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## A REVISION OF *GALIUM* (RUBIACEAE) IN AUSTRALIA AND NEW ZEALAND

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### ABSTRACT

McGillivray, D.J. (National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000) 1983. A revision of *Galium* (Rubiaceae) in Australia and New Zealand. *Telopea* 2(4): 355-377. — Twelve native species are described including the new species *G. terrae-reginae* Ehrendorfer et McGillivray (Queensland, p.361), *G. compactum* Ehrendorfer et McGillivray (Victoria, South Australia; p.370), *G. roddii* Ehrendorfer et McGillivray (New South Wales, p.371), and *G. curvihirtum* Ehrendorfer et McGillivray (Victoria, South Australia; p.373). The new name *G. migrans* Ehrendorfer et McGillivray (p.362) is provided for *G. erythrorrhizum* F. Muell. ex Miq. non Boiss. et Reut., and *G. trilobum* Colenso replaces *G. tenuicaule* A. Cunn. non Krockner. A key to the species is provided on p.356; non-indigenous species are included only in the key.

### INTRODUCTION

The earliest collections of *Galium* from New Zealand and Australia were made in 1769 by Banks and Solander on the coast of New Zealand. Solander's manuscript name for this species was incidentally mentioned by G. Forster (1786: 89), but the first names to be validly published, *G. gaudichaudii* DC. and *G. australe* DC., did not appear until 1830. The former species was described from material collected in 1819 by Gaudichaud during Freycinet's voyage (1817-1820); *G. australe* was named from specimens gathered in 1827 during the voyage of the "Astrolabe" (1826-1829) under the command of J.S.C. Dumont d'Urville. Allan Cunningham (1839: 205) described the two New Zealand species from collections made by his brother Richard, thus providing a valid name, *G. propinquum*, to replace Solander's manuscript name, and a later homonym, *G. tenuicaule*, for the species which is now known as *G. trilobum* Colenso. Further contributions to the taxonomy of *Galium* in Australia and New Zealand were made by J.D. Hooker (1847: 461 bis, 462 bis, 1852: 113), Miquel (1856: 113), Bentham (1867: 445), F. Mueller (1875: 188), Colenso (1888: 192), Ewart and Rees (1913: 4), Black (1929: 538), Ewart (1931: 1047), and Wakefield (1955: 69).

Bentham made the only comprehensive treatment of the genus in Australia. He recognized five indigenous species, of which three are upheld in this revision. Some changes in their delimitations have been necessary. Wakefield made the next significant improvement by recognizing two new species but at the same time retaining distinct species within *G. gaudichaudii* and *G. propinquum*. From the more ample material now available it is evident that Wakefield and earlier workers were hampered by the lack of adequate collections.

This paper was prepared with the assistance and guidance of Professor F. Ehrendorfer (University of Vienna) who has been interested in the Rubiaceae since the nineteen-forties and has made various cytological, evolutionary and taxonomic studies, particularly in the *Galieae*. During 1966 he visited Australia on a Senior Research Fellowship from the Australian Academy of Science. His studies of the collections of Australian *Galieae* in Herbarium Australiense (CANB) and his observations in the field revealed taxa which had not been recognised in the existing classifications of Australian *Galia*. At about the same time my own studies of the collections in the National Herbarium of New South Wales (NSW) indicated some of the inadequacies which had been independently discovered by Ehrendorfer.

Discussions between us about the delimitation of taxa led to the development of this study. Professor Ehrendorfer gave me further valuable assistance with the paper during my visit to Graz (Austria) in July 1969. In a future paper Ehrendorfer proposes to discuss the affinities of the Australian and New Zealand species and to deal with broader aspects of their classification.

Although living plants were studied, the descriptions are based entirely on dried specimens. All of the specimens cited were examined unless otherwise indicated.

Comparative tables of selected features for each species are included after the key; see Tables 1, 2 (pp. 358-360).

#### KEY TO SPECIES

(To assist users in retracing their steps through the key the number of the preceding lead is given in parenthesis.)

- A. Leaves and stipules in whorls of 4(-5); if in whorls of 5 then leaves usually 10-15 mm long, 2.5-5 mm wide, and fruits ribbed. Perennials and ? annuals. Indigenous species. (for lead B: non-indigenous species—see p.358)
- 1 Ovaries and fruits smooth, papillose, rugose or ribbed, never tuberculate or hairy ..... 2
- 1\* Ovaries and fruits tuberculate or hairy ..... 12
- 2 Cymes equal to or shorter than the leaves ..... 3
- 2\* Cymes longer than the leaves ..... 7
- 3(2) Longest pedicel in each cyme more than 2 mm in length ..... 4
- 3\* Longest pedicel in each cyme 2 mm or less in length ..... 5
- 4(3) Leaf-base abruptly rounded to a short petiole, upper surface of leaf glossy; internodes (6-) 8-18 (-25) mm long; flowers often yellowish ..... 5. *ciliare*
- 4\* Leaf-base tapering or gradually rounded to a short petiole, upper surface of leaf matt; internodes (3-) 10-30 (-45) mm long; flowers cream to white ..... 4. *propinquum*
- 5(3\*) All stems prostrate to procumbent; leaves more than 2 mm wide; fruits prominently ribbed ..... 11. *liratum*
- 5\* Some stems erect or ascending; leaves usually less than 2 mm wide; fruits rugose to ruminant ..... 6
- 6(5\*) Rhizomes absent or sparingly developed; internodes (5-) 12-20 (-35) mm long, leaves narrowly ovate to linear, (4-) 5-8 (-12) mm long, often irregularly curved in drying ..... 6. *gaudichaudii*
- 6\* Rhizomes usually evident; internodes (2-) 3-8 (-15) mm long; leaves ovate to narrowly ovate, (2.5-) 3.5-4.5 (-6) mm long, not irregularly curved in drying ..... 7. *compactum*
- 7(2\*) Leaf-base abruptly rounded to a short petiole, upper surface of leaf glossy; internodes (6-) 8-18 (-25) mm long; flowers often yellowish ..... 5. *ciliare*
- 7\* Leaf-base tapering or gradually rounded to a short petiole, or non-petiolate, upper surface of leaf matt; internodes (5-) 10-40 (-80) mm long; flowers cream to white ..... 8
- 8(7\*) On lower parts of stems the pairs of leaves and stipules very unequal in length (leaf length: stipule length >3:2); stems retrorsely aculeate or smooth, indumentum never conspicuous; leaf length: breadth >3:1 ..... 9. *binifolium*
- 8\* On lower parts of stems the pairs of leaves and stipules slightly unequal (leaf length: stipule length <3:2); leaf-ratio and indumentum of stems various ..... 9
- 9(8\*) Primary root conspicuous and/or rhizomes absent or sparingly developed; lower parts of stems comparatively stiff and brittle; inflorescences (2-) 3-8 (-25)-flowered ..... 10
- 9\* Primary root usually not evident, rhizomes usually well-developed; stems comparatively weak and flexible throughout; inflorescences 1-5 (-7) commonly 3-, flowered ..... 11

- 10(9) Leaf margin recurved to almost flat; pedicels (1-) 2-3.5 (-8) mm long (leaves almost flat and straight when dried) ..... 3. **migrans**
- 10\* Leaf margin strongly recurved; pedicels 0.1-1 (-2) mm long (leaves commonly irregularly curved when dried) ..... 6. **gaudichaudii**
- 11(9\*) Peduncles curved, longer than the pedicels; leaves narrowly obovate to elliptical; leaf length:breadth >3:1 ..... 12. **trilobum**
- 11\* Peduncles straight (or sometimes absent), shorter than the pedicels; leaves ovate to narrowly ovate or elliptical; leaf length:breadth usually 3:1 or less ..... 4. **propinquum**
- 12(1\*) Ovaries and fruits tuberculate ..... 13
- 12\* Ovaries and fruits hairy ..... 16
- 13(12) Cymes longer than the leaves ..... 14
- 13\* Cymes shorter than the leaves ..... 15
- 14(13) Primary root conspicuous and/or rhizomes absent or sparingly developed; lower parts of stems comparatively stiff and brittle; inflorescences (2-) 3-8 (-25)-flowered, peduncles usually longer than the pedicels ..... 3. **migrans**
- 14\* Primary root usually not evident, rhizomes usually well-developed; stems comparatively weak and flexible throughout; inflorescences 1-5 (-7) -, commonly 3, -flowered, peduncles shorter than the pedicels ..... 4. **propinquum**
- 15(13\*) Longest pedicel of each cyme less than 1 mm long; fructual† tubercles rounded ... 8. **roddii**
- 15\* Longest pedicel of each cyme 2 mm or more in length; fructual† tubercles pointed ..... 4. **propinquum**
- 16(12\*) Fructual† hairs each with a conspicuous terminal hook, hairs spreading, their length c. equal to or more than half the width of each mericarp ..... 1. **australe**
- 16\* Fructual† hairs straight or curved, or if conspicuously hooked then their length noticeably less than half the width of each mericarp ..... 17
- 17(16\*) On lower parts of stems the pairs of leaves and stipules very unequal in length (leaf length: stipule length >3:2); peduncles longer than pedicels; leaf length:breadth >3:1 . 9. **binifolium**
- 17\* On lower parts of stems the pairs of leaves and stipules slightly unequal (leaf length: stipule length <3:2); peduncle:pedicel ratio and leaf-ratio various ..... 18
- 18(17\*) Leaf length:breadth ratio 2:1 or less ..... 19
- 18\* Leaf length:breadth ratio >2:1 ..... 20
- 19(18) Stems comparatively weak and flexible, commonly glabrous to retrorsely aculeate; pedicels straight or uniformly curved ..... 4. **propinquum**
- 19\* Stems comparatively stiff and brittle, densely covered with spreading hairs; pedicels noticeably curved at their apices ..... 2. **terrae-reginae**
- 20(18\*) Peduncles shorter than pedicels; stems comparatively weak and flexible throughout; primary root usually not evident, rhizomes usually well-developed ..... 4. **propinquum**
- 20\* Peduncles longer than pedicels; lower parts of stems comparatively stiff and brittle; primary roots conspicuous and/or rhizomes absent or sparingly developed ..... 21
- 21(20\*) Pedicels 0.5-1.5 (-2.5) mm long; flowers (1-) 2-3 (-5) per peduncle; fruits densely covered with short curved usually whitish hairs ..... 10. **curvihirtum**
- 21\* Pedicels (1-) 2-4 (-8) mm long; flowers (2-) 3-7 (-25) per peduncle; fructual indumentum variable, sometimes similar to that of *G. curvihirtum* but not so short and close 3. **migrans**

†Fructual, an adjective derived from *fructus*, comparable to *staminal*, and modelled on other nouns of the fourth declension. The new word may add flexibility to descriptions of fruits.

- B.(A)** Leaves and stipules in whorls of (4-) 6-9, if in whorls of 4-6 then leaves usually 3-8 mm long and fruits narrowly oblong with hooked hairs. Annuals. Non-indigenous species (for descriptions of these species see Tutin et al., Fl. Europaea 4: 14-36 [1976].)
- 1 Stems comparatively robust usually >50 cm long; leaf margin with retrorse hairs ..... 2
- 1\* Stems comparatively delicate usually <25 cm long; leaf margin with antrorse hairs ..... 3
- 2 Fruits with hooked hairs; upper surface of leaves hairy ..... **G. aparine** L.
- 2\* Fruits with numerous tubercles or papillae; upper surface of leaves glabrous ..... **G. tricornutum** Dandy
- 3 Fruits with hooked hairs; inflorescences few-flowered ..... **G. murale** (L.) All.
- 3\* Fruits papillose; inflorescences many-flowered ..... **G. divaricatum** Pourret ex Lamk.

Table 1. Comparison of selected vegetative features

Species	Root System	Internode length (mm) and stem indumentum	Leaf shape and size (mm)	Notes
1. australe	strong primary root and nodal roots up to 15 cm from rootstock	(8-) 15-45 (-90) retrorsely aculeate, sparsely to densely covered with recurved or spreading hairs or rarely glabrous	elliptical to narrowly ovate or oblong (4-) 6-12 (-18) x 1.5-4 (-6)	
2. terrae-reginae	strong primary root with nodal roots up to 5 cm from the rootstock	(4-) 8-20 (-25) numerous spreading hairs	ovate, narrowly ovate or elliptical (2.5-) 3-5 (-7) x (1.5-) 2-2.5 (-3.5)	
3. migrans	strong primary root and nodal roots up to 20 cm from the rootstock	(5-) 15-40 (-100) commonly retrorsely aculeate, sometimes with many to few spreading to retrorse hairs, rarely glabrous	elliptical to ovate, sometimes almost linear (3-) 5-10 (-18) x (1-) 1.5-3 (-5)	commonly with bright light green foliage
4. propinquum	primary root later supplemented or superseded by nodal roots from well-developed slender rhizomes	(3-) 10-30 (-45) commonly retrorsely aculeate to glabrous, or with spreading to retrorse hairs	elliptical to narrowly ovate or ovate, sometimes almost round (1.5-) 2-8 (-15) x (0.7-) 1-2.5 (-6)	stems comparatively weak and flexible throughout compared with the stiffer lower stems of 3. <i>G. migrans</i>
5. ciliare	nodal roots from subterranean stems, primary root not conspicuous	(6-) 8-18 (-25) spreading dense to sparse hairs or glabrous, not retrorsely aculeate	ovate, sometimes rotund (2.5-) 3.5-8 (-10) x (1-) 1.5-3 (-4)	leaf-base abruptly rounded, upper foliar surface glossy
6. gaudichaudii	strong primary root, weak development of nodal roots up to 5 cm from the rootstock	(5-) 12-20 (-35) hirsute, retrorsely aculeate or sometimes almost glabrous	narrowly ovate to linear, often almost narrowly triangular (4-) 5-8 (12) x (0.6-) 0.8-1.2 (-2.0)	leaves often irregularly curved and disarranged in dried specimens
7. compactum	strong primary root and well-developed rhizomes	(2-) 3-8 (-15) pilose to almost glabrous, not retrorsely aculeate	ovate to narrowly ovate (2.5-) 3.5-4.5 (-6) x (0.8-) 1.5-1.8 (-2.2)	internodes usually shorter than those of other species
8. roddii	mainly well-developed rhizomes, primary root strongly developed but rarely observed	(2-) 4-12 (-25) hirsute	narrowly ovate, curved upwards 3-4.5 x 0.8-1.2	

