the Verbenaceae, and later Walpers (1845) recorded the validated name in the tribe Aegiphileae. Schauer (1847) re-classified the Verbenaceae into three tribes:² Verbenaeae, Viticeae and Avicennieae. He further subdivided the tribe Viticeae into three subtribes:² Symphoremeae, Caryopterideae and Viticeae, with *Glossocarya* in the subtribe Caryopterideae. The subtribe Caryopterideae was accepted for the genus by Miquel (1858) and Bocquillon (1863). In the same publication, however, Bocquillon (1863) sank *Glossocarya* in the synonymy of genus *Caryopteris* Bunge. Subsequently, Bentham (1876) raised the status of the subtribe Caryopterideae to a tribe. The tribe Caryopterideae was later accepted for *Glossocarya* by C.B. Clarke (1885), Durand (1888), Post and Kuntze (1904), Bailey (1913), Craib (1922), Ridley (1923), Fletcher (1937, 1938), Lemée (1943) and Moldenke (1959, 1971, 1980).

In 1895, Briquet re-classified the Verbenaceae and upgraded the tribe Caryopterideae to a subfamily Caryopteridoideae. This classification was adopted by Dalla Torre & Harms (1904) and Moldenke (1959, 1971, 1980). Post & Kuntze (1904), however, did not accept Briquet's (1895) above classification and reduced the subfamily Caryopteridoideae to tribe Caryopterideae. Junell (1934) appears to have broadly accepted Briquet's classification, but he called Briquet's subfamilies and tribes as tribes and subtribes respectively. In his treatment of the Verbenaceae taxa, Junell (1934) placed the genus *Glossocarya* in the subfamily ("Tribus") Viticoideae, tribe ("Subtribus") Ajugeae. The new tribe and subtribe for the genus seems to have not been adopted by any subsequent botanist. A majority of botanists, however, have retained the genus in the Verbenaceae without reference to any subfamily or a tribe. The present author agrees with Bentham (1876) in retaining this genus in the tribe Caryopterideae as expressed by Fletcher (1937). [See comments under genus].

After the validation of *Glossocarya* by Griffith (1843), it remained a monotypic genus in the publications of Walpers (1845), Schauer (1847), Miquel (1858) and Bocquillon (1863).

¹The present treatment of the genus *Glossocarya* is the eighth in the series of taxonomic revisions in the family Verbenaceae in Australia (See Munir, 1982, 1984a, 1984b, 1985, 1987a, 1987b, 1989).

²For characters on which Schauer (1847) based his tribes and subtribes of the Verbenaceae see DC., *Prod.* 11 (1847) 522-700. Also see Munir (1989) 102-103.

(1863). Subsequently, Bentham (1876), C.B. Clarke (1885), Durand (1888), Briquet (1895), Trimen (1895), Dalla Torre & Harms (1904), Junell (1934) and Dop (1936) credited the genus with 3 species. Post & Kuntze (1904) and Ridley (1923) increased the number to 4, while Angely (1956) and Moldenke (1959) raised the number to 8. More recently, however, Moldenke (1971, 1982) increased the number to 9 species with 3 infraspecific taxa. The present publication has added yet another new species to the above number.

Australian History of the Genus

The first Australian collections of *Glossocarya* were made by Bowman, Dallachy, Daemel and Thozet sometime between 1862 and 1869 in northern Queensland. These collections were identified by F. Mueller (1868) as *Clerodendron linnæi* Thwaites. In view of its marked difference from other *Clerodendrum* species, F. Mueller (1868) created a new section "*Hemiderma*" for this taxon. Regarding it he also remarked that "the abnormal plant belongs for the time being to its own special section, if not genus, distinguished by a sectional name."

In 1870, Bentham recognised the above named taxon as a new *Clerodendrum* species and thus named it after F. Mueller's new section, *Hemiderma*, as *Clerodendrum hemiderma*. This name was accepted by F. Mueller (1875, 1882, 1889) and Bailey (1883, 1890, 1901). Subsequently, however, Bentham (1876) recognised it as a species of *Glossocarya* and mentioned *C. hemiderma* but did not make the new combination, *Glossocarya hemiderma*, which was published by Bailey (1913). This was the first record of *Glossocarya* from Australia. F. Mueller (1889), however, still placed *Glossocarya* in the synonymy of *Clerodendrum*. In 1928, Domin described one of his collection from northern Queensland as *G. calcicola*, thus increasing the number of *Glossocarya* species in Australia to two. Both species were accepted for Australia by Moldenke (1959, 1971, 1980, 1982) Elliot & Jones (1986) and others. At present there are three species of *Glossocarya* known from Australia.

GLOSSOCARYA Wallich ex Griffith

Glossocarya Wallich ex Griffith, *Calcutta J. Nat. Hist.* 3 (1843) 366;

Walp., *Repert. Bot. Syst.* 4 (1845) 133; Schauer in A.D.C., *Prodr.* 11 (1847) 625; Miq., *Fl. Ind. Bat.* 2 (1858) 903; Bocq., *Adansonia* 3 (1863) 179, 180, 206, as syn. of *Caryopteris* Bunge; *Rév. Verbenac.* (1863) 110, as syn. of *Caryopteris* Bunge; Pfeiffer, *Nom. Bot.* 1, part 2 (1874) 1460; Benth. in Benth. & Hook.f., *Gen. Pl.* 2 (1876) 1136, 1158; Kurz, *Forest Fl. Brit. Burma* 2 (1877) 257; C.B. Clarke in Hook.f., *Fl. Brit. Ind.* 4 (1885) 598; Durand, *Gen. Phan.* (1888) 322; F. Muell., *Sec. Syst. Cens. Aust. Pl.* 1 (1889) 173, as syn. of *Clerodendrum*; Baillon, *Hist. Pl.* 11 (1892) 115; Briq. in Engl. & Prantl, *Pflanzenfam.* IV, 3a (1895) 177, 178; Trimen, *Handb. Fl. Ceylon* 3 (1895) 361; Dalla Torre & Harms, *Gen. Siphon.* (1904) 433, no. 7197; T. Post & Kuntze, *Lexic. Gen. Phan.* (1904) 251, 688; Bailey, *Comp. Cat. Qld. Pl.* (1913) 386; Craile, *Kew Bull. Misc. Inf.* (1922) 240; Ridley, *Fl. Mal. Penin.* 2 (1923) 636; Junell, *Symb. Bot. Upsal.* 4 (1934) 119; Dop, *Fl. Gén. Indochine* 4 (1935) 886; Fletcher, *Kew Bull. Misc. Inf.* (1937) 71, 74; ib. (1938) 37; Lemée, *Dict. Syn. Gen. Pl. Phan.* 8b (1943) 657; Mold., *Résumé Verbenac. etc.* (1959) 413; N. Burb., *Dict. Aust. Pl. Gen.* (1963) 135; Mold., *Fifth Summary Verbenac. etc.* 2 (1971) 523, 763; Cliff. & Lud., *Keys Fam. Gen. Qld. Fl. Pl.* (1972) 124; Airy Shaw, *Dict. Fl. Pl. & Ferns* 8th edn (1973) 494; Mold., *Phytologia* 34 (1976) 274; Farr et al., *Index Nom. Gen.* (1979) 727; Baines, *Aust. Pl. Gen.* (1981) 166; Mold., *Phytologia* 47 (1981) 335; *Phytologia* 48 (1981) 122; *Phytologia* 50 (1982) 413; Mold. in Dassan. & Fosb., *Fl. Ceylon* 4 (1983) 480; Elliot & Jones, *Encyc. Aust. Pl.* 4 (1986) 367; Stanley in Stanley & Ross, *Fl. S.E. Qld* 2 (1986) 370; Mabb., *Pl. Book* (1987) 245.

Type species: G. mollis Wallich, *Numer. List no.* 1741 (1829), *nom. nud. ex Griffith, Calcutta J. Nat. Hist.* 3 (1843) 366.

