

## A review of the genus *Minuria* DC. (Asteraceae, Astereae)

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### Abstract

Lander, Nicholas S., and Barry, Rhonda. A review of the genus *Minuria* DC. (Asteraceae, Astereae). *Nuytsia* 3, 2: 221–237 (1980).

Three new species in the Australian genus *Minuria* are described: *M. chippendalei* from the Northern Botanical Province of Western Australia and the Darwin and Gulf District of the Northern Territory; *M. gardneri* from the Eremaean and South West Botanical Provinces of Western Australia and the North Western Botanical Region of South Australia; *M. macrocephala* from the Eremaean Botanical Province of Western Australia. A key to all nine species of *Minuria*, nomenclatural notes, descriptions and distribution maps are provided.

### Introduction

De Candolle (1836) erected the genera *Elachothamnus*, *Minuria* and *Therogeron* to accommodate taxa collected on the Lachlan River by Allan Cunningham. In later years two new genera, *Kippistia* F. Muell. (1859) and *Minuriella* Tate (1899), were described based on single collections. The first four of these genera were united under *Minuria* by Benthams (1867), Benthams & Hooker (1873), Hoffman (1899) and Dalla Torre et Harms (1900–7). Tate's genus *Minuriella* was included in *Minuria* by Black (1929).

Seven described species make up the genus *Minuria* as it has been recognized to date of which one species, *Minuria suaedifolia* (F. Muell.) F. Muell. ex Benth., is returned to the monotypic genus *Kippistia* F. Muell. by us (Lander & Barry, 1980). In addition, three hitherto undescribed composites from Western Australia, South Australia and the Northern Territory belong here. Thus we recognize a total of nine species in the genus *Minuria*.

*Minuria* is in the tribe Astereae sub-tribe Asterinae, Australian members of which include *Calotis*, *Vittadinia*, *Podocoma*, *Celmisia*, *Olearia* and *Erigeron*. *Minuria* is easily distinguished from other genera in the Asterinae on the basis of the following combination of characters: (1) the naked receptacle; (2) the two or more rows of ray florets; (3) the obtuse anther bases; (4) the dimorphic pappi—those of the ray florets are markedly different in morphology or dimensions from those of the disc; (5) the single row of pappus hairs; and (6) the dimorphic achenes—those of the ray are fertile whilst those of the disc are sterile.

We have examined and annotated all available material of *Minuria* from the following herbaria: AD, NSW, CANB, MEL, BRI, NT and PERTH. The short lists of selected specimens given below record only a few collections from each State for which duplicates have been distributed, otherwise a single recent collection is cited. No attempt has been made to indicate the full range of variation of any species by such lists. For the three newly described taxa all specimens examined have been cited. For each species all collections have been mapped by marking their occurrence in one degree squares superimposed on Bonnes Equal Area Projection of Australia.

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## MINURIA DC.

*Minuria* DC., Prod. 5: 298 (1836); Steudel, Nom. Bot. ed. 2: 150 (1840-1); Bentham, Fl. Austral. 3: 497-500 (1867); Bentham in Bentham & Hooker, Gen. Pl. 2: 267 (1873); F. Mueller, Syst. Census Austral. Pl. 77-8 (1882); Baillon, Hist. Pl. 8: 136 (1886); Durand, Index Gen. Phan. 195 (1888); Hoffman in Engl. & Prantl, Nat. Pflanzenfam. 4 (5): 159-60 (1889); F. Mueller, Sec. Syst. Census Austral. Pl. 131 (1889); Baillon, Dict. Bot. 362 (1891); Dalla Torre & Harms, Gen. Siph.: 532 (1900-7); Lemée, Dict. Gen. Phan. 4: 490-1 (1932).

*Lectotype* (here designated): *M. leptophylla* DC.

*Therogeron* DC., Prod. 5: 283 (1836); Steudel, Nom. Bot. ed. 2, 679 (1840-1); Kuntze, Rev. Gen. 368-9 (1891).

*Lectotype* (here designated): *T. denticulatum* DC. *Paratype*: *T. integerrimum* DC.

*Elachothamnos* DC., Prod. 5: 398 (1836); Steudel, Nom. Bot. ed. 2, 544 (1840-1).

*Type*: *E. cunninghami* DC.

*Minuriella* Tate, Trans. Roy. Soc. S. Austral. 23: 288-9 (1899); Dalla Torre & Harms, Gen. Siph. 636 (1900-7).—*Minuria* sect. *Minuriella* (Tate) Lemée, Dict. Gen. Phan. 4: 491 (1932).

*Type*: *Minuriella annua* Tate

After describing the monotypic genus *Minuriella*, Tate (l.c., 1899) noted “. . . the species typifies a new section or sub-genus, for which I propose the name *Minuriella* . . .”. Thus there seems to have been considerable doubt in Tate’s mind whether to treat the new entity as a genus, or as a section or sub-genus of *Minuria*. In the event he settled for the first of these alternatives and it would seem most expedient to treat the quotation above as a mere slip of the pen. Lemée (1932, l.c.) later validated the name *Minuria* sect. *Minuriella*. In our opinion little purpose would be served by recognizing sections in *Minuria*.

The name *Minuria* is derived from the Greek *minyros* meaning small, thin and weak, probably alluding to the leaves of the type species, *M. leptophylla*.

Annual or perennial herbs or dwarf shrubs, erect or prostrate. *Stems* herbaceous, suffrutescent or woody, glabrous or variously pubescent. *Leaves* alternate, sometimes clustered, sessile, linear, lanceolate, ovate, obovate or spatulate, sometimes falcate, glabrous or variously pubescent, sometimes with small floral leaves or with leaves overtopping the capitula; margin entire, undulating, finely serrulate or conspicuously dentate; apex obtuse, acute or acuminate. *Capitula* pedunculate, solitary or rarely clustered, terminal, heterochromous. *Peduncles*  $\pm$  differentiated from main stems or branchlets, glabrous or variously pubescent. *Involucral bracts* in 3-4 rows, linear to lanceolate, uniform, grading in size or dimorphic, glabrous or variously pubescent, with 0-2 prominent ribs; margin  $\pm$  membranous, entire or denticulate; apex acute to acuminate, entire or fimbriate,  $\pm$  tinged pink. *Receptacle* naked, flat to noticeably convex. *Ray florets* many in 2 or more rows, estaminate; ligules white, violet, mauve, blue, lilac, lavender to pink, often quite variable in one species,  $\pm$  conspicuous; floral tube glabrous; stigma lobes subulate to lanceolate, with conspicuous papillose stigmatic lines, achene fertile, brown, reddish-brown, red, orange or yellow,  $\pm$  prominently ribbed, glabrous or variously pubescent,  $\pm$  flattened, lanceolate, elliptical to obovate in outline; pappus of several to many free, barbellate bristles or of capillary bristles  $\pm$  united in clumps. *Disc florets* staminate, yellow, pentamerous, rarely tetramerous; floral tube glabrous or variously pubescent with multicellular, biseriate hairs; anther bases obtuse; stigma lobes subulate or narrowly lanceolate, pubescent on dorsal surfaces to below point of bifurcation; achene sterile, glabrous or pubescent with notched twin-hairs, translucent or opaque, white, straw-coloured or reddish-brown, flattened, linear-lanceolate or elliptical in outline; pappus very variable, of dimorphic hairs, with both short and long  $\pm$  free, barbellate bristles (shorter ones sometimes reduced to scales) capillary or branching towards apices, or else pappus a cup of connate scales surmounted by 1-8 bristles. A genus of nine species confined to Australia.

Key to the species of *Minuria*

1. Stems and peduncles entirely glabrous or with a few scattered hairs.
  2. Capitula large, to 35 mm in diameter when open; ray achenes densely pubescent with glochidial twin-hairs ..... 8 *M. macrocephala* N. S. Lander & R. Barry
  - 2\*. Capitula small, to 12 mm in diameter when open; ray achenes with notched or glochidial twin-hairs
    3. Uppermost leaves overtopping capitula ..... 1 *M. annua* (Tate) Tate ex J. M. Black
    - 3\*. Uppermost leaves not overtopping capitula
      4. Ray pappus longer than achene; disc pappus hairs uniform with 8–10 barbellate bristles 1.5–2.0 mm long; ray achene with notched twin-hairs ..... 6 *M. integerrima* (DC.) Benth.
      - 4\*. Ray pappus shorter or equal to achene; disc pappus hairs dimorphic with short barbellate bristles c. 0.8 mm long, and c. 8 longer bristles 2.5–3.0 mm long; ray achenes with glochidial twin-hairs ..... 9 *M. rigida* J. M. Black
- 1\*. Stems and peduncles weakly to densely pubescent
  5. Stems more or less woolly with multi-cellular stellate hairs; leaves somewhat pubescent with unicellular hairs; leaf apices and margins often conspicuously dentate ..... 4 *M. denticulata* (DC.) Benth.
  - 5\*. Stems pubescent with unicellular uniseriate hairs; leaves glabrous or pubescent with multicellular uniseriate hairs; leaf apices and margins entire
    6. Leaves entirely glabrous.
      7. Ray florets and conspicuous, ligules 5–7 mm long; ray achenes pubescent with glochidial twin-hairs; disc achenes glabrous ..... 3 *M. cunninghamii* (DC.) Benth.
      - 7\*. Ray florets very small and inconspicuous, ligules less than 1 mm long; ray achenes with a sparse cover of adpressed notched twin-hairs; disc achenes with multi-cellular biseriate hairs ..... 5. *M. gardneri* N. S. Lander & R. Barry
    - 6\*. Leaves sparsely to densely pubescent with multicellular uniseriate hairs
      8. Ray achenes densely pubescent with notched twin-hairs; innermost involucre bracts glabrous ..... 7 *M. leptophylla* DC
      - 8\*. Ray achenes only moderately pubescent with notched twin-hairs; innermost involucre bracts pubescent with multicellular uniseriate hairs ..... 2. *M. chippendalei* N. S. Lander & R. Barry

**1. *Minuria annua*** (Tate) Tate ex Black, Fl. South Australia 589 (1929); J. M. Black, Fl. South Australia Ed. 2, 859 (1957).