9. binifolium	strong to rather weak primary roots sometimes supplemented by occasional nodal roots	(20-) 30-60 (-80) retrorsely aculeate or smooth, lacking a conspicuous indumentum	narrowly elliptical, commonly slightly falcate (4-) 6-12 (-20) x (0.7-) 1-2.5 (-3)	leaves often reclinate to retrorse; foliaceous stipules noticeably shorter than leaves
10. curvihirtum	primary root well-developed, nodal roots absent	(10-) 15-35 (-60) commonly retrorsely aculeate sometimes with spreading or retrorse hairs or glabrous	narrowly ovate-linear, sometimes ovate or elliptical (3-) 4-12 (-15) x (0.6-) 1-2 (2.5)	
11. liratum	primary root, not always strongly developed, nodal roots rare	30-50 retrorsely aculeate to glabrous	obovate to elliptical (6-) 10-15 (-20) x (1.5-) 2.5-5 (-7)	leaves usually broader than those of other species
12. trilobum	nodal roots (primary roots not observed)	(15-) 25-40 (-50) retrorsely aculeate or sometimes almost smooth	narrowly obovate to elliptical, sometimes sub-linear to spatulate (4-) 6-12 (-20) x 1.5-3 (-4)	

Table 2. Selected features of inflorescences and fruits; distribution

Species	Ultimate Peduncles	Pedicels (mm)	Fructual Surface	Distribution*
1. australe	1-7 (-10)-flowered (0-) 5-12 (-25) mm long straight	(0.5-) 2.5-10 (-22) slightly or strongly curved usually within 2 mm of ovary or fruit, rarely straight	with numerous usually transparent, uncinete hairs 0.4-1.0 mm long	NSW, VIC (E. of 146°E), TAS, SA (Kangaroo Island only)—see fig. 1.
2. terrae-reginae	1-3-flowered 1-5 (-7) mm long straight	1-3 (-5) conspicuously curved near apex particularly at the fruiting stage	tuberculate to rugose and covered with numerous slightly to strongly curved hairs	Q—see fig. 1
3. migrans	(2-) 3-7 (-25)-flowered (2-) 5-15 (-35) mm long straight	(1-) 2-3.5 (-8) usually slightly curved	exceedingly variable: papillose, rugose, tuberculate or covered fig. 1. with curved to straight aculei or hairs	Q, NSW (incl. ACT), VIC, SA, WA—see fig. 1.
4. propinquum	1-5 (-7)-flowered, often 3-flowered, often absent or inconspicuous, maximum length 6 mm usually straight	(0.3-) 1-4 (-7) often curved	papillose, tuberculate (with pointed tubercles), ruminate, rugose or with curved ascending hairs, sometimes exhibiting a combination of these	NZ, Q, NSW, VIC, SA—see fig. 2
5. ciliare	5-9-flowered 5-15 mm long straight	1-5 straight	papillose but otherwise smooth	Q, NSW (incl. ACT), VIC, TAS—see fig. 3
6. gaudichaudii	1-5 (-7)-flowered up to 2.5 mm long straight	0.1-1.0 (-2.0) straight	rugulose, without tubercles or hairs	Q, NSW (incl. ACT), VIC, TAS, SA—see fig. 4
7. compactum	1-2 (-3)-flowered < 0.5 mm long	up to c. 0.5	rugose	VIC, SA—see fig. 3
8. roddii	1-2 (-3)-flowered 0.3-0.5 mm long	0.3-0.5	covered with many rounded pale-capped tubercles	NSW—see fig. 3
9. binifolium	often 3-flowered, up to 8-flowered (2-) 4-25 mm long straight to slightly curved	2-5 (-7) straight	rugose or sometimes ribbed, glabrous or rarely with numerous curved short hairs	NSW, VIC, SA—see fig. 5

10. <i>curvihirtum</i>	(1-) 2-3 (-5)-flowered (0.5-) 1-6 (-11) mm long straight	0.5-1.5 (-2.5) straight or slightly curved	densely covered with curled whitish hairs (finer and shorter than those of <i>Galium australe</i> )	VIC, SA—see fig. 5
11. <i>liratum</i>	1-3 (-5)-flowered ≤ 1 mm long	0.5-1.5 straight to slightly curved	ribbed, with 5-7 irregular longitudinal ribs	NSW, VIC—see fig. 6
12. <i>trilobum</i>	(1-) 2-3-flowered, (5-) 8-14 (-25) mm long curved	(1-) 3-6 (-10) usually curved	finely runcate to smooth	NZ—see fig. 7

\* NZ—New Zealand; Q—Queensland, NSW—New South Wales, ACT—Australian Capital Territory, VIC—Victoria, TAS—Tasmania, SA—South Australia, WA—Western Australia.

1. *Galium australe* DC., Prodr. 4: 608 (1830) non Reiche (1900); J.D. Hooker, Fl. Tasmaniae 1: 171 (1856); Miquel, Ned. Kruidk. Arch. 4: 113 (1856), '1859'; Bentham, Fl. Austral. 3: 446 (1867), *p.p.*; F. Mueller, Syst. Census Austral. Pl.: 76 (1882), Key Syst. Victorian Pl. 2: 30 (1885), Key Syst. Victorian Pl. 1: 292 (1888), Second Syst. Census Austral. Pl.: 128 (1889); Moore & Betche, Handb. Fl. New South Wales: 253 (1893); Rodway, Tasmanian Fl.: 71 (1903); Anon., Field Naturalist Census Pl. Victoria: 60 (1931); Wakefield, Victorian Naturalist 72: 72 (1955); Black, Fl. South Australia, edn 2, 4: 800 (1957), *p.p.*; Beadle et al., Handb. Vasc. Pl. Sydney Distr.: 358 (1963), [see following Notes p.000]; Curtis, Stud. Fl. Tasmania 2: 273 (1963); Beadle et al., Fl. Sydney Region: 428 (1972).

HOLOTYPE: [Victoria], Port-Western, d'étréit de Bass, exped. de L'Astrolabe 1829 *Mr d'Urville* (G-DC); 'ad fretum Bass' (protologue).

SYNONYMY: *Galium densum* Hook. f., London J. Bot. 6: 461 *bis* (1847); Miquel, Ned. Kruidk. Arch. 4: 113 (1856), '1859'. LECTOTYPE (here designated): [Tasmania], Side of Western Mountains—Alt. 2000 ft., *Gunn 549*, 16.1.1845 (K). ISOLECTOTYPE: *Gunn 549* (NSW). LECTOPARATYPES: [Tasmania], Hampshire Hills, *Gunn 549*, 1837 (K); on road to Macquarie Harbour from Lake St Clair, *Gunn 549*, 10.2.1845 (K).

*Galium squalidum* Hook. f., London J. Bot. 6: 462 *bis* (1847); J.D. Hooker, Fl. Tasmaniae 1: 171 (1856). *Galium australe* var. *pilosohispidum* Benth., Fl. Austral. 3: 447 (1867). LECTOTYPE (here designated): [Tasmania], New Norfolk, *Gunn 1129*, 6.11.1840 (K). ISOLECTOTYPE: *Gunn 1129* (NSW). LECTOPARATYPES: [Tasmania], Glen Leith, *Gunn s.n.*, 14.9.1840 (K); Lawrenny, *Gunn 1009*, 10.1840 (K).

*Galium albescens* Hook. f., London J. Bot. 6: 462 *bis* (1847); J.D. Hooker, Fl. Tasmaniae 1: 171 (1856); Bentham, Fl. Austral. 3: 447 (1867); Curtis, Stud. Fl. Tasmania 2: 273 (1963). HOLOTYPE: Mount Wellington, *Gunn s.n.*, 5.1839 (K). ISOTYPE: NSW.

[*Galium australe* var. *laeve*, *nomen nudum*: F. Muell. ex Hook. f., Fl. Tasmaniae 1: 171 (1856).

*Galium subalatum*, *nomen nudum*: F. Muell. ex Miq., Ned. Kruidk. Arch. 4: 113 (1856), '1859'.]

Misapplication of the name *Galium australe*: see misapplied names: 2. *Galium terrae-reginae*, 3. *G. migrans* and 10. *G. curvihirtum*.

DISTRIBUTION: In a variety of habitats at low altitudes, from coastal dunes to sheltered inland gullies (sometimes epiphytic on trunks of tree ferns) in Tasmania, South Australia (Kangaroo Island only), Victoria (E. of 146°E) and southern coastal New South Wales. See fig. 1.

*Plant* perennial, ? biennial; root system with a strong primary root and nodal roots up to 15 cm from rootstock; habit straggling or intertwining, sometimes loosely caespitose. *Stems* many to several, (5-) 20-60 (-100) cm long, branching in the lower half of plant; internodes (8-) 15-45 (-90) mm long; stem indumentum very variable, stems retrorsely aculeate, sparsely to densely covered with recurved or spreading hairs or rarely glabrous. *Leaves* elliptical to narrowly ovate or oblong, (4-) 6-12 (-18) mm long, 1.5-4 (-6) mm wide (stipular leaves slightly shorter), dark green to dark brown (on drying, usually coriaceous sometimes membranaceous); leaf-base angustate; leaf-apex acute to obtuse-mucronate; leaf-margin usually recurved sometimes revolute; upper surface with few to many forwardly directed hairs, occasionally with numerous soft spreading hairs or rarely almost glabrous; lower surface with spreading and/or forwardly directed hairs commonly restricted to the mid-vein, or sometimes glabrous;

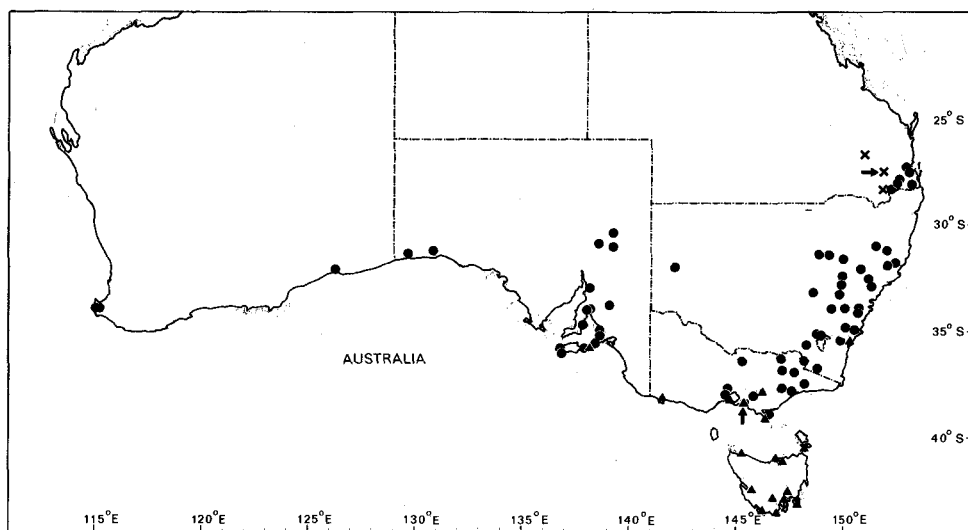


Fig. 1. Distribution of *G. australe*-▲, *G. terrae-reginae*-X, and *G. migrans*-●. Arrows indicate type localities.

venation obscure except in membranaceous leaves; secretory cells usually coalescent and restricted to a subapical position, sometimes isolated and scattered, rarely absent. *Inflorescence* elongate, subcolumnar or pyramidal, (4-) 10-40 (-70) cm long, consisting of lateral and sometimes terminal cymes, vegetative growth continuing after the first flowering; lateral cymes dischiasal or monochasial, (6-) 12-25 (-55) mm long; ultimate peduncles 1-7 (-10)-flowered, straight, sometimes bearing inconspicuous terminal bracts, (0-) 5-12 (-25) mm long; pedicels (0.5-) 2.5-10 (-22) mm long, slightly or strongly curved usually within 2 mm of ovary or fruit, rarely straight. *Flowers* (1.5-) 2.0-2.5 (-2.8) mm diameter, corolla rotate. *Fruits* 1.2-1.5 mm long, with numerous, usually transparent, uncinat hairs 0.4-1.0 mm long.

SELECTED SPECIMENS: NEW SOUTH WALES—*South Coast*: Clyde district, *Bauerlen* 1.1884 (MEL). VICTORIA: Fumina, Gippsland, 2.1925 (Ex Herb. Williamson, MEL); Queenscliff, *Tadgell* 10.1904 (MEL); "The Jackass", Fitzroy River, near Mount Deception, *Beaglehole* 1651, 1949 (NSW); ad ripam Darby fluminis promontorii Wilsoni, *Mueller* 3. 1853 (MEL); Near Darby River on Tongue Point Track, Wilsons Promotory, *Johnson NSW 95298*, 1.1967 (NSW). SOUTH AUSTRALIA—*Kangaroo Island*: Ad rivulos rupestris sinus Pink-bay, Kangaroo Island, 3.1857 (MEL). TASMANIA: Clarke Island, Furneaux Group, Bass Strait, *Maclaine*, 1894 (MEL); "The Nut", Circular Head, far NW. Tasmania, *Willis* 1.1965 (MEL); Side of Bluff, Circular Head, *Gunn 549/1842*, 12.1837 (NSW); near George Town, *Oakden* 4.1886 (MEL); near Pipers River, SE. Coast (MEL); Gordon River, *Milligan NSW 23919* (ex Herb. Archer), 12.1846 (NSW); Swanport, *Story* (MEL 17652, 17655, 17656); Rhyndaston, 12.1909 (MEL 17891, 17895); Junees Caves, near Maydena, *T. & J. Whaite 2391*, 1.1961 (NSW); Mount Wellington, *Gunn 549/1842*, 1. 1841 (NSW); Port Arthur, *Buften*, 1892 (MEL 17666, 17667, 17837); Cockle Creek, Recherche Bay, 1.1856 (MEL); New Harbour, *Davis NSW 83665*, 1.1938 (NSW); Gunner's Quoin, *Rodway H 393*, 6.1929 (CANB).

In the past the name *Galium australe* DC. has been applied broadly to include the Australian species having hairs on the ovaries or fruits; see 2. *G. terrae-reginae*, 3. *G. migrans* and 10. *G. curvihirtum*. Although it is included in Beadle et al. (1963), (1972), the species has not been authentically recorded from the Sydney district or the Blue Mountains.

The apically curved pedicels and the uncinat hairs of the fruits distinguish *G. australe* from other species.

## 2. *Galium terrae-reginae* Ehrendorfer et McGillivray, sp. nov.

Species affinis *G. australis* DC. sed habitu conferto, foliis brevibus, pilis fructuum curvatis non uncinatis differt.

HOLOTYPE: QUEENSLAND—*Darling Downs District*: One Tree Hill, Gowrie, *F.M. Bailey* (BRI 063832).

DISTRIBUTION: South eastern Queensland, from Chinchilla to Warwick. (No ecological data available). See fig. 1.

*Plant* ? biennial to perennial; root system consisting of a strong primary root with nodal roots up to 5 cm from the rootstock; habit loosely caespitose to straggling. *Stems* numerous, 15-45 cm long, branching throughout, with numerous spreading hairs, internodes (4-) 8-20 (-25) mm long. *Leaves* ovate, narrowly ovate or elliptical, (2.5-) 3-5 (-7) mm long, (1.5-) 2-2.5 (-3.5) mm wide, dull green; leaf-base shortly attenuate; leaf-apex acute to shortly acuminate; leaf-margin recurved to strongly recurved; upper surface with evenly distributed spreading or ascending hairs, lower surface with slightly fewer hairs mainly on margin and mid-vein; reticulate venation usually evident; secretory cells inconspicuous and in a subterminal position only, or absent. *Inflorescence* subpyramidal to elongate; ultimate peduncles 1-3-flowered, 1-5 (-7) mm long, straight; pedicels 1-3 (-5) mm long, conspicuously curved near apex particularly at the fruiting stage. *Flowers* c. 2 mm diameter, corolla rotate, ? yellowish. *Fruits* c. 1.5 mm long, tuberculate to rugose and covered with numerous slightly to strongly curved hairs.