Scandent or subscandent shrubs or woody liana. *Stem* and branches almost terete or obscurely tetragonal. *Leaves* simple, decussate-opposite, petiolate, exstipulate, entire, reticulate-veined, unicostate. *Inflorescence* cymose; cymes pedunculate, dichotomous, usually arranged in a dense terminal, corymb-like thyrse. *Flowers* small, numerous, complete, bracteate, pedicellate or sessile, zygomorphic, bisexual, hypogynous; bracts small or minute, or some of the

lowermost foliaceous. *Calyx* of 5 fused sepals, persistent, tubular or somewhat campanulate, variously 5-toothed or sometimes almost truncate, non-acrescent. *Corolla* of 5 fused petals, deciduous, mostly hypocrateriform or infundibular, tubular below with nearly equally spreading 5 lobes at the top; tube narrow-cylindric, broadened at the apex, straight or curved, longer than calyx; lobes subequal. *Stamens* 4, didynamous, usually much exerted, alternate with the corolla-lobes, epipetalous, inserted in the corolla-throat; filaments filiform; anthers dorsifixed, ovate or ovate-oblong, 2-lobed, lobes parallel or divergent in the free lower half. *Ovary* bicarpellary, syncarpous, 4-locular, with one ovule in each cell, attached to an axile placentation at or above the middle; style terminal, exerted, filiform, glabrous, with 2 short stigmatic lobes. *Fruit* a schizocarp, oblong or ellipsoid-oblong, exerted from the fruiting-calyx, 4-valved, separating into 4 narrow mericarps, substipitate, the valves narrowly obovoid, their margins inflexed or involute from above or from slightly below the middle, placentiferous, each holding one seed by its inflexed margin, dehiscent from the base or from the middle, freeing a persistent, naked, central column ("carpophore"), forming 1-seeded mericarps which are extended basally into a short or linear wing; seeds oblong, erect, narrow, exalbuminous; fruiting calyx enclosing almost lower half of fruit.

Number of species: World: \pm 13 specific and infraspecific taxa; Australia: 3 species.

Derivation of name

The generic name is derived from the Greek, *glossa*, a tongue; *karyon*, a nut; referring to the one-seeded mericarps with its involute tongue-like margin.

Distribution (Map 1)

The genus *Glossocarya* is known from Sri Lanka, Burma, Thailand, Cambodia, Vietnam, Malaya (West Malaysia), Papua New Guinea and Australia. So far, it has not been recorded from India, Philippines and any part of Indonesia.

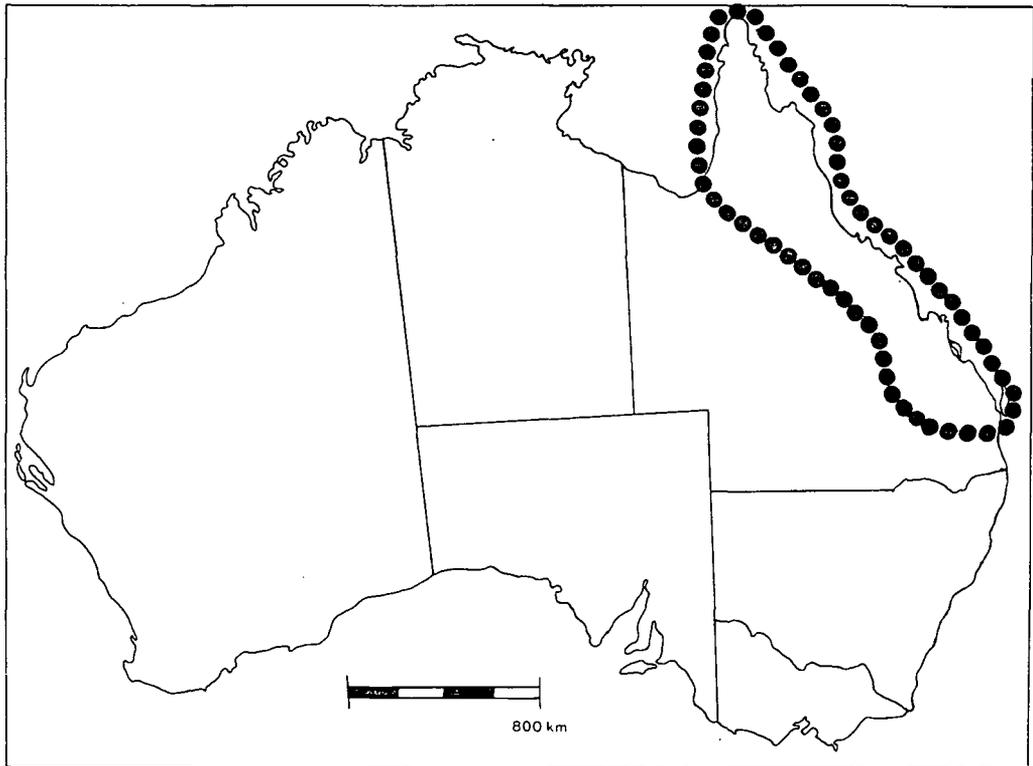
In Australia, the genus is represented by three species of which two are endemic in eastern Queensland and one is also known from Papua New Guinea.

Comments

Since the inception of the genus *Glossocarya*, various authors have called its fruit a "capsule" and each unit of the fruit a "pyrene" or "nutlet". During the present studies, the fruit has been found to split into 4 parts each with part of the ovary wall. Therefore, it is regarded here as a schizocarp which splits into 4 mericarps.

In a tentative key to the accepted taxa, Moldenke (1982) divided the genus into two categories: The first with seeds basally winged ("alate") and gynophore (i.e. central column) present, and second with seeds not basally winged and no gynophore present. The first category contains only *G. hemiderma* (F. Muell.) Benth. and the second all other species in the genus. In the generic description, however, Moldenke (1982) described the fruit capsular, 4-valvate, "the valves . . . dehiscent from the base or from the middle, freeing a persistent, naked, central column, forming 1-seeded pyrenes which are extended basally into a short or linear wing." This seems to contradict the statement in the "key to the accepted taxa" for segregating *G. hemiderma* from the rest of the taxa in the genus. During present investigation also, all three Australian species were found to have seeds basally winged and a carpophore present. In fact, these two characters are identical in all three Australian species so that they can hardly be used for distinguishing one from the other.

Bentham (1876) described the inflorescence as "flores in cymes sessiles." However, the flowers in two Australian species are found to be shortly pedicellate (up to 3 mm long) and in one almost sessile (up to 1 mm long). [In 1876, the species with up to 3 mm long pedicels was



Map 1. Distribution of the genus *Glossocarya* Wallich ex Griffith in Australia.

the only one known from Australia.]

No cytological investigation of any *Glossocarya* species have been done. There is a need for cytological work on the taxa of this genus.

According to Bhoj Raj (1983), "the pollen grains of *Glossocarya* and some species of *Caryopteris* have a tectate-perforate exine structure with a spinulose or vestigial spinulose sculpture, and are very similar to those of the *Clerodendrum* type."

Briquet (1895) mentions "8 staminodes", but such a character has not been noticed by any other botanist.

Affinities

Glossocarya is closely related to *Caryopteris* Bunge in its inflorescence being cymose, centrifugal, the cymes arranged into corymbose thyrses; calyx more or less cup- or bell-shaped; ovules laterally attached above the base or near the summit of the cells; fruit a schizocarp, 4-valved, the valves separating the mericarps from the placental axis and mericarps winged. Nevertheless, *Glossocarya* can easily be distinguished by its calyx-tube being minutely toothed or almost truncate, corolla not 2-lipped and fruiting calyx not accrescent. In *Caryopteris*, the calyx is deeply 5-fid, corolla 2-lipped with posterior lip usually fimbriate or toothed, stamens greatly exserted and the fruiting calyx accrescent.

According to Fletcher (1937), the fruit characters of the genus *Garrettia* Fletcher "clearly place this genus in the tribe Caryopterideae, which include the genera *Peronema*,

Hymenopyramis, *Glossocarya*, *Caryopteris* and a recently described genus from Annam, *Karomia*, all of which are characterised by having a capsule which dehisces by four valves into four, 1-seeded pyrenes. The imparipinnate leaves and two stamens of *Peronema*, the greatly enlarged calyx surrounding the fruit of *Karomia*, the greatly accrescent 4-winged utricular calyx of *Hymenopyramis*, and the oblong exserted capsule of *Glossocarya*, clearly forbid its inclusion in any of these genera". There are a few characters common between *Glossocarya* and *Petraeovitex* Oliv. Both have non-involucrate cymose inflorescence, 4-valved schizocarpic fruit with valves separating the mericarps from the placental axis. However, *Petraeovitex* may easily be distinguished by its leaves being ternate or biternate; fruiting calyx accrescent, distinctly winged, and greatly changed in form and appearance.

Glossocarya has often been mistaken for *Clerodendrum* L. because of its similar looking leaves, inflorescence type and exserted stamens and style. The latter, however, can easily be distinguished by its drupe and accrescent calyx, while *Glossocarya* has a schizocarp and non-accrescent calyx.