*Minuriella annua* Tate, Trans. Roy. Soc. South Australia 23: 288 (1899).

*Lectotype*: “. . . Mount Lyndhurst Run near Farina, South Australia . . . discovered by Mr. Max Koch who has had the species under observation for two flowering seasons”, Koch 407, Aug. 1899 (lecto: AD 97625312; isolecto: AD 97630576, AD 98027006, BRI, CANB, MEL, NSW). *Paratype*: Koch 407, March–June ?1900 as “1899” (AD 97625313).

Annual herb 6–12 cm high. *Stems* herbaceous, pale green to brown, glabrous. *Leaves* alternate, sessile, linear, glabrous, to 3.3 cm long, c. 1 mm wide; margin entire; apex acute-obtuse with uppermost leaves overtopping capitula. *Capitula* solitary, terminal, pedunculate, conical, to 8 mm in diameter. *Peduncles* pale green to brown, to 6 mm long, 0.5–1.0 mm wide, glabrous. *Involucral bracts* in 3 rows, pale green to yellow, lanceolate, glabrous, 3–4 mm long, c. 1 mm wide, with 2 prominent ribs on each bract; margin membranous; apex acute, fimbriate. *Receptacle* slightly convex. *Ray florets* many in several rows, estaminate; ligule white, 1.7–2.5 mm long, c. 0.2 mm wide; floral tube 1.8–2.3 mm long; stigma lobes lanceolate, 0.3–0.8 mm long; achene fertile, brown, 1.5–2.5 mm long, 0.3–0.6 mm wide, moderately pubescent with adpressed notched twin-hairs; pappus of many uniformly barbellate bristles 2–3 mm long. *Disc florets* staminate; floral tube 2.0–2.8 mm long, glabrous; anthers c. 1 mm long, c. 0.2 mm wide, with acute sterile apical appendages; stigma lobes subulate, 0.7–1.1 mm long, c. 0.1 mm wide; achene sterile, linear in outline, glabrous, 2–3 mm long, c. 0.3 mm wide; pappus of dimorphic bristles with short barbellate bristles free or united into fimbriate scales, c. 1 mm long, and 3–5 bristles 2.6–2.8 mm long with barbs longer and denser at tips.

*Flowering Period:* August to October.

*Habitat:* Low shrubland on calcareous soils.

*Distribution:* See Fig. 1.

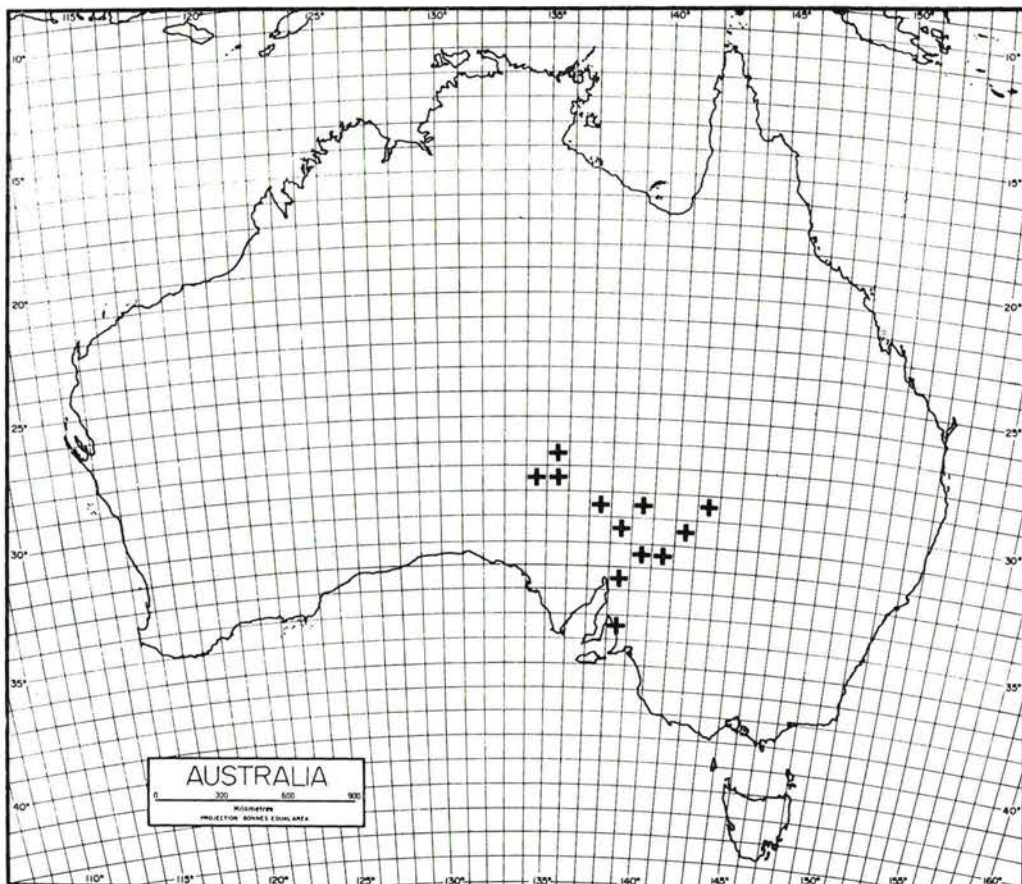


Figure 1. Distribution of *M. annua* based on herbarium material.

*Selected Specimens:* SOUTH AUSTRALIA: 15 miles (23 km) NE of Munday Creek on road to "Murn-peeowie" Station, Symon 5604, Aug. 1968 (AD, CANB); NEW SOUTH WALES: 7 km NE of "McDougalls Well" homestead, 95 km NNW of Broken Hill, Lander 64, Sept. 1971 (NSW).

*Affinities:* *M. annua* bears an obvious resemblance to *M. gardneri* from which it can be distinguished by its glabrous stems, its annual habit and its leaves which overtop the capitula. The latter two characters are unique in the genus. Although Tate (1899) placed this species closest to *M. suaedifolia* (= *Kippistia suaedifolia*) its gross similarity to young plants of the latter species is superficial only.

*Name:* the specific epithet refers to the annual habit of this species which readily distinguishes it from other members of the genus.

## 2. *Minuria chippendalei* N. Lander et R. Barry sp. nov.

Species phyllaris pubescentibus a congeneribus diversa. Herba parva perennis. Achenia florum radiatorum fertilia, pilis furcatis geminis pubescentia etiam pappo setis multis liberis barbellatis ornata; achenia disci sterilia pilis  $\pm$  emarginatis binatis pubescentia etiam pappo setis quam eis acheniorum radiatorum aliquantum longioribus ornata.

*Type:* Wade Creek, Vansittart Bay, Western Australia, Gardner 1537, Oct. 1921 (holo: PERTH).

Perennial herb 10–20 cm high. *Stems* suffrutescent, pale green, densely pubescent with patent, multicellular, uniseriate hairs becoming adpressed nearer the capitula. *Leaves* alternate, sessile, narrowly linear-lanceolate, to 11 mm long, to 1 mm wide, densely pubescent with multicellular, uniseriate hairs; margin entire; apex acute. Capitula solitary or in pairs terminating sparsely leafy branches, to 12 mm in diameter. *Involucral bracts* in 3 rows, lanceolate, 5–7 mm long, c. 1 mm wide; outer row moderately pubescent with multicellular, uniseriate hairs; apices acuminate; margins of inner row of bracts membranous. *Receptacle* slightly convex. *Ray florets* many in several row, estaminate; ligule white to lilac-pink, 5.6–6.3 mm long, 0.7–1.3 mm wide; floral tube 1.6–3.1 mm long; stigma lobes subulate, 0.5–0.7 mm long; achene fertile, lanceolate in outline, 1.7–2.3 mm long, 0.5–0.7 mm wide, moderately pubescent with notched twin-hairs; pappus of many free, uniformly barbellate bristles 3.5–4.2 mm long. *Disc florets* staminate; floral tube 3–4 mm long, glabrous; anthers 1.5–2.0 mm long, c. 0.3 mm wide, with sterile apical appendages; stigma lobes subulate, 0.2–0.3 mm long, c. 0.3 mm wide; achene sterile, opaque, linear in outline, 1.0–1.7 mm long, c. 0.5 mm wide, moderately pubescent with notched twin-hairs; pappus of uniform, barbellate bristles c. 4 mm long.

*Flowering Period:* October to June.

*Habitat:* In open forest on lateritic soils.

*Distribution:* See Fig. 2.

