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Systematics of *Abrotanella*, an Amphi-pacific genus of *Asteraceae* (*Senecioneae*)

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Abstract: The amphi-pacific genus *Abrotanella* (Gaudich.) Cass. of the southern hemisphere in the *Asteraceae* (*Senecioneae, Blennospermatinae*) is revised and 18 species are recognized. Three new species are described: *A. fertilis* Swenson from New Zealand, *A. purpurea* Swenson and *A. trilobata* Swenson from southern South America. The sexual function of central florets, perfect or functionally male, floret vascular pattern, and internal secretory spaces in the phyllaries are shown to be taxonomically informative for the circumscription of the species. Central without marginal vascular tissue in the lobes of florets, a unique pattern for *Asteraceae*, is reported. A diagnostic key, line drawings, descriptions, and distribution maps are supplied for all species.

Abrotanella (Gaudich.) Cass. is a fascinating genus of small, often cushion-forming alpine plants. Its distribution is even more interesting; *Abrotanella* is restricted to the southern hemisphere including the Falkland Islands and southern South America, and across the Pacific Ocean to New Zealand, Tasmania, continental Australia, and New Guinea. Thus, *Abrotanella* occurs in both the eastern and the western Pacific. Knowledge of such austral distribution patterns was incipient in the 1840s with the discoveries during expeditions such as the Antarctic Voyage (Hooker 1844, 1853). Later, these patterns became even more perceptible and the issue of their nature was brought forward by Mueller (1889). Two main hypotheses may explain these patterns – dispersal and vicariance. The latter includes theories such as an expanding earth (Carey 1976) or a lost continent Pacifica (Nur 1977). Biogeographic interest of the Pacific has come into focus during the last decades and with a cladistic approach new tools are available (e.g., Humphries & al. 1988, Page 1988, Bremer 1992). Today we know more than 50 genera with this trans-Pacific relationship. Information for biogeographic analyses usually come from systematic monographs but little work, except on *Nothofagus* Blume, has so far been done on these genera. Seberg (1991) urged for reliable phylogenetic hypotheses to be used as a foundation for biogeographic inferences. I add that if cladistic analyses shall yield robust hypotheses of phylogenetic relationships understanding of the terminal taxa is important. This study attempts to clarify the species and to expand the systematic knowledge of the genus *Abrotanella*.

The very first discovery of *Abrotanella* was dramatic. As the French corvette *Uranie* approached the Falkland Islands on 14 February 1820 it was wrecked in the Berkeley Sound. On board of the vessel was CHARLES GAUDICHAUD, who had been making extensive collections on this journey. He managed to save much of the material, press it, and dry it again before he set out to explore the Falkland Islands (SKOTTSBERG 1913). A minute cushion herb resembling a moss was included in the collections. It was later described as *Oligosporus emarginatus* by GAUDICHAUD (1825). CASSINI realised that the plant, which had disciform and heterogamous heads, did not belong in *Oligosporus* (= *Artemisia* L.). Instead, he transferred it to the new genus *Abrotanella* (CASSINI 1825) close to *Artemisia*, which it resembled, in the *Anthemideae*.

In 1839–1842, during the Antarctic Voyage of the two vessels Erebus and Terror, they navigated in the waters of New Zealand and Australia. Assistant surgeon and naturalist on board was J. D. HOOKER (CHEESEMAN 1925). Among his discoveries, three new genera were described: *Trineuron* and *Ceratella* from the sub-Antarctic Islands (HOOKER 1844), and *Scleroleima* from Tasmania (HOOKER 1846). HOOKER assumed that all were closely allied to the Falkland species of *Abrotanella*. A few years later GRAY (1862) added two more species to *Abrotanella* from southern South America. He criticised HOOKER's generic classification, which to a certain degree was based upon a reduced pappus. When HOOKER (1964) described *A. inconspicua* from New Zealand, he considered GRAY's suggestions and intended to transfer all the species to *Abrotanella*, but he did not make the necessary new combination for *Scleroleima*. In the Flora of Australia (BENTHAM 1866), *Scleroleima* and the species described by MUELLER (1855, 1857) as *Trineuron* were finally transferred to *Abrotanella*.

One species, *Rhamphogyne rhynchocarpa* (BALF. f.) S. MOORE from Rodriguez Island in the Indian Ocean, is often cited as a species of *Abrotanella*. Although it was originally described as such by BALFOUR in the flora of Mauritius and the Seychelles (BAKER 1877), it was transferred as early as 1914 by MOORE to the monotypic genus *Rhamphogyne* in the *Astereae*. The current knowledge of this species, now possibly extinct, was reviewed by SWENSON & BREMER (1994).

From 1877 to 1969, when the last species were described, 10 more species were added to the genus. Some of these species are synonyms but most belong to *Abrotanella*. One plant, *A. christensenii*, described by PETRIE (1915), belongs to the *Astereae* and it is synonymous with *Solenogyne gunnii* (HOOK. f.) CABRERA (SWENSON 1993).

In floras where *Abrotanella* is described, it is placed in *Anthemideae* (see, e.g., ALLAN 1961, MOORE 1983, ROYEN 1983). As this position was not satisfactory, NORDENSTAM (1977) transferred the genus, as a tentative solution, to subtribe *Blennospermatinae* of *Senecioneae*. The *Blennospermatinae* include three other genera: *Blennosperma* LESS., *Crocidium* HOOK., and *Ischnea* F. MUELL. (NORDENSTAM 1977) of which the latter was reviewed by SWENSON (1994). Exclusion from *Anthemideae* is supported by cypsela anatomy (N. S. KHANDIJIAN, pers. comm.). Exclusion of *Abrotanella* from *Anthemideae* was followed in a recent generic monograph of that tribe (BREMER & HUMPHRIES 1993). The systematic position within *Senecioneae-Blennospermatinae* has caused some controversy. Evidence against this position is based on pollen morphology (GADEK & al. 1989), cypsela anatomy

(Bruhl & Quinn 1990), and floral structure (Bruhl & Quinn 1991). In spite of the new information, these authors have not suggested any alternative position. This problem will be addressed in forthcoming cladistic analyses of the group (Swenson, unpubl.). It has also been suggested that *Abrotanella* may even be polyphyletic and that the type species. *A. emarginata*, should be nested in the *Senecioninae* (H. Robinson, pers. comm.). A preliminary cladistic analysis of the *Blennospermatinae* has shown that the genus is monophyletic, and no support for dividing it into sections or subgenera was found. I have, therefore, pending future analyses, decided to keep the genus in its traditional circumscription.

Material and methods

This revision is based on morphological information gathered mainly from herbarium specimens but also from fresh material collected during fieldwork in South America, New Zealand, and Tasmania. In South America, southernmost Argentina and Chile were visited from December to February, 1993–94. Fieldwork in Tasmania and New Zealand was fulfilled in December 1994 and January 1995. On both trips several herbaria were visited. Specimens from the following herbaria have been studied: A, AK, BA, BAB, BM, CANB, CHR, CONC, F, GB, GH, HIP, HO, K, L, LD, LP, MEL, P, S, SI, UPS, US, WELT.

Morphology. For the study of morphological structures, flowers and leaves were soaked in Copenhagen mixture (70 ml ethanol, 29 ml distilled water, 1 ml glycerol, 2 drops methanol) or boiled in water and later examined under stereo and light microscope. Habit drawings were made from herbarium specimens as well as drawings of details from the soaked material mentioned above. All measurements, when possible and adequate, are given with 0.1 mm accuracy. For anatomical studies, thin sections were prepared on a rotation microtome and stained in safranin, lightly counterstained with fast green, and then made into slides. The morphological terminology follows Bremer (1994).

Common characters for the genus are normally, as well as here, given in the generic description and not repeated under each species. The appropriate character state is reiterated under the species, however, when words such as "sometimes" or "rarely" have been used in the generic description.