Key to the species

- 1a. Leaf-blades glabrous, subcoriaceous or coriaceous, non-glandular; calyx and corolla pubescent but non-glandular outside; ovary and fruit non-glandular and glabrous 1. *G. coriacea*
- b. Leaf-blades pubescent-tomentose or at least puberulous when young, chartaceous; calyx and corolla pubescent and glandular outside; ovary and fruit glandular and tomentose-hirsute 2
- 2a. Leaf-blades glandular-punctate and densely pubescent to tomentose on lower surface; pedicels up to 1 mm long 2. *G. calcicola*
- b. Leaf-blades not glandular-punctate, pubescent when young, later glabrous; pedicels 1-3 mm long 3. *G. hemiderma*

1. *Glossocarya coriacea* Munir, sp. nov.

Clerodendron hemiderma F. Muell. ex Benth., Fl. Aust. 5 (1870) 61, p.p. quoad spec. *Dallachy* s.n. MEL 98208, Rockingham Bay and *Thozet* s.n. K, MEL 98209, MEL 98225 & MEL 98230, Rockhampton.

Frutex scandens vel liana lignosa (1-) 1.5-4 (-6) m longa. Caulis glaber; cortex aspera pallide grisea vel brunnea. Folia breviter petiolata; lamina ovata elliptico-ovata vel subcordulata integra obtusa vel breviter acuminata (20-) 35-80 (-110) mm longa (15-) 20-60 (-75) mm lata coriacea vel subcoriacea superne aliquam nitida et viridis inferne obscura et pallide viridis glabra; petiolus gracilis puberulus (2-) 4-8 (-10) mm longus. Inflorescentia thyrsus corymboides terminalis et in axillis foliorum supremorum (30-) 40-80 (-110) mm longus (40-) 50-100 (-120) mm latus; cymae congestae trichotomae pubescentes; pedunculi laterales primarii graciles pubescentes (10-) 15-40 (-50) mm longi. Flores suaveolentes pedicellati bracteati congesti; pedicelli incano-pubescentes non glandulosi 1-3 mm longi; bractee sessiles oblongo-lanceolatae incano-pubescentes \pm 1 mm longae. Calyx campanulatus vadose 5-dentatus raro 6-dentatus interdum fere truncatus non glandulosus extra incano-pubescentis intra glaber 3-4.5 mm longus apice 2-3 mm diametro; dentes breves rotundati vel breviter apiculati 0.5-1 mm longi basaliter \pm 1 mm lati. Corolla alba infundibuliformis 5-lobata non glandulosa extra sericeo-pubescentis fauce villosa; tubus infra cylindricus superne dilatatus 5-7 mm longus superne 1.5-3 mm diametro; lobi elliptici vel elliptico-oblongi obtusi 2-3.5 mm longi 1.5-2.5 mm lati. Stamina 4 didynama exserta; filamenta alba fauce corollae inserta filiformia supra glabra prope basem villosa 6-9 mm longa; antherae oblong-ellipticae 0.5-1 mm longae. Ovarium ellipsoideo-obovoideum non glandulosum glabrum interdum apice pilis paucis sparsis vadose 4-lobatum 1-1.5 mm longum \pm 1 mm diametro; stylus albus filiformis glaber 9-12 mm longus; stigma bifida. Fructus oblongus vel ellipsoideo-oblongus apice rotundatus super calycem fructificantem multum exsertus ubi vivus viridis ubi maturus siccusque cinereo-brunneus 4-8 (-10) mm longus 2-3.5 mm diametro generatim glaber interdum initio apice sparsim hirsutus postea glabrescens dehiscens in nucas 4 angustas findens in nuxe quoque pars inferior sine semine alata; calyx fructificans chartaceus 3-5 mm diametro non lateraliter expansus dimidium infernum fructus includens.

Type: C.T. White 12490, Port Curtis district, Queensland, Australia, 26.xi.1943 (BRI, holotype; GH, K, MO, UC — isotypes).

Description (Fig. 1)

A scandent shrub or a woody liana, (1-) 1.5-4 (-6) m long. Stem glabrous; bark rough, light grey or brown. Leaves shortly petiolate; lamina ovate, elliptic-ovate or somewhat cordulate,

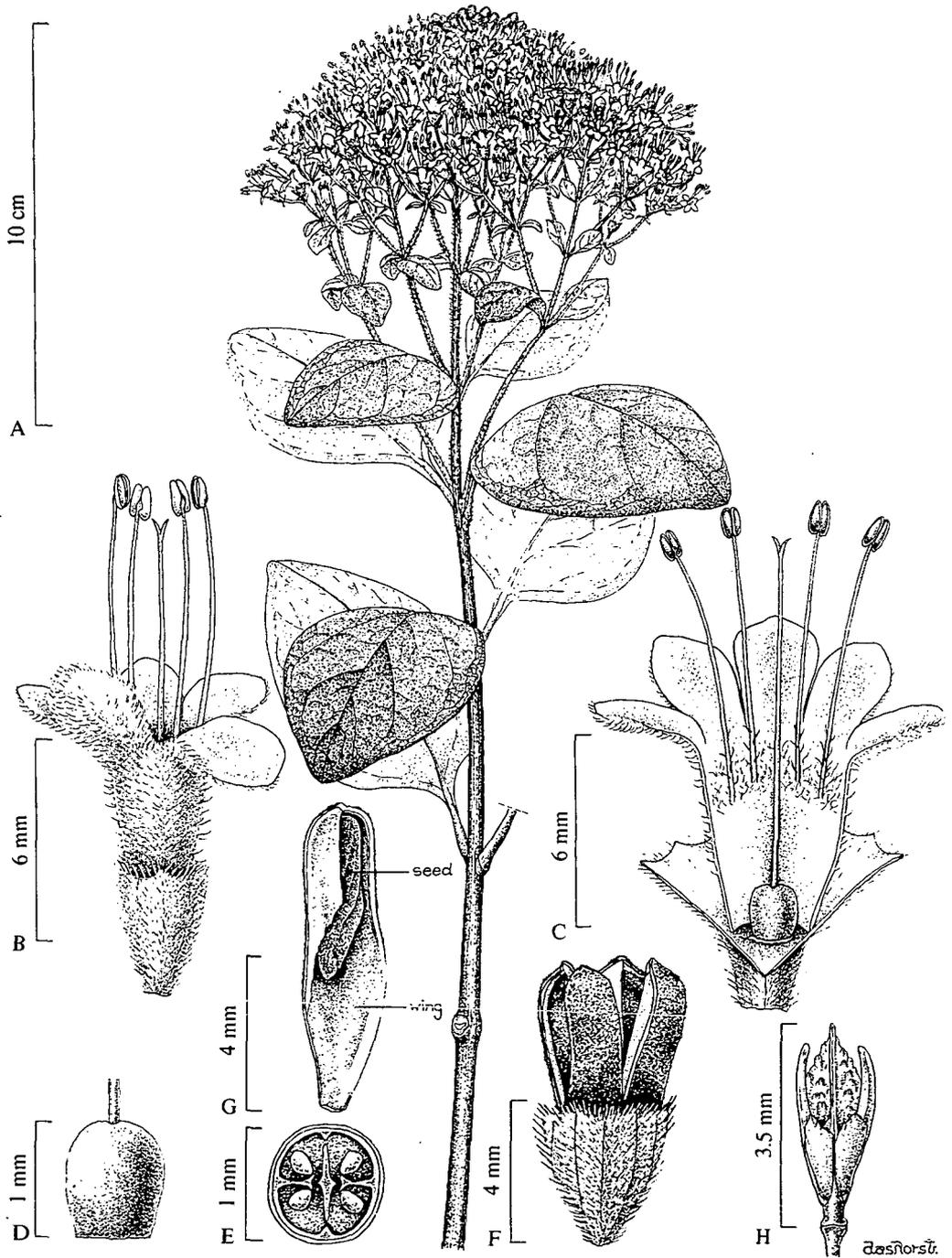


Fig. 1. *Glossocarya coriacea* Munir, sp. nov. (A-E, N. Gibson 1072: BRI; F-H, P. O'Shanesy 36: MEL 98236). A, flowering branch; B, flower; C, flower with calyx and corolla vertically cut open showing androecium, glabrous gynoecium and hairy corolla-throat; D, ovary; E, transverse section of ovary; F, dehiscent fruit with glabrous mericarps; G, mericarp showing seed and wing; H, carpophore without mericarps and fruing calyx.