*Other specimens:* WESTERN AUSTRALIA: Mitchell Plateau, S of Amax campsite, 14°50'S, 125°50'E, Hnatiuk MP 103, Sept. 1976 (PERTH); NORTHERN TERRITORY: 22.4 miles (33.6 km) SE Darwin, Chippendale 4478, May 1958 (AD, BRI, MEL, NSW).

*Affinities:* *M. chippendalei* is very distinct from other members of the genus and its affinities are obscure. The pubescent inner involucral bracts are unique in the genus although *M. cunninghamii* has similar hairs on its outermost involucral bracts. The occurrence of paired capitula is worthy of note since they are otherwise found only in *M. integerrima*.

*Name:* The specific epithet is bestowed in honour of Mr. George M. Chippendale, one of the collectors of this plant, in recognition of his contribution to our knowledge of the flora of the Northern Territory by both collecting trips and publications.

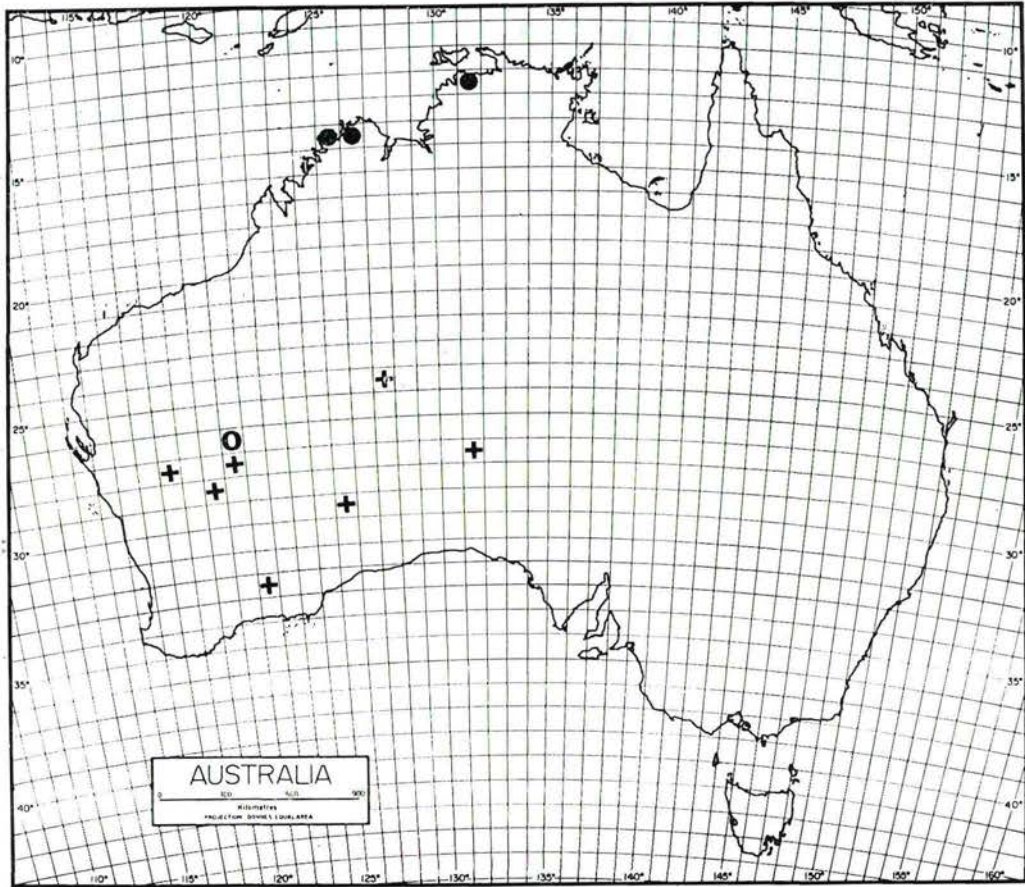


Figure 2. Distributions of (○) *M. macrocephala*, (●) *M. chippendalei* and (+) *M. gardneri* based on herbarium material.

### 3. *Minuria cunninghamii* (DC.) Benth., Fl. Austral. 3: 498-9 (1767).

F. Mueller, Key Vict. Pl. 2: fig. 79 (1885); J. M. Black, Fl. S. Austral, Ed. 2, 857 (1957); Davis, Austral. J. Bot. 12: 152-6 (1964); Turner, Amer. J. Bot. 57: 383 (1970).

*Elachothamos cunninghamii* DC., Prod. 5: 398 (1836); Steudel, Nom. Bot. Ed. 2, 544 (1840-1); F. Mueller, Pl. Indig. Col. Victoria fig. 34 (1864-5).—*Senecio othonnaeoides* A. Cunn. ex DC., Prod. 5: 398 (1836) nom. inval. pro syn.—*Therogeron cunninghamii* (DC.) Kuntze, Rev. Gen.: 368-9 (1891).

*Type*: "... in humidis depressis ad flumen Lachlan Nov.-Holland. julio flor, legit cl. All. Cunningham" (holo: G-DC; iso: K, BM).

*Eurybiopsis intricata* F. Muell., Linnaea 25: 394-396 (1852).—*Therogeron tenuifolius* Sonder, Linnaea 25: 467 (1852).

*Type*: "In clivulis petracis umbrosis ad Cudnaka Oct. 1851." F. Mueller (holo: MEL 70299; iso: MEL 70298).

*Olearia glabra* C. T. White, Proc. Roy. Soc. Queensland 55: 68 (1944).

*Type*: Dynevor Downs, Warrego District, Queensland, C. T. White 11829, 2/4/1941 (holo: BRI; iso: NSW).

Perennial spreading herb to 1 m high, grading from a fairly delicate to a robust plant. *Stems* woody, brown, sparsely pubescent with unicellular hairs. *Leaves* alternate, sessile, sometimes clustered along main stem, lanceolate, glabrous, to 4.0 cm long, 1-3 mm wide;

margins entire; apices acute-acuminate. *Capitula* solitary, pedunculate, terminating branches, conical, to 20 mm in diameter. *Peduncles* pale brown, sparsely pubescent with unicellular hairs increasing in density towards summit; floral leaves 1-3, pale brown. *Involucral bracts* in 4 rows, pale yellow, lanceolate, 2-7 mm long, c. 1 mm wide, those of outer 2 rows c. half the size of the inner 2 rows and moderately pubescent with multicellular, uniseriate hairs clumped at bases, midrib more prominent on inner two rows; margins of inner 2 rows membranous; apices all acute. *Receptacle* slightly convex. *Ray florets* many in several rows, estaminate; ligules white, pink or mauve, 4.7-7.1 mm long, 0.4-1.0 mm wide; floral tube 4-6 mm long; stigma lobes subulate, 1.5-2.5 mm long; achene fertile, lanceolate in outline, ribbed, 1.5-2.5 mm long, c. 0.4 mm wide, moderately pubescent with unicellular, glochidial hairs; pappus of many finely and uniformly barbellate bristles 7.6-9.0 mm long. *Disc florets* staminate; floral tube 4.6-6.9 mm long, glabrous; anthers 1.6-2.5 mm long, c. 0.4 mm wide with acuminate sterile apical appendages; stigma lobes subulate 1.0-1.4 mm long, c. 0.3 mm wide; achene sterile, opaque, linear in outline, glabrous, 4-6 mm long, c. 0.5 mm wide; pappus of dimorphic hairs, with shorter bristles 1.2-1.6 mm long, more or less united to form scales, and longer, barbellate bristle 4.0-4.5 mm long with barbs longer towards the apices.

*Flowering Period*: February to October.

*Distribution*: See Fig. 3.

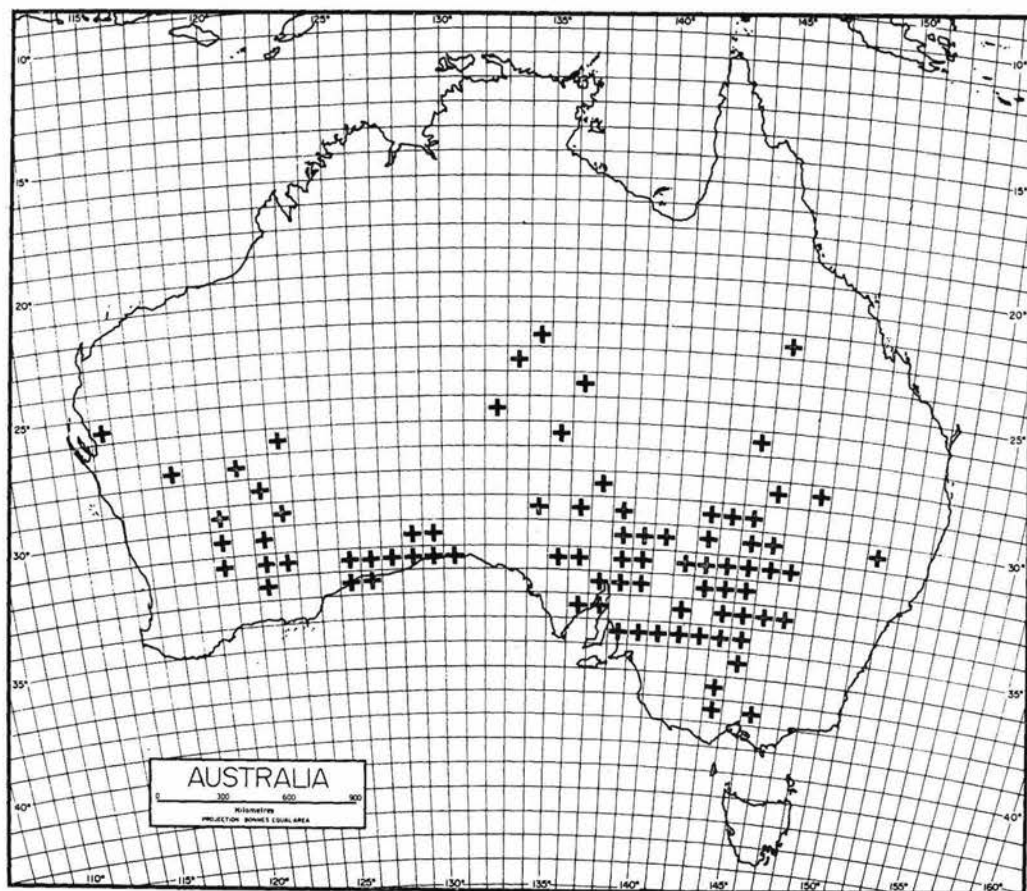


Figure 3. Distribution of *M. cunninghamii* based on herbarium material.