Maps. The distribution maps are computer-drawn using CANVAS 3.0 for Macintosh. For each country, when appropriate, the districts or states where collections were made are indicated. Symbols represent localities and several collections, depending on the scale, may be found within a radius of 10–50 km. Collections with uncertain locations are omitted from the maps.

Provincial delimitation within Chile varies, especially in the south. Magallanes is often delimited as a large province stretching from Isla Wellington in the north to Cape Horn in the south. This province is sometimes, as well as here, divided into Ultima Esperanza in the north, Magallanes in between, and Antarctica in the far south.

Species concept. Since this study is based on herbarium material and morphology, the morphological species concept has been applied. Species concepts, especially the morphological, are discussed by several authors (see DuRietz 1930, Cronquist 1978, Stuessy 1990).

Collection list. Types are not reiterated in the collection lists. Localities are given in their English form except for South America, where Spanish is used, e.g., for islands, mountain peaks, and lakes. Provinces or states, localities, and collectors within the same locality, are in alphabetic order. The localities have been identified, as far as possible, as to province, latitude, and longitude, and this information is added unless given on the labels. Altitudes are frequently given in feet, but have here been converted into metres. The Falkland Islands or Islas Malvinas are treated as an independent floristic area.

Morphology

Most species of *Abrotanella* are very small, not reaching more than a few centimetres above the ground although some species form cushions that can reach up to a metre or more in diameter. Especially in South America and on Tasmania, these cushion-forming species frequently grow in association with other, habitually similar species, but from different families. Because of their minuteness, the plants are often very difficult to determine in the field and characters that segregate or identify the species need to be characterized. These, and others, are discussed briefly below.

Leaves. The entire, glabrous leaves of *Abrotanella* have been described as

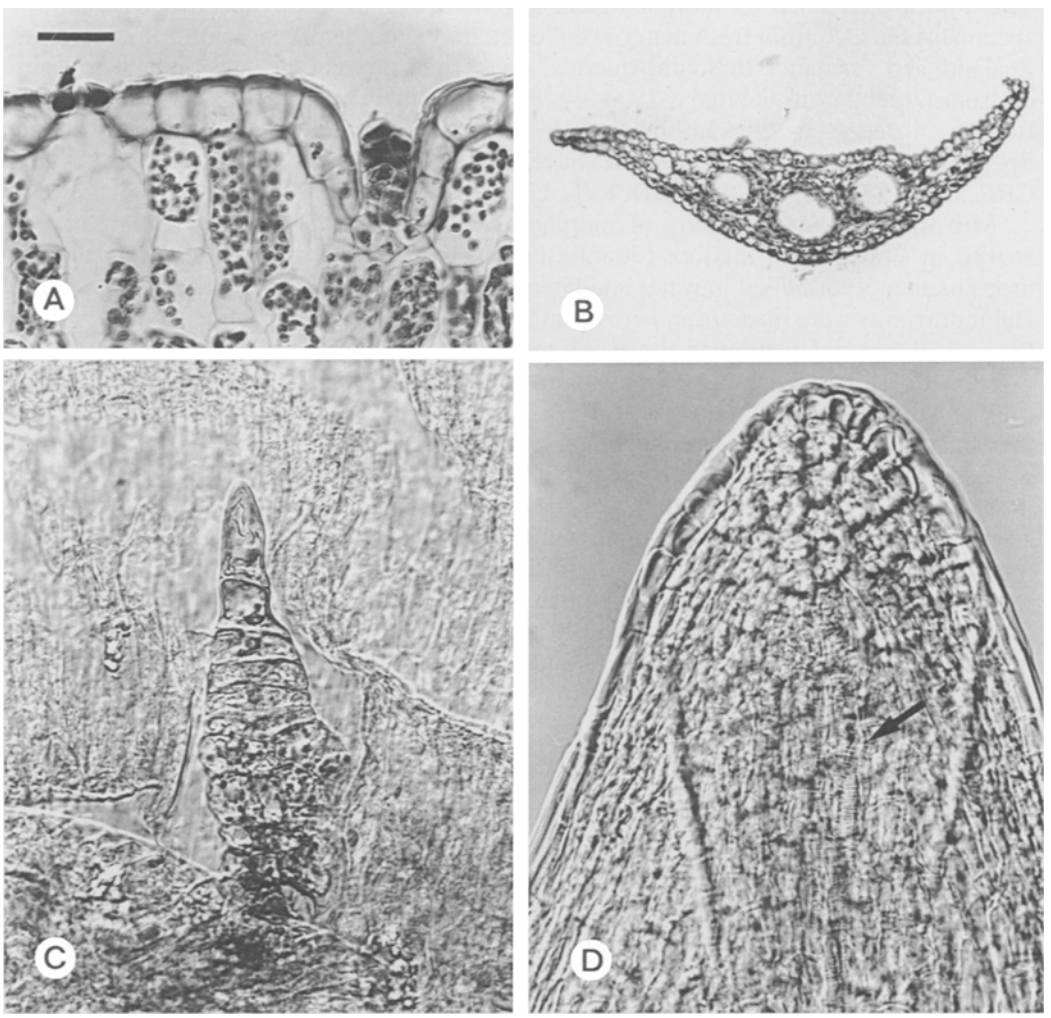


Fig. 1. Some anatomical structures in *Abrotanella*. *A* Sunken microscopic multicellular gland on a leaf-surface. Stoma with the stomatal cavity is visible to the upper left. (*A. trichoachaenia*: Swenson 329). *B* Cross-section of a phyllary showing three secretory ducts (*A. inconspicua*: Given 72925). *C* Multicellular gland basally on a phyllary (*A. trilobata*: Swenson & Martinsson 313). *D* Central floret lobe showing central vascular tissue (arrow) (*A. rosulata*: Oliver 4.1.1945). Bar: *A, D*, 35 µm, *B* 0.12 mm, *C* 30 µm

"coriaceous" by various authors (see, e.g., CHEESEMAN 1925, ALLAN 1961). I find the leaf texture somewhat coriaceous but often also thick, i.e., crassulate. In other words, there is no clear distinction between coriaceous and crassulate leaves within the genus. Petioles are often purple, sheathing, and widening towards the base. The sheathing base is more or less amplexicaul in the whole genus and a small sheath clasping the entire stem is found in one species, namely in *A. emarginata*. Leaf apex is also a good character as it is retuse, obtuse, or apiculate, and not variable within species, except in *A. linearis* BERGGR.

Microscopic multicellular glands or trichomes of about 5–20 cells, 30–60 µm long, are found on leaves from all species (Fig. 1 A). They are almost always purplish, sunken into small cavities, which make them visible even without a hand-lens as small dots.

Internal secretory spaces, like those reported in leaves of many *Asteraceae* (see, e.g., LERSTEN & CURTIS 1987, SWENSON 1994), are common in *Abrotanella*.

Bracts and phyllaries. The number and presence of peduncular bracts varies within the genus. In general, most species have sessile capitula, even in the fruiting stage, and therefore no bracts. Some species have short pedunculate capitula with leaf-like bracts. Three species have dimorphic bracts; the outer are larger and the inner smaller, with five and three translucent ducts, respectively (Fig. 5 A3).

The capitula have, opposed to the bracts discussed in the former paragraph, few series of phyllaries (involucral bracts). When HOOKER (1844) described *Trineuron spathulatum*, later reduced to *Abrotanella spathulata* (HOOKER 1864), he named the genus after "...the three cellular nerves or lines of the ovary and involucral scales". These structures in the phyllaries have been interpreted as nerves or veins. Under closer examination, it is revealed that they are not nerves but internal secretory spaces or ducts (Fig. 1 B). They are hereinafter described as translucent ducts. A single nerve is present in the phyllaries of these species, too, but it is obscured by the translucent ducts. With some exceptions, this character is nearly always congruent with cyathiform outer florets (see below).