MISAPPLIED NAME: *Galium australe* auct. non DC.: F.M. Bailey, Queensland Fl. 3: 782 (1900), *p.p.*; F.M. Bailey, Compr. Cat. Queensland Pl.: 257 (1913).

SPECIMENS EXAMINED: QUEENSLAND—**Darling Downs District**: Chinchilla, *Darnell-Smith NSW 23986*, 4. 1926 (NSW); Warwick, *Beckler*, 1857 (MEL); Prior's Station, *Leichhardt NSW 23987*, 11.1843 (NSW).

The species is characterized by its loosely caespitose to straggling habit, stems branching through their length, leaves usually not more than 5 mm long with inconspicuous secretory cells, cymes 1-3-flowered, pedicels conspicuously curved near the apex (especially evident at the fruiting stage) and fruits with numerous curved (not uncinat) hairs.

### 3. *Galium migrans* Ehrendorfer et McGillivray, *nom. nov.*

REPLACED SYNONYM: *Galium erythrorrhizum* F. Muell. ex Miq., Ned. Kruidk. Arch. 4: 113 (1856), '1859', *nomen illeg.*, non *G. erythrorhizon* Boiss. et Reut. 1852 ('*erythrorrhizum*' is an orthographic variant of the earlier epithet).

LECTOTYPE (here designated): [South Australia], Kangaroo Island, *Mueller* (U-sheet no. 2419B).

LECTOPARATYPE: [South Australia], in valle Schlancken, *Behr* (U).

SYNONYMY: (see also preceding replaced synonym): *Galium gaudichaudii* var. *muriculatum* Benth., Fl. Austral. 3: 446 (1867); F.M. Bailey, Queensland Fl. 3: 781 (1900); F.M. Bailey, Compr. Cat.: 257 (1913); Black, Fl. South Australia edn 2, 4: 799 (1957). *Galium umbrosum* var. *muriculatum* (Benth.) Ewart et Rees, Proc. Roy. Soc. Victoria (n.s.) 26: 4 (1913); Black, Fl. South Australia 4: 538 (1929); Ewart, Fl. Victoria: 1047 (1931). *Galium umbrosum* var. *gaudichaudi-muriculatum* Maiden et Betche, Census New South Wales Pl.: 188 (1916), *nomen illeg.* LECTOTYPE (here designated): New England, C. *Stuart* (K).

MISAPPLIED NAMES: *Galium australe* auct. non DC.: Bentham, Fl. Austral. 3: 447 (1867), *p.p.*; Moore & Betche, Handb. Fl. New South Wales: 253 (1893), *p.p.*; F.M. Bailey, Queensland Fl. 3: 782 (1900), *p.p.*; Black, Fl. South Australia 4: 539 (1929), *p.p.*; Gardner, Enum. Pl. Austral. Occid.: 122 (1931); Black, Fl. South Australia edn 2, 4: 800 (1957).

*Galium umbrosum* auct. non Forst. f. ex Hook. f. [*nomen illeg.* = *G. propinquum*]: F. Mueller, Fragm. 9: 188 (1875), *p.p.*, Syst. Census Austral. Pl.: 142 (1882), *p.p.*; Key Syst. Victorian Pl. 2: 30 (1885), *p.p.*, Key Syst. Victorian Pl. 1: 292 (1888), *p.p.*; Maiden & Betche, Census New South Wales Pl.: 188 (1916), *p.p.*; Black, Fl. South Australia 4: 538 (1929) *p.p.*; Ewart, Fl. Victoria: 1047 (1931), *p.p.*

*Galium gaudichaudii* auct. non DC.: Wakefield, Victorian Naturalist 72: 70 figs 4 & 4a, 72 (1955), *p.p.*

DISTRIBUTION: *Galium migrans* is the most widely distributed species of *Galium* in Australia, occurring from south eastern Queensland through New South Wales, Victoria and South Australia to south western Western Australia; it is found up to altitudes of c. 1700 metres. Usually it grows in moist open or sheltered situations in rock crevices or over and between stones or boulders, frequently in association with limestone or basic igneous rocks. One may expect to find the species in the vicinity of limestone caves from New South Wales to south western Western Australia. See fig. 1.

*Plants* perennial, able to flower in the first year; root system with strong primary root and nodal roots up to 20 cm from the rootstock; habit straggling to loosely



caespitose, sometimes pendulous in festoons. *Stems* numerous, (10-) 20-40 (-80) cm long, much-branched, branching sometimes reduced or absent in upper half of stems; internodes (5-) 15-40 (-100) mm long, stems commonly retrorsely aculeate, sometimes with many to few spreading to retrorse hairs, rarely glabrous. *Leaves* elliptical to ovate sometimes almost linear, (3-) 5-10 (-18) mm long, (1-) 1.5-3 (-5) mm wide, commonly a bright light green colour, sometimes darker and dull (from more shaded situations) or pale green with a greyish cast produced by the indumentum; leaf-base distinctly petiolate; leaf-apex obtuse-mucronate to shortly acuminate, sometimes acute; leaf margin recurved to almost flat; indumentum of few to many spreading or ascending hairs, evenly distributed on the upper surface, predominantly along margin and mid-vein on the lower surface; reticulate venation usually evident, more conspicuous on older leaves; secretory cells almost always present, commonly numerous and coalescent, particularly near the leaf-apex. *Inflorescence* pyramidal occupying about upper  $\frac{2}{3}$  of stems; ultimate peduncles (2-) 3-7 (-25)-flowered, straight, (2-) 5-15 (-35) mm long; pedicels usually slightly curved, (1-) 2-3.5 (-8) mm long, peduncles and pedicels of preceding year's growth often persistent. *Flowers* 1.2-2.5 (-3) mm diameter, corolla rotate, cream to yellowish or white. *Fruits* 1.2-1.7 mm long exceedingly variable in surface covering: papillose, rugose, tuberculate or covered with curved to straight aculei or hairs.

SELECTED SPECIMENS: QUEENSLAND—**Moreton District:** Mount Samson, c. 20 miles [32 km] NNW. of Brisbane, *White* 7.1913 (BRI); Three Mile Bush, c. 3 miles [5 km] NW. of Brisbane G.P.O., *Bailey* 7.1874 (BRI); Dams Creek, Mount Coot-tha ['Cootha'] near Brisbane, *Everist* 302, 1.1932 (BRI); Mount Tambourine, *White* 1.1916 (BRI); Mount Cordeaux, c. 25 miles [40 km] directly NE. by E. of Warwick, *Phillips* NSW 83632, 6.1961 (NSW); Christmas Creek, *White* 9320, 10.1933 (BRI); Roberts Plateau, Lamington National Park, *Tryon & White* 2.1920 (BRI).—**Darling Downs District:** Spring Creek, near Killarney, *Hubbard* 5775, 3.1931 (BRI); The Ranch, foot of Wilsons Peak, *Michael* 11.1933 (BRI). NEW SOUTH WALES—**North Coast:** Clarence River (MEL); Comboyne-Wingham, *Phillips* CBG 014082, 2.1961 (CBG); Bowman and Barrington Rivers, *Maiden* NSW 23904, 9.1897 (NSW); Brushy Mountains near Gloucester, *Maiden* NSW 23898, 9.1897 (NSW); Parsons Creek, S. of Bulga, *Ehrendorfer* 10.1966 (GRAZ, US); 0.5 miles [0.8 km] S. of Mount Bright Lookout, 4 miles [6 km] W. of Cessnock, *McGillivray* 1391, 9.1965 (NSW).—**Central Coast:** Nortons Basin, near Wallacia, *Coveny* NSW 83636, 10.1966 (NSW); Razorback Mountain, Camden, *McBarron* 9692, 10.1964 (NSW).—**South Coast:** Bungonia Gorge, S. of Marulan, *Adams* 1614, 1623, 11.1966 (CANB, NSW); Yalwal, c. 15 miles [24 km] by road WSW. of Nowra, *Rodway* 179, 11.1930 (NSW).—**Northern Tablelands:** Head of Macleay River, *Leichhardt* NSW 83625, 1843 (NSW); Moona Plains, Walcha, *Crawford*, 1.1885 (MEL); Tia Falls, *Forsyth & Cheel* NSW 23906, 10.1900 (NSW); c. 8 miles [13 km] E. of Norfolk Falls, Warung State Forest, NE. of Coolah, *Briggs* 965 & *Johnson*, 10.1966 (NSW); Warung State Forest, *Ehrendorfer* 10.1966 (GRAZ, WU).—**Central Tablelands:** Cheshire Creek, Wyagdon, *Constable* NSW 31184, 3.1955 (NSW); Jenolan Caves, *Blakely* NSW 23899 (NSW); 0.25 mile [0.4 km] W. of Abercrombie Caves, *Briggs* NSW 83634, 10.1965 (NSW).—**Southern Tablelands:** Wee Jasper Caves, *Whaite* 2834, 10.1964 (NSW); Two Sticks Road in vicinity of Devil's Gorge, A.C.T., *Burbidge* 1.1957 (CANB); near Mount Coree, A.C.T., *Gray* 4970, 1.1961 (CANB, NSW); Upper Orraral Valley, c. 1 mile [1.5 km] from homestead, A.C.T., *Burbidge* 6668, 11.1960 (CANB); Braidwood district, *Bauerlen* 223, 12.1884 (MEL); Yarrangobilly Caves, *Betche* NSW 23982, 2.1897 (NSW); Near Geehi, c. 7 miles [11 km] NW. of Mount Kosciusko, *Gittins* 641, 1.1963 (NSW); Geehi River Track, below Pinnacle Track (c. W. of Mount Townsend), *Ford* NSW 83624, 1.1959 (NSW).—**North Western Slopes:** 1 mile [1.5 km] W. of Timor Rock, Warrumbungle Mountains, *Johnson & Briggs* NSW 94574, 10.1966 (NSW); North side of Beloungery Split Rock, Warrumbungle Mountains, *Johnson & Briggs* NSW 94573, 10.1966 (NSW).—**Central Western Slopes:** Dart Brook, Scone, *Cabbage* NSW 23911, 10.1909 (NSW); Wollar, near Mudgee, *Campbell* NSW 23897, 11.1906 (NSW); Apple Tree Flat, Cudjegang, c. 10 miles [16 km] SE. of Mudgee, *Tindale* NSW 25656, 10.1953 (NSW); Bingham Springs, Bumberry, *Cleland* 9.1916 (AD).—**South Far Western Plains:** Scropes Range, Menindee district, *Constable* NSW 4878, 11.1947 (NSW). VICTORIA: Snowy Creek, Owens River, *Morton*, 1889 (MEL); Junction Dam, Kiewa River, *Rodd* 369, 12.1966 (NSW); Snowy River, *Bauerlen* 158, 4.1890 (MEL 17848, top specimen only); Limestone Creek, E. of Benambra, *Willis* 2.1946 (MEL); Murrindal River, Buchan district, *Wakefield* NSW 83629, 10.1949 (NSW); Gippsland, Nightingale Creek, just above Tali Karng, *Muir* 2947, 12.1963 (MEL); Bairnsdale district, Mitchell River Cliffs, near Wy Yung, *Hart* 11.1917 (MEL); Trentham Falls, *Robbins* (*Beaglehole* 7735), 1938 (NSW); Wilsons Promontory, *Mueller* NSW 17853, 5.1853 (NSW); Warragool Forest, *Reader* 11.1885 (MEL); Bacchus Marsh, *Meebold* 21896, 12.1936 (NSW); Lederberg, Gorge, *Sutton* 10.1904 (MEL); You Yangs, *Willis* 11.1962 (MEL). SOUTH AUSTRALIA—**Nullarbor Region:** Murrawijinnie Caves, 6 miles [10 km] N. of Nullarbor homestead, *Willis* 8.1947 (MEL); Koonalda Cave, 55 miles [88 km] ENE. of Eucla, *Beaglehole* 13419, 9.1965 (NSW).—**Flinders Ranges Region:** Gorge of western branch of Balcanoona Creek above Loch Ness Well, Gammon Ranges, *Eichler* 12920, 9.1956 (AD); Mount Chambers Gorge, c. 95 km SE. of Leigh Creek, *Filson* 3463, 10.1960 (AD); Oratunga Creek, near Moolooloo, c. 20 km NE. of Parachilna, *Lothian* 948, 10.1960 (AD); Wirrabara Forest, *Gill* 12 (MEL).—**Eyre Peninsula Region:** c. 2 km N. of Tumbly Bay, *Lothian* 1145, 10.1962.—**Northern Lofty Region:** Port Germein Gorge, c. 10 km E. of Port Germein, *Cleland* 9.1963 (AD); South Hummocks Range, c. 110 km NNW. of Adelaide,

*Kraehenbuehl* 1402, 8.1965 (AD).—**Murray Region:** Worlds End, SE. of Burra, *Brummitt* 9.1893 (AD).—**Yorke Peninsula:** c. 5 km W. of Kulpara, S. side of Kadina Road, northern Yorke Peninsula, *Lothian* 3045, 11.1964 (AD); Yorke Peninsula, *Tepper* 729, 1133 (MEL).—**Southern Lofty Region:** Morialta, c. 10 km E. of Adelaide, *Black* 9.1928 (AD); Third Creek, Lofty Ranges, *Mueller* 1.1848 (MEL); Waterfall Gully, base of Mount Lofty, *Tate* 10.1878 (AD); National Park, Belair, c. 8 km SSE. of Adelaide, *Black* 11.1905 (AD); Between Cape Jervis and Victor Harbour, south-eastern slope to Boat Harbour Creek, c. 3½ km N. of the sea coast, *Eichler* 14443, 11.1957 (AD).—**Kangaroo Island:** Cape Willoughby, *Tepper* 1278 (MEL); Ravine des Casoars, 8 km E. of Cape Borda, *Wilson* 683, 11.1958 (AD); Near small lagoon SW. of Kelly Hill reserve, c. 12 km ENE. of Cape du Couedic, *Wilson* 708, 11.1958 (AD). WESTERN AUSTRALIA—**Darling District:** Lakes Cave, Margaret River, *Ehrendorfer* 12.1966 (NSW, WU); Mammoth Cave, Margaret River, *Ehrendorfer* 12.1966 (NSW, WU); Gallinup, *Maiden NSW* 84540, 10. 1909 (NSW).—**Coolgardie District:** 9 miles [14 km] S. of Cocklebiddy, *George* 8550, 10.1966 (NSW).