entire, obtuse or shortly acuminate, (20-) 35-80 (-110) mm long, (15-) 20-60 (-75) mm wide, coriaceous or subcoriaceous, semiglossy green above, dull pale green below, glabrous; petiole slender, puberulous, (2-) 4-8 (-10) mm long. *Inflorescence* corymboid thyrse, terminal and in the axil of top-most leaves, (30-) 40-80 (-110) mm long, (40-) 50-100 (-120) mm wide; cymes congested, trichotomous, pubescent; lateral primary peduncles slender, pubescent, (10-) 15-40 (-50) mm long. *Flowers* "sweetly scented", pedicellate, bracteate, congested; pedicels hoary-pubescent, non-glandular, 1-3 mm long; bracts sessile, oblong-lanceolate, hoary-pubescent \pm 1 mm long. *Calyx* campanulate, shallowly 5-toothed, rarely 6-toothed, sometimes almost truncate, non-glandular, hoary-pubescent outside, glabrous inside, 3-4.5 mm long, 2-3 mm diam. at top; teeth short, rounded or shortly apiculate, 0.5-1 mm long, \pm 1 mm wide at base. *Corolla* "white", infundibuliform, 5-lobed, rarely 6-lobed, non-glandular, silky-pubescent outside, villous in throat; tube cylindrical below, enlarged at top, 5-7 mm long, 1.5-3 mm diam. at top; lobes elliptic or elliptic-oblong, obtuse, 2-3.5 mm long, 1.5-2.5 mm wide. *Stamens* exerted; filaments "white", filiform, glabrous above, villous near base, 6-9 mm long; anthers oblong-elliptic, 0.5-1 mm long. *Ovary* ellipsoid-obovoid, non-glandular, glabrous, sometimes with a few sparse hairs on top, shallowly 4-lobed, 1-1.5 mm long, \pm 1 mm diam.; style "white", filiform, glabrous, 9-12 mm long, stigma bifid. *Fruit* oblong to ellipsoid-oblong, rounded at top, much exerted above fruiting calyx, green when fresh, greyish-brown when mature and dry, 4-8 (-10) mm long, 2-3.5 mm diam., generally glabrous, sometimes initially sparsely hairy on top, later turning glabrescent, dehiscent, splitting into 4 narrow mericarps, the lower seedless portion winged on each nut; fruiting calyx chartaceous, 3-4 mm diam.

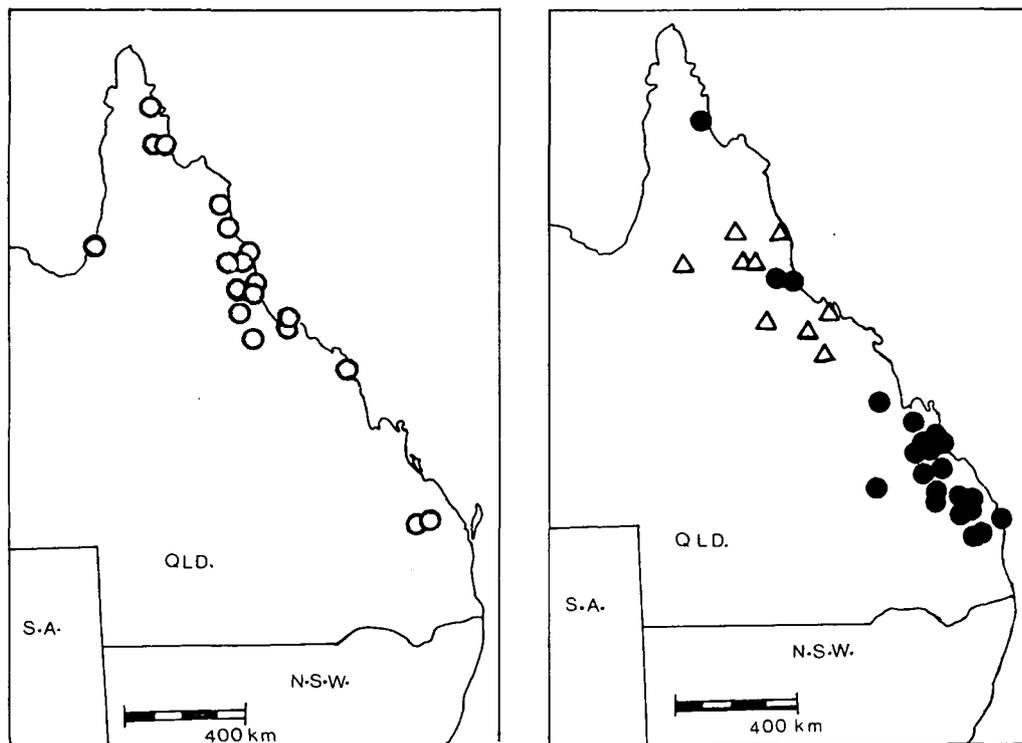
Representative specimens (Collections seen: Australian 50)

AUSTRALIA: QUEENSLAND: *Anderson 3975*, Along Moore Creek, c. 2 km N Rockhampton, 14.iv.1985 (BRI); *Bancroft s.n.*, Eidsvold, -iv.1923 (A, BRI, GH, NSW); *Batianoff & McDonald 682*, Double Head, Rosslyn Harbour, 7 km SE Yeppoon, 9.ix.1977 (BRI); *Bidwill 18*, Wide Bay, undated (K); *Blake 12755*, Marmor, between Rockhampton and Gladstone, 8.iii.1937 (BRI); *Bowman s.n.*, Herbert Creek, 1870 (MEL 98427); *Bowman s.n.*, Crocodile Creek, undated (MEL 98235); *Dallachy s.n.*, Herbert River, 5.xi.1868 (MEL 98222, syntype of *Clerodendron hemiderma* F. Muell. ex Benth.); *Dallachy s.n.*, Rockingham Bay, undated (C, MEL 98208, syntype of *Clerodendron hemiderma* F. Muell. ex Benth.); *Dallachy s.n.*, Mt Archer, 3.i.1863 (MEL 98233); *Dietrich 902*, Rockhampton, 1864-66 (CANB, G, HBG, L, MEL, NY, PR); *Dietrich 1331*, loc. cit., 1864 (AD, FI, HBG, MEL, PR); *Forster 2772*, Mt Perry, 7.xii.1986 (BRI, NSW); *Forster 3289*, 1 km SW Booyal, 27.xi.1987 (BRI); *Fryar s.n.*, Glastonbury, 27.xi.1980 (BRI); *Gibson 460*, Callide, Biloela area, 1.i.1983 (BRI); *Gibson 997*, State Forest 53, Dan Dan scrub, 5.xii.1987 (BRI); *Gibson 1072*, State Forest 60, Rundle Range, 23.xii.1987 (BRI); *Hyland 6824*, T.R.14, Rocky River Catchment, 7.ix.1973 (L, QRS); *O'Shanesy 10*, Rockhampton, 7.i.1867 (MEL 98237); *Rodd & Hardie 4387*, Burnett Highway, 22 km S Mt Morgan, 14.iv.1983 (BRI, NSW); *Sharpe & Hockings 679*, Isla Gorge, c. 28 km SW Theodore, 24.viii.1973 (BRI); *Sharpe & Forster 4621*, Mt Glastonbury, c. 20 km W Gympie, 11.i.1987 (BRI, MEL); *Smith 651*, Dallarnil, Burnett district, 28.xii.1939 (BRI); *Smith 3577*, Mt Scoria, c. 6.5 km SSE Thangool, 27.x.1947 (BISH, BRI, GH, L); *Smith 9807*, Goodnight Scrub, c. 65 km SW Bundaberg, 11.vi.1957 (BRI, GH, L); *Telford 964*, Coalstaun Lakes, c. 40.23 km E Gayndah, 27.v.1969 (CBG 2 spec.); *Thozet s.n.*, Rockhampton, 1869 (K, MEL 98225, MEL 98209, MEL 98230 — syntypes of *Clerodendron hemiderma* F. Muell. ex Benth.); *Thozet 555*, Mt Archer, undated (MEL 98243); *Webb 2208*, Bajool, 5.ix.1950 (CANB); *Webb & Tracey 10727*, Mt Etna via Rockhampton, 13.v.1971 (BRI, CANB); *White 12490*, Marmor S of Rockhampton, Port Curtis District, 26.xi.1943 (BRI, holotype: GH, K, MO, UC — isotypes); *Williams 80001*, 30 km S of Lotus Creek, Bruce Hwy, 5.iv.1980 (BRI); *Wilson 709*, Goodnight Scrub, 64.37 km SW Bundaberg, 11.vi.1957 (BRI).

Distribution and ecology (Map 2)

G. coriacea seems to be endemic to the coastal regions of Queensland in Australia. It has been most commonly collected from pastoral districts "Leichhardt", "Port Curtis" and "Wide Bay". A few collections are known from around Rockingham Bay in the "North Kennedy" district. The northernmost known locality is on Cape York Peninsula where it has been recorded from Rocky River Catchment area near McIlwraith Range. This taxon has not been reported from any off-shore island nor from the coastal areas along the Gulf of Carpentaria. The overall known distribution is between 22° and 27°S and 149° and 153°E.