Glands or trichomes, similar to those on the leaves, are present on the phyllary base of most species (Fig. 1 C). These glands, however, are normally longer, up to 80 µm, and have a top-cell. On some species, particularly those with translucent ducts in the phyllaries, the glands have probably lost their secretory function and they resemble normal, septated trichomes.

Florets. The capitula are disciform and heterogamous with slightly dimorphic florets. The corollas are tubular or cyathiform in the outer florets and campanulate or more or less tubular in the central florets. Nearly all species from New Zealand, Australia, and New Guinea, have cyathiform (i.e., cup-shaped) outer florets. In general, outer florets have divided styles with short, ovate branches (Fig. 2 A).

Central florets are of two types, as correctly observed by GRAY (1862), perfect and functionally male. Perfect, i.e., hermaphroditic and fully fertile florets have a more or less tubular or slightly campanulate corolla and a divided style with truncate style-branches, short acute sweeping hairs, and stigmatic papillae (FIG. 2 B). Florets that are functionally male are campanulate with a truncate, undivided style (Fig. 2 C). Since neither sweeping hairs nor stigmatic papillae are observable, they have been interpreted as absent. The cypselas, however, are still well developed except in *Abrotanella emarginata* where reduction has taken place

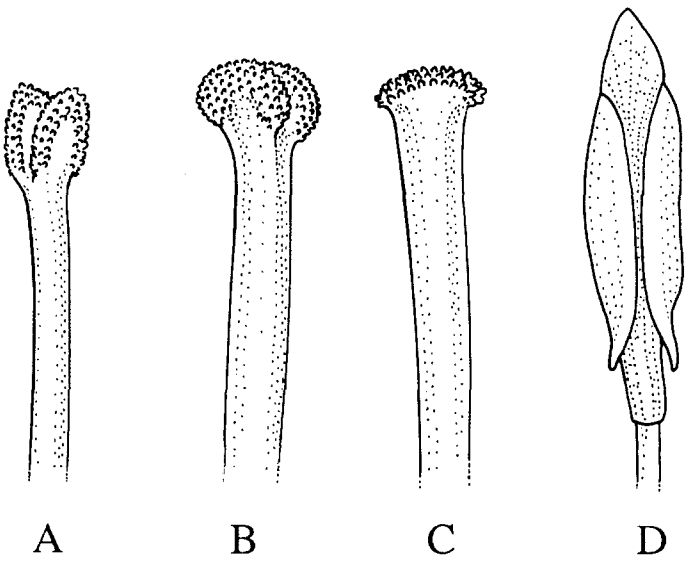


Fig. 2. Styles and anther of *Abrotanella*. *A* Style of a female outer floret (*A. trilobata*: SWENSON & MARTINSSON 319). *B* Divided style of a perfect central floret (*A. purpurea*: SWENSON & MARTINSSON 323): *C* Undivided style of a functionally male central floret (*A. inconspicua*: GIVEN 72925). *D* Anther with obovate appendix and short sterile tails (*A. inconspicua*: GIVEN 72925). Scale: × 40

(Fig. 3 A5). The first eleven species enumerated below have functionally male florets and the remaining species have perfect florets. Species are arranged with its plausible closest relative based on gross morphology.

Floret lobation is a polymorphic character in *Abrotanella* and deviations from the number given for each species may be found. The character seems to be more constant in the normally 4-lobed central florets than in the outer florets, which are 3-4-lobed.

Corolla vascular tissue in the *Asteraceae* is normally marginal, following the lobe margin, fusing at the lobe sinuses, and continuing downwards through the corolla to the cypsela. Another pattern of venation within the *Asteraceae*, considered as primitive, is the combination of marginal and central strands (midvein), which often are not fused in the lobe apex (KOCK 1930, CARLQUIST 1961). This type is found in several tribes within the *Asteraceae*, though it is not very common. The vascular pattern in *Abrotanella*, especially in the central florets, is an informative character, possible to use even in the field. The vascular tissue is marginal, central, or both, but sometimes it is only rudimentary or completely absent. One interesting type consists of a well developed midvein, whereas all marginal strands are reduced (Fig. 1 D). This is a specific case previously unreported from the *Asteraceae*. Species with a well developed midvein only are all found in Australia and New Zealand. In South American species, the venation is marginal or a combination of central and marginal, often fused at the apex, but may not be fully developed along the whole length of the corolla.

The small caudate anthers of *Abrotanella* are mostly uniform in length, the length of the sterile tails, appendage form, and endothecium (Fig. 2 D). A few spe-

cies do vary. *Abrotanella emarginata* has very short tails (Fig. 3 A5) and *A. scapigera* (F. MUELL.) BENTH. has fairly long ones (Fig. 5 C5). Endothecial tissue with wall thickenings on the horizontal or vertical walls are described as polarized and radial, respectively. Both types are common in the *Senecioneae* (NORDENSTAM 1978). The endothecium in *Abrotanella* is clearly polarized in 16 of the 18 species. In *A. trichoachaenia* CABRERA and *A. purpurea* SWENSON the polarized endothecium is also partly radial.

Cypselas. The outer morphology of the cypselas is quite uniform in all species of *Abrotanella*. All of them lack a true pappus but some species have a crowned apex or small horns, alternatively awns. Neither of the structures have been interpreted as a true pappus, but as an outgrowth from the cypsela wall or the nerves. Three species, *A. submarginata* A. GREY, *A. muscosa* KIRK, and *A. trichoachaenia*, have hairy cypselas, often at the base, with twin hairs which are slightly divided at the apex (Fig. 12 A7). The remaining species have glabrous fruits but the cypsela wall is minutely papillose in some of the western Pacific species.

Cypsela anatomy has been studied in a few species [*Abrotanella emarginata, A. forsteroides, A. scapigera* (F. MUELL.) BENTH., *A. fertilis* SWENSON, and *A. linearifolia* A. GREY]. The pericarp is uniform in all species studied except for some autapomorphies. The exocarp is a well developed single layer of cells but *A. forsteroides*, and *A. emarginata* to some extent, have outer cell wall thickenings. The mesocarp consists of 2–3 cell layers, frequently with 4–5, more or less developed resin ducts, and libriform fibres in association with those. The endothelium, or seed coat, is conspicuous with a compressed cell layer. Crystals are present in the mesocarp of *A. fertilis*.

Abrotanella (GAUDICH.) Cass., Dict. Sci. Nat. **36**: 27 (1825).

Type species: *Abrotanella emarginata* (GAUDICH.) CASS.

Perennial herbs, often very small, low, mat- or cushion-forming or caespitose, rarely up to 12 cm high. Leaves rosulate, alternate, often densely imbricate, sometimes a few cauline or bract-like, linear-oblanceolate or oblong-ovate, glabrous or very rarely with septate hairs, rarely keeled or flat but still somewhat crassulate-coriaceous, with sunken multicellular glands; apex retuse, obtuse or apiculate; margins entire, sometimes scariose, often with septate hairs towards the base; petiole sheath-like or rarely a true sheath, often purple; stomata adaxial and abaxial. Capitula disciform, heterogamous, solitary and terminal or seldom 2-10 corymbosely arranged, up to 5 mm wide, sessile to pedunculate; peduncle often elongated in fruit, glabrous or rarely septate hairy; bracts leaf-like, phyllary-like, or absent. Phyllaries (3-) 5–14 (-19), ± imbricate, free, equal, in 1–3 series, oblong-linear or obovate, often with microscopic glands at the base, sometimes with translucent ducts; nerves 1 or rarely 5 or absent; apex obtuse-acute or retuse; margins entire or seldom denticulate, ± scariose, often tinged purple. Receptacle naked and flat. Outer florets female, fertile, tubular or cyathiform, in one series, glabrous; corolla 3–4 (-5)-lobed, basally often bulbous, white, purple, pale green, or yellowish, often two-coloured; vascular tissue in lobe margin, central, or absent; style glabrous, bilobed; style-branches short, ovate. Central florets functionally male, campanulate, with an undivided, truncate style lacking sweeping hairs and stigmatic papillae, or central florets perfect, ± tubular to slightly

campanulate, with a divided, truncate style having short, acute sweeping hairs and stigmatic papillae; corolla 4-lobed but occasionally 2-, 3- to 5-lobed, white, purple, pale green or yellowish, often two-coloured, glabrous; vascular tissue in lobe margin, central, or both central and marginal, or absent; anthers caudate, 0.5–1.5 mm long; appendage oblong; endothecium polarized or rarely partly radial. Cypsela straight or rarely slightly curved, ellipsoid-obvoid or somewhat terete, nerved or ribbed, glabrous, minutely papillose or hairy; apex smooth, rimmed, crowned or with small horns or awns, rarely beaked. Pappus absent.