*Selected Specimens:* WESTERN AUSTRALIA: Bango Creek (14 km) W of Windidda, *Speck* 1273, Feb. 1959 (AD, CANB, MEL, NSW, PERTH); Nullarbor Plain, 80 km S of Rawlinna, *Wilson* 7674, Sept. 1968 (AD, MEL, NSW, PERTH); SOUTH AUSTRALIA: near Port Augusta, *Phillips* CBG 022660, Sept. 1962 (BRI, CBG); between Hawknest and Hallmark Dams, 16–20 km N of Overland Corner, *Symon* 3636 (AD, CANB); VICTORIA: Benetook, c. 25 km SW of Mildura, *Patton* MEL 70324, March 1949 (MEL); NEW SOUTH WALES: Fowlers Gap, *Jacobs* 2173, Oct. 1975 (AD, NSW); Caroonboon, between Wanganella and Moulamein, *Moore* 5665, July 1970 (CANB, NSW); QUEENSLAND: 20 miles (30 km) from Cunnamulla towards St. George at Charlotte Plains turn-off, *Phillips* CBG 036705, Sept. 1963 (CBG, NSW); NORTHERN TERRITORY: 30 miles (45 km) N of Alice Springs, *Chippendale* 9145, July, 1962 (BRI, NSW, NT); 46 km N of Alice Springs, *Swinbourne* 520, Oct. 1962 (AD, NSW, NT); E of Alice Springs, *Swinbourne* 335, July 1962 (AD, MEL, NSW, NT).

*Chromosome Number:*  $n = 9, 18$  (Turner, 1970, l.c.)

*Affinities:* *M. cunninghamii* is similar to *M. macrocephala* from which it can be distinguished by its pubescent stems, glochidial ray achene hairs and uniformly barbellate ray pappus bristles. The unicellular stem hairs and dimorphic involucre bracts are found in no other species in the genus. Also unique to this species in the genus are the pubescent outer involucre bracts, although *M. chippendalei* has pubescent inner bracts.

*Name:* The specific epithet honours Allan Cunningham, the collector of the type of this species.

#### 4. *Minuria denticulata* (DC.) Benth., Fl. Austral. 3: 499 (1867).

J. M. Black, Fl. S. Australia Ed. 2, 858 (1957); Davis, Proc. Linn. Soc. New South Wales 88: 35–40 (1963).

*Therogeron denticulatum* DC., Prod. 5: 283 (1836).—*Minuria candollei* var. *denticulata* (DC.) Maiden & Betche, Census New South Wales Pl. 195 (1916).

*Type:* “Molle’s Plains, Lachlan River, July 1817”, *Cunningham* 39 (holo: G-DC).

*Minuria candollei* F. Muell., Fragm. 9: 119 (1875) pro pte., nom. illeg.; F. Mueller, Fragm. 10: 56 (1876); F. Mueller, Syst. Census Austral. Pl. 78 (1882); F. Mueller, Key Vict. Pl. 1: 297 (1887–8); F. Mueller, Second Syst. Census Austral. Pl. 131 (1889); Moore & Betche, Handb. Fl. New South Wales 265 (1893); Dixon, Pl. New South Wales 175 (1906).—*Erigeron candollei* Benth., Fl. Austral. 3: 499 (1867) nom. inval. pro syn.

Mueller (1875 l.c.) published the name *M. candollei* indicating that it was composed of *M. integerrima* and *M. denticulata*. Later, Mueller (1876 l.c.) published a description of *M. candollei*, again noting that it comprised the two species above, and also pointing out Bentham’s error (1867 l.c.) in saying that he (Mueller) proposed to join the two species under *Erigeron candollei*. By Art. 63 of the International Code of Botanical Nomenclature the superfluous name *M. candollei* is untenable, for if it were acceptable to unite the two species one of the existing epithets would have to be adopted. However, the two species are easily separable.

The first use of the epithet *denticulata* as a varietal name appears to have been by Maiden & Betche (1916), and although they attribute it to Mueller there is no justification for this.

Perennial, spreading herb to c. 30 cm high. *Stems* suffrutescent, only slightly woody in older branches, grey-green, moderately pubescent with multicellular, stellate hairs. *Leaves* alternate, obovate-spathulate, to 4.5 cm long, 1–5 mm wide, almost glabrous or moderately covered with unicellular hairs; margin denticulate; apex often conspicuously denticulate, otherwise acute-obtuse. *Capitula* solitary, discoid, to 15 mm in diameter, pedunculate with floral leaves. *Involucre bracts* in 4 rows, yellow, lanceolate, 2–3 mm long, c. 1 mm wide, glabrous, with 1 prominent midrib; margin of inner 3 rows membranous, slightly fimbriate; apex acuminate, fimbriate, tinged pink. *Receptacle* convex. *Ray florets* many in several rows, estaminate; ligule white to pale lavender, 2.0–3.2 mm long, to 0.5 mm wide; floral tube 1.0–1.5 mm long; stigma lobes subulate c. 0.5 mm long; achene fertile, pale yellow, elliptical in outline, 0.5–1.0 mm long, 0.2–0.5 mm wide, glabrous; pappus of 7–10 free, barbellate bristles, c. 1.5 mm long, with barbs denser at tips. *Disc florets* staminate; floral tube 2.9–3.7 mm long, glabrous or sparsely pubes-



cent at lower end with multicellular, biseriate, patent hairs; anthers 1.0–1.8 mm long, c. 0.3 mm wide with acute sterile apical appendages; stigma lobes subulate, 0.5–1.2 mm long, c. 0.2 mm wide; achene sterile, opaque, flattened, linear in outline, glabrous, 0.8–1.5 mm long, c. 0.3 mm wide; pappus of dimorphic bristles, with a tuft of short, free bristles, c. 0.3 mm long, and 6–8 longer, barbellate bristles, 2.0–2.5 mm long, with barbs longer and denser at tips.

*Flowering Period:* March to October.

*Habitat:* Low shrubland in places of ephemeral water.

*Distribution:* See Fig. 4.

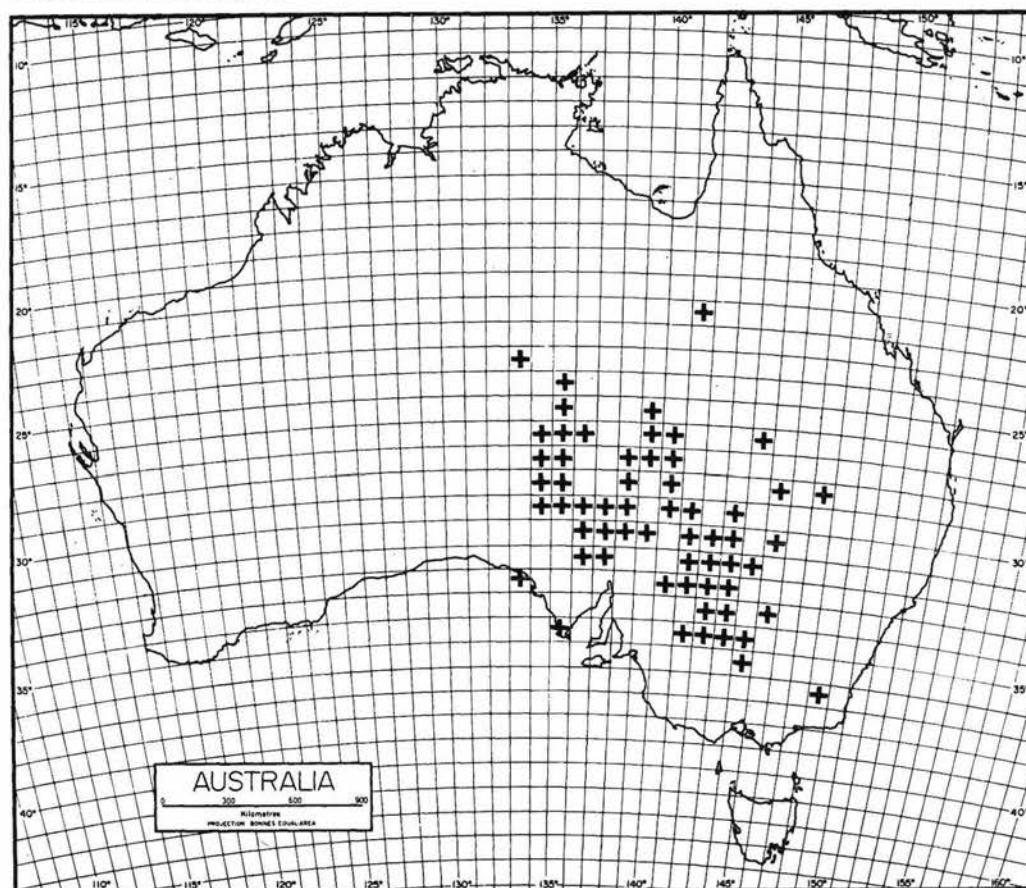


Figure 4. Distribution of *M. denticulata* based on herbarium material.