Growing in semi-evergreen vineforest on limestone outcrops. Also found in monsoon



Map 2. Distribution of *G. hemiderma* ○, *G. calcicola* △, *G. coriacea* ●.

rainforest on steep rocky hillside and on dissected sandstone plateau. Often climbing on shrubs and tree-tops in river-catchment areas.

Comments

The material of this species has been misidentified and distributed in some herbaria as *Clerodendron hemiderma*, *Glossocarya hemiderma* and *G. calcicola*. The chief distinguishing character of this species is its glabrous ovary and almost coriaceous glabrous leaves, but these characters were apparently overlooked by other botanists. No one has recorded glabrous ovary in the genus *Glossocarya* in Australia.

As mentioned above, the ovary is generally completely glabrous, but in a few collections (e.g. *Bancroft s.n.* and *Sharpe & Forster 4621*) a few sparse hairs have been noticed on top of ovary. Sometimes, the number of calyx-teeth and corolla-lobes each range from 4 to 6 in flowers of the same inflorescence. The juvenile leaves are puberulous and sometimes crenate or dentate, but mature leaves are always glabrous and entire.

Affinities

G. coriacea seems to be nearest to *G. hemiderma*. In view of their close resemblance, *G. coriacea* has previously been misidentified as *G. hemiderma*. The former, however, may readily be identified by its coriaceous glabrous leaves, pubescent but non-glandular calyx and corolla, and absence of glands and hairs on ovary and capsule.

2. *Glossocarya calcicola* Domin, *Biblioth. Bot.* 89, VI (1928) 558, fig. 180; Wangerin, *Just's Bot. Jahresber.* 56(1) (1936) 668; Fedde & Schuster, *Just's Bot. Jahresber.* 56(2) (1937) 285; Mold., *Known Geogr. Distrib. Verbenac.* edn 1 (1942) 69; *ibid.* edn 2 (1949) 153; Mold., *Résumé Verbenac. etc.* (1959) 209; *Fifth Summary Verbenac. etc.* 1 (1971) 346; *Sixth Summary Verbenac. etc.* (1980) 336; *Phytologia* 50 (1982) 418; Elliot & Jones, *Encyc. Aust. Pl.* 4 (1986) 368 & fig.

Holotype: *Domin 8156*, Chillagoe in collibus calcareis carsticisque frequens, 9.ii.1910 (PR); *Domin 8157*, loc. cit. 9.ii.1910 (PR, possible isotype).

G. hemiderma F. Muell. ex Benth., *Fl. Aust.* 5 (1870) 61, p.p. quoad spec. *Bowman 77*, Sellheim River, Qld undated (MEL 98221).

Typification

While dealing with Domin's Australian collections of the family Verbenaceae it seems that on several occasions he gave a new collecting number to duplicates of his collection. This had been noticed in his collections of the genera *Callicarpa* L., *Clerodendrum* L., *Premna* L. and *Vitex* L. During present investigation it was found that Domin seems to have continued with this practice in a collection of *G. calcicola*. The label information and collecting dates with his collection nos *Domin 8156* and *Domin 8157* are exactly the same. Both numbers (i.e. specimens) belong to the type collection and appear to have been collected simultaneously from the same plant. According to the protologue of *G. calcicola*, *Domin 8156* is found to be the holotype of this species, and *Domin 8157* is, therefore, regarded here as a possible isotype. Both type specimens are preserved in Herb. PR.

Description (Fig. 2)

A large scandent shrub or liana 2-5 m long. *Stem* pubescent, becoming glabrescent when old; branchlets canescent-tomentose. *Leaves* shortly petiolate; lamina cordate-orbicular or broadly cordate-ovate, entire, obtuse or shortly acuminate, (20-) 30-55 (-65) mm long, (20-) 35-50 (-55) mm wide, chartaceous to coriaceous, green shiny but shortly and softly puberulent-pubescent above, glandular-punctate and densely pubescent-tomentose on lower surface; petiole densely pubescent-tomentose, 3-8 (-10) mm long. *Inflorescence* terminal, dense corymboid thyrses, 30-60 (-90) mm long, 40-100 (-140) mm wide; cymes compact, many-flowered, pubescent-tomentose; lateral primary peduncles pubescent-tomentose, (10-) 20-30 (-40) mm long. *Flowers* subsessile or with a short pubescent pedicel up to 1 mm long; bracts minute, sessile, oblong or linear-lanceolate, \pm 1 mm long. *Calyx* narrowly campanulate or obovoid, shallowly 5-toothed, sometimes almost truncate, glandular and hoary-pubescent outside, glabrous inside, 2.5-3.5 mm long, 1.5-2 mm diam. at top; teeth short, acute, \pm 0.5 mm long, about 1 mm wide at base. *Corolla* "white", infundibuliform, 5-lobed, glandular and pubescent outside, sparsely villous in throat; tube slender, cylindrical, broadened at top, almost twice as long as the calyx, (4-) 5-7 mm long, 1-2 mm diam. at top; lobes elliptic-oblong, obtuse 2-3 mm long, 1-2 mm wide. *Stamens* much exerted; filaments "white", filiform, glabrous above, villous towards base, (4-) 6-9.5 mm long; anthers oblong-elliptic, 0.5-1 mm long, \pm 0.5 mm wide. *Ovary* ellipsoid-obovoid, glandular and densely tomentose-hirsute on upper half, faintly 4-lobed on top, 0.5-1 mm long, \pm 0.5 mm diam.; style exerted, filiform, glabrous, 8-12 mm long. *Fruit* oblong to ellipsoid-oblong, rounded at top, almost twice as long as the fruiting calyx, green, turning greyish-brown when mature and dry, 5-8 mm long, 2-3 mm diam., glandular, tomentose to hirsute on the upper half; fruiting calyx chartaceous, 3-5 mm long, not expanding outwards.

Specimens examined

AUSTRALIA: QUEENSLAND: *Bowman 77*, Sellheim River, 1869 (MEL 98221, syntype of *Clerodendron hemiderma* F. Muell. ex Benth.); *Clarkson 6846* & *McDonald*, Royal Arch Tower, c. 5 km SW Chillagoe, 10.iii.1987