Abrotanella consists of 18 species restricted to the southern hemisphere. *Abrotanella emarginata* grows on the Falkland Islands – the eastern outpost of overall distribution. *Abrotanella nivigena* (F. MUELL.) BENTH., at the western edge of the combined range, grows on the high peaks of south-eastern Australia and New Guinea. This distance covers almost half the world from an antarctic climate in the south to high tropical mountains with a similar climate. Seven species are restricted to southern South America, south of Puerto Montt in Chile and San Carlos de Bariloche in Argentina, eight to New Zealand including the sub-Antarctic Campbell and Auckland Islands, two to Tasmania, and one to the mountains of continental Australia and New Guinea. Species distributions are especially in South America, except for the type species, in general poorly known, due to the often inaccessible habitats.

It is not known for certain from where the generic name *Abrotanella* is derived. No reference or indication was given by CASSINI (1825). Neither *A. emarginata* nor any of the subsequently described species have any scent but CASSINI presumably considered it closely allied, based on morphology, to the aromatic genus *Artemisia* in the *Anthemideae*. I believe he formed the name from the diminutive of the species epithet of *Artemisia abrotanum*, an old European medicinal plant.

Key to the species

1. Central florets perfect; style divided; style-branches truncate; cypsela with embryo 2
1. Central florets functionally male; style undivided, truncate to cup-shaped; cypsela empty 9

2. Central florets campanulate; lobes 1/3–1/5 of corolla length 3
2. Central florets ± tubular; lobes 1/10 of corolla length 5

3. Leaf margins scariose; leaf apex retuse; cypsela apex with awns 16 *A. muscosa*
3. Leaf margins herbaceous; leaf apex obtuse; cypsela apex with a corona 4

4. Florets yellowish; style-branches often purple; cypsela hairy ..... 17 *A. trichoachaenia*
4. Florets purple; style-branches yellow; cypsela glabrous ..... 18 *A. purpurea*

5. Leaf margins scariose; leaf apex retuse; cypsela hairy at base 6
5. Leaf margins herbaceous; leaf apex apiculate or obtuse; cypsela glabrous 7

6. Phyllaries elliptic; cypsela apex with a corona ..... 15 *A. submarginata*
6. Phyllaries oblong; cypsela apex with long awns ..... 16 *A. muscosa*

7. Leaf apex apiculate; phyllaries elliptic-oblong, obtuse-truncate 8

7. Leaf apex obtuse; phyllaries obovate, retuse ..... 12 *A. fertilis*
8. Florets entirely purple; cypsela apex rimmed ..... 13 *A. linearifolia*
8. Floret tubes whitish-greenish, lobes purple; cypsela crowned ..... 14 *A. trilobata*
9. Capitula 2–10, corymbosely arranged 10
9. Capitula solitary 13
10. Leaves linear; peduncular bracts leaf-like ..... 9 *A. linearis*
10. Leaves oblanceolate or oblong-ovate; peduncular bracts dimorphic (Fig. 5 A3) 11
11. Leaves oblanceolate; capitula pedunculate; cypsela without horns 12
11. Leaves oblong-ovate; capitula subsessile; cypsela with horns (Fig. 5 A7) ..... 5 *A. rosulata*
12. Leaf apex obtuse; at least central florets purple ..... 6 *A. spathulata*
12. Leaf apex apiculate; all florets white ..... 7 *A. scapigera*
13. Plants forming dense cushions; leaves oblong, glabrous 14
13. Plants of a more lax habit, ± caespitose; leaves linear, base often marginally hairy 16
14. Leaf apex retuse, scariose; central cypselas < 0.2 mm long ..... 1 *A. emarginata*
14. Leaf apex obtuse or acuminate, not scariose; central cypselas ≥ 1.0 mm long 15
15. Leaf margins entire; apex + obtuse ..... 2 *A. diemii*
15. Leaf margins dentate; apex accuminate ..... 3 *A. forsteroides*
16. Leaves often > 15 mm long; capitula pedunculate in flower ..... 9 *A. linearis*
16. Leaves ≤ 15 mm long; capitula subsessile or sessile in flower 17
17. Leaves recurred, > 1.0 mm wide; cypsela with small horns ..... 10 *A. pusilla*
17. Leaves erectopatent, ≥ 1.0 mm wide; cypsela without horns 18
18. Leaves apiculate; peduncle not elongated in fruit ..... 4 *A. inconspicua*
18. Leaves retuse-obtuse; peduncle elongated in fruit 19
19. Phyllaries 3.0–3.5 mm long; cypsela minutely papillose ..... 8 *A. nivigena*
19. Phyllaries 2.0–2.5 mm long; cypsela glabrous ..... 11 *A. caespitosa*

1. *Abrotanella emarginata* (Gaudich.) Cass., Dict. Sci. Nat. **36**: 27 (1825).

≡ *Oligosporus emarginatus* Gaudich., Ann. Sci. Nat. **5**: 104, t. 3-IV (1825).

Type: Lectotype selected here: [Falkland Islands], Malouinas, Gaudichaud s.n. (P). – Isolectotypes: P.

Note. In the Paris herbarium (P) there are three sheets of this species with the collector name Gaudichaud. One of these specimens has also the original plate (t. 3-IV) attached. All of these are most probably syntypes and belong to the same original collection. In reference to Article 8.1 in the Code, one herbarium sheet is the type of a name of a species, and, thus, lectotypification is here necessary. The specimen holding the illustration is here selected as lectotype. Another specimen found in Leiden, collected by D'Urville in 1821 and belonging to the earliest collections was not cited by Gaudichaud (1825).

Outer floret lobation has caused confusion in this species. First, Gaudichaud

(1825) described the forets as 4-lobed but it is uncertain as to which florets he considered. Second, when the species was transferred to *Abrotanella* by CASSINI (1825), the central florets were described as 4–5-lobed. I as other authors (e.g., SKOTTSBERG 1913, MOORE 1983), found only 4-lobed central florets and thus consider the notion of 5-lobed florets as erroneous.

The species epithet *emerginata* refers to the notched leaf apex, which is characteristic for the species.

Herbs forming compact cushions. Leaves erect, oblong, 2–5× 1.0–1.5 mm; margins glabrous, scariose, especially towards the retuse apex; petiole a true sheath. Capitula sessile, sunken among the leaves; peduncle not elongated in fruit. Phyllaries 5, oblong-elliptic, obtuse, 2.0–2.5 mm long. Outer florets 3–5, tubular, 3–4-lobed, pale green, 1.2–1.5 mm long; vascular tissue absent. Central florets 2–3 (-6), functionally male, purple but soon turning brown, 1.8–2.2 mm long; vascular tissue marginal; anthers 0.7–0.9 mm long, shortly tailed. Cypsela obovoid-ellipsoid, ribbed, glabrous, 1.0–1.3 mm long; apex rimmed; cypsela of central florets rudimentary, < 0.2 mm long. 2n = 18 (MOORE 1983). Fig. 3 A.