*Selected Specimens:* SOUTH AUSTRALIA: 5 miles (8 km) S of Tingatingana, *Carrick* 1971, Aug. 1968 (AD, MEL); Lake Eyre Basin, 9 miles (14 km) N of Warrina, *Lothian* 1368, Aug. 1963 (AD, MEL, NT); 5 miles (8 km) W of Cockburn, *Phillips* CBG 006726, Aug. 1964 (AD, CBG); VICTORIA: W side of Lake Walla-Walla, S. of Lindsay River, *Willis* MEL 70340, Aug. 1948 (MEL, NSW); NEW SOUTH WALES: 1.6 km S of Lake Cobham on Silver City Highway, *Lander* 98, Sept. 1971 (NSW); QUEENSLAND: Birdsville, *Boylard* 179, Sept. 1966 (BRI); NORTHERN TERRITORY: Old Andado Homestead, *Taylor* 3, Feb. 1971 (CANB, NT).

*Affinities:* *M. denticulata* is similar to *M. rigida* from which it can be distinguished by its pubescent stems and leaves. The multicellular, stellate stem hairs and the unicellular leaf hairs are both unique to this species in the genus as are the glabrous ray achenes.

*Name:* The specific epithet refers to the denticulate leaf margins.

### 5. *Minuria gardneri* N. S. Lander et R. Barry sp. nov.

Species affinis *M. annua* (Tate) Tate ex Black a qua caulibus sparsim pubescentibus habitu perenni et foliis capitula superentibus praecipue differt. Frutex nanus perennis. Achenia florum radiatorum fertilia, pilis adpressis furcatis geminis parce pubescentia etiam pappo setis 7-9 barbellatis ornata; achenia disci sterilia, glabra, pappo cupula setorum connatorum ab 1 (-8) setis longioribus superatorum ornata.

*Type*: Mount Sir Samuel, Western Australia, *Gardner* 2426, 26 July 1931 (holo: PERTH; iso: NSW).

Perennial, compact dwarf shrub to c. 20 cm high. *Stems* suffrutescent, green to green-brown, sparsely pubescent with multicellular, uniseriate hairs. *Leaves* alternate, sessile, linear, often falcate, glabrous, to 10 mm long, c. 1 mm wide; margin entire; apex obtuse-acute. *Capitula* solitary, conspicuously pedunculate, terminal, discoid, to c. 7 mm in diameter. *Peduncle* pale green, to 20 mm long, c. 0.5 mm wide, densely pubescent with multicellular, uniseriate hairs; floral leaves 3-5, 1.8-5.4 mm long, c. 0.5 mm wide. *Involucral bracts* in 3 rows, lanceolate, 2-3 mm long, c. 0.5 mm wide, glabrous, with 1 prominent rib; margins of inner two rows membranous; *apices* acute. *Receptacle* slightly convex. *Ray florets* many in several rows, estaminate; ligules white, 0.3-0.6 mm long, c. 0.1 mm wide; floral tube 0.5-1.5 mm long; stigma lobes subulate, 0.1-0.3 mm long; achene fertile, red-brown, elliptical in outline, c. 0.5 mm long, c. 0.1 cm wide, sparsely pubescent with adpressed twin-hairs notched at apices; pappus of 7-9 uniformly barbellate bristles 1-2 mm long. *Disc florets* staminate; floral tube 1.8-2.3 mm long, sparsely pubescent with multicellular, biseriate hairs; anthers 1.0-1.5 mm long, c. 0.3 mm wide, with acute, sterile apical appendages; stigma lobes subulate, c. 0.6 mm long, c. 0.1 mm wide; achene sterile, linear in outline, glabrous, 0.6-0.8 mm long, c. 0.2 mm wide; pappus of dimorphic bristles with short connate bristles c. 0.5 mm long surmounted by 1(-8) conspicuously and uniformly barbellate bristles 0.5-1.3 mm long.

*Flowering Period*: July to December.

*Habitat*: On margins of salt lakes in low shrubland and low open woodland on gypsum, loam and clay-loam soils.

*Distribution*: See Fig. 2.

*Other specimens*: WESTERN AUSTRALIA: Lake Miranda, near Mt. Sir Samuel, *Blackall* 330, July 1931 (PERTH); 6 miles (9 km) N of Bulga Downs, *Demarz* 5649, Sept. 1975 (PERTH); Lake Austin, *Demarz* 6951, Aug. 1978 (PERTH); Van der Linden Lakes, W of Giles, *George* 8235, Oct. 1966 (PERTH); 110 km N of Seemore Downs, 29°52'S, 125°40'E, *George* 11905, July 1974 (PERTH); near S end of Lake Cowan, c. 5 km N of Norseman, *Wilson* 6058, July 1967 (PERTH); SOUTH AUSTRALIA: Musgrave Range, c. 63 km W of Musgrave Park, *Whibley* 975, Sept. 1963 (AD); precise locality, collector and date unknown, BRI 219995 (BRI).

*Affinities*: *Minuria gardneri* bears an obvious resemblance to *M. annua* from which it can be distinguished by its perennial habit, its pubescent stems and the absence of leaves overtopping the capitula. This species also bears a gross superficial resemblance to *Kippistia suaedifolia* for which it has been mistaken in the past.

*Name*: The specific epithet is bestowed in honour of the late Mr. Charles Austin Gardner (1896-1970), Government Botanist of Western Australia and the collector of the type of this species.

### 6. *Minuria integerrima* (DC.) Benth., Fl. Austral. 3: 499 (1867).

J. M. Black, Fl. S. Austral. Ed. 2, 858 (1957); Davis, Phytomorphology 14: 231-239 (1964). *Therogeron integerrimum* DC., Prod. 5: 283 (1836).

*Type*: "A rare plant on the wet plains of the Lachlan River, New South Wales, July 1817", *Cunningham* (holo: G-DC; possible iso: MEL 70345).

*Minuria candollei* F. Muell., Fragm. 9: 119 (1875) pro pte., nom. illeg.; F. Mueller, Fragm. 10: 56 (1876); F. Mueller, Syst. Census Austral. Pl. 78 (1882); F. Mueller, Key Vict. Pl. 1: 297 (1887-8); F. Mueller, Second Syst. Census Austral. Pl. 131 (1889); Moore & Betch, Handb. Fl. New South Wales 265 (1893); Dixon, Pl. New South Wales 175 (1906); Maiden & Betche, Census New South Wales Pl. 135 (1916).

Notes on the name *M. candollei* can be found under *M. denticulata*.

Erect, spreading, perennial herb to 60 cm high. *Stems* suffrutescent, older ones more woody, green to brown, glabrous. *Leaves* alternate, sessile, dark grey to green, lanceolate-ovate, to 5.0 cm long, 1–9 mm wide, glabrous, midrib conspicuous; margin somewhat undulating, often slightly dentate; apex acute-acuminate. *Capitula* solitary or clustered, terminating branches, discoid, c. 12 mm in diameter, pedunculate. *Involucral bracts* in 4 rows, c. 0.5 mm wide, glabrous, 2–4 mm long, with 1 prominent midrib; margin entire; apices acute, tinged pink. *Receptacle* convex. *Ray florets* many in several rows, estaminate; ligule purple to lilac-blue, 3.2–4.4 mm long, c. 0.2 mm wide; floral tube 1.1–1.6 mm long; stigma lobes subulate 0.6–1.1 mm long; achene fertile, brown, lanceolate, 0.6–1.1 mm long, to 0.6 mm wide, moderately pubescent with notched twin-hairs; pappus of many, free, barbellate bristles, 1.5–2.0 mm long, with barbs denser at the tips. *Disc florets* staminate; floral tube c. 0.3 mm long, glabrous; anthers 0.8–1.2 mm long, c. 0.2 mm wide, with acute sterile apical appendages; stigma lobes 0.5–1.0 mm long, c. 0.2 mm wide; achene sterile, translucent, flattened, elliptical in outline, 0.4–1.0 mm long, to 0.3 mm wide, glabrous; pappus of c. 8–10 uniform, barbellate bristles, 1.5–2.0 mm long, with barbs longer and denser at tips.

*Flowering Period:* June to October.

*Habitat:* In a variety of habitats and soils near places of permanent or ephemeral water.

*Distribution:* See Fig. 5.