*Galium migrans* is not only the most widely distributed of the Australian species of *Galium* but also the most variable, particularly in the nature of the indumentum of its fruits. It is characterized by a well-developed primary root, much-branched habit, light bright green foliage (except in well-shaded situations), leaves obtuse-mucronate to acuminate, inflorescences with conspicuous ultimate peduncles and gently curved pedicels, the persistence of old peduncles and pedicels on older stems.

**4. *Galium propinquum* A. Cunn.,** Ann. Nat. Hist. 2: 205 (1839); J.D. Hooker, Fl. Novae-Zelandiae 1: 113 (1852); Wakefield, Victorian Naturalist 72: 70 fig. 3 & 3a, 71 (1955); Allan, Fl. New Zealand 1: 592 (1961); Beadle et al., Handb. Vasc. Pl. Sydney Distr.: 257 (1963), Fl. Sydney Region: 427 (1972).

HOLOTYPE: NEW ZEALAND: NO 469 R. Cunningham 1834. (K). 'Shaded woods, Wangaroa, R. Cunningham, 1833' (protologue).

SYNONYMY: *Galium umbrosum* Forst. f. ex Hook. f., Handb. New Zealand Fl. 1: 121 (1864), *nomen illeg.*; [G. Forster, Prodr.: 89 (1786), *nomen nudum*; A. Cunningham, Ann. Nat. Hist. 2: 206 (1839), *nomen nudum, pro syn.*; Endlicher, Ann. Wiener Mus. 1: 177 (1836), *nomen nudum*; J.D. Hooker, Fl. Novae-Zelandiae 1: 113 (1852), *nomen nudum, pro syn.*]; F. Mueller, Fragm. 9: 188 (1875), *sens. ampl., p.p.*, Syst. Census Austral. Pl.: 76 (1882), *p.p.*, Key Syst. Victorian Pl. 2: 30 (1885), *p.p.*, Key Syst. Victorian Pl. 1: 292 (1888), *p.p.*, Second Syst. Census: 128 (1889), *p.p.*; Kirk, Student's Fl. New Zealand: 249 (1899); Rodway, Tasmanian Fl.: 71 (1903), *sens. ampl., p.p.*; Cheeseman, Man. New Zealand Fl.: 266 (1906); Maiden & Betche, Census New South Wales Pl: 188 (1916); Cheeseman, Man. New Zealand Fl., edn 2: 879 (1925); Black, Fl. South Australia 4: 538 (1929), *sens. ampl., p.p.*; Ewart, Fl. Victoria: 1047 (1931), *sens. ampl., p.p.*; Black, Fl. South Australia, edn 2, 4: 799 (1957). TYPE: as for *Galium propinquum* A. Cunn.

*Galium propinquum* var. *elongatum* Hook. f., Fl. Novae-Zelandiae 1: 113 (1852), 'α. *elongata*'.

*Galium propinquum* var. *glabratum* Hook. f., l.c. 'β. *glabrata*'.

*Galium propinquum* var. *hispidulum* Hook. f., l.c., 'γ. *hispidula*'; Allan, Fl. New Zealand 1: 592 (1961).

Hooker did not at any time cite types for the three preceding varietal names.

*Galium gaudichaudii* var. *muriculatum* Benth., Fl. Austral. 3: 446 (1867), *p.p.*; *Galium umbrosum* var. *muriculatum* (Benth.) Ewart et Rees, Proc. Roy. Soc. Victoria (n.s.) 26: 4 (1913); Black, Fl. South Australia 4: 538 (1929), *p.p.*; Ewart, Fl. Victoria, 1047 (1931), *p.p.* LECTOTYPE: see synonymy of 3. *G. migrans*.

*Galium erythrocaulon* Colenso, Trans. New Zealand Inst. 16: 332 (1884); Allan, Fl. New Zealand 1: 592 (1961). TYPE: NEW ZEALAND: 'Stony declivities, skirts of dry woods between Norsewood and Danneverke, Waipawa county, 1879-1882', Colenso. (WELT, not seen). ISOTYPE (?): K.

DISTRIBUTION: New Zealand: North and South Islands, Stewart Island and Ruapuke Island—occurring in a variety of habitats but favouring grassy or rocky sites in shady and/or moist situations. See fig 2.

Australia: Queensland (rarely collected), New South Wales, Victoria and South Australia (only one collection, from the Mount Lofty Ranges). In coastal climates it favours moist shaded fertile sites in rainforest or wet sclerophyll forest, while on the tablelands it occurs also in more open situations in woodland and grassland. The species has not been recorded in association with limestone. See fig. 2.

*Plants* annual (?), to perennial; root system of primary root later supplemented or superseded by nodal roots from well-developed slender rhizomes; habit prostrate to weakly decumbent. *Stems* usually weak and flexible, (4-) 6-30 (-50) cm long, sparingly branched; internodes (3-) 10-30 (-45) mm long; stems commonly retrorsely aculeate to glabrous or with spreading to retrorse hairs. *Leaves* elliptical to narrowly ovate, (1.5-) 2-8 (-15) mm long, (0.7-) 1-2.5 (-6) mm wide, dull green, to yellowish green, rarely dark green; leaf-base tapering to a short petiole; leaf-apex shortly acuminate to obtuse-mucronate, sometimes acute; leaf margin recurved to strongly recurved; upper surface with few spreading to ascending hairs, lower surface glabrous or with few hairs along margin and mid-vein; venation usually obscure on upper surface, commonly visible on lower surface with reflected light, usually evident with

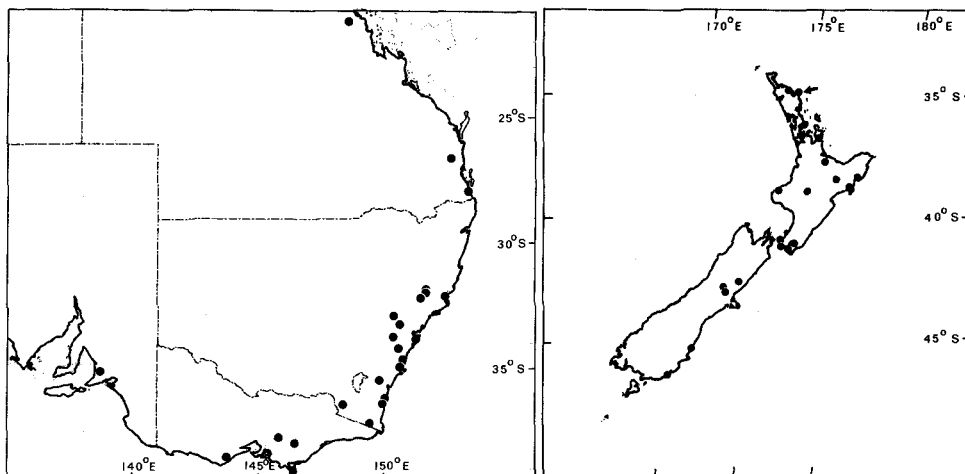


Fig. 2. Distribution of *G. propinquum*. Arrow indicates the type locality.

transmitted daylight; secretory cells always present, usually linear, occasionally roundish, coalescent towards the leaf apex and along the mid-vein, frequently also scattered over the lower surface. *Inflorescence* elongate sometimes pyramidal, consisting of axillary cymes; ultimate peduncles 1-5 (-7)-flowered, commonly 3-flowered, often absent or inconspicuous, usually straight, maximum length 6 mm; pedicels (0.3-) 1-4 (-7) mm long, often curved. *Flowers* (1.0-) 1.2-1.8 (-2.0) mm diameter, corolla rotate, white to cream. *Fruits* 0.9-1.2 mm long, papillose, tuberculate (with pointed tubercles), ruminant, rugose (with thin-walled rugosities), or covered with few to many curved ascending hairs, sometimes exhibiting a combination of these surface features.

**SELECTED SPECIMENS:** NEW ZEALAND (N. to S.; all specimens are from, CHR unless otherwise indicated):—**North Island:** Cape Brett, Bay of Islands, *Collett* 9.1964; Whangeripo Valley, *Petrie* 11.1919; Kawau Island, *Moore* 12.1953; Auckland, *Kirk* 42 (MEL); Pongakawa Valley, Te Puke district, *Healy* 11.1948; Anaura Bay, *Zotov* 2.1940; Mount Maungapohata, *Druce* 12.1953; Near Mahnia camp-site Tongariro National Park, *Ogle* 2.1962; Morere Hot Springs Reserve, *Mason* 8672, 1.1961; Egmont, *Druce* 2.1960; East Wairarapa, Pahaoa Road, *Moore* 11.1958; Mount Maunsell, East Wairarapa, *Druce*, 11.1962; Rimutaka Hill, *Hay* 11.1951; Colonial Knob, Tawa Flat, *Allan* 11.1943; Otari Bush, Wellington, *Mason* 12.1939; Miramar Gully, Wellington, *Mason* 8.1947; Tongue Point, Wellington Heads, *Healy* 4.1937; Putangirua Strm., Palliser Bay, *Hay* 3.1952; Cape Turakirae, Wellington, *Moore* 12.1952.—**South Island:** Middle Gorge, Hurunui River, North Canterbury, *Moar* 856, 8.1957; Lees Valley, behind Mount Oxford, *Simpson* 4.1956; View Hill, Oxford, *Mitchell* 12.1942; Godley Head, Banks Peninsula, *Macmillan* 65/13 & *Collett* 1.1965; Presqu'île de Banks, *Raoul*, 1843 (MEL); Moeraki Point, East Otago, *Collett* 3.1965; Tautuku Beach, Catlins district, *Mason* 4550, 1.1957; *Cunningham* 115 (MEL).

**AUSTRALIA: QUEENSLAND—South Kennedy District:** Dalrymple Heights, *Clemens*, Jul-Nov. 1947 (BRI).—**Wide Bay District:** Blackall Range, *Keys* 5.1910 (BRI), *White*, 12.1916 (NSW).—**Moreton District:** Tamborine Mountain, c. 45 miles [70 km] S. of Brisbane, *Hubbard* 5.1930 (BRI). **NEW SOUTH WALES**—**North Coast:** Copeland, near Gloucester, *Hind* NSW 84348, 1.1967 (NSW); Gloucester River, below Gloucester Tops, WSW. of Gloucester, *Constable* 6000, 6.1965 (NSW); Nabcia via Taree, *Gilbert* NSW 23902, 7.1947 (NSW).—**Central Coast:** Culoul Range, 8 miles [13 km] W. of Putty Road, *Rodd* 365, 12.1966 (NSW); Manly Beach, *Wilhelmi* 12.1863 (MEL); Fox Valley, Wairoonga, *Johnson* 945, 4.1947 (NSW); The Oaks Recreation Reserve, *McBarron* 13847, 2.1967 (NSW); Macquarie Pass, Albion Park, *McBarron* 10283, 1.1965 (NSW); Minnamurra Falls, Jamberoo, *McBarron* 5320, 11.1950 (NSW); Saddleback Mt., Jamberoo-Kiama Rd, *McBarron* 10275, 1.1965 (NSW).—**South Coast:** Nowra, *Rodway* 2123, 2.1936 (NSW); Nariri Creek, *Reader*, 1880 (MEL); Bodalla State Forest, 5 miles [8 km] NW. of Narooma, *Constable* 6785, 5.1966 (NSW); Mt Dromedary, *Reader* (MEL); Nungatta, *Weatherhead*, 1883 (MEL).—**Northern Tablelands:** Barrington Tops, *Fraser & Vickery* NSW 23905, 5.1934 (NSW).—**Central Tablelands:** E. of Rylstone, *McGillivray* 1088 & *Rodd*, 4.1965 (NSW); base of Scenic Railway, Katoomba, *Briggs* 882 & *Johnson*, 10.1966 (NSW).—**Southern Tablelands:** Braidwood district, *Büerlen* 179, 12.1886 (MEL); head of Spencers Creek, Kosciusko, *Johnson & Constable* NSW 15942, 1.1957 (NSW). **VICTORIA:** Acheron Way, *Tadgell*, 3.1937 (MEL); East Gippsland, *Wakefield* 4323, 1945-1946 (NSW); Watts River, *Mueller* 12.1873 (MEL); Thompson River crossing S. of Walhalla, *Johnson* NSW 95323, 1.1967 (NSW); Forrest, Otway Ranges, *Beaglehole* 7742, 2.1952 (NSW); c. 1 mile [1.5 km] E. of Lilly Pilly Gully, Wilsons Promontory, *Tindale* NSW 95251, 1.1967 (NSW); Tidal River, Wilsons Promontory, *Johnson* NSW 95297, 1.1967 (NSW). **SOUTH AUSTRALIA:** Mount Lofty Ranges, *Menzel* 11.1897 (AD).

The species is characterized by its prostrate to weakly decumbent habit, well-developed rhizomes frequently with the primary roots not evident, weak sparingly-branched stems, commonly 2-5-flowered pedunculate to shortly pedunculate cymes, and curved pedicels. It may be distinguished from *Galium migrans* by its well-developed rhizomes and weak, sparingly-branched comparatively glabrous stems; from *Galium ciliare* by its prostrate to weakly decumbent stems, leaves tapering to a short distinct petiole, ultimate peduncles 1-5 (-7)-flowered, and fruits which are usually not smooth. *Galium trilobum*, the endemic New Zealand species, has stems usually longer than 20 cm, leaves rarely less than 6 mm long and without secretory cells, and curved peduncles longer than 5 mm.

**5. *Galium ciliare* Hook. f.**, London J. Bot. 6: 461bis (1847); J.D. Hooker, Fl. Tasmaniae 1: 170, t. XLI A, B (1856); Miquel, Ned. Kruidk. Arch. 4: 113 (1856), '1859'; J.D. Hooker, Handb. New Zealand Fl. 1: 121 (1864); Bentham, Fl. Austral. 3: 446 (1867); F. Mueller, Fragm. 9: 188 (1875), *pro syn.*; Curtis, Stud. Fl. Tasmania 2: 272 (1963); Burbidge & Gray, Fl. Austral. Cap. Territory: 339 (1970).

TYPE MATERIAL: Kew Negative No. 9184, (K). 'Dry pastures, abundant; Gunn.: - v.v. .' (protologue). [Selection of a lectotype for the name *Galium ciliare* cannot be justified and would only need to be considered if infraspecific names were proposed. In the original description Hooker cites his own and Gunn's collections but without any details which can be matched with herbarium material. The citations in *Flora Tasmaniae* do not clarify this. In addition, the specimens and the collection data are so arranged on the type sheet, Kew Negative No. 9184, that one cannot be assigned to the other with any confidence. Certainly a piece or pieces could be designated as a lectotype, but in the present circumstances this seems both unnecessary and inadvisable. Bentham, *l.c.* p. 446, in citing 'abundant in dry pastures, J.D. Hooker', is not lectotypifying the name but merely mentioning Hooker's field note and indicating that he has seen material from Hooker's collections, or, in this example, material from Herbarium Hookerianum including Gunn's collections.]

