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**A NEW SPECIES *LINDERNIA COWIEI*
AND THE VARIABILITY OF *L. TENUIFOLIA*
(SUBG. *BONNAYA*: SCROPHULARIACEAE)
IN NORTHERN AUSTRALIA**

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Abstract

Lindernia cowiei, a new species of Subg. *Bonnaya* from Melville Island, Northern Territory, is described. It is most closely allied to *L. tenuifolia*, a species from southeast Asia and Malesia which also occurs in the far northern coastal regions of Northern Territory and Queensland. A discussion of relationships and a key and known geographical and ecological distribution of the two Australian species is provided. Variation of *L. tenuifolia* in Australia encompasses *L. viatica*, another southeast Asian species distinguished in the past 20 years, but variation within populations in Australia does not support its separation at the level of species.

This paper has been prompted by the need to name a new species in Subg. *Bonnaya* for a treatment of *Lindernia* in the forthcoming *Flora of the Northern Territory Flood Plains*. In addition the taxonomy of its closest relative, which also occurs in the same region, is discussed.

Lindernia is a genus which has been poorly understood in Australia. A taxonomic revision being undertaken by the author will increase the representation of species from ten known by the 1980s (Hnatiuk 1990: from information on existing published knowledge supplied by W.R. Barker and Australian herbaria) to over 40 (W.R. Barker, in preparation).

This is the fourth publication precursive to the Australian revision of the genus. Six new species and a new combination were described in an earlier paper (Barker 1990) for inclusion in the *Flora of the Kimberley Region* (Barker 1992a). The treatment of *Lindernia* in the *Flora of New South Wales* (Barker 1992b) separated *L. procumbens* (Krock.) Philcox, a new Australian record, and *L. alsinoides* R.Br., which had been confused under the latter name in New South Wales and southeast Queensland. In addition, records of species not previously included in Australian literature, such as *L. tenuifolia* and *L. viatica* (misspelled as "*vitacea*") following Yamazaki 1981), and manuscript names arising from successive editions of a draft conspectus and key to *Lindernia* in Australia (Barker, unpubl.), distributed to Western Australian, Northern Territory and Queensland botanists to enhance understanding and collecting activity, have been included in recent publications. These include censuses of Northern Territory (Dunlop et al. unpubl.) and the Kakadu and Alligator Rivers area of Arnhem Land (Brennan 1996) and the Australian listing of rare and endangered species (Briggs & Leigh 1996).

Important to the understanding of these species has been the key regional works on *Lindernia* of Philcox (1968) dealing with Malesia and Yamazaki (1981, 1985) dealing with parts of southeast Asia. Both record Australian occurrences of various Asian and Malesian species.

In determining distribution and ecology, I have seen much material in the Herbarium of the Northern Territory (DNA, NT), the Western Australian Herbarium (PERTH) and the State Herbarium of South Australia (AD), with some from the National Herbarium of Victoria (MEL) and the National Herbarium of New South Wales (NSW). Queensland material is represented by exchange material from the Mareeba branch of the Queensland Herbarium (MBA).

Relationships of the new species

The new species *L. cowiei* belongs to Sect. *Bonnaya* (Link & Otto) Philcox within Subg. *Bonnaya* (Link & Otto) Yamazaki which is characterised by lax inflorescences, deeply lobed calyces, and filiform staminodes (Yamazaki 1981). From Australian material examined and Yamazaki's (l.c.) and Philcox's (1968) works in particular amongst Asian and Malesian treatments of *Lindernia* studied, it differs from *L. antipoda*, *L. ciliata* and *L. ruellioides* by its subtire to sparingly and obscurely serrate leaf teeth with teeth not sharply acute. These characters ally it to *L. tenuifolia* (including *L. viatica*) and *L. succosa*, the latter of which differs by its fleshy leaves and ovate calyces. The new species differs from all by its much larger, showy corolla. The closest allied species, *L. tenuifolia*, including variants attributable to *L. viatica*, is known also from northern Australia. In particular both occur on Melville Island, the only known record of the new species. A key to these closely allied species is provided.