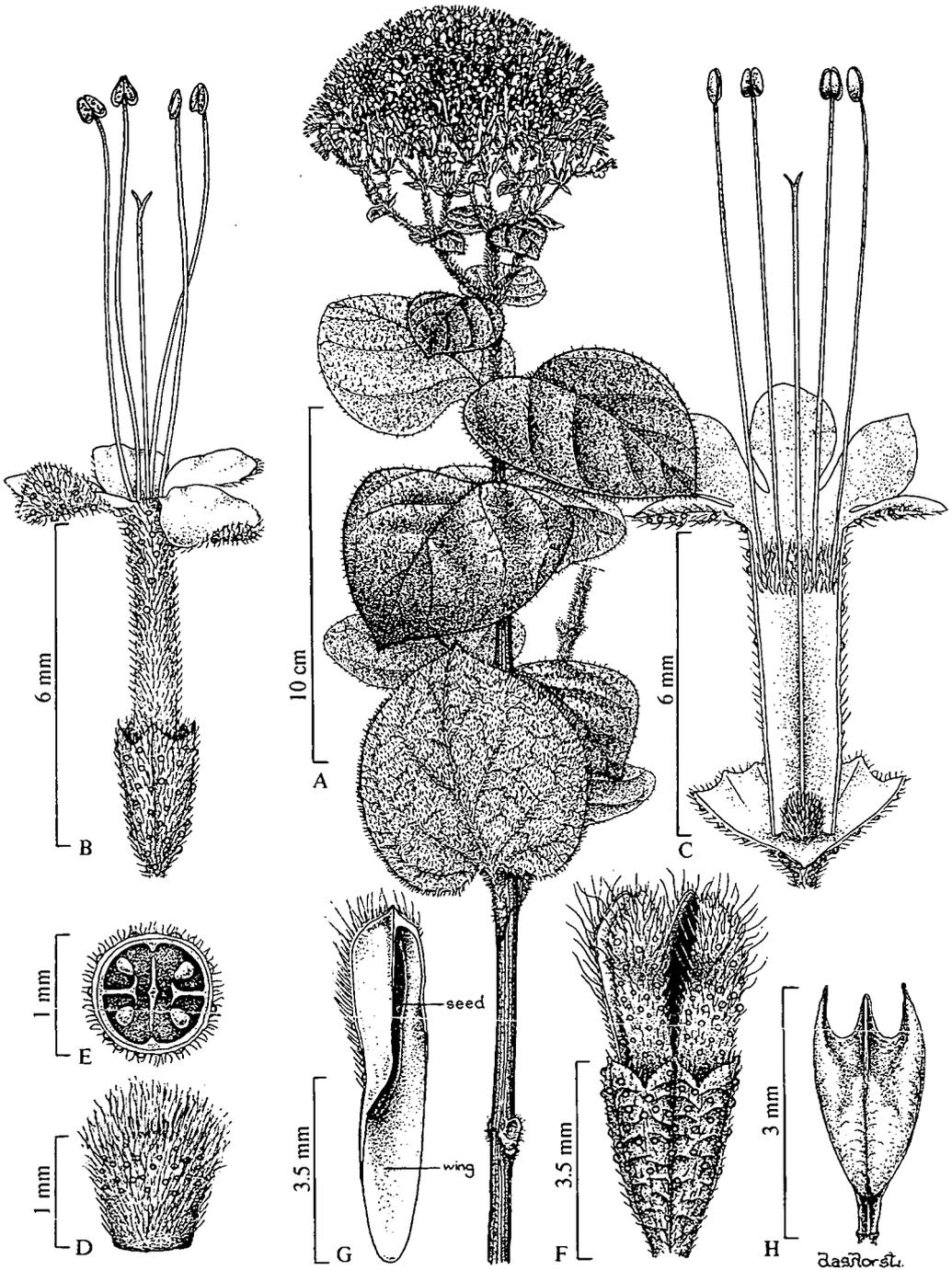


Fig. 2. *Glossocarya calcicola* Domin (A-H, K. Domin 8156, holotype). A, habit sketch of a flowering branch; B, flower; C, flower with calyx and corolla longitudinally cut open showing androecium and gynoecium; D, ovary; E, transverse section of ovary; F, dehiscent fruit with tomentose mericarps; G, mericarp showing seed and wing; H, carpophore without mericarps and fruiting calyx.

(AD, BRI); *Clarkson 6887 & McDonald*, Forty Mile Scrub National Park, 1.6 km N of the Mount Surprise road junction on Kennedy Highway, 11.iii.1987 (AD, BRI, DNA, MBA, PERTH, QRS); *Conn & Campo 1317*, Griffith Siding, c. 4 km E Mungana, 10 km W Chillagoe, 2.vi.1983 (BRI, CANB, DNA, MAREEBA, MEL); *Daintree s.n.*, Gilbert River, undated (MEL 98242); *Domin 8155*, apud rivulum Harveys Creek, -xii.1909 (PR); *Domin 8156*, Chillagoe in collibus calcareis carsticisque frequens, 2.ii.1910 (PR, holotype); *Domin 8157*, loc. cit., 2.ii.1910 (PR, possibly an isotype); *Flecker 7169*, Chillagoe, 4.i.1941 (BRI); *Hubbard & Winders 6767*, Chillagoe, 22.i.1931 (BRI, K); *Hyland 5832*, between Chillagoe and Mungana, 26.i.1972 (BRI, QRS); *Hyland 6052*, Barrabas Scrub, 16.v.1972 (BRI, QRS); *Kahn s.n.*, Toomba NW Charters Towers, 23.iv.1978 (JCT/S-7851); *Michael 283*, Chillagoe, undated (E, GH); *F. Mueller s.n.*, Burdekin River, undated (K); *Webb & Tracey 10178*, 6.4 km N Mungana, 31.v.1970 (BRI, CANB); *Williams 80010*, Reedy Brook Station, between Reedy Brook and Valley of Lagoons, 9.iv.1980 (BRI); *Wyatt 8*, Mt Inkerman S of Home Hill, -i.1968 (BRI); *Collector unknown*, Chillagoe, 23.viii.1967 (BRI).

Distribution and ecology (Map 2)

G. calcicola is endemic to Queensland where it is known to occur chiefly in the west-south-west of Cairns and south-south-west of Townsville. Almost all known localities are restricted to the pastoral districts "Cook" and "North Kennedy" where this species has been frequently collected from around Chillagoe, Mungana and along Burdekin River. The overall distribution is in the coastal areas between 17° and 21°S and 142° and 148°E.

It is known to grow "amongst limestone boulders on outcrops" and in "deciduous vine thicket on basalt". Also recorded from "limestone karst outcrops, dominated by *Brachychiton*, *Eucalyptus dichromophloia* and *Terminalia platyphylla*".

Comments

A collection of this species by *B.J. Conn & J. De Campe 1317*, from west of Chillagoe in Queensland, is reported to have come from "limestone karst outcrops, dominated by *Brachychiton*, *Eucalyptus dichromophloia* and *Terminalia platyphylla*". The above named *Eucalyptus* species, however, is according to G.M. Chippendale (1988), only known from "central-northern Northern Territory".

Foliage of juvenile shoots is markedly different from that on mature stems. Often the foliage on juvenile shoots is smaller and with dentate or lobed margins, but the laminae of mature leaves are always entire.

The corolla-tube was described by Moldenke (1982) as "internally glabrous", but during the present study a villous tomentum has been observed inside the corolla-throat.

According to field notes by *Clarkson 6887 & McDonald s.n.*, the flowers of this species are "green", but *Hyland 5832* recorded flowers with "white petals".

Affinities

Amongst Australian *Glossocarya* species, *G. calcicola* seems nearest to *G. hemiderma*. In both species, leaf-blades are hairy at least at young stage, calyx and corolla pubescent and glandular outside, and ovary and capsule glandular and tomentose-hirsute. For distinguishing characters see 'Key to the species'. According to Domin (1928), *G. calcicola* is closely related to "eastern Indian" species *G. mollis* Wall. In both taxa, the leaf-blades are tomentose to subvelutinous beneath, and ovary and capsule tomentose-hirsute. However, *G. mollis* can easily be distinguished by the larger size of its leaf-blades (6-10 cm long) and rather ample inflorescence (up to 30 cm long and 15 cm wide). Besides, the leaf-blades in *G. mollis* are apically usually acute or acuminate to mucronate, obsoletely pubescent above, and corolla-lobes 4 mm long. In *G. calcicola*, the leaf-blades are 2-6.5 cm long and 2-5.5 cm wide, apically obtuse or shortly acuminate, softly pubescent above; inflorescence 3-9 cm long and 4-14 cm wide; corolla-lobes 2-3 mm long. Moreover, *G. mollis* occurs in Burma and Malaya (now West Malaysia) while *G. calcicola* is endemic to north-eastern Queensland in Australia.

3. *Glossocarya hemiderma* (F. Muell. ex Benth.) Bailey, *Compr. Cat. Qld Pl.* (1913) 386, fig. 365, p.p.; Domin, *Biblioth. Bot.* 89, VI (1928) 558, p.p.; Junell, *Symb. Bot. Upsal.* 4 (1934) 119, 120 & fig. 184, p.p.; Beer & H.J. Lam, *Blumea* 2 (1936) 221, 226, p.p.; Mold., *Résumé Verbenac. etc.* (1959) 201, 209, 211, 264, 266, 296, p.p.; Willaman & Schubert, *Techn. Bull. U.S.D.A.* 1234 (1961) 237, p.p.; Mold., *Fifth Summary Verbenac. etc.* 1 & 2 (1971) 336, 346, 349, 446, 449, 523, p.p.; Mold., *Phytologia* 28 (1974) 448, p.p.; *Phytologia Mém.* 2 Sixth Summary Verbenac. etc. (1980) 327, 336, 340, p.p.; Baines, *Aust. Pl. Gen.* (1981) 166, p.p.; *Phytologia* 50 (1982) 419, p.p. excl. C.T. White 12490; Stanley in Stanley & Ross, *Fl. S.E. Qld* 2 (1986) 370, p.p.; Elliot & Jones, *Encyc. Aust. Pl.* 4 (1986) 368, p.p.; Williams, *Native Pl. Qld* 3 (1987) 142, p.p., 143 fig.

Lectotype: *J. Dallachy s.n.*, Rockingham Bay, Queensland, undated (MEL 98216, lectotype designated here; MEL98203 – MEL98207, MEL98210 – 98214, MEL98227 – MEL98229, MEL un-numbered spec. — isolectotypes!) excl. syntypes *Bowman 77*, Sellheim River; *Thozet s.n.*, Rockhampton.

Clerodendron hemiderma F. Muell. ex Benth., *Fl. Aust.* 5 (1870) 61, p.p. excl. syntypes *Bowman 77*, Sellheim River, *Dallachy s.n.*, MEL98208, Rockingham Bay & *Thozet s.n.*, Rockhampton; F. Muell., *Fragm.* 9 (1875) 5; *Syst. Cens. Aust. Pl.* 1 (1882) 103; Bailey, *Synop. Qld Fl.* (1883) 380; F. Muell., *Sec. Syst. Cens. Aust. Pl.* 1 (1889) 173; Bailey, *Cat. Pl. Qld* (1890) 36; *Qld Fl.* 4 (1901) 1182, p.p.; Elliot & Jones, *Encyc. Aust. Pl.* 3 (1984) 49, p.p., "*Clerodendrum*".