SYNONYMY: *Galium gaudichaudii* var. *glabrescens* Benth., Fl. Austral. 3: 446 (1867); F.M. Bailey, Compr. Cat. Queensland Pl.: 257 (1913); Domin, Biblioth. Bot. 89: 1184 (1929). *Galium umbrosum* var. *gaudichaudi-glabrescens* Maiden et Betche, Census New South Wales Pl.: 188 (1916), *nomen illeg.* HOLOTYPE: New South Wales, Clarence River, Beckler (K). 'New England, Beckler' (protologue). ISOTYPE: (MEL 17762).

*Galium umbrosum* Forst. f. ex Hook. f., Handb. New Zealand Fl. 1: 121 (1864), *nomen illeg.*, *sens. ampl.*: F. Mueller, Fragm. 9: 188 (1875), *p.p.*, Syst. Census: 76 (1882), *p.p.*, Key Syst. Victorian Pl. 2: 30 (1885), *p.p.*, Key Syst. Victorian Pl. 1: 292 (1888), *p.p.*, Second Syst. Census: 128 (1889), *p.p.*; Moore & Betche, Handb. Fl. New South Wales: 253 (1893); Rodway, Tasmanian Fl.: 71 (1903), *p.p.*

*Galium gaudichaudii* var. *latifolia*, *nomen nudum*: Miq., Ned. Kruidk. Arch. 4: 113 (1856), '1859'.

Misapplication of the name *Galium ciliare*: See misapplied names: 7. *Galium compactum*. (Some material of *Galium ciliare* has been identified as *G. gaudichaudii*, but in the literature it is treated as *G. gaudichaudii* var. *glabrescens*).

DISTRIBUTION: In savannah and woodland habitats intermingled with grasses or sometimes between rocks, favouring basaltic soils in tableland regions; altitudinal range c. 100-1300 metres. Bunya Mountains, Queensland; tablelands (rarely slopes) in New South Wales, montane situations in Victoria, and Tasmania. See fig. 3.

*Plants* perennial; root system of nodal roots from subterranean stems, primary root not conspicuous; habit spreading, trailing, sometimes loosely caespitose. *Stems* ascending or erect from trailing primary stems, unbranched or sparingly branched near base, (4-) 10-20 (-40) cm long; internodes (6-) 8-18 (-25) mm long, stems with spreading dense to sparse hairs or glabrous, not retrorsely aculeate. *Leaves* ovate, sometimes rotund, usually maintaining a light yellowish-green colour on drying, (2.5-) 3.5-8 (-10) mm long, (1-) 1.5-3 (-4) mm wide, abruptly narrowed into an obtuse base; apex obtuse-mucronate to obtuse; margin recurved; upper surface noticeably glossy, with spreading or forwardly directed hairs along margin and midrib, or glabrous; reticulate venation usually evident; secretory cells, several to many, linear and scattered as well as coalescent near the apex. *Inflorescence* elongate, columnar, (5-) 8-20 (-25) mm long, consisting of lateral and terminal cymes, the latter sometimes prominent; ultimate peduncles 5-9-flowered, 5-15 mm long, straight; pedicels straight, 1-5 mm long. *Flowers* commonly yellowish, occasionally cream (? sometimes white), 1.5-3 mm diameter, corolla rotate. *Fruits* papillose but otherwise smooth.

SELECTED SPECIMENS: QUEENSLAND—**Darling Downs District**: Summit of Mount Mowbullen, Bunya Mountains, Tryon 11.1890 (BRI). NEW SOUTH WALES—**Northern Tablelands**: 19 miles [30 km] NE. of

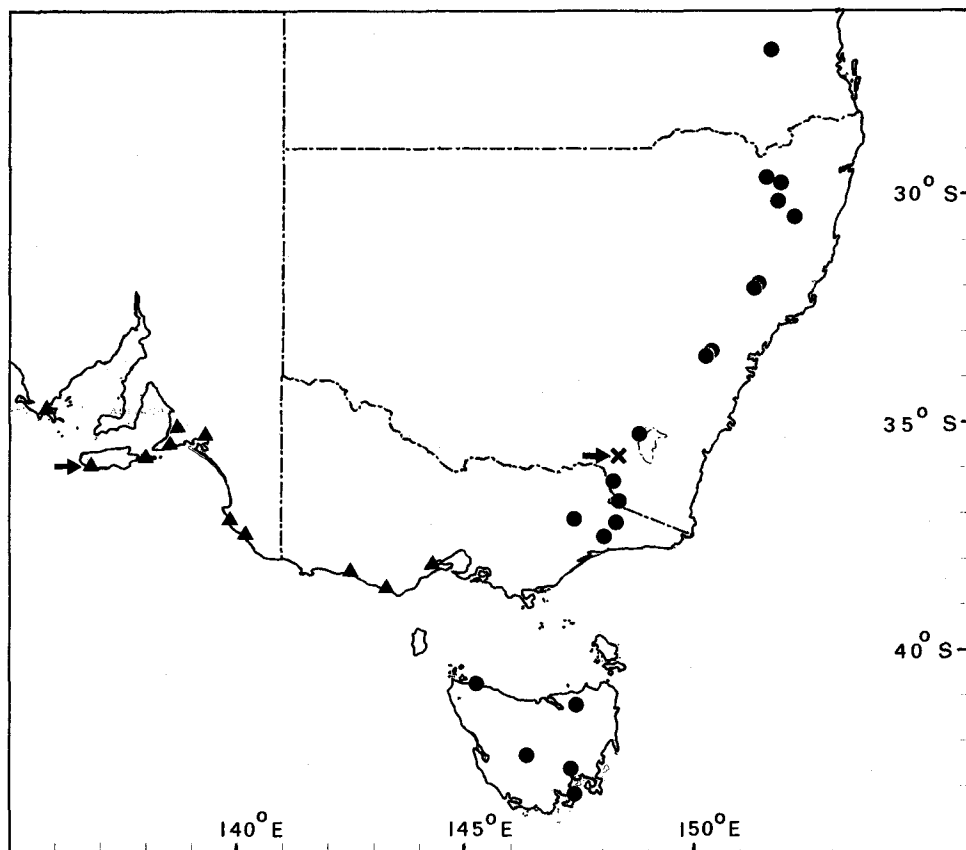


Fig. 3. Distribution of *G. ciliare*-●, *G. compactum*-▲, and *G. roddii*-X. Arrows indicate type localities.

Glen Innes on Gwydir Highway, *McGillivray* 2393, 9.1966 (NSW); Glen Innes, *Beche* NSW 23913, 10.1886 (NSW); Ben Lomond, *Beckler* (MEL); Ebor Falls, 50 miles [80 km] NE. of Armidale, *Davis (ex Herb. Rodway)* NSW 83980, 1.1941 (NSW).—**Central Tablelands:** Mt Tomah, *Rodd* NSW 94577, 11.1966 (NSW); Hartley Vale Railway Station, *Johnson & Briggs* 889, 891, 10.1966 (NSW).—**Southern Tablelands:** Dingo Dell area, N. of Mount Coree, A.C.T., *Burbidge* 6869, 12.1960 (CANB); Alpine Way just S. of Youngal Saddle in Snowy Mountains, *Muir* 3251, 2.1964 (MEL); Ingeegoodbee, *Costin* NSW 23925, 2.1949 (NSW).—**Central Western Slopes:** Wooloma Mountain, Belltrees, Scone, *White* NSW 23912, 11.1903 (NSW); Moonan Brook, Hunter River, *Carter* 1.1895 (MEL). VICTORIA: Gelantipy, c. 25 miles [40 km] directly W. of Bonang, *Wakefield* NSW 83652, 1.1948 (NSW); W. Tree, c. 13 miles [21 km] N. of Buchan, *Wakefield* NSW 83651, 1.1949 (NSW); Dargo Track, Mount St. Bernard, *Tadgell* 12.1914 (MEL). TASMANIA: Bluff, Circular Head, (*ex Herb. Gunn*) 12.1837 (NSW); Mount Arthur, *Coates & Sullivan*, 1886 (MEL); Mount Barrow and foothills, Dorset County, *Rupp* NSW 23927, 1.1922 (NSW); Mersey River, *Story* (MEL); 1 mile [1.5 km] W. of Dee River, Lyell Highway, *Johnson* NSW 23926, 1.1949 (NSW); Rhyndaston, 12.1909 (MEL); North Brunni Island, *Rodway* NSW 83985, 1.1901 (NSW); Marlborough at Glen Burn, *Gunn* 1128, 1.1847 (NSW); Pinnibar area, *Mazanec* 3.1963 (CANB).

*Galium ciliare* is characterized by relatively erect and unbranched stems, glossy ovate to rotund leaves, columnar inflorescences often with prominent terminal cymes and yellow to cream flowers.

**6. *Galium gaudichaudii* DC.**, Prodr. 4: 607 (1830); Bentham, Fl. Austral. 3: 446 (1867); F.M. Bailey, Queensland Fl. 3: 781 (1900); Rodway, Tasmanian Fl.: 71 (1903); F.M. Bailey, Compr. Cat. Queensland Pl.: 257 (1913); Ewart & Rees, Proc. Roy. Soc. Victoria 26: 4 (1913); Anon., Field Naturalists Census Pl. Victoria: 60 (1923), *p.p.*; Black Fl. South Australia 4: 538 (1929); Domin, Biblioth. Bot. 89: 1189 (1929); Ewart, Fl. Victoria: 1046 (1931); Wakefield, Victorian Naturalist 72: 72 (1955); Black,

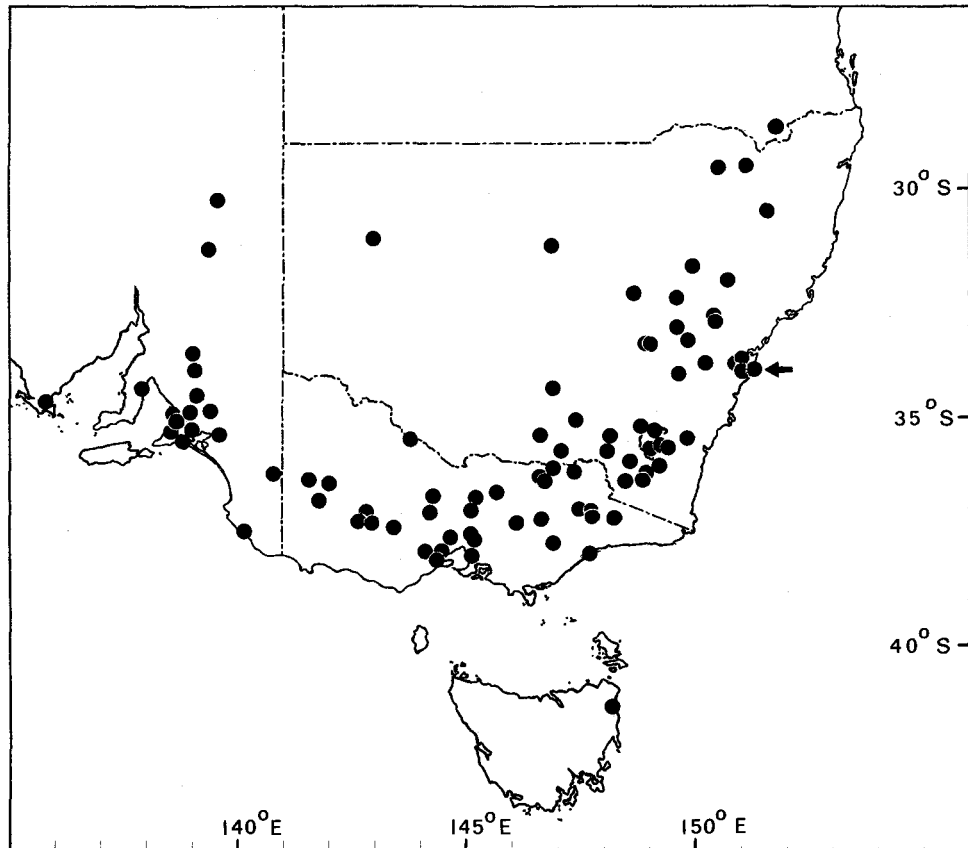


Fig. 4. Distribution of *G. gaudichaudii*. Arrow indicates the type locality.

Fl. South Australia, edn 2, 4: 799 (1957), *p.p.*; Beadle et al., Handb. Vasc. Pl. Sydney Distr.: 358 (1963); Cochran et al., Fl. & Pl. Victoria: 78, plate 215 (1968); Burbidge & Gray, Fl. Austral. Cap. Terr.: 339, fig. 343 (1970); Beadle et al., Fl. Sydney Region: 428 (1972).

HOLOTYPE: [New South Wales], in Nova-Hollandia ad Port Jackson, *Gaudichaud* (G-DC). ISOTYPES (?): E, K (ex Herb. J. Gay).

SYNONYMY: *Galium vagans* Hook. f., London J. Bot. 6: 461 *bis* (1847). HOLOTYPE: Van Diemen's Land, *Gunn* 548 (K) ['Grassy places; Gunn' (protologue).]

*Galium axiflorum* F. Muell. ex Miq., Nederl. Kruidk. Arch. 4: 113 (1856), '1859', including:

forma *minor* Miq. HOLOTYPE: [South Australia], Lofty-range, *Mueller* (U).

forma *laxe-ramosum* Miq. HOLOTYPE: [South Australia], Barossa-range, in formatione arenacei transitionis, *Mueller* (U).

forma *procerum* Miq. HOLOTYPE: Tasmania, *Stuart* (U).

*Galium umbrosum* var. *gaudichaudii* (DC.) Maiden et Betche, Census New South Wales Pl.: 188 (1916), '*Gaudichaudii*'. TYPE: as for *G. gaudichaudii* DC.

*Galium gaudichaudii* var. *typicum* Domin, Biblioth. Bot. 89: 1184 (1929), *nomen inval.*

MISAPPLIED NAME: *Galium umbrosum* auct. non Forst. f. ex Hook. f., *nomen illeg.* [superfl., = *G. propinquum*]: F. Mueller, Fragm. 9: 188 (1875), *p.p.*, Syst. Census: 76 (1882), *p.p.*; C. Moore, Census Pl. New South Wales: 32 (1884), in parenthesis; F. Mueller, Key Syst. Victorian Pl. 2: 30 (1885), *p.p.*, Key Syst. Victorian Pl. 1: 292 (1888), *p.p.*, Second Syst. Census: 128 (1889), *p.p.*; Moore & Betche, Handb. Fl. New South Wales: 253 (1893), *p.p.*; Rodway, Tasmanian Fl.: 71 (1903), *p.p.*; Maiden & Betche, Census New South Wales Pl.: 188 (1916), *p.p.*

Misapplication of the name *Galium gaudichaudii*: see misapplied names: 3. *G. migrans* and 7. *G. compactum*.

DISTRIBUTION: A widely distributed species in south eastern Australia, usually occurring on relatively dry sites in sclerophyll forest, woodland, savannah or heath and on a variety of soil types from those based on acid to basic igneous rocks to those of sedimentary origin, including limestones, sandstones, shales and slates. See fig. 4.