Variation in *L. tenuifolia* in northern Australia and its taxonomic implications

From examination of Australian collections, it seems clear that *L. viatica* and *L. tenuifolia* are conspecific. The characters separating them, namely the arrangement of flowers in the inflorescence, the corolla length and width of lower lobe, and plant height (see key), appear relatively trifling, at least the inflorescence character breaking down on robust, relatively tall individual plants. From the specimens seen they have very similar ranges of distribution habitat and flowering times.

With the two species recognised in the literature (Philcox 1968; Yamazaki 1981, 1985) as extending widely in southern Asia, it is important that material and if necessary populations from there be studied to ensure that the same situation prevails or whether some infraspecific recognition is warranted.

Key distinguishing the new species *L. cowiei* from the widely variable *L. tenuifolia* in Australia

- 1a. Flowers single at a node, opposed by a small leaf; corolla 3-4 mm long along upper side, the middle lobe of the lower lip c. 1.5—2 mm wide; plant to 6 cm high *L. tenuifolia* (Colsm.) Alston (s.str.)
- 1b. Flowers paired at nodes; corolla 7—10 mm long along upper side; plants to 40 cm high
 - 2a. Corolla 8.5—10 mm long along upper side, the middle lobe of the lower lip c. 6 mm wide; leaves entire to bluntly serrate, with several main veins at base *L. cowiei* W.R. Barker
 - 2b. Corolla 5—7 mm long along upper side, the middle lobe of the lower lip c. 2 mm wide; leaves entire to very shallowly undulate, with a single main vein
..... *L. tenuifolia* (Colsm.) Alston (variation formerly attributed to *L. viatica* (Kerr ex Barnett) Philcox, here synonymised)

Lindernia cowiei W.R. Barker, sp. nov.

"*Lindernia D123061 Goose Creek*": Dunlop et al., Checkl. Vasc. Pl. N.Terr., Austral. (1995) 102.

Species nova subgeneris *Bonnaya* sectionis *Bonnaya*, *L. tenuifoliae* (Colsm.) Alston, *L. viaticam* (Kerr ex Barnett) Philcox inclusantem, affinis, sed differt floribus formosis labio infero maiore.

Holotypus: *I.D. Cowie 5518 & G. Bellis*, 30 Mar 1995, Northern Territory, Darwin & Gulf region: Melville Island, Goose Creek Floodplain, DNA123061. **Isotypi:** AD99530159; AD99530160; (n.v.) MEL.

Semi-aquatic annual herb 35–60 cm high; stem erect to ascending, with branches sometimes arising from the widely spaced lower nodes, rounded in spirit material, quadrangular in dried, with a cluster of short pale roots at base. Leaves narrow linear to narrowly obovate, 25–50 mm long, 2–5 mm wide, narrow cuneate, entire, coarsely undulate

or sparsely unevenly bluntly serrulate, bluntly acute, glabrous, the bases of a pair joined across node: venation of palmate type, the main veins distally parallel. Flowers over 10, opposite, in terminal open racemes; bracts subulate, 1–2 mm long; pedicels 10–23 mm long, ascending. Calyx 2.5–3.5 mm long, glabrous, with sepals entire with a narrow membranous margin. Corolla 8.5–10 mm long along upper side, mauve with white centre; tube 4–5 mm long; hood narrow triangular, 4.5–5 mm long, c. 2.5 mm wide; lower lip widely spreading, c. 6 mm long, middle lobe c. 6 mm wide, lateral lobes c. 4.5 mm wide, with two longitudinal ridges behind the abaxial staminodes. Stamens: adaxial pair functional, the anthers borne under hood, 2-celled, the cells divergent, ellipsoid, 0.7 mm long, not awned; abaxial pair reduced to two staminodes at base of lower corolla lip, the connective oblique on the filament, depressedly deltoid; staminodes prominent, without vestigial anthers, the free part 1.5 mm long when straightened, the distal $\frac{2}{3}$ linear, uncinately (obliquely C-shaped), the base dilated. Stigma borne distally of adaxial anthers, together appressed under the corolla hood. Capsule borne on deflexed pedicels 15–20 mm long, narrowly ovoid-cylindrical, to 12 mm long, 1 mm diameter. Seeds finely reticulate. Fig. 1.