Distribution and habitat. Southernmost South America and Falkland Islands (Fig. 4) *Abrotanella emarginata* is the most widespread species of the genus in South America. It grows in moist, open habitats, such as Magellanic moorland, from 100 m s.m. in the far south to alpine cushion heath at 1000 m s.m. in the north. Although the most northern records are from several mountains in Torres del Paine, Chile, there are so far no records at the same latitude west of the huge Patagonian icecap. *Abrotanella emarginata* is solitary or, more frequently, forms large compact cushions up to one metre in diameter in association with *Bolax gummifera* (LAM.) SPRENGEL, but sometimes also with species of *Azorella* LAM. Flowering season is from October to December. Florets wither fast, turning brown, and may persist in the capitula for several months.

Selected specimens. Argentina – Santa Cruz: Estancia Las Viscachas, Güer Aike, Ensenada de Riques, 50° 45′ S, 72° 12′ W, 31 Jan. 1977, ARROYO, BOELCKE, GOMEZ, & MOORE, TBPA 2709 (BAB); Estancia Stag River, Güer Aike, meseta Latorre, cerro Punta Gruesa, 51° 30 S, 72° 05′ W, 25 Jan. 1978, ROIG & al. TBPA 2936 (HIP, SI); Güer Aike, 51° 34′ S, 72° 01′ W, 750 m s.m., 15 Feb. 1978, BOELCKE, CORREA, & CRESPO TBPA 3232 (BAB, HIP). **Tierra del Fuego**: Bahía Aguirre, east slope of Monte Lucio López, 54° 55′ S, 66° 00′ W, 450–600 m s.m., 15 Feb. 1968, MOORE 1858 (LP); Bahía Thelis, south side of Monte Spion Kop, 54° 34′ S, 67° 67′ W, 8 Feb. 1971, GOODALL 3352 (BAB); Canal Beagle, Feb. 1922, SKOTTSBERG & GUSINDE 56 (GB); Estancia Moat, mountain at head of Río Chico, 54° 53′ S, 66° 53′ W, 700 m s.m., 26 Jan. 1968, MOORE 1628 (K) and 1650 (LP); Estancia Río Ewan – Atumeyanuah, along roadside between road and fence on a flat plain, 11 Dec. 1974, GOODALL 4874 (BAB, GH, HIP); Estancia Sarmiento, foothills north of Sierra Beauvoir, 17 Dec. 1972, GOODALL 4383 (A, CHR); Glaciar Martial, valley south of the glacier, 15 km NNW of Ushuaia, 54° 47′ S, 68° 23′ W, 740 m s.m., 4 Jan. 1994, SWENSON & MARTINSSON 318 (BAB, S, UPS); Lago Fagnano, north side, Aserradero Vidal, Cerro Atukoyak, 54° 28′ S, 67° 37′ W, 900 m s.m., 17 Jan. 1968, MOORE 1574 (K, LP) – south side, Monte Henhuepeu, 54° 34′ S, 67° 07′ W, 7 Jan. 1972, MOORE 2834 (BAB, LP); Mt Wood, slopes of, 600–800 m s.m., 13 Feb. 1971, GOODALL 3503 (BAB, SI); Paso Garibaldi, on Ruta 3, between Ushuaia and Lago Fagnano, 54° 42′ S, 67° 55′ W, 23 Jan. 1967, GOODALL 619 (CHR, LP, P, US); Peninsula at Ushuaia, 8 Mar. 1902, SKOTTSBERG 92 (LD); Río Varela, west side, and old trail across mountain from Estancia Harberton, 54° 46′ S, 67° 24′ W, 500–600 m s.m., 17 Feb. 1968, MOORE 1921 (LP); Sand bank of Río Grande,

south of Tropezon, 23 Feb. 1969, GOODALL 2113 (US). **Isla de los Estados**: Bahía Capitán Cánepa, 54° 50′ S, 64° 30′ W, 3 Nov. 1971, DUDLEY, GOODALL & CROW 1327 (HIP, SI); Bahía San Antonia, Puerto Hoppner, 54° 47′ S, 64° 26′ W, 9 Nov. 1971, DUDLEY, GOODALL & CROW 1657 (BAB); Puerto Basil Hall, 420 m s.m., 22 Oct. 1971, DUDLEY, GOODALL & CROW 745 (BAB); Puerto San Juan, 54° 47′ S, 67° 50′ W, 31 Dec. 1933, CASTELLANOS 12987 (BA, GB), – 31 Dec. 1933, CABRERA 12987 (LP); Puerto Vancouver, 54° 49′ S, 64° 05′ W, 4 Dec. 1967, NICORA, CRESPO & ANCIBOR 7343 (SI).