*Plants* perennial; root system with strong primary root and weak development of nodal roots up to 5 cm from the rootstock; habit caespitose, loosely caespitose, straggling to trailing. *Stems* numerous, commonly erect, (5-) 10-25 (-100) cm long, branching in the lower half of plant; internodes (5-) 12-20 (-35) mm long; stems hirsute, retrorsely aculeate, or sometimes almost glabrous. *Leaves* narrowly ovate to linear (often almost narrowly triangular in outline owing to recurving of margins towards apex), often irregularly curved in drying, (4-) 5-8 (-12) mm long, (0.6-) 0.8-1.2 (-2.0) mm wide; leaf-base shortly attenuate to truncate, non-petiolate; leaf-apex subobtusate (but when observed superficially appearing acute owing to recurving of the leaf margin); leaf-margin strongly recurved; upper surface with scattered ascending hairs, hairs on lower surface confined to margin and midvein; venation obscure; secretory cells coalescent in a subapical position, sometimes also isolated and scattered. *Inflorescence* elongate, columnar or subpyramidal; lateral cymes condensed, 3-5 (-10) mm long; ultimate peduncles 1-5 (-7)-flowered, up to 2.5 mm long; pedicels 0.1-1.0 (-2.0) mm long. *Flowers* 1.5-2 mm diameter, corolla rotate, cream, purplish in bud. *Fruits* 0.8-1.5 mm long, rugulose, without tubercles or hairs.

SELECTED SPECIMENS: QUEENSLAND—**Darling Downs District:** Granite Hill just W. of Glen Aplin, *Everist & Webb* 1371, 11.1946 (BRI, CANB). NEW SOUTH WALES—**Central Coast:** near Vineyard Station, Richmond Line, *Salasoo* 990, 9.1952 (NSW); Veterinary Research Station, Glenfield, *McBarron* 8407, 10.1963 (NSW); Bringley, *Boorman & Cheel* NSW 23957, 9.1913 (NSW).—**South Coast:** Narira Creek, *Reader* 8.1880 (MEL).—**Northern Tablelands:** 5 miles [8 km] NW. of Armidale, *Davis (ex Herb. Rodway)* NSW 38600, 12.1940 (NSW); c. 8 miles [13 km] E. of Norfolk Falls, Warung State Forest, NE. of Coolah, *Johnson & Briggs* 964, 10.1966 (NSW).—**Central Tablelands:** Hill End, *Lauterer* 9.1885 (MEL); Mount Canobolas, 10 miles [16 km] SW. of Orange, *Constable* NSW 53344, 11.1960 (NSW); Limekilns, c. 17 miles [27 km] by road NE. of Bathurst, *Whaite* 878, 1.1951 (NSW); Jenolan Caves, *Blakely* (SYD); Rockley, *Boorman* NSW 23959, 11.1906 (NSW); Abercrombie Caves, *Boorman* NSW 23958, 11.1918 (NSW).—**Southern Tablelands:** 17 miles [27 km] from Uriarra on Yass Road, *Moore* 1849, 10.1952 (CANB); Hall, A.C.T. *D'Arny* 49, 11.1959 (CANB); Canberra-Broken Bridge (Uriarra), A.C.T., *Melvaine* 10.1938 (CANB); Canberra, [A.C.T.] *Cambage* 2984, 11.1911 (NSW, SYD); Black Mountain, A.C.T., *Gauba* CBG 010972, 11.1949 (CBG); Red Hill (Canberra), A.C.T., *Gauba* 10.1949 (GAUBA 9565; CBG 010934); slopes of Jerrabomberra, S. of Queanbeyan, *Burbridge* 6699, 11.1960 (CANB); top of Fitz's Hill, A.C.T., eastern side near summit, *Burbridge* 6217 & *Gray*, 12.1958 (CANB); 2 miles [3 km] from Naas on Gudgenby Road, A.C.T., *Moore* 2969, 11.1954 (CANB); Tharwa, [A.C.T.], *Cambage* 3003, 11.1911 (NSW); Braidwood district, *Bauerlen* 12.1884, 1.1885, 10.1886 (MEL); 2 miles [3 km] S. of Captains Flat, *Briggs* NSW 83602, 12.1965 (NSW); The Glen, via Tumberumba, *McBarron* 2884, 12.1948 (NSW, SYD); Happy Jacks River, Tumut River catchment area, *Newman* NSW 23915, 12.1952 (NSW); Snowy Mountains Highway near Rhine Falls, 12 miles [19 km] from Cooma, *Muir* 2422, 10.1961 (MEL); Murrumbidgee River, 5 miles [8 km] from Cooma, *Cambage* 2107, 11.1908 (NSW, SYD); Jindabyne, *Maiden & Forsyth* NSW 23971, 1.1899 (NSW); Summit Road, Sawpit Creek, Mt Kosciusko area, *Martin* 1.1963 (SYD).—**North Western Slopes:** Warialda, *Rupp* NSW 23976, 9.1905 (NSW); Inverell Road and Frasers Creek, *Boorman* NSW 23978, 9.1910 (NSW).—**Central Western Slopes:** Kars Gap, Scone, *Cambage* 2600, 10.1909 (SYD); Dubbo, *Cambage* NSW 23954, 10.1906 (NSW); Camboon, 7 miles [11 km] N. of Rylstone, *Baker* NSW 23956, 10.1893 (NSW); Bowan Park near Cudal, *Blakely* NSW 23967, 10.1906 (NSW); Ardlethan, *Cambage* 4332, 10.1916 (NSW).—**Southern Western Slopes:** Gilmore, near Tumut, *Boorman* NSW 23941, 10.1916 (NSW); Pleasant Hills, *Fisher*, 1890 (MEL); Woomargama, *McBarron* 131, 12.1946 (SYD); Wagga Wagga, *Thom*, 1887 (MEL); Monument Hill, Albury, *McBarron* 3748, 10.1949. —**North Western Plains:** *Girilambone*, *Betche* 84, 10.1886 (NSW).—**North Far Western Plains:** Tarella, [a station N. of Wilcannia], *Bauerlen* 8.1887 (MEL). VICTORIA: McKellops Bridge, *Robbins (Beaughole 7734)*, c. 1937 (NSW); Boundary Creek, below the "Bare Rock", Wulgulmerang, far East Gippsland, *Willis* 11.1962 (MEL); on the Omeo-Corryong road, 8 miles [13 km] S. of Carmody's Hut, *Muir* 3665, 12.1964 (MEL); between Omeo and Swifts Creek, *Robbins (Beaughole 7736)*, c. 1937 (NSW); Buckety Plain, Bogong High Plains, *Willis* 1.1947 (MEL); along Langstone Creek on metamorphic granite soils up to 4000 ft. [1200 m], *Stirling* 10.1882 (MEL 17705); 4 miles [6 km] S. of Granya, 23 miles [37 km] E. of Wodonga, *Muir* 2371, 10.1961 (MEL); Beechworth, *Meebold* 21705, 11.1936 (NSW); Mount Stanley, *McBarron* 2930, 1.1949 (NSW); Minogue's Lookout, 10 miles [16 km] SE. of Mount Howitt, *Muir* 994, 12.1959 (MEL); Tali Karng, Gippsland, *Muir* 2966, 12.1963 (MEL); Sperm Whale Head, Gippsland, *Barton* 11.1926 (MEL); near Still Creek, on the Jamieson Road, 22 miles [35 km] from Eildon, *Muir* 1640, 10.1960 (MEL); Hurstbridge, *Tadgell* 10.1923 (MEL); Warrandyte, *Meebold* 21704, 11.1936 (NSW); Cheltenham, *Morrison* 11.1894 (AD, CANB); Darebin Creek, *Mueller* 10.1852 (MEL); Tamleugh, Goulburn Valley, *Minchin*, 1886 (MEL); Hughes Creek, near Avenal, *Davis* NSW 83606 (ex *Herb. Rodway*) 11.1942 (NSW); Seymour, *Davis* NSW 83607 (ex *Herb. Rodway*) 9.1942 (NSW); Lower Loddon (near junction with Murray), *Thom*, 1882 (MEL); Flora Hill, Bendigo, *Robbins (Beaughole 7980)*, 10.1947 (NSW); Castlemaine, *Robbins (Beaughole*

3715), 10.1939 (NSW); Taradale, *Tadgell* 10.1933 (MEL); Toolern Vale, *Tadgell* 12.1932 (MEL); Lintons Forest, *Whan NSW 23974*, 1862 (NSW); Stawell, *Parch* 10.1928 (MEL); Ararat, *Green 54* (MEL); along Forest Access Road to Ararat near top of William Ridge, Grampians area, *Whaite 1618*, 11.1953 (NSW); Moyston, *Sullivan* 10.1872, 10.1879 (MEL); Ben Major State Forest, N. of Beaufort, *Muir 1589*, 10.1960 (MEL); Salt Lake, Shire of Dimboola, *Reader*, 11.1895 (MEL 17722, in part); Mount Arapiles, *Beauglehole 7579*, 10.1964 (NSW); Mitre Rock, near Mount Arapiles, c. 15 km WSW. of Horsham, *Hicks 9.1960* (AD); Nhill, *Staer NSW 23945*, 4.1911 (NSW); Maryvale, *Macpherson*, 1898 (MEL); Lower Glenelg River, between Eaglehawk Bend and Blackfish Creek, *Willis* 10.1948 (MEL). SOUTH AUSTRALIA—Eyre Peninsula Region: Port Lincoln, *Browne*, 1874 (MEL), *Black* 10.1909 (AD).—Flinders Ranges Region: Ridge N. of North Tusk, Gammon Ranges, *Eichler 12813*, 9.1956 (AD); Wilpena Pound, *Beck* 10.1924 (AD).—Northern Lofty Region: Mine Hill, Burra, *Brummitt* 10.1892 (AD); Tothill Range, c. 145 km N. of Adelaide, *Kraehenbuhl 1151*, 10.1963 (AD).—Murray Region: Mannum, Murray River, *Cleland NSW 23966*, 11.1913 (NSW).—Yorke Peninsula: Ardrossan, *Tepper (ex Herb. Black)* 10.1879 (AD).—Southern Lofty Region: Barossa Range, *Behr* (MEL); Port Adelaide, *Blandowsky*, 1850 (MEL); Belair, *Tate* 11.1883 (AD); National Park, Belair, *Eichler 13393*, 12.1956 (AD); Mount Lofty Botanic Garden, c. 12 km SE. of Adelaide, *Kuchel 1260*, 10.1963 (AD); Strathalbyn, *Black* 11.1910 (AD); Willunga, *Black* 9.1904 (AD); Encounter Bay, *Cleland (ex Herb. Black)* 1.1924 (AD). TASMANIA: Mount Direction, *Black* 11.1911 (MEL); St. Helens, *Fitzgerald NSW 23937*; South Esk, *Stuart*, 1848 (MEL); Landfall Creek, *Simson* 10.1880 (MEL).

*Galium gaudichaudii* may be distinguished from other species by its strong primary root with little or no development of nodal roots, leaves commonly disarranged in drying and narrowly ovate to narrowly triangular, with margins strongly recurved towards the leaf apices, relatively unbranched stems bearing crowded cymes with peduncles usually less than 2.5 mm long and pedicels up to 2 mm long; the fruits are rugulose, without hairs or tubercles. Specimens of several species, principally those of 3. *G. migrans* and 7. *G. compactum*, have been misclassified as *G. gaudichaudii*.

### 7. *Galium compactum* Ehrendorfer et McGillivray, sp. nov.

Species affinis *G. gaudichaudii* DC. sed rhizomatibus conspicuis, ramorum internodiis foliisque brevibus, cymis paucifloris 1-2 (-3) floribus differt.

HOLOTYPE: SOUTH AUSTRALIA: Kangaroo Island, Sandhill on road to Cape du Couedic, ca. 1½ km south of Rocky River Homestead, *Hj. Eichler 15376*, 11.11.1958 (AD).

DISTRIBUTION: Coastal, commonly sandy habitats, from near Geelong in Victoria to Port Lincoln, South Australia, and including Kangaroo Island. See fig. 3.

*Plants* perennial; root system of strong primary root and well-developed rhizomes; habit caespitose, sometimes straggling, ? sometimes pendulous. *Stems* usually numerous (2-) 3-8 (-25) cm long, pilose to almost glabrous, not retrorsely aculeate; internodes (2-) 3-8 (-15) mm long, generally shorter than in the other species. *Leaves* ovate to narrowly ovate, (2.5-) 3.5-4.5 (-6) mm long and (0.8-) 1.5-1.8 (-2.2) mm wide, light green or brown, never dark on drying; leaf-base cuneate to attenuate; leaf-apex acute; margin recurved sometimes more prominently so towards the leaf-apex; upper surface pilose to almost glabrous, not retrorsely aculeate; indumentum on lower surface similar but occurring predominantly on the margin and midvein; venation obscure; secretory cells usually present and coalescent near the leaf-apex, sometimes in scattered or continuous groups. *Inflorescence* columnar, sometimes catkin-like, (0.5-) 1-4 (-8) cm long, consisting of lateral and terminal cymes; lateral cymes shorter than the leaves; ultimate peduncles up to 0.5 mm long, 1-2 (-3)-flowered; pedicels up to c. 0.5 mm *Flowers* 1.5-2 mm diameter, corolla rotate. *Fruits* c. 1.5 mm long, rugose.

MISAPPLIED NAMES: *Galium ciliare* auct. non Hook. f.: *Black*, Fl. South Australia 4: 538 (1929). It differs noticeably from *G. ciliare* which has a looser habit (internodes usually 8-18 mm long), longer lateral cymes (peduncles 5-15 mm long), and papillose fruits.

*Galium gaudichaudii* auct. non DC.: *Black*, Fl. South Australia edn 2, 4: 799 (1957), p.p.; *G. gaudichaudii* has little or no development of rhizomes, looser habit (internodes usually 12-20 mm long), and longer cymes 3-5 (-10) mm long.

SELECTED SPECIMENS: VICTORIA: Near Geelong, *Wilson*, 1885 (MEL); Gellibrand River, *Anon.* 1874 (MEL); Warrnambool, *Anon.* 10.1856 (NSW); Cape Nelson, *Anon.* 15 (MEL). SOUTH AUSTRALIA—Eyre Peninsula: Port Lincoln, *Dixon* 10.1883 (AD), *Black* 10.1909 (AD).—Murray Region: Scrub E. of Wellington, *Tepper* (AD).—Southern Lofty Region: Belair, *Tate* 11.1883 (AD); Waterfall Gully, c. 10 km ESE. of Adelaide, *Cleland* 11.1924 (AD); Summerton near Uraidla, *Griffith* 12.1907 (AD); Willunga, *Black*, 9.1904 (AD); Cape Jervis, *Maiden NSW 23935*, 1.1907 (NSW); Newland Head, Encounter Bay,



*Cleland* 1.1928 (AD).—**Kangaroo Island:** Dudley Peninsula, *Tepper* 11.1883 (AD); Rocky River, *Cleland* 12.1934 (AD); Cape du Couedic, *Cleland* 11.1924 (AD); Mount Taylor, *Tepper* 11.1886 (MEL).—**South-eastern Region:** Robe, *Beck* 10.1910 (AD); Beachport, *Black* 11.1917, 12.1917 (AD).