Type: As for *G. hemiderma* (F. Muell. ex Benth.) Bailey.

C. linnaei auct. non. Thwaites: F. Muell., *Fragm.* 6 (1868) 151.

Typification

G. hemiderma is based on four different collections from Queensland. These were gathered by *Daemel s.n.* from Cape York Peninsula, *Dallachy s.n.* from Rockingham Bay, *Bowman 77* from Sellheim River and *Thozet s.n.* from Rockhampton. As no holotype was designated by the author a lectotype is selected here. Of these syntypes, Bowman's collection from Sellheim River was found to belong to *G. calcicola* Domin and Thozet's one from Rockhampton to a newly described species, *G. coriacea* Munir. Thus these two collections are excluded from *G. hemiderma*. In the remaining two (syntype) collections, Daemel's collection comprises five specimens and Dallachy's at least two dozen. All Dallachy's syntypes came from around Rockingham Bay, but at least seven of them were collected on different dates and some from different localities. Of all these syntypes, one of Dallachy's specimen, numbered MEL 98216, is particularly complete, and well preserved, so that it is selected here as the lectotype of this species.

Description (Fig. 3)

A straggling or scandent liana or large woody shrub, 2-3 (-6) m tall. *Stem* glabrescent when full-grown; branches and branchlets hoary-pubescent with appressed hairs. *Leaves* shortly petiolate; lamina ovate or cordate-ovate, entire, obtuse or shortly acuminate, (25-) 40-80 (-110) mm long, (15-) 20-60 (-80) mm wide, chartaceous, dull green above, light green beneath, puberulous when young, later glabrous; petiole slender, puberulous, (3-) 5-8 (-10) mm long. *Inflorescence* terminal and in the axil of top-most leaves, corymboid thyrse, (30-) 40-80 (-110) mm long, (40-) 60-100 (-150) mm wide; cymes rather compact, trichotomous, pubescent; lateral primary peduncles slender, divergent, hoary-pubescent, (10-) 20-40 (-50) mm long. *Flowers* pedicellate, bracteate, small, numerous; pedicels hoary-pubescent, glandular, 1-3 mm long; bracts sessile, oblong-lanceolate, hoary-pubescent, \pm 1 mm long. *Calyx* non-acrescent, campanulate or obovoid, shallowly 5-toothed, sometimes almost truncate, hoary-pubescent and glandular outside, glabrous inside, 3-4.5 mm long, 2-3 mm diam. at top; teeth rounded or blunt, shortly apiculate, \pm 0.5 mm long, 1 mm wide at base. *Corolla* cream-white, infundibuliform, 5-lobed at top, glandular and hoary-puberulous outside,

villous in throat; tube slender, cylindrical below, enlarged at top, 5-7 mm long, 1.5-3 mm diam. at top; lobes elliptic-oblong, obtuse, (1.5-) 2-3 (-3.5) mm long, 1.5-2.5 mm wide. *Stamens* 4 (or rarely 5), didynamous, exserted; filaments white, inserted above middle of corolla-tube, filiform, glabrous above, villous near base, 6-9 mm long; anthers oblong-elliptic, 0.5-1 mm long. *Ovary* ellipsoid-obovoid, glandular and tomentose-hirsute on upper half, somewhat 4-lobed, \pm 1 mm long, 0.5-1 mm diam.; style exserted, filiform, glabrous, 9-13 mm long; stigma bifid. *Fruit* oblong to ellipsoid-oblong, rounded at top, much exserted above fruiting calyx, green when fresh, greyish brown when mature and dry, 6-10 mm long, 3-3.5 mm diam., the exserted portion glandular and tomentose-hirsute, 4-locular in upper part where the endocarp closes round the seeds and separates into 4 narrow mericarps, the lower seedless portion resembling a wing on each mericarp, the lower portion of the dissepiment remaining attached to the receptacle (after the mericarps have fallen) as a cuneate-oblong carpophore which is 3-toothed at top and nearly as long as the calyx; fruiting calyx thinly chartaceous, 3-5 mm long, not expanding outwards.

Specimens examined

AUSTRALIA: QUEENSLAND: *Batonoff 3134 & Dalliston*, Shaw Island, 4.xi.1985 (BRI); *Boylard & Gillieatt 628*, c. 8 km E Euramo, 29.xi.1969 (BRI, GH, K, L, MEL); *Cunningham s.n.*, Cleveland Bay, 1819 (BM); *Daemel s.n.*, Cape York, loc. incert, undated (BM, K 2 spec., MEL 98217, MEL 98220 — syntypes); *Dallachy s.n.*, Rockingham Bay, undated (MEL 98216, lectotype; MEL 98203 - MEL 98207, MEL 98210 - MEL 98214, MEL 98227 - MEL 98229 & MEL unnumbered spec. — isolectotypes); *Dallachy s.n.*, Herbert River, Rockingham Bay, 17.xi.1863 (C, MEL 98223, syntypes); *Dallachy s.n.*, Rockingham Bay, 26.iii.1865 (C, MEL 98218, syntypes); *Dallachy s.n.*, Four Mile Creek, Rockingham Bay, 28.vii.1865 (MEL 98226, MEL 98202); *Dallachy s.n.*, Rockingham Bay, 14.xii.1865 (MEL 98219, syntype); *Dallachy s.n.*, Dalrymple Gap, 10.xii.1867 (MEL 98215, syntype); *Dansie 3457*, Forest Reserve 185, Danbulla, c. 25 km SW Cairns, -.xi.1964 (BRI 2 spec., L); *Dansie s.n.*, Caravan Creek area, Mulgrave River, 3.vi.1965 (BRI 061235, BRI 061236); *Dockrill 899*, Forest & Timber Bureau Qld Research Station, Atherton, 25.xi.1974 (BRI, L, QRS); *Flecker 7838*, Murray River near Rockingham Bay, 25.xii.1941 (AD); *Forster 3619 & Bolton s.n.*, 2 km SW Mt Keelbottom, Fletcher Creek, Dotswood, 12.iii.1988 (BRI); *Hamilton s.n.*, Foot of Bellenden Ker, -.ii.1912 (BRI 268206); *Hyland 5730*, State Forest Reserve 310 Dreghorn L.A., 23.xii.1971 (BISH, BRI, CANB, GH, K, L); *Hyland 6824*, T.R. 14 Rocky River Catchment, 7.ix.1973 (BRI); *Ising 836*, Murray River, 25.xii.1941 (AD); *Irvine 729*, Forest & Timber Bureau Arboretum Atherton, 18.i.1974 (BRI, L, QRS); *Jessup 328 & 329*, Beauty Spot, Good Night, S.F.W. Booyal, 21.v.1981 (BRI); *Kanny s.n.*, Bellenden Ker, -.ii.1912 (BRI 268207); *Keys 76*, Mount Perry, undated (BRI 268204); *MacGillivray 82*, Sandy Cape, Port Bowen, 1842 (BM); *F. Mueller s.n.*, Gilbert River, undated (P); *F. Mueller s.n.*, Rockingham Bay, undated (GH partly, the other part *G. coriacea*, K, L 908266-897, L 908266909); *Nugent 35*, Cairns, undated (BRI); *Rodd & Hardie 4450*, Clevedon, 25 km SE Townsville, 18.iv.1985 (BRI); *Sandercoe 859*, Magnetic Island, 10.viii.1982 (BRI); *Smith 10590*, Mt Cook trip, 27.viii.1959 (BRI); *Webb & Tracey 8123*, McIlwraith Range, NE Coen, -.viii.1962 (BRI); *Webb & Tracey 8124*, Bailey Creek, -.viii.1962 (BRI); *Webb & Tracey 8556*, Claudie River between Portland Roads and Iron Range, 21.x.1968 (BRI).

PAPUA NEW GUINEA: *Brass 5674*, Kubuna, Central Division, Papua, -.xi.1933 (L, NY); *Brass 8243*, Lower Fly River, east bank opposite Sturt Island, Papua, -.x.1936 (GH, L); *Brass 21984*, Banapa, Cape Vogel Peninsula, Milne Bay District, 20.iv.1953 (CANB, GH, L); *Carr 11471*, Kanosia, 22.ii.1935 (L.).

Distribution and ecology (Map 2)

G. hemiderma is known to occur in tropical Queensland. Almost all known localities are in the east coastal areas and on nearby off-shore islands, with the exception of one collection from Gilbert River along the Gulf of Carpentaria. It has been most commonly recorded from Atherton Tableland and the area along Rockingham Bay. The northern-most locality is near Claudie River on Cape York Peninsula and the southern-most near Bundaberg. Moldenke (1959, 1971, 1980, 1982), however, has reported this species from Thursday Island in the Torres Strait.