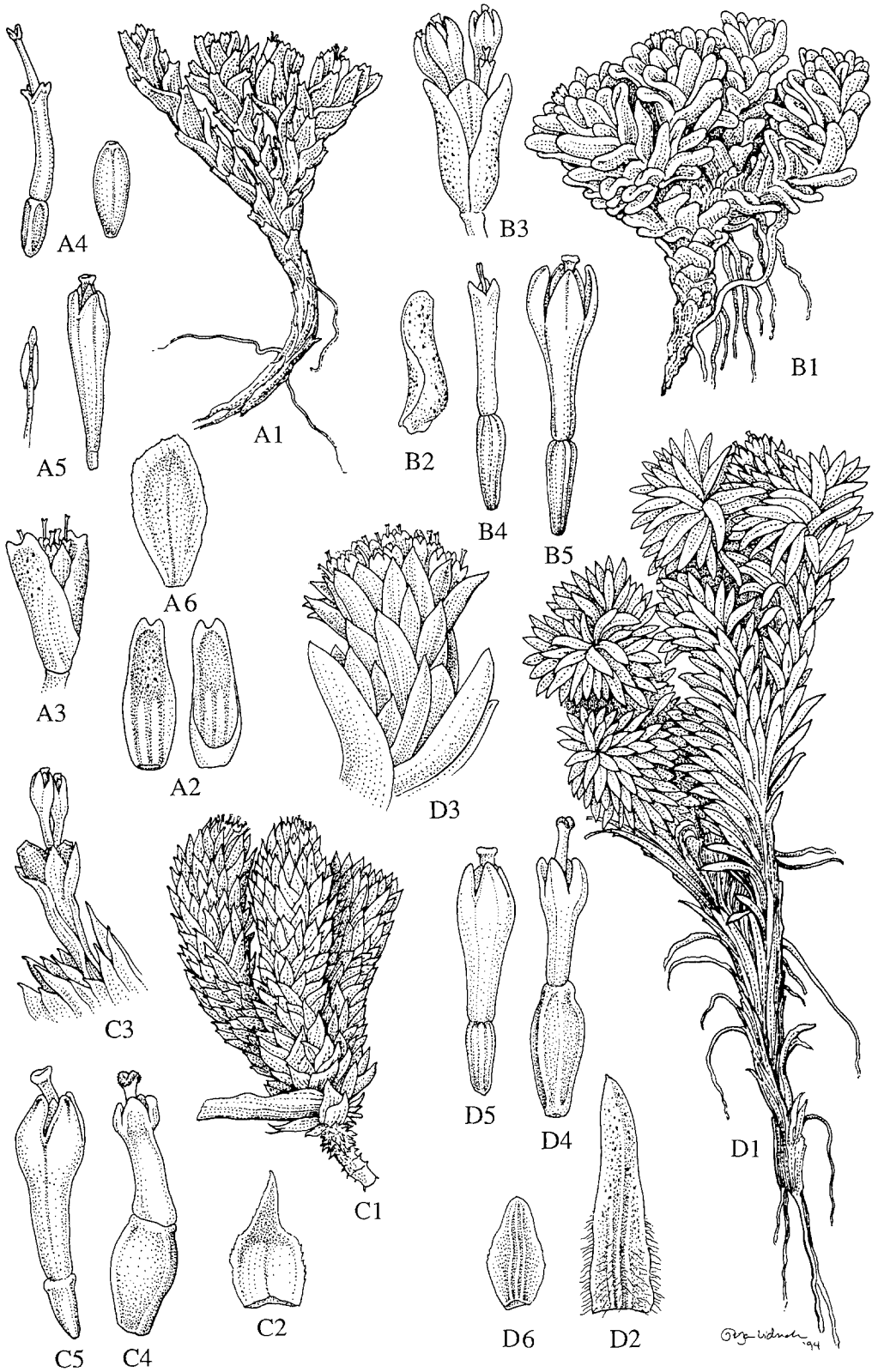
Chile – Antartica: Isla Deceit, 55° 53′ S, 67° 10′ W, 19 Nov. 1982, PISANO 5654 (GH, HIP); Isla Hermite, 55° 59′ S, 67° 30′ W, St. Martin's Cove, 200 m s.m., 13 Jan. 1959, GODLEY 1024 (CHR, K); – Antarctic Expedition 1839–43, HOOKER s.n. (GH, K, P); Isla Hornos, 55° 59′ S, 67° 15′ W, 15 Nov. 1981, PISANO 5237 (GH, HIP); Isla Hoste, Orange Bay, Hardy Peninsula, 120 m s.m., 12 Jan. 1959, GODLEY 987 (CHR, K); Isla Navarino, mountain above Senio Grandi, 365 m s.m., 7 Jan. 1959, KNOX 1177 (CHR, K), – Tableland above Puerto Williams, 54° 58′ S, 67° 38′ W, 660 m s.m., 28 Dec. 1993, SWENSON & MARTINSSON 309 (HIP, S, UPS); Isla Wollaston, 55° 44′ S, 67°19′ W, 300 m s.m., 16 Jan. 1980, DOLLENZ 717 (HIP). **Magallanes**: Cerro de Canchas de Ski, Punta Arenas, 53° 07′ S, 71° 03′ W, 400–550 m s.m., 3 Feb. 1962, RICARDI & MATTHEI 324 (CONC); Cerro Mirador, Reserva Forestal Magallanes, Peninsula Brunswick, 53° 10′ S, 71° 01′ W, 29 Dec. 1971, PISANO 3368 (CONC, GH, HIP); Isla Riesco, Fiordo Funny, 750 m s.m., 2 May 1982, DOLLENZ 1221 (HIP); Los Tres Morros, Reserva Parrillar, Peninsula Brunswick, 53° 22′ S, 71° 17′ W, 640 m s.m., 18 Dec. 1993, SWENSON & MARTINSSON 302 (HIP, S, UPS). **Tierra del Fuego**: Almirentasgo, Rio Azopardo, 54° 29′ S, 68° 55′ W, 3 Mar. 1908, SKOTTSBERG s.n. (UPS); Altos de Boqueron, 2 km SE of Río del Oro, 53° 16′ S, 69° 55′ W, 15 Dec. 1971, MOORE & GOODALL 185 (BAB, K, UPS); Cordón Pirámide, valley above Yendegaia airfield, 54° 48′ S, 68° 53′ W, 600 m s.m., 30 Mar. 1971, GOODALL 3841 (BAB); Estancia Vicuña, hill behind settlement, 54° 07′ S, 68° 46′ W, 250 m s.m., 11 Mar. 1968, MOORE 2182 (LP); on road to Bahía Inútil, 25 km from Porvenir, 53° 17′ S, 70° 11′ W, 15 Dec. 1971, MOORE & GOODALL 140 (BAB, HIP). **Ultima Esperanza**: Parque Nacional Torres del Paine, Cerro Agudo, 50° 47′ S, 73° 05′ W, 900 m s.m., 15–17 Jan. 1987, ARROYO & SQUEO 870100 (CONC), – Cerro Daudet, 50° 47′ S, 73° 05′ W, 800 m s.m., 18 Jan. 1987, ARROYO & SQUEO 870129 (CONC), – Cerro Diente, 50° 47′ S, 72° 57′ W, 950 m s.m., 21 Dec. 1985, ARROYO & SQUEO 850873 (CONC), – 900 m s.m., 25 Jan. 1987, ARROYO & SQUEO 870185 (CONC), – Cerro Donoso, Rió de las Chinas, 50° 44′ S, 72° 31′ W, 700 m s.m., 9–11 Feb. 1987, ARROYO, VELOSO & PEÑALOZA 870302 (CONC), – Cerro Ferrier, north-east slope, 51° 07′ S, 73° 10′ W, 750 m s.m., 9 Jan. 1994, SWENSON & MARTINSSON 325 (HIP, S, UPS); Peninsula Roca, Seno Resi, 51° 51′ S, 73° 02′ W, 750 m s.m., 27 Feb. 1978, PISANO, TBPA 2940 (BAB, HIP).

Falkland Islands – East Falkland: Fitzroy, Apr. 1949, SLADEN JB 108/4 (BM); Mt Tumbledown, 51° 40′ S, 59° 05′ W, W of Port Stanley, 8 Jan. 1964, MOORE 512 (LP, K); Mt Usbourne, summit area, 705 m s.m., 51° 40′ S, 59° 25′ S, 18 Jan. 1964, MOORE 606 (K); Port Harriet, 31 Oct. 1907, SKOTTSBERG 9 (GB, HIP, LD, UPS); Stanley, 51° 40′ S, 59° 00′ W, 29 Jan. 1948, HAMILTON JH 49 (BM). **West Falkland**: Roy Cove, summit area of Sharp Peak, 13 Feb. 1964, MOORE 856 (P).

2. *Abrotanella diemii* CABRERA, Bol. Soc. Argent. Bot. **11**: 275 (1969).

Type: Holotype: Argentina, Prov. Neuquén, filo entre ríos Colorado y Bravo, Puerto Blest, [40° 57′ S, 71° 38′ W], 1600 m s.m., 22. III. 1946, DIEM 956 (LP). – Isotype: SI.

Note. Outer floret lobation was erroneously described as 2-lobed in the protologue by CABRERA (1969). The material I have seen, as well as the depicted floret


A4
A1
B3
B1
A5
B2
B4
B5
A6
A3
D3
A2
C3
C1
D5
D4
D1
C2
C5
C4
D6
D2

in Flora Patagonia (CABRERA 1971), has 3 lobes. The species is named in honour of JOSÉ DIEM who has, through his collections, contributed much to the knowledge of the wild flora in the Nahuel Huapí region.

Herbs forming cushions up to 8 cm in diameter; base slightly wood. Leaves erectopatent, oblong, obtuse, 4–7× 1.5 mm; margins glabrous, not scariose. Capitula sessile, sunken among the leaves; peduncle not elongated in fruit. Phyllaries 5–6, elliptic, obtuse, 2.5–2.7 mm long; margins entire, scariose towards the base. Outer florets 2–3, tubular, 3-lobed, 2.0 mm long. Central florets 3–4, functionally male, 2.5 mm long; anthers c. 1.0 mm long. Cypsela obovoid, ribbed, minutely papillose, c. 1.8 mm long; apex rimmed. Fig. 3 B.