This species is characterized by well-developed rhizomes, compact habit (most stems 3-8 cm long), columnar inflorescences with lateral cymes shorter than the leaves, and rugose fruits.

### 8. *Galium roddii* Ehrendorfer et McGillivray, sp. nov.

Species affinis *G. gaudichaudii* DC. sed rhizomatibus conspicuis, fructibus tuberculatis differt.

HOLOTYPE: NEW SOUTH WALES: Cave Creek, Cooleman Caves, east of Yarrangobilly, c. 0.5 mile [0.8 km] below the Blue Waterhole, *Rodd* 87, 18.4.1965. (NSW). ISOTYPES (yet to be distributed): E, K, US, WU.

DISTRIBUTION: The species is a narrow endemic, apparently confined to limestone in the vicinity of Cave Creek, Cooleman Caves east of Yarrangobilly in the Southern Tablelands of New South Wales at the comparatively high altitude of 1200-1250 metres. It occurs as occasional clumps in crevices of cliffs and limestone pavements, and in gravel at the foot of clefts in the limestone. See fig. 3.

*Plants* perennial; root system mainly roots from well-developed rhizomes, primary root strongly developed but rarely observed; habit caespitose with some trailing stems, and clumps at intervals along the rhizomes. *Stems* several to many, 6-30 cm long, hirsute, much-branched near the base, sparingly branched or unbranched in the upper two-thirds; internodes (2-) 4-12 (-25) mm long. *Leaves* narrowly ovate, curved upwards, 3-4.5 mm long, 0.8-1.2 mm wide, dull pale green, soon becoming brown on lower stems; leaf base narrowing abruptly to a broad short petiole; leaf apex acute, accentuated by the recurved leaf margin; margin thickened, recurved; upper surface with few to many spreading or ascending hairs, lower surface lineate, usually with fewer hairs; venation obscure; secretory cells linear to round, coalescent and commonly also diffuse, rarely absent. *Inflorescence* columnar, consisting of many short lateral cymes 2-3 mm long; ultimate peduncles 1-2 (-3)-flowered, 0.3-0.5 mm long; pedicels 0.3-0.5 mm long. *Flowers* c. 2.2 mm diameter, corolla rotate, dull cream. *Fruits* 1.3-1.6 mm long, covered with numerous rounded pale-capped tubercles.

SPECIMENS EXAMINED: NEW SOUTH WALES—**Southern Tablelands:** Cave Creek, about 2 miles [3 km] above junction with Goodradigbee R., *Rodd* 476, 3.1967 (NSW); Cave Ck., head of Goodradigbee R., *Rodd* 563, 12.1967 (NSW).

The species is named after A.N. (Tony) Rodd, Botanist, whose collections and critical notes have improved our understanding of many taxa in the Australian flora.

### 9. *Galium binifolium* Wakefield, *Victorian Naturalist* 72: 69, 70 fig. 1 (1955); Beadle et al., *Handb. Vasc. Pl. Sydney Distr.*: 357 (1963), *Fl. Sydney Region*: 427 (1972).

HOLOTYPE: VICTORIA: Sand-dunes near Betka River, Mallacoota, beneath a stand of tall *Melaleuca* shrubs, *Wakefield* 4794, 6.1.1953 (MEL). ISOTYPE: K.

SYNONYMY: ? *Galium umbrosum* var. *bifolium* F. Muell., *Fragm.* 9: 188 (1875). TYPE: Hastings-River, Beckler. Not seen.

MISAPPLIED NAMES: ? *Galium geminifolium* auct. non. F. Muell.: *Domin, Biblioth. Bot.* 89: 1184 (1929).

DISTRIBUTION: On slopes and near creeks in forest and woodland entangled in herbage or trailing over rocks, occurring from near sea-level up to c. 800 metres altitude. Eastern New South Wales, Victoria and south eastern South Australia. See fig. 5.

*Plants* biennial or annual (? perennial); root system of strong to rather weak primary roots sometimes supplemented by occasional nodal roots; habit straggling to clambering, sometimes loosely caespitose. *Stems* several to occasionally many, (15-) 20-50 (-100) cm long, sparingly branched or unbranched; internodes (20-) 30-60 (-80) mm long, stem surface with retrorsely aculeate asperities or smooth, apparently never with a conspicuous indumentum. *Leaves* often reclinate to retrorse, narrowly elliptical, commonly slightly falcate, (4-) 6-12 (-20) mm long, (0.7-) 1-2.5 (-3) mm wide, stipular leaves rarely exceeding two-thirds the length of non-stipular leaves; texture

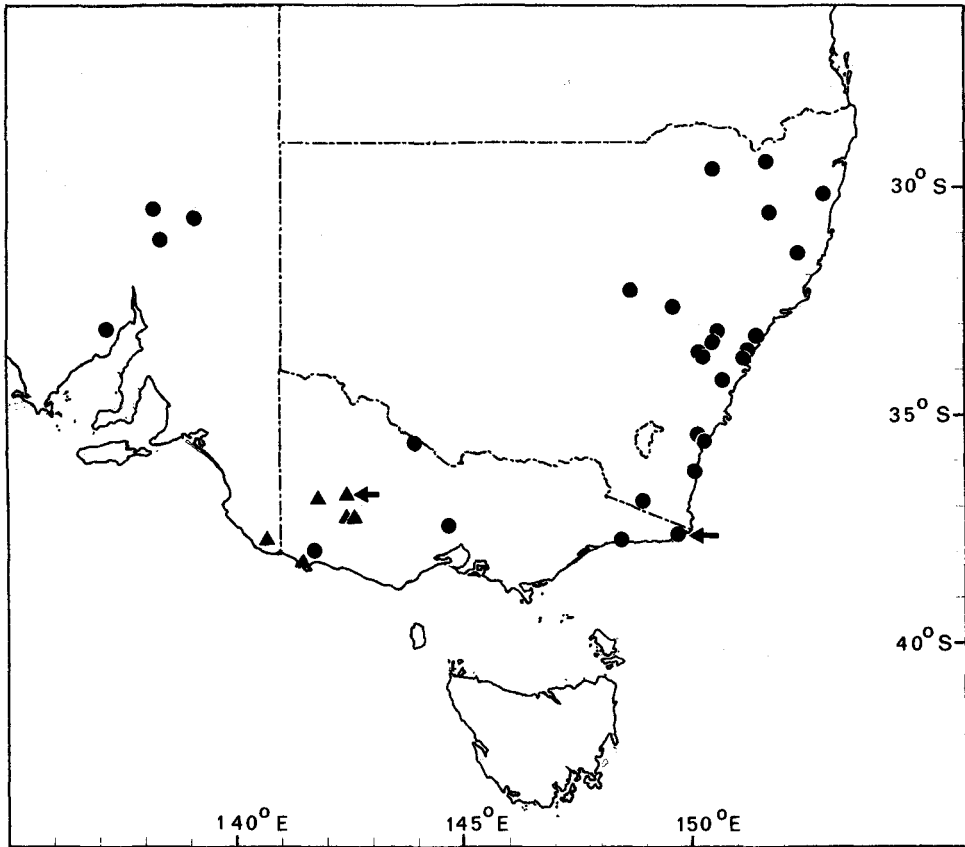


Fig. 5. Distribution of *G. binifolium*-●, and *G. curvihirtum*-▲. Arrows indicate type localities.

membranaceous to subcoriaceous; leaf-base attenuate to shortly attenuate; leaf-apex acute; margins recurved; leaf-surface with few forwardly directed hairs mainly on margins and on the upper and lower surfaces of the midrib; reticulate venation usually clearly visible; some apical secretory cells usually present. *Inflorescence* elongate from well below the middle of stems (above the middle in some young plants); lateral cymes c. 5-25 mm long; ultimate peduncles conspicuous, straight to slightly curved, commonly 3-flowered, but up to c. 8-flowered, pedicels up to 5 mm long, commonly 2-3 mm. *Flowers* 1.8-2.2 (-2.5) mm diameter, corolla rotate, cream to yellowish sometimes with reddish or purple tinges. *Fruits* c. 1.5 mm long, rugose or sometimes ribbed, glabrous or rarely with numerous curved short hairs.

MISAPPLIED NAMES: *Galium umbrosum* var. *muriculatum* auct. non (Benth.) Ewart et Rees: Black, Fl. South Australia 4: 538 (1929), p.p.

*Galium gaudichaudii* var. *muriculatum* auct. non Benth.: Black, Fl. South Australia, edn 2, 4: 799 (1957), p.p.

SELECTED SPECIMENS: NEW SOUTH WALES—**North Coast**: Timber Top via Glenreagh, *King NSW 23988*, 11.1949 (NSW); Macleay River, *Beckler (MEL)*; Seaview Range, *Maiden NSW 23910*, 11.1897 (NSW); Upper Williams River, *Fraser & Vickery NSW 23903*, 1.1934 (NSW).—**Central Coast**: Culoul Range, 9 miles [14 km] W. of Putty road, *Rodd 367*, 12.1966 (NSW); Wyong-Warnervale, *Salasoo 1619*, 10.1958 (NSW); Milson Island, Hawkesbury River, *Cleland (AD)*; Mountain Lagoon, 10 miles [16 km] NE. of Bilpin, *Constable 5764*, 4.1965 (NSW); Warrawee, *Blakely NSW 23900*, 11.1914 (NSW); Nepean River, Douglas Park, *McBarron 11827*, 1.1966 (NSW).—**South Coast**: Clyde River, *Bauerlen 103*, 11.1884 (MEL); Kioloa State Forest, NE. of Batemans Bay, *Adams 1590*, 10.1966 (NSW); Narira Creek, near Narooma, *Reader 8.1880 (MEL)*; Tingiringi Mountain, *Bauerlen 170*, 1.1889 (MEL).—**Northern Tablelands**: 5 miles [8 km] NE. of Armidale, *Davis NSW 83986*, 5.1939 (NSW).—**Central Tablelands**: Mount Victoria, *Maiden NSW 23901*, 12.1896 (NSW); base of Scenic Railway, Katoomba, *Johnson & Briggs 886*, 10.1966 (NSW).—

**North Western Slopes:** Emmaville, *Boorman NSW 23989*, 10.1901 (NSW); Warialda, *Boorman NSW 83658*, 10.1914 (NSW);—**Central Western Slopes:** Dubbo, *Cleland 9.1911* (AD); Moolarben Creek, Mudgee-Wollar road, *Johnson & Constable NSW 31908*, 9.1950 (NSW). VICTORIA: Lake Charm, *French Jnr. 11.1896* (MEL); Hanging Rock, Heskett, *Tindale NSW 84368*, 1.1967 (NSW); Mount Cole, *Dillon 31*, 1894 (MEL); Wall Creek, Orbost, *Wakefield 3954*, c. 10.1945 (NSW); near Lake Condah, *Beaglehole 7744*, 11.1950 (NSW). SOUTH AUSTRALIA—**Flinders Ranges Region:** Mt Parry c. 15 km W. of Leigh Creek, *Tate*, 8.1883 (AD); c. 8 km E. of Nepabunna Station, *Lothian 3220*, 11.1964 (AD); Parachilna Gorge, *Black 10.1918* (AD).—Locality uncertain: Middle Back, Rockwater holes, *Tepper 9.1886* (AD).

This species is characterized by its sparingly branched, smooth to retrorsely aculeate stems, the binifoliate condition of its leaves [i.e. the foliaceous stipules noticeably shorter than the corresponding leaves of each whorl], conspicuous peduncles and relatively short pedicels, and its rugose fruits.

It has been confused with the binifoliate *Asperula aesthenes* Shaw et Turrill (*A. geminifolia* var. *retroscabra* F. Muell, *Fragm.* 9: 188 (1875), *nomen nudum*), sometimes misidentified as *A. geminifolia* F. Muell. In *A. aesthenes* the angles of the stems have a keen scabrous feel and the flowers are tubular; it is readily distinguished from the smoother-stemmed *G. binifolium*.

The occasional occurrence of fruits with hair suggests that the fruits surface of the Australian species should not be considered to have overriding significance in delimiting taxa. In *G. binifolium* the hairy and glabrous fruits can occur on intertwining plants in the same piece of herbage (cf. *Fraser & Vickery NSW 23903*).

#### 10. *Galium curvihirtum* Ehrendorfer et McGillivray, sp. nov.

Species affinis *G. binifolii* Wakefield sed folii margine revoluti venis obscuris, pilis fructuum numerosis curvatis differt.

HOLOTYPE: VICTORIA: Mt. Arapiles, ca. 20 miles [32 km] east of Horsham, *Aston 1075*, 3.10.1963 (MEL 17791).

DISTRIBUTION: From the brief ecological notes available this species grows in open forest or woodland as an inconspicuous herb amongst herbaceous ground vegetation. It occurs in western Victoria and the south east of South Australia. See fig. 5.

*Plants* biennial, ? perennial; root system with well-developed primary root, nodal roots absent; habit prostrate to straggling, rarely caespitose. *Stems* several, rarely numerous, (10-) 25-40 (-110) cm long, commonly retrorsely aculeate, sometimes with spreading or retrorse hairs or glabrous; internodes (10-) 15-35 (-60) mm long. *Leaves* usually narrowly ovate-linear, sometimes ovate or elliptical, (3-) 4-12 (-15) mm long, (0.6-) 1-2 (-2.5) mm wide; leaf-base attenuate; leaf-apex narrowly acute sometimes acuminate; leaf-margin strongly recurved sometimes revolute; upper surface with few, sometimes many, spreading to ascending hairs; lower surface usually glabrous except for sparse indumentum along the midvein; midvein conspicuous, reticulum obscure, rarely evident; secretory cells usually linear, both coalescent in a subapical position and scattered, sometimes also confluent along the midvein. *Inflorescence* elongate to loosely pyramidal, occupying the upper half of the plant, consisting of lateral, rarely terminal cymes; ultimate peduncles (1-) 2-3 (-5)-flowered, straight, (0.5-) 1-6 (-11) mm long, pedicels straight or slightly curved 0.5-1.5 (-2.5) mm long. *Flowers* white to cream c. 2 mm diameter, corolla rotate. *Fruits* (1.0-) 1.5 mm long, densely covered with curled whitish hairs (finer and shorter than those of *Galium australe*).

MISAPPLIED NAME: *Galium australe* auct. non DC.: Black, *Fl. South Australia* 4: 539 (1929); edn 2, 4: 800 (1957).