Collections from Papua New Guinea are the only ones examined from outside Australia.

Growing in mixed mesophyll vineforest as well as notophyll vineforest on soil derived from granitic material. Sometimes scrambling among grasses on banks of creeks on sandy-clay loam. According to Moldenke (1982), "collectors have found this plant "common" or "very common" in mixed softwood forests, in rainforests on limestone, and along roadsides, flowering

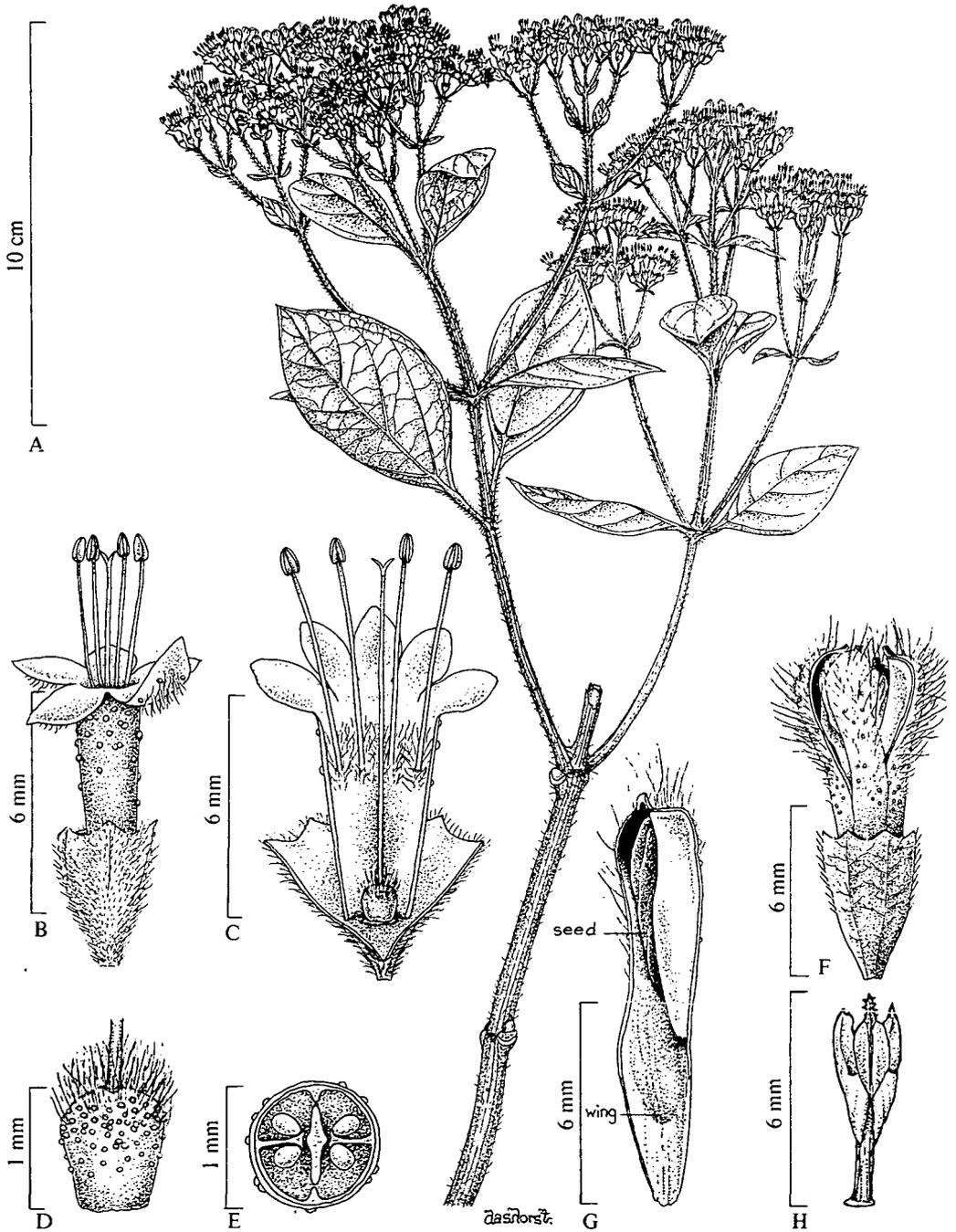


Fig. 3. *Glossocarya hemiderma* (F. Muell.) Bailey. (A-H, *J. Dallachy s.n.*: MEL 98216, lectotype). A, habit sketch of a flowering branch; B, flower; C, flower with calyx and corolla longitudinally cut open showing androecium and gynoecium; D, ovary; E, transverse section of ovary; F, dehiscent fruit with tomentose mericarps; G, mericarp showing seed and wing; H, carpophore without mericarps and fruiting calyx.

in May, June, October and November, in fruit in April. The corollas are said to have been "white" on all collections where the colour was noted".

Williams (1987) made the following ecological observations on *G. hemiderma*: "The plants are well branched. Soils are brown, cracking clay loams, often containing a good deal of loose stone and giving the impression they may become rather cloggy during periods of wet weather. The plants were also found in a small patch of depauperate vine scrub on the summit of a lofty hill. The soil was very stony and there was a good deal of large outcropping of rock in the area". Also known from depauperate rainforest.

Comments

G. hemiderma was first identified by F. Mueller (1868) as *Clerodendron linnaei* Thwaites. In view of some "abnormal" characters present in this species, F. Mueller proposed for it a new section "*Hemiderma*" in *Clerodendrum*. Later Bentham (1870) recognised this taxon as a new *Clerodendrum* species and named it after F. Mueller's new "section *Hemiderma*" as *Clerodendron hemiderma* F. Muell. ex Benth. The protologue of the new species, however, was prepared by Bentham (1870) not F. Mueller. The species authorship, therefore, should go to Bentham only. In his comments on this taxon, Bentham (1870) remarked that "this plant has a singular resemblance with Cingalese *C. linnaei* Thw. which has the same climbing habit, foliage, and inflorescence, but rather larger flowers, the outer bracts much larger, broader, and foliaceous, and the fruit, although nearly similar in shape, is much more normal, without the flat wing-like bases of the nuts or the persistent axis upon which F. Mueller has founded his sectional character of *Hemiderma*". Subsequently, Bentham (1876) identified this taxon with the genus *Glossocarya* and thus transferred it to the latter. The combination of *G. hemiderma* has been attributed by the majority of authors to Bentham & Hooker, but although their intention is quite clear, they nevertheless did not formally publish it.

F. Mueller (1868) cited un-numbered collections of *E. Daemel*, *J. Dallachy*, *P. O'Shanesy* and *A. Thozet* from Cape York and Rockhampton. In the protologue of this species, Bentham (1870) also cited the above mentioned collections except for *P. O'Shanesy's*. Instead, he cited *Bowman's* [77] collection from Sellheim River. All of Dallachy's collections of this taxon came from around Rockingham Bay and none from Rockhampton or Cape York Peninsula. Out of all these collections, Daemel's and Dallachy's specimens are found to belong to *G. hemiderma*, and O'Shanesy's to *G. coriacea*. For the identity of other collections see "Typification" of this species.

Bentham (1870) described the corolla-tube as "glabrous inside", and a more or less similar view was expressed by Moldenke (1982). In fact, the corolla is glandular and hoary-pubescent outside and distinctly villous in throat.

Moldenke (1974, 1980) recorded this species from Northern Territory, but so far its occurrence in that State has not been confirmed. There is no mention of this taxon in Dunlop's (1987) "Checklist of Vascular Plants of the Northern Territory". Beer & H.J. Lam (1936) cite *L.J. Brass 5674* from Papua, and note that this is the first record of the genus and species in Papua New Guinea. Williams (1987) recorded this species from pastoral districts Leichhardt and Moreton in Queensland, which areas are outside its presently known distribution range. He presumably included in it the distribution of newly described *G. coriacea* which before the present investigation was known as *G. hemiderma*.

Sometimes, juvenile leaves are smaller and distinctly dentate or shallowly lobed. According to Elliot & Jones (1984), this species has been misidentified and distributed in some herbaria as *Clerodendron* sp.

Affinities

G. hemiderma is nearest to *G. calcicola* Domin and *G. mollis* Wall. ex Griff. in their leaves

and inflorescence being of similar shape and disposition; calyx and corolla pubescent and glandular outside; ovary and capsule glandular and tomentose-hirsute. Nevertheless, *G. hemiderma* may easily be distinguished by its leaf-blades becoming glabrescent-glabrous when mature and pedicels 1-3 mm long. The pedicels in *G. calcicola* and *G. mollis* are generally up to 1 mm long.

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