Distribution and habitat. Mountain(s) in southwestern Argentina (Fig. 4). This endemic, cushion-forming plant, which is closely allied to *Abrotanella emarginata*, is known only from one collection. The locality, a ridge some 10 km north of Puerto Blest in Nahuel Huapí National Park, is surrounded by impassable Valdivian rain forest and very steep mountains. I have, during fieldwork 1994, unsuccessfully searched for the species on the ridge immediately south-east of the type locality, i.e., south of Cerro Tres Lagunas. No information on ecology was given by CABRERA (1969) but the ridges, at an elevation of 1600 m s.m., are very windy, dry, and often with weathered rocks. The type possesses both flowers and fruits.

3. *Abrotanella forsteroides* (HOOK. f.) BENTH., Fl. Austral. **3**: 554 (1866).

≡ *Scleroleima forsteroides* HOOK. f., London J. Bot. **5**: 444, t. 14 (1846).

Type: Lectotype selected here: Australia, Tasmania, J. D. H., Antract. Exp., 1839–1843 (K). – Isolectotypes: GH, P, UPS.

Note. In the protologue, several collectors were cited by HOOKER (i.e., R. BROWN, R. C. GUNN, and J. D. HOOKER). Two specimens of BROWN's (BM, K) and GUNN's (K, HO) collections have been identified, respectively. GUNN's collection was cited as number 443 in Flora Tasmaniae (HOOKER 1860); it is possibly, but not necessarily, the collection cited in the protologue. There is, however, another unnumbered collection made by GUNN. HOOKER's own collection, cited as J. D. H., has duplicates in several herbaria. All specimens mentioned above, with some ambiguity for GUNN's collections, could be considered as syntypes. None of these, however, is in a fertile stage except HOOKER's specimen in UPS and BROWN's in BM, though they have only fruiting stages with detached cypselas. There is plenty of material on HOOKER's specimen in GH. Since no potential specimen is better than any other, in terms of quality, HOOKER's specimen in Kew is selected as lectotype. The justification for this choice is that most of HOOKER's type material is deposited at Kew with many distributed duplicates.

Fig. 3. *A Abrotanella emarginata* (SWENSON & MARTINSSON 309); *B A. diemii* (DIEM 956); *C A. forsteroides* (SIMPSON 8016, *C*3 from SMITH 281); *D A. inconspicua* (GIVEN 72925). *A*1–*D*1 Habit; *A*2–*D*2 leaves (*A*2 left abaxial view; right, adaxial view); *A*3, *D*3 capitula among upper leaves, *B*3 capitula, *C*3 cup-forming capitula in fruiting stage; *A*4–*D*4 outer florets with mature cypselas (*A*4 right); *A*5–*D*5 central florets with reduced or empty cypselas (*A*5 at left, anther with short sterile tails); *A*6, *D*6 phyllaries. Scales: *A*1–*D*1 (× 2); *A*2–*D*2, *A*3–*D*3, *D*6 (× 6); *A*4–*D*4, *A*5–*D*5, *A*6 (× 11)

The species was also mentioned in HOOKER's (1864) Handbook of the New Zealand Flora. In the flora, HOOKER briefly discussed the taxonomic position of *Scleroleima, Ceratella,* and *Trineuron* and their affinities to *Abrotanella*. He included *Ceratella, Trineuron*, but *Scleroleima* was never recombined. Two years later, BENTHAM (1866) transferred *Scleroleima* to *Abrotanella*.

In HOOKER's (1846) protologue it is mentioned how similar in appearance his new species is to *Forstera uliginosa* (J. R. FORST. & G. FORST.) HOMBR. & JACQ. from Cape Horn. This is the only indication by the author from where the epithet is derived. I deduce from this that the plant was named after the genus *Forstera*. In BENTHAM's (1866) Flora Australiensis the epithet was misspelled as *forsterioides,* an error which has then appeared for a long time in the literature.

Erect herbs with sparingly branched stems to an even height, forming compact cushions. Leaves erect, persistent, oblong and tapering towards the acuminate, hyaline apex, 3–5 × 1.0–1.5 mm; margins glabrous, dentate. Capitula at anthesis sessile among the uppermost leaves; peduncle without bracts, somewhat elongated in fruit. Phyllaries 3–5, elliptic, obtuse-acute, c. 1 mm long, forming a hard cup at the fruiting stage; nerve absent. Outer florets 1–3, narrowly cyathiform, 4-lobed, greenish to yellowish, c. 2 mm long; vascular tissue marginal. Central florets 1–3, functionally male, coloured as outer florets but often with a brownish patch on inner surface of lobe, 2.2–2.5 mm long; vascular tissue marginal, sometimes also central at apex; anthers c. 1 mm long. Cypsela obovoid, 4-angled, ribbed, glabrous, 1.5–1.8 mm long, exerted from the phyllary cup; apex rimmed. 2n = 36 (BEUZENBERG & HAIR 1984). Fig. 3 C.

Distribution and habitat. Endemic to the mountains of Tasmania – Australia, at an altitude of 1000–1550 m s.m. (Fig. 7). It is one of five Tasmanian cushion plants, forming dense cushions, sometimes up to several metres in diameter. It is fairly common (CURTIS 1969) to summit moors, screes, and wet places such as below snowbanks. Flowers in October to early January but when the soil moisture is low, the florets quickly wither and turn brown.

Selected specimens. Australia – Tasmania: ARCHER s.n. (GH, HO, K, L, P, S); 1802–5, BROWN 2134 (BM, K); GUNN s.n. (F, GH, L, P, UPS, US); 1849, HOOKER 2058 (K); Ben Lomond National Park, 41° 33′ S, 147° 40′ E, Hamilton Crags 1.5 km east of Legges Tor, 1550 m s.m., 23 Jan. 1989, DAVIES 1182 (MEL), – Jan. 1979, KIRKPATRICK s.n. (HO), – Land of Little Sticks, 26 Mar. 1983, NOBLE 28526 (HO); Cradle Mts National Park, 1 km SE of Kitchen Hut, 41° 41′ S, 145° 57′ E, 1250 m s.m., 28 Dec. 1994, SWENSON & MARTINSSON 338 (CHR, HO, S, UPS) and 340 (HO, S, UPS); Lake Mackenzie, north end of Great Western Tiers, 41° 41′ S, 146° 23′ E, 24 Oct. 1979, CURTIS s.n. (HO); Moonlight Ridge, Hill one, 43° 27′ S, 146° 46′ E, 1000 m s.m., 31 Jan. 1983, SHORT 1876 (MEL); Mt Ben Lomond, 41° 34′ S, 147° 40′ E, c. 1500 m s.m., 20 Jan. 1878, ? s.n. (MEL); Mt Field National Park, 42° 40′ S, 146° 30′ E, 22 Jan. 1949, BURBIDGE 3288 (K), – West, 4 Nov. 1929, COMBER 1558 (K), – East, 1160 m s.m., 23 Jan. 1944, CURTIS s.n. (HO), – Near summit, 1430 m s.m., 2 Feb. 1969, JELFORD s.n. (A, L), – 1060 m s.m., Jan. 1915, GIBBS 6579 (BM, K, L), – East, MUELLER 18 (P), – Near stream at Lake Dobson, 42° 45′ S, 146° 35′ E, 1000 m s.m., 6 Jan. 1978, SMITH 281 (HO), – 1060 m s.m., Oct. 1913, SUTTON 2677 (K), – Newdegate Pass, 1250 m s.m., 25 Dec. 1994, SWENSON & MARTINSSON 335 (CHR, HO, S, UPS), – Along track to Mt Field, 1200 m s.m., 28 Jan. 1960, THORNE & CAROLIN 26674 (CHR); Mt Sarah Jane, southeast base, 43° 00′ S, 146° 29′ E, 6 Jan. 1987, BRUHL & PROBER 633 (CANB); Mt Wellington 42° 54′ S, 147° 14′ E, 31 Jan. 1840, GUNN 443 (K, HO), – 27 Jan. 1968, HEMSLEY 6521 (A, K), – 25 Jan. 1948, LEVRING s.n. (GB), – 1200 m s.m. Jan.