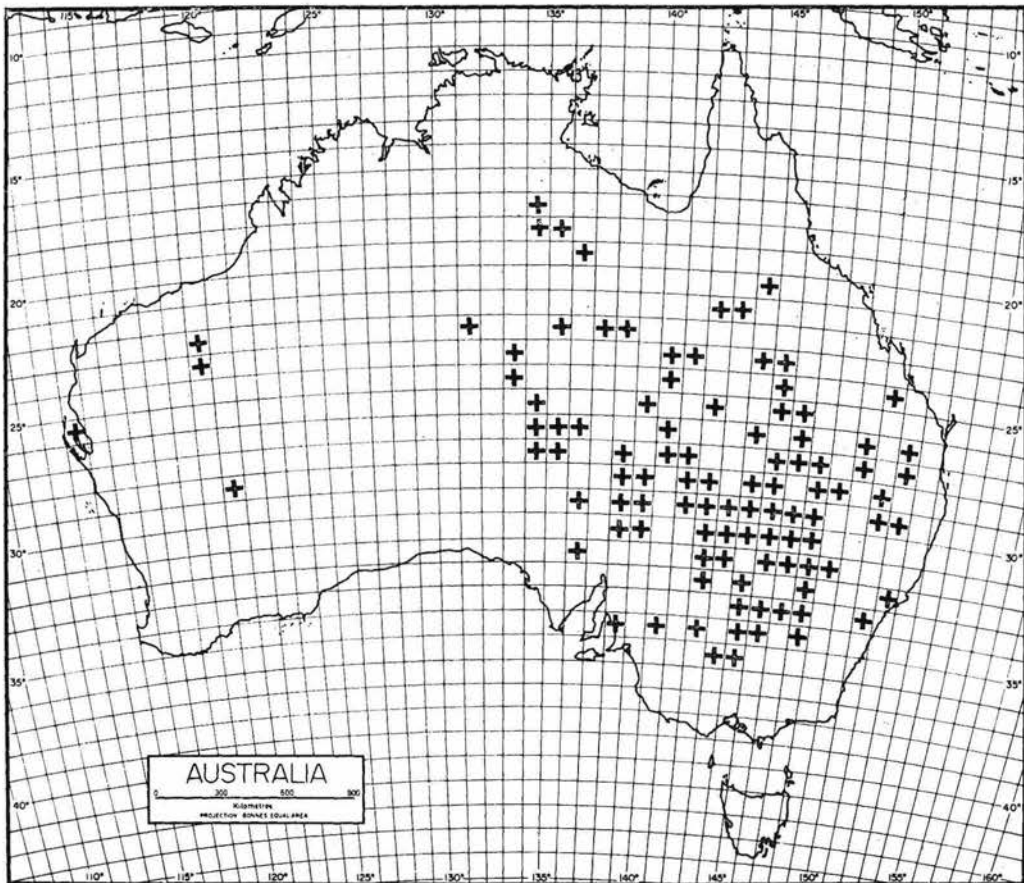


Figure 5. Distribution of *M. integerrima* based on herbarium material.

*Selected specimens:* WESTERN AUSTRALIA: Lawlers, *Fitzgerald*, July 1899 (NSW, PERTH); 49 miles (73 km) S of turn-off to Mt. Newman, *Mirrington* 710941, Sept. 1971 (NSW, PERTH); SOUTH AUSTRALIA: Coopers Creek, Innamincka Creek bed below crossing, *Johnson* NSW 128015, June 1972 (NSW); VICTORIA: Murray River, flats on Cowra Station, 19 km W of Merbein, *Henshall* NT 46860, Oct. 1969 (NT); NEW SOUTH WALES: 8 miles (12 km) W of Louth on Wanaaring Road, *Moore* 5592, June 1969 (BRI, CANB, MEL, NSW); QUEENSLAND: Gilruth Plains, Cunnamulla, *McKee* 10332, April, 1963 (CANB, NSW); NORTHERN TERRITORY: Charlotte Waters, *Chippendale* 1329 (BRI, CANB, NSW, NT); 40 miles (64 km) N of Helen Springs Station, *Perry* 1893, Aug. 1948 (AD, BRI, MEL, NSW).

*Affinities:* The affinities of *M. integerrima* are obscure. It appears to have many features in common with *M. gardneri* from which it can be distinguished by its glabrous stems and its disc pappus bristles which are barbellate, with barbs becoming longer and denser towards their tips. This species is remarkable for the occasional occurrence of tetramerous disc florets, a character also observed in *Kippistia suaedifolia*. The clustering of several capitula together is also worthy of note, although they are often paired in *M. chippendalei*.

Disc florets with four lobes and four anthers are often observed in *M. integerrima*. The presence of tetramerous disc florets in predominantly pentamerous capitula is possibly to be explained in terms of the crowding of floral primordia. This phenomenon is discussed by Gardner (1977) and Grau (1977). It should be noted that *M. integerrima* is a somatic apomict and can possess from 0–25+ disc florets per capitulum in which there is a total failure of male gametogenesis (Davis, 1964).

*Name:* The specific epithet refers to the usually entire leaf margins.

## 7. *Minuria leptophylla* DC., Prod. 5: 298 (1836); Benth., Fl. Austral. 3: 498 (1867).

J. M. Black, Fl. S. Australia Ed. 2, 857 (1957); Turner, Amer. J. Bot. 57 (4): 383 (1970).

*Therogeron leptophyllum* (DC.) Kuntze, Rev. Gen. 368–9 (1891) nom. illeg.

*Type:* "Summits of barren hills, Lachlan River, Interior of New South Wales, 27 April, 1817", *Cunningham* 23 (holo: G-DC).

*Minuria tenuissima* DC., Prod., 5: 298 (1836).

*Lectotype* (here designated): "Barren Hills on the Lachlan River, New South Wales, 15 Apr. 1817". *Cunningham* 50 (G-DC). *Paratype:* ditto, *Cunningham* 24 (G-DC).

*Minuria leptophylla* var. *hispida* Benth., Fl. Austral. 3: 498 (1867); F. M. Bailey, Syn. Queensland Fl. 240 (1883); F. M. Bailey, Queensland Fl. 3: 799 (1900); F. M. Bailey, Compr. Cat. Queensland Pl. 259 (1913).

*Type:* "Rockingham Bay, *Dallachy*, a single slender specimen in Herb. F. Mueller . . ." (holo: K).

*Minuria asteroidea* Sond., *Linnaea* 25: 467–8 (1852).—*Eurybia asteroidea* F. Muell. ex Sond., *Linnaea* 25: 468 (1852) nom. inval. pro syn.

*Lectotype* (here designated): Cudnaka, *Mueller*, Oct. 1851 (lecto: MEL 70416; isolecto: MEL 70419). *Paratypes:* Adelaide, *Mueller* MEL 70410 & 70411, undated, (MEL) between Saltcreek and Pfeiffer's Station, Behr MEL 70414 & 70410, Nov. 1849 (MEL); Holdfast Bay, *Mueller* MEL 70413–5, undated (MEL); Mount Remarkable, *Mueller* MEL 70412, undated (MEL); Cudnaka *Mueller* MEL 70420, undated (MEL).

Small, spreading, perennial herb to 50 cm high. *Stems* suffrutescent, pale brown to green, sparsely pubescent with adpressed, multicellular, uniseriate hairs. *Leaves* alternate, sessile, linear, to 4.0 cm long, c. 1 mm wide, sparsely to moderately pubescent with clumped, multicellular, uniseriate hairs; margin entire; apex acute to acuminate, sometimes apiculate. *Capitula* solitary, terminal, pedunculate, c. 1.5 cm in diameter. *Involucral bracts* in 4 rows, yellow to green, lanceolate, 2–6 mm long, c. 1 mm wide, glabrous, with 1 prominent midrib; margin of inner 3 rows membranous; apex acute, fimbriate, tinged pink. *Receptacle* slightly convex. *Ray florets* many in several rows, estaminate; lingule white to purple, 4.2–7.0 mm long, 0.7–2.1 mm wide; floral tube 1.7–3.4 mm long; stigma lobes subulate, 1.0–1.5 mm long; achene fertile, brown to orange, obovate in outline, 1.3–3.8 mm long, 0.5–1.2 mm wide, densely pubescent with notched twin-hairs; pappus

of many, free, uniformly barbellate bristles, 2.5–4.0 mm long. *Disc florets* staminate; floral tube 2.8–4.0 mm long, glabrous; anthers 1.1–1.6 mm long, c. 0.3 mm wide with acuminate sterile apical appendages; stigma lobes 1.2–2.0 mm long, 0.2–0.3 mm wide; achene sterile, translucent, linear in outline, glabrous, 1.6–3.0 mm long, c. 0.3–0.6 mm wide; pappus of dimorphic hairs, with short, free, uniformly barbellate bristles 0.6–1.2 mm long, and 2–6 longer, barbellate bristles, 2.2–3.1 mm long, with barbs denser at tips.

*Flowering Period*: Throughout the year.

*Habitat*: Low shrubland, open forest and woodland, on a variety of sub-strata including sandy loam, red gravel and shale.

*Distribution*: See Fig. 6.