SPECIMENS EXAMINED: VICTORIA: Mount Arapiles, *Reader 11.1895* (MEL); Mount Arapiles, *Beaglehole 7437*, *7439 & Finck*, 2.1959 (NSW); Mount William, Grampians, *Sullivan 11.1872* (MEL); East side of Victoria Range, gully above Strachans, Grampians, *Beaglehole 16119 & Willis*, 12.1966 (NSW); Gorae West, W. of Portland, *Beaglehole 1652*, 10.1946 (NSW); Bridgewater, W. of Portland, *Beaglehole 1654*, 10.1946 (NSW). SOUTH AUSTRALIA—**South-eastern Region:** Monbulla Scrub, near Mount Gambier, *Andrew 12.1918* (AD).

This species is characterized by its sparse, straggling, sparingly-branched habit, 1-3 (-5)-flowered cymes and fruits covered with numerous curled whitish hairs.

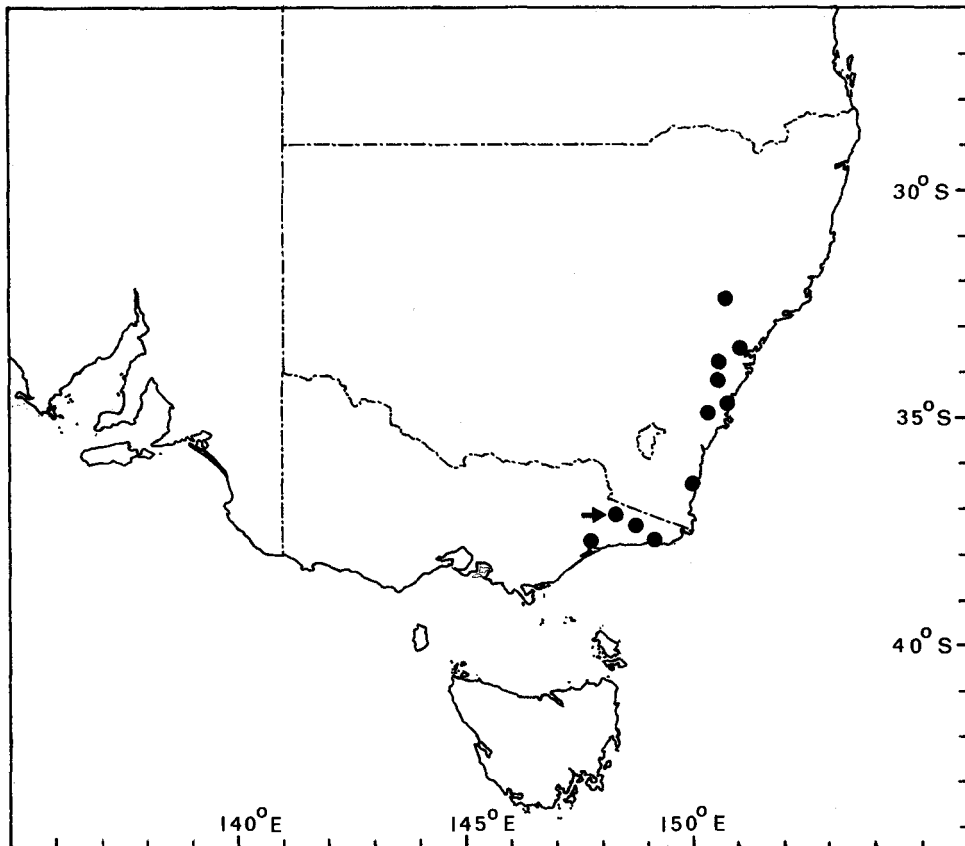


Fig. 6. Distribution of *G. liratum*. Arrow indicates the type locality.

**11. *Galium liratum* Wakefield**, *Victorian Naturalist* 72: 70 incl. figs 2 & 2a (1955); Beadle et al., *Handb. Vasc. Pl. Sydney Distr.*: 358 (1963), *Fl. Sydney Region*: 428 (1972).

HOLOTYPE: [Victoria], Turnback Road, above Little River, near Snowy River, *Wakefield* 4800, 20.1.1953 (MEL). ISOTYPE: K.

DISTRIBUTION: The species occurs in eastern New South Wales and eastern Victoria, commonly below 200 metres altitude. It favours moist sites in forest or woodland and is usually found growing over or near sandstone or granite rocks. See fig. 6.

*Plants*? annual or biennial; root system of primary root, sometimes not strongly developed, nodal roots rare; habit creeping or procumbent. *Stems* several, (8-) 15-30 (-80) cm long, retrorsely aculeate to glabrous; internodes 30-50 mm long. *Leaves* in whorls of 4, rarely 5, obovate to elliptical, (6-) 10-15 (-20) mm long, (1.5-) 2.5-5 (-7) mm wide, membranaceous; leaf-base conspicuously petiolate; leaf-apex obtuse-mucronate to broadly acute; leaf-margin slightly recurved to flat; indumentum on upper and lower surfaces sparse, more conspicuous along margin and underside of mid-vein, hairs conical and ascending; venation conspicuous, reticulate; secretory cells absent. *Inflorescence* sub-pyramidal; ultimate peduncles 1-3 (-5)-flowered, up to 1 mm long; pedicels 0.5-1.5 mm long, straight to slightly curved. *Flowers* inconspicuous, 1.0-1.4 mm diameter, corolla rotate, white. *Fruits* c. 1.3 mm long, ribbed, with 5-7 irregular longitudinal ribs.

SPECIMENS EXAMINED: NEW SOUTH WALES—**Central Coast**: Hawkesbury River, near Sydney, *Cleland* (AD); Euroka Creek, Glenbrook, *Whaite* 1149, 4.1952 (NSW); Nortons Basin, *Coveny* NSW 83646, 10.1966

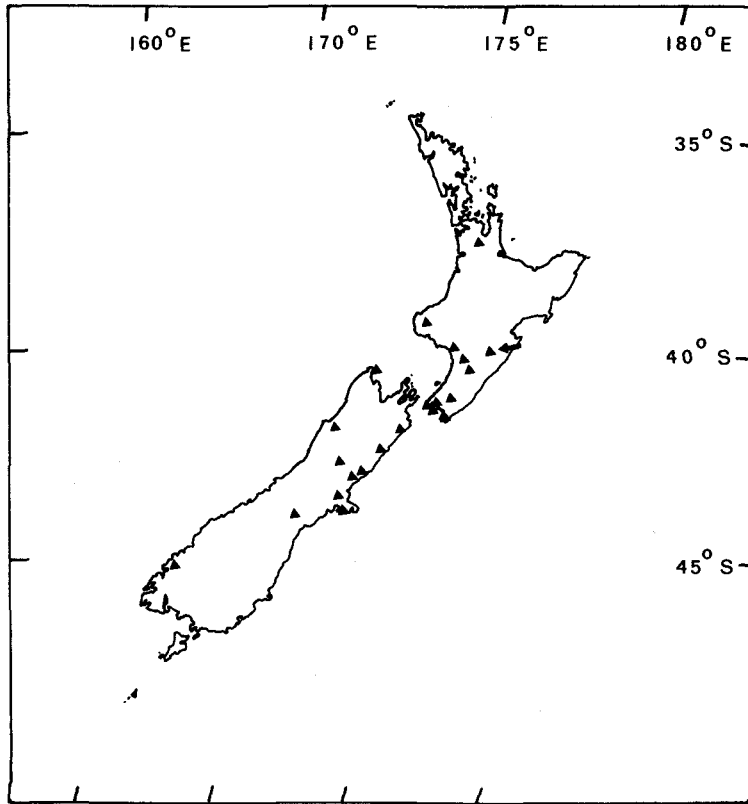


Fig. 7. Distribution of *G. trilobum*. Arrow indicates the type locality.

(NSW); Bents Basin, *Woolfs* (MEL); Nepean River, Douglas Park, *McBarron 12365*, 4.1966 (NSW); Minnamurra Falls, *Hind NSW 84259*, 1.1967 (NSW).—**South Coast**: Yalwal Creek, between Yalwal and Barrier, *Rodway 1249*, 12.1933 (NSW); Lower Shoalhaven (hills), *Bäuerlen 338*, 1.1884 (MEL); Mumbulla Mountain, 10 miles [16 km] c. NNE. of Bega, *Constable 6804*, 5.1966 (NSW).—**Central Western Slopes**: Denman, *Heron NSW 23909*, 10.1908 (NSW). VICTORIA: Eastern foot of Mount Ellery, East Gippsland, *Wakefield & Willis*, 12.1951 (MEL); Boggy Creek, East Gippsland, *Robbins (Beaglehole 7740)*, c. 1937 (NSW); Sarsfield, 11 miles [18 km] NE. of Bairnsdale, *Wakefield 2738*, 12.1948 (NSW).

This species is unlikely to be confused with any other. It is characterized by its creeping habit, petiolate leaves usually more than 2.5 mm wide, very condensed few-flowered cymes with peduncles and pedicels rarely more than 1 mm long, and its ribbed fruit.

**12. *Galium trilobum* Colenso**, *Trans. New Zealand Inst.* 20: 192 (1888), '*triloba*'; Allan, *Fl. New Zealand* 1: 592 (1961), *pro syn.*

TYPE: NEW ZEALAND: 'Edge of streamlets in dense shaded woods near Danneverke, County of Waipawa; 1887: W.C.' (protologue), WELT, not seen. ISOTYPE ? : K.

SYNONYMY: *Galium tenuicaule* A. Cunn., *Ann. Nat. Hist.* 2: 205 (1839), *nomen illeg.*, non Krockner (1823), nec Jordan (1852); J.D. Hooker, *Fl. Novae-Zelandiae* 1: 113 (1852), *Handb. New Zealand Fl.*: 120 (1864); Kirk Student's *Fl. New Zealand*: 249 (1899); Cheeseman, *Man. New Zealand Fl.*: 266 (1906), 879 (1925); Allan, *Fl. New Zealand* 1: 592 (1961). HOLOTYPE: NEW ZEALAND: In the Kiatea Wood near the water-fall of Keri Keri. R. *Cunningham* 1834 (K). 'Damp woods on the Keri Keri and Wangaroa rivers—1834, R. *Cunningham*.' (protologue).

DISTRIBUTION: New Zealand, North and South Islands, Stewart Island and Ruapuke Island: favouring damp to swampy situations, e.g. swamp at lake edge; among rocks on edge of fresh water pool; steep damp gully. See fig. 7.

*Plants* perennial ?; root system of nodal roots (primary roots not observed); habit straggling, decumbent or climbing. *Stems* numerous usually lax, 12-45 (-80) cm long, sparingly branched, retrorsely aculeate or sometimes almost smooth; internodes (15-) 25-40 (-50) mm long. *Leaves* narrowly obovate to elliptical, sometimes sublinear to spatulate, (4-) 6-12 (-20) mm long, 1.5-3 (-4) mm wide, dull green, dark when dry, gradually tapering to a broad petiole-like base; leaf-apex acuminate to acute, sometimes obtuse-mucronate; leaf-margin slightly recurved to flat; leaf-indumentum similar to that of stems; venation obscure, sometimes evident on the lower surface; secretory cells absent. *Inflorescence* elongate to pyramidal, occupying the upper half to two-thirds of stems, vegetative growth sometimes continuing after flowering; ultimate peduncles (1-) 2-3-flowered, curved, (5-) 8-14 (-25) mm long; pedicels usually curved, (1-) 3-6 (-10) mm long. *Flowers* 2 (-2.5) mm diameter, corolla white, 4- or 3-lobed. *Fruits* 1-1.5 mm long, finely ruminant to smooth.

SELECTED SPECIMENS (N to S; all specimens are from CHR unless otherwise indicated): NEW ZEALAND—**North Island:** c. 1 mile [1.5 km] N of Mangatarata, Hauraki Plains Co., *Mason* 7204, 11.1959; Ahukawakawa Swamp, between Egmont and Ponakas Range, *Druce* 1.1963; Lake Alice near Bulls, *Mason* 4087, 1.1956; Paori Lake, S. of Wanganui, *Mason* 4137, 1.1956; Manawatu Gorge, *Allan* 1.1932; Near Waiohine River, between Greytown and Cartertown, *Healy* 53/549, 3.1953; Hutt River, W. side, NW. of upper Hutt, *Healy* 53/1034, 11.1953; Sinclair Head, Cook Strait, *Hamlin* 11.1949; Cape Turakirae, *Druce* 11.1952; Red Rocks, Wellington Coast, *Kelly* 11.1962; Waitetuma Station, Cape Palliser, *Moore* 3.1954.—**South Island:** Para Swamp, Marlborough, *Healy* 347, 4.1947; Wharf Valley, Marlborough, *Mason* 2624 & *McQueen*, 12.1953; near Leg O'Mutton Lake, W. of Kaikoura, *Mason* 9262, 2.1962; Burns Swamp, c. 5½ miles [9 km] from Kaikoura, *Mason* 9155, 2.1962; Tidal Creek at bridge on Carters Creek Road, Buller County, *Mason* 1652 & *Moar*, 1.1953; SW. of Spotswood, on Phoebe Road, North Canterbury, *Mason* 9211, 2.1962; near MacKenzie Domain, Cheviot, *Mason* 9201, 2.1962; Lake Sumner, *Adams* 1.1957; View Hill, Oxford, *Mitchell* 12.1942; Presqu'île de Banks, *Raoul*, 1843 (MEL); Lynn Valley, Mount Peel, *Allan* 4.1919; Lake Katherine, George Sound, *Mason* 4.1949.

*Galium trilobum* is characterized by its narrowly obovate to elliptical leaves with no secretory cells, (1-) 2-3-flowered cymes, curved peduncles (5-) 8-14 (-25) mm long and longer than the pedicels, 4- or 3-lobed corolla, and finely ruminant to smooth fruits.

#### EXCLUDED NAMES

*Galium aparine* var. *minor* Benth., Fl. Austral. 3: 447 (1867) = *G. aparine* L., a naturalized alien.

*G. geminifolium* F. Muell., Trans. Victorian Inst. 1: 127 (1855) and *G. umbrosum* var. *geminifolium* (F. Muell.) Moore et Betche, Handb. Fl. New South Wales: 253 (1893) = *Asperula gemella* Shaw et Turrill.

*G. parisiense* var. *australe* Ewart et White, Proc. Roy. Soc. Victoria n.s. 21: 549 (1909) = *G. divaricatum* Lam., a naturalized alien.

*G. perpusillum* (Hook. f.) Allan, Fl. New Zealand 1: 592 (1961) = *Asperula perpusilla* Hook. f.

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- Botany Department, University of New England, Armidale, New South Wales (NE);
- Queensland Herbarium, Brisbane, Queensland (BRI);
- Gauba Herbarium, Australian National University, Canberra, Australian Capital Territory (GAUBA);
- Herbarium Australiense, Canberra, Australian Capital Territory (CANB);
- Canberra Botanic Gardens [now National Botanic Gardens], Canberra, Australian Capital Territory (CBG);
- Botany Division, Department of Scientific and Industrial Research, Christchurch, New Zealand (CHR);
- Royal Botanic Gardens, Kew, England (K);
- British Museum of Natural History, London, England (BM);
- John Ray Herbarium, University of Sydney, New South Wales (SYD);
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