Distribution and ecology

Known only from the type collection. “Goose Creek”, Melville Island, is a local name for Andranangoo Creek on topographic maps (Mr I. Cowie, pers. comm. June 1998). It was located on a seasonally inundated floodplain (of the drier type), along a channel in a tidally influenced area, with *Eleocharis dulcis* in 20 cm of water.

Phenology: Flowering and fruiting occurs in at least March – April, the single March 30 collection being in full flower, with some fruits and plenty of buds.

Conservation status: 1K (coding following Briggs & Leigh 1996: indicating that it is known from the type only and that its distribution is inadequately known).

Etymology: The species is named in appreciation of its discoverer’s considerable efforts to increase the knowledge of *Lindernia* in Northern Territory over the past decade.

L. tenuifolia (Colsm.) Alston in Trim., Fl. Ceyl. 6, Suppl. (1931) 214; Dunlop et al., Checkl. Vasc. Pl. N. Terr., Austral. (1995) 102; Brennan, Annot. Checkl. Vasc. Pl. Alligator R. Reg., N. Terr., Austral. (1996) 96.

Gratiola tenuifolia Colsm., Prod. Desc. Grat. (1793) 8, basionym.

Holotype: Koenig s.n., Ceylon, C (n.v.: Philcox 1968).

L. viatica (Kerr ex Barnett) Philcox, Taxon 19 (1970) 649; Yamazaki, J. Fac. Nat. Sci. Univ. Tokyo, Bot. 13 (1981) 53 “*vitacea*”; Dunlop et al., Checkl. Vasc. Pl. N. Terr., Austral. (1995) 102 “*vitacea*”; Brennan, Annot. Checkl. Vasc. Pl. Alligator R. Reg., N. Terr., Austral. (1996) 96 “*vitaceae* Kerr, Barnett & Philcox”;

Ilysanthes viatica Kerr ex Barnett, Kew Bull. 16 (1963) 489, basionym.

Holotype: Kerr 19604, Thailand, Aran Pratet, K (n.v.).

Distribution and ecology

In Australia *L. tenuifolia* in its broader sense is apparently a native, occurring in the near coastal fringe of Northern Territory from towards the border with Western Australia in the Fitzmaurice River, to Melville Island and Darwin area, in the Alligator River floodplains, and then to east Arnhem Land, and on Cape York in far north Queensland.

Outside Australia it occurs from Sri Lanka and India to South China, Taiwan, Cambodia, Vietnam, Laos, Thailand, and the Malay Peninsula.