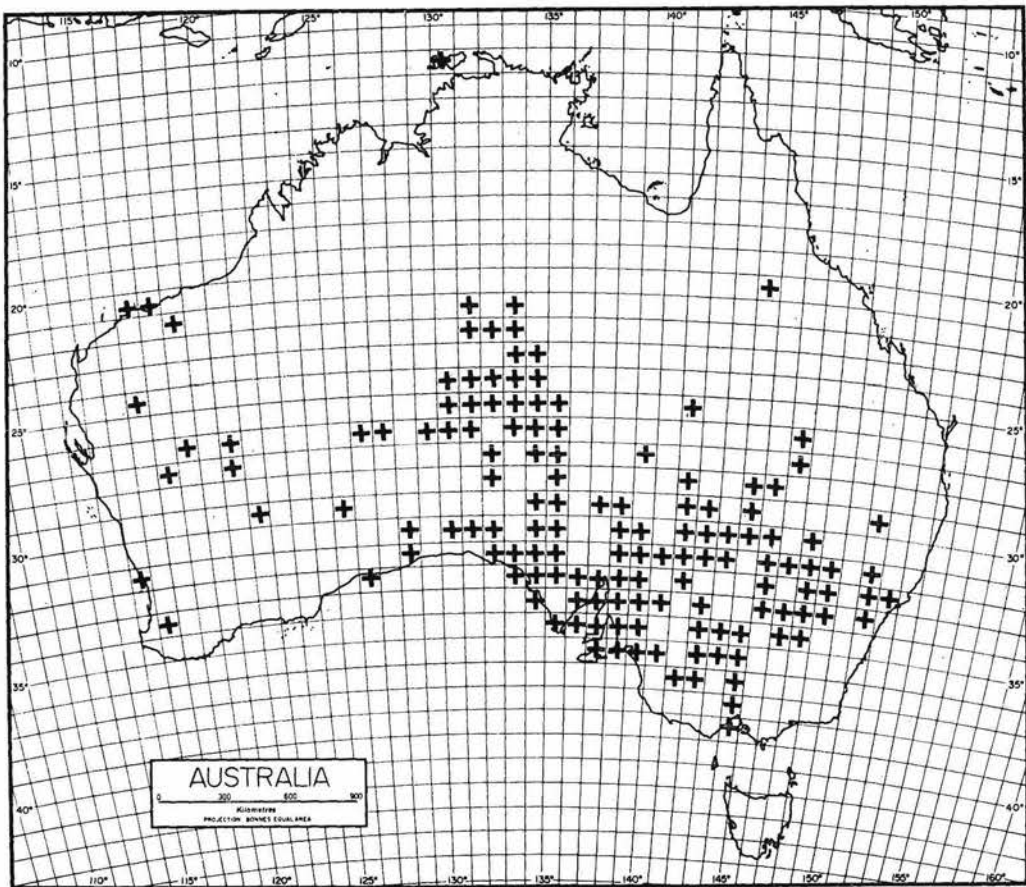


Figure 6. Distribution of *M. leptophylla* based on herbarium material.

*Selected specimens*: WESTERN AUSTRALIA: 70 miles (115 km) S of Wiluna, *Blackall* 2418, July 1931 (NSW, PERTH); SOUTH AUSTRALIA: 7 miles (11 km) S of Emu, *Forde* 399, Aug. 1956 (AD, CANB, MEL); 22 miles (33 km) S of De Rose Hills Station, *Perry* 5520, Sept. 1955 (AD, BRI, CANB, MEL, NSW, NT, PERTH); VICTORIA: between Nhill and Jeparrit, 0.8 miles (1.4 km) SW of Glenlee, *Aston* 1051, Oct. 1963 (AD, MEL); NEW SOUTH WALES: Fowlers Gap, near Broken Hill, *Jacobs* 2120, Oct. 1975 (AD, NSW); Balranald, *Phillips* CBG 025351, Aug. 1962 (CBG, NT); QUEENSLAND: West Covey, Gilruth Plains. *Roe* 142a, 2. 1941 (BRI, CANB); NORTHERN TERRITORY: 5 miles SSE of Undoolya Station, *Lazarides* 5751, 8. 1956 (AD, BRI, CANB, NSW, NT, PERTH); 23.5 miles (36 km) W of Alice Springs, *Chippendale* 2708, 8. 1956 (BRI, CANB, NSW, NT).

*Chromosome Number*:  $n = 9$  (Turner, 1970, l.c.).

*Affinities*: *M. leptophylla* appears to have many characters in common with *M. annua* from which it can be distinguished by its perennial habit and pubescent stems and leaves.

*Name*: The specific epithet refers to the narrow leaves of this species.

*Special Note*: A single specimen collected 7.5 miles (11.3 km) N of Bulga Downs, Western Australia, Demarz 05651, Sept. 1975 (PERTH) included tentatively by us under *M. leptophylla* appears to be somewhat aberrant and, with further collection, may be found to represent a distinct taxon. It differs from other material of *M. leptophylla* in possessing short, fleshy, glabrous leaves.

### 8. *Minuria macrocephala* N. S. Lander et R. Barry sp. nov.

Species affinis *M. cunninghamii* (DC.) Benth. a qua caulibus glabris et capitulis grandibus praecipue differt. Frutex effusus nanus perennis. Achenia florum radiatorum fertilia, pilis glochidiatis geminis dense pubescentia etiam pappo setis multis minute barbellatis ornata; achenia disci sterilia, glabra, pappo c. 10 setis brevibus ramosis capillaribus et 7-10 setis longioribus barbellatis ornata.

*Type*: Barwidgee road, 10 miles (16 km) S of Yelma turn-off, Eremaean Province, Western Australia, Speck 1348, Oct., 1958 (holo: CANB; iso: NSW, PERTH).

Perennial, spreading dwarf shrub to c. 50 cm high. *Stems* woody, grey to light brown, glabrous. *Leaves* alternate, sessile, linear, mostly falcate, almost glabrous with a few multicellular, uniseriate hairs on the margins towards the apices, to 30 mm long, 1-2 mm wide grading into involucre bracts; margin entire; apex acuminate. *Capitula* solitary, terminal, broadly conical, to 35 mm in diameter. *Involucre bracts* in several rows, linear-lanceolate, 5-15 mm long, c. 3 mm wide, glabrous, with 1 prominent midrib; margin membranous, slightly fimbriate or entire; apex acute-acuminate. *Receptacle* convex. *Ray florets* many in 2-3 rows, estaminate; ligule (colour unknown), 7.4-11.2 mm long, 1-2 mm wide; floral tube 7-9 mm long; stigma lobes subulate, 5-6 mm long, c. 0.1 mm wide; achene fertile flattened, lanceolate in outline, c. 4 mm long, c. 1 mm wide, densely pubescent with glochidial twin-hairs; pappus of many tapering, minutely barbellate bristles, 12-19 mm long, free to their bases or united to form clumps. *Disc florets* staminate; floral tube 14-18 mm long; anthers 6-7 mm long, c. 0.8 mm wide, with acute, sterile apical appendages; stigma lobes subulate, 5-6 mm long, c. 0.8 mm wide; achene sterile, flattened, lanceolate in outline, glabrous, 11-14 mm long, 0.8-1.3 mm wide, with 2 prominent veins on each face; pappus of dimorphic bristles, with c. 10 short capillary bristles 3.5-5.7 mm long, free or united, conspicuously branching toward the apices, and 7-10 barbellate bristles 13-17 mm long, the barbs more conspicuous towards the apices.

*Flowering Period*: September to February.

*Habitat*: In low shrubland.

*Distribution*: Known only from the vicinity of "Barwidgee" Homestead which is 27°02'S, 120°55'E in the Austin District in the Eremaean Botanical Province of Western Australia. See Fig. 2.

*Other specimen*: WESTERN AUSTRALIA: SE of Wiluna on saltbush country, Barwidgee paddock on Lake Violet and Barwidgee Station Boundary, Oliver M44, Sept. 1966 (PERTH).

*Affinities*: *M. macrocephala* is closely allied to *M. cunninghamii* from which it can be distinguished by its much larger capitula and floral parts; its glabrous peduncles; its glabrous involucre bracts which are not tinged pink at their apices and which are not as conspicuously fimbriate; and the clumping of its ray pappus bristles. The latter feature is found only in this species of *Minuria*. *M. macrocephala* is considerably larger in all its floral parts than any other species in the genus. Specimens of it have been placed under *M. cunninghamii* in the past.

*Name*: The specific epithet refers to the particularly large capitula found in this species.

**9. *Minuria rigida*** J. M. Black, *Trans. Roy. Soc. South Australia* 42: 182 (1918).

J. M. Black, *Fl. South Australia* 278, fig. 25 (1926); J. M. Black, *Fl. South Australia* 588 (1929); J. M. Black, *Fl. South Australia* Ed. 2, 858 & Fig. 1158 (1957).

*Lectotype*: (here designated): Hergott (Maree), *J. M. Black* AD 97626285 (AD).

*Isolectotypes*: Hergott (Maree) *J. M. Black*, Oct. 1917 (AD 97826036; AD 97826039; MEL 70479; NSW 122725).

Perennial, prostrate or erect, dwarf shrub to 25 cm high. *Stems* suffrutescent, brownish-green to brown, glabrous. *Leaves* alternate, sessile, ovate-lanceolate, glabrous, to 1.3 cm long, 4 mm wide; margin finely serrulate; apex acuminate. *Capitula* solitary, pedunculate, terminating branches, broadly conical, to 12 mm in diameter. *Involucral bracts* in four rows, yellowish-green, lanceolate, 2–3 mm long, c. 1 mm wide, glabrous, with 1 prominent midrib; margins of inner 3 rows membranous; apex acuminate, fimbriate. *Receptacle* convex. *Ray florets* many in several rows, estaminate, ligule pale blue-mauve; 4.3–5.4 mm long, 0.5–0.7 mm wide; floral tube 0.9–1.5 mm long; stigma lobes 0.8–1.1 mm long; achene fertile, reddish-brown, lanceolate in outline, 0.8–1.5 mm long, 0.3–0.4 mm wide, densely pubescent with glochidial twin-hairs; pappus of many, barbellate bristles 0.7–1.0 mm long *Disc florets* staminate; floral tube 3.4–3.8 mm long; anthers 1.5–2.1 mm long, c. 0.4 mm wide; stigma lobes subulate 0.7–1.1 mm long, 0.2–0.3 mm wide; achene sterile, reddish-brown, lanceolate, glabrous, 0.6–0.7 mm long, c. 0.2 mm wide; pappus of dimorphic hairs, short barbellate bristles c. 0.8 mm long, with c. 8 longer barbellate bristles, 2.8–3.0 mm long.

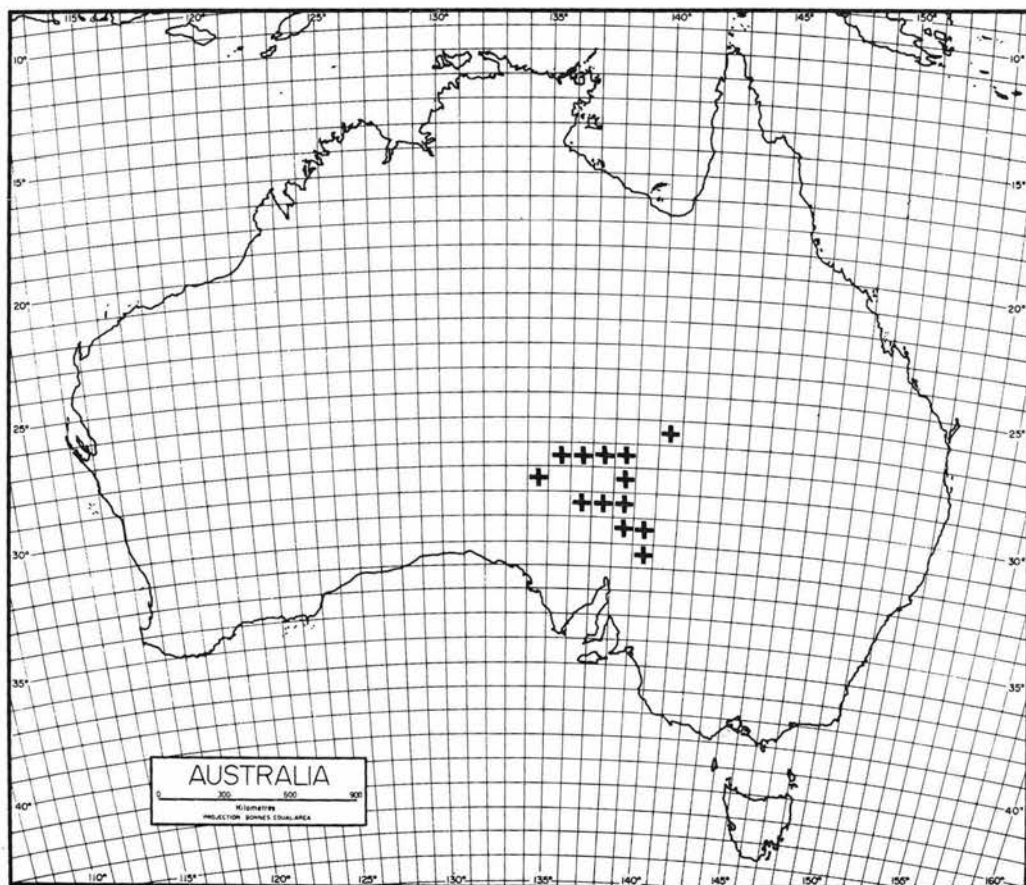


Figure 7. Distribution of *M. rigida* based on herbarium material.

*Flowering Period:* October.

*Habitat:* Low shrublands near places of ephemeral water.

*Distribution:* See Fig. 7.

*Selected specimens:* SOUTH AUSTRALIA: 1.5 km E of Lyndhurst along Strezlecki Track, *Sikkas* 1076, Sept. 1973 (AD, CBG); Lake Frome, *Weber* 2089, July 1971 (AD, BRI).

*Affinities:* *M. rigida* is most similar to *M. denticulata*. See under that species for distinguishing features.

*Name:* The specific epithet probably refers to the stiff leaves found in this species.

The bulk of this work was completed while both authors were employed at the National Herbarium of New South Wales.

We wish to thank Mr. Paul Wilson for reading the manuscript and Mr. Alex George for providing Latin diagnoses.

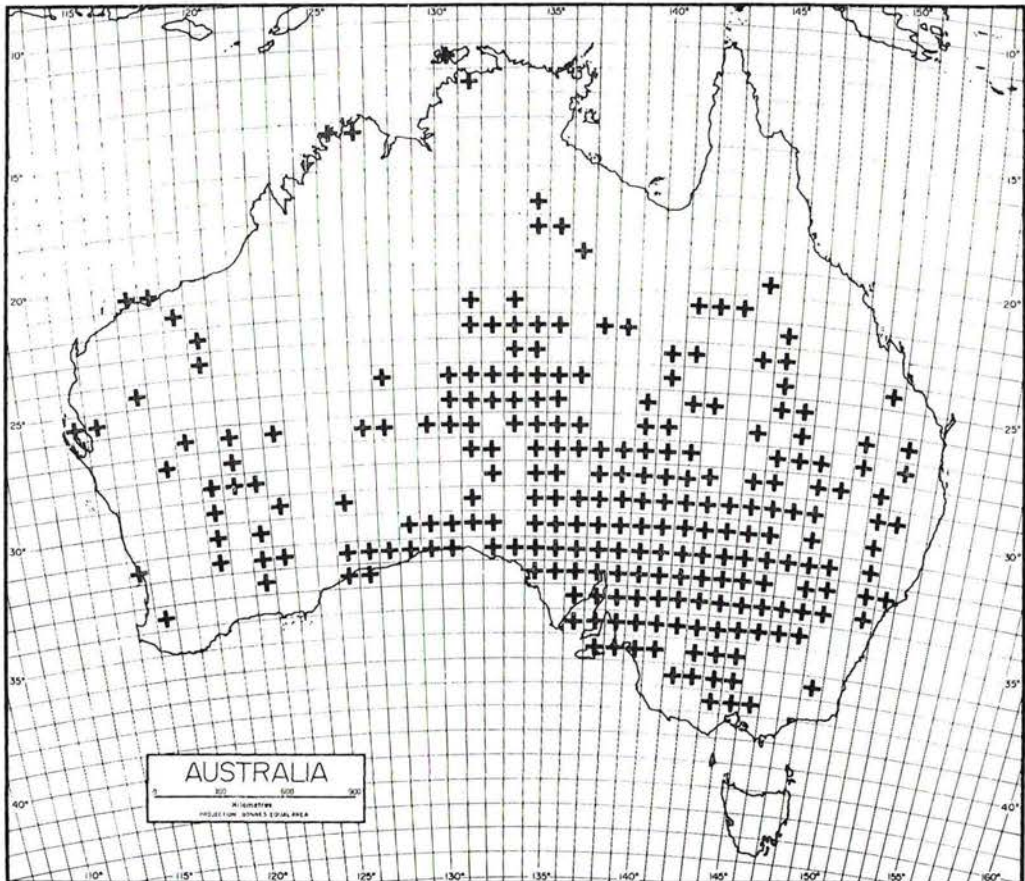


Figure 8. Distribution of *Minuria* based on herbarium material.



## References

- Bentham, G. (1867). *Flora Australiensis* vol. 3. (Lovell Reeve & Co.: London).
- Bentham, G. & Hooker, J. D. (1873). *Genera Plantarum* vol. 2. (William Pamplin, Lovell Reeve & Co., Williams & Norgate: London).
- Black, J. M. (1929). *Flora of South Australia* part 4. (Government Printer: Adelaide).
- Candolle, A. P. de (1836). *Prodromus Systematis Naturalis Regni Vegetabilis* vol. 5. (Treuttel & Wurtz: Paris).
- Dalla Torre, K. W. von & Harms, H. (1900-7). *Genera Siphonogamarum ad Systema Englerianum Conscripta*. (Englemann: Lipsiae).
- Davis, G. (1964). The embryology of *Minuria integerrima*: a somatic apomict. *Phytomorphology* 14: 231-239.
- Gardner, R. C. (1977). Observations on tetramerous disc florets in the Compositae. *Rhodora* 79: 139-146.
- Grau, J. (1977). Astereae—systematic review. In Heywood, V. H. et al.: *The Biology and Chemistry of the Compositae* (Academic Press: London)
- Hoffmann, O. (1899). Compositae. In A. Engler & K. Prantl: *Die Natürlichen Pflanzenfamilien* vol. 4. (Dunker & Humblot: Berlin).
- Lander, N. S. & Barry, R. (1980). Reinstatement of the genus *Kippistia* F. Muell. (Asteraceae, Asterineae). *Nuytsia* 3, 2: 215-219
- Mueller, F. J. H. (1859). Report on the plants collected during Mr. Babbage's expedition into the north-western interior of South Australia in 1858. In *Victoria—Parliamentary Papers—Votes and Proceedings of the Legislative Assembly 1859-60*, 3 (No. 1): 1-21. (Government Printer: Melbourne).
- Tate, R. (1899). Diagnosis of four new species of plants from South Australia. *Trans. Roy. Soc. S. Australia* 23: 288.

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