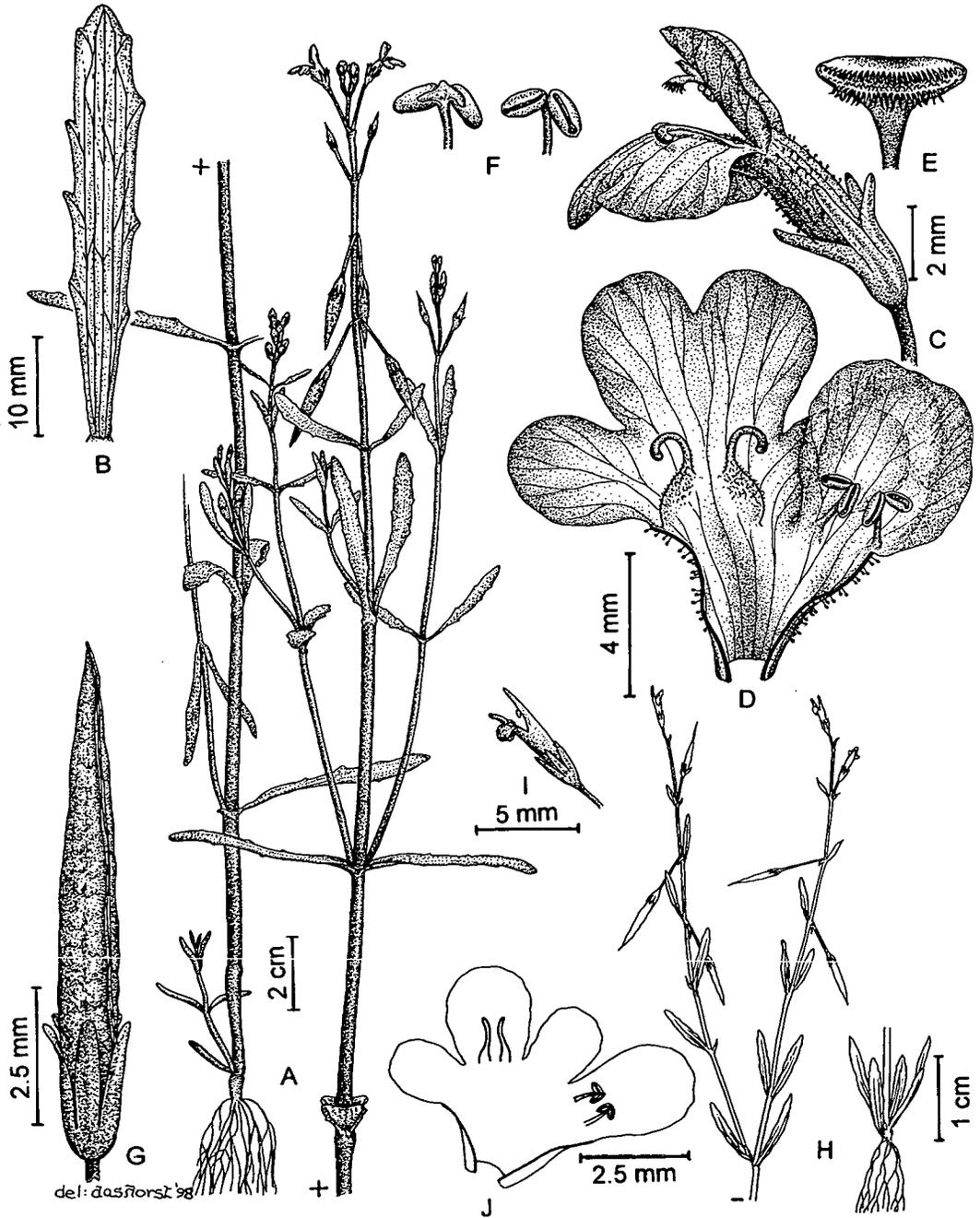


Fig. 1. A–G, *Lindernia cowiei* W.R.Barker, dwarf form. A, habit; B, leaf; C, flower; D, corolla open exposing stamens and staminodes; E, stigma; F, anthers, adaxial and abaxial side; G, capsule (I.D. Cowie 5518 & G. Bellis). H–J, *Lindernia tenuifolia* (Colsm.)Alston. H, habit; I, flower; J, corolla opened exposing stamens and staminodes (R.M. Barker 423).

The species occupies seasonally damp or inundated sites, usually coastal, sometimes more inland sites, behind mangroves, in swampy sites, along drainage lines, in sand flats or cracking clay of sedgeland flats, in cleared shrubland or open woodland or, in the Fitzmaurice River area, at the bottom of a sandstone slope.

Outside Australia the species is known from roadsides or paddy fields.

Phenology. Flowering and fruits are known from February to May.

Specimens examined

Dwarf forms attributable to *L. tenuifolia* s.str.

NORTHERN TERRITORY. DARWIN & GULF: *G. Leach 4115*, 21 Feb 1994, Fitzmaurice River, DNA; *I.D. Cowie 5524 & G. Bellis*, 30 Mar 1995, Melville Island, Jessie River, DNA; *P.K. Latz 3617*, 28 Apr 1973, Leanyer Swamp, Darwin, NT (partly); *R.M. Barker 423*, 5 May 1983, Kapalga, 4 km past airstrip, AD.)

QUEENSLAND. COOK: *A. Gunness 2313*, 12 Apr 1994, Namaleta Creek, S of Skardon River. AD, (n.v.) BRI; *A. Gunness 2510*, 22 Mar 1995, NW Cape York, Skardon River, AD.

Robust forms which formerly would have been attributable to *L. viatica*:

NORTHERN TERRITORY. DARWIN & GULF: *I.D. Cowie 5549*, 30.v.1995, Melville Island, Cape Fleeming, DNA; *G.J. Leach 2700*, 23 Mar 1990, Fog Bay, SW of Darwin, DNA, AD; *P.K. Latz 3617*, 28 Apr 1973, Leanyer Swamp, Darwin, NT (partly); *B. Harwood 31*, 10 Feb 1995, Holmes Jungle, DNA; *W.R. Barker 7058*, 1 Jun 1994, Howard Springs Park estate, pending subdivision c. 400 m down Parakeet Road from Bronzewing Road, 50 m N of road, AD (dupl. for distrib.); *R.M. Barker 438*, 5 May 1983, Kapalga ruins, near Kapalga landing, AD (2 sheets); *G. Wightman 10*, 4.vi.1982, Pandanus Point, Kapalga, AD; *J. Taylor 277*, 24 Mar 1981, Kapalga, DNA; *A.M. Buchanan 10395*, 17 May 1987, Mouth of Second Creek, Elcho Island, DNA; *I.D. Cowie 4076 & Leach*, 3 May 1993, E Arnhem Land, Cape Shield, DNA.

QUEENSLAND. COOK: *J. Clarkson 7776*, 14.ii.1989, Moa Island, c. 1 km NE of Kubin along road to St Pauls, MBA.

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References

- Barker, W.R. (1990). New taxa, names and combinations in *Lindernia*, *Peplidium*, *Stemodia* and *Striga* (Scrophulariaceae) mainly of the Kimberley Region, Western Australia. *J. Adelaide Bot. Gard.* 13: 79—93.
- Barker, W.R. (1992a). Scrophulariaceae, In J.R. Wheeler et al. (Eds.) *Flora of the Kimberley Region*. (Western Australian Herbarium, Dept of Conservation & Land Management, Como), pp. 811—839.
- Barker, W.R. (1992b). *Lindernia*, In G.J. Harden (Ed.) *Flora of New South Wales*, vol.3. (N.S.Wales Univ. Press, Kensington), pp. 564-565.
- Barker, W.R. (unpubl.). *Lindernia* s.lat. (Scrophulariaceae) in Australia: a draft key and conspectus. (Photostated; editions circulated to selected herbaria and botanists in 1986, 1987, 1993, 1995), 16 pp.
- Brennan, K. (1996). An annotated checklist of the vascular plants of the Alligator Rivers Region, Northern Territory, Australia. *Supervising Scientist Report 109*. (Supervising Scientist, Commonwealth of Australia, Barton, ACT).
- Briggs J.D. & Leigh, J.H. (1996) *Rare or Threatened Australian Plants*. 1995 Revised Edition. (CSIRO Australia & Australian Nature Conservation Agency: Collingwood, Victoria).
- Dunlop, C.R. et al. (unpubl.). Checklist of the Vascular Plants of the Northern Territory, Australia. Family Ordered. (Conserv. Comm. N. Territory; unpublished 1995 report of restricted distribution).
- Hnatiuk, R.J. (1990). Census of Australian Vascular Plants. *Bureau Fl. Fauna, Canberra, Austral. Fl. Fauna Ser.* 11. (Austral. Govt. Publ. Serv.: Canberra).
- Philcox, D. (1968). Revision of the Malesian species of *Lindernia* All. (Scrophulariaceae). *Kew Bull.* 22: 1-72.
- Yamazaki, T. (1981). Revision of the Indo-Chinese species of *Lindernia* All. (Scrophulariaceae). *J. Faculty Sci. Univ. Tokyo*, iii. Bot. 13: 1-64.
- Yamazaki, T. (1985). *Flora du Cambodge, du Laos et du Viêt-Nam*. 21 Scrophulariacées. (Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie: Paris).