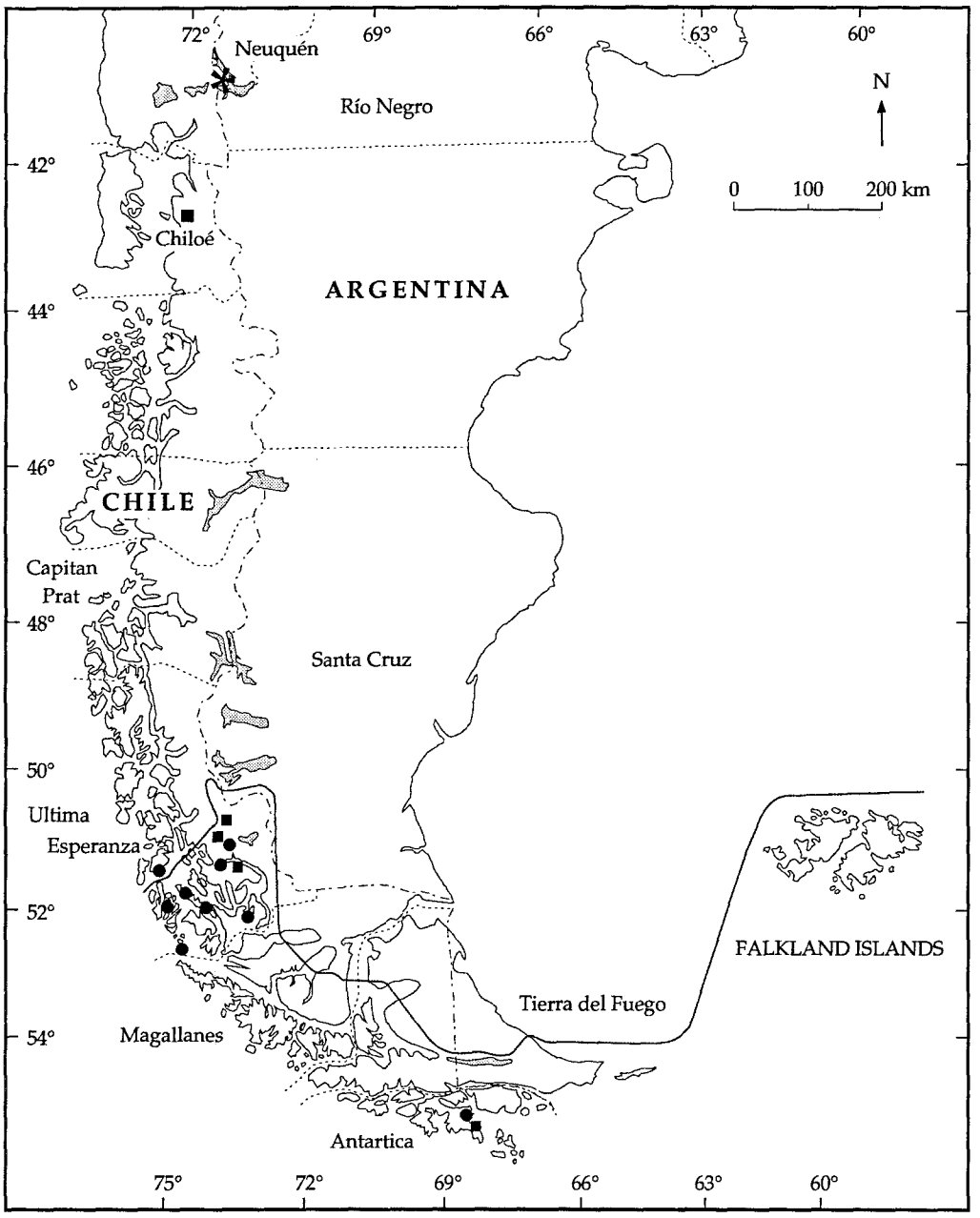


Fig. 4. Distributions of *Abrotanella diemii* (*), *A. emarginata* (south of the line), *A. purpurea* (■), and *A. submarginata* (●).

1869, Mueller s.n. (L, MEL, P), – 1268 m s.m., 7 Jun. 1926, Rodway s.n. (BM), – 15 Nov. 1929, Rodway s.n. (HO), – 1270 m s.m., 1 Jan. 1977, Simpson 8016 (CHR), – 1250 m s.m., 24 Dec. 1994, Swenson & Martinsson 334 (HO, S, UPS), – 1200 m s.m., 5 Dec. 1973, Van Steenis 23290 (L); Ouse River, Little Split Rock, 41° 49′ S, 146° 31′ E, 1190 m s.m., 2 Mar. 1984, Moscal 6714 (HO); Second Bar Lake, 0.5 km NW of Lake, 41° 47′ S, 146° 31′ E, 1215 m s.m., 12 Mar. 1984, Moscal 6949 (HO).

4. *Abrotanella inconspicua* HOOK. f., Handb. New Zealand Fl., p. 140 (1864).

Type: Lectotype selected here: New Zealand, [South Island], Otago, Mt Alta, [44° 30′ S, 168° 59′ E], 6000 ft, soft patches, 1863 (K). – Isolectotypes: CHR, WELT.

Note. This species was described with the citation "forming soft patches on Mount Alta, elev. 6000 ft., HECTOR & BUCHANAN". This description is not found on one sheet but is applicable to at least three or possibly four separate mounted specimens. The first specimen, in Kew, reads "soft patches, Otago, Mt Alta, 1863", but is without collectors name. The second specimen, in WELT, reads "Mount Alta, 6000 ft., BUCHANAN". The third specimen, in CHR, is most probably a snippet of the latter but lacks altitudinal notation. The fourth collection, possibly cited in the protologue as "HECTOR", was sent by Dr. HECTOR to someone else in Feb. 1882 and reads "*Cotula cryptoflora* BUCH., Black Peak, Otago, 5000 ft". On the sheet a letter is attached, in which a description of the plant is written. The letter is not signed but begins "*Cotula cryptoflora* BUCH." and ends with "Collected by A. MACKAY on Black Peak Range, Otago, at 6000 feet altitude on swampy ground". The name *Cotula cryptoflora* has never been published legitimately.

Without doubt, all specimens belong to the same taxon. There is no conflict between the protologue and the three first mentioned specimens. These belong most plausibly to the same collection and constitute syntypes. Several comments on the fourth sheet, such as "Black Peak" and "5000 ft", do not correspond to the protologue and it must therefore be rejected as a plausible syntype. Moreover, much of HOOKER's type material is placed in Kew, and this justifies my lectotypification.

HOOKER (1864) was obviously unimpressed by the size of the species, though it is one of the largest in the genus, when he described it as a "very inconspicuous moss-like herb" to which he applied the specific epithet "*inconspicua*".

Herbs forming low, soft patches or cushions. Leaves ± needle-like, erectopatent, linear, 5–7 (-13) × 1 mm; apex apiculate; margins hairy towards the base. Capitula subsessile among the leaves; peduncle without bracts, not elongated in fruit. Phyllaries 12, linear-oblong, obtuse, 3 translucent ducts, 3 mm long. Outer florets c. 10, cyathiform, 4-lobed, white, often with purple lobes, 1.7–1.8 mm long; vascular tissue central. Central florets 8–16, functionally male, white, 2.0–2.4 mm long; vascular tissue central; anthers c. 1 mm long. Cypsela obovoid-ellipsoid, ribbed, glabrous, 2 mm long; apex rimmed. 2n = 18 (BEUZENBERG & HAIR 1984). Fig. 3 D.

Distribution and habitat. South Island – New Zealand (Fig. 9 A). A common, cushion-forming species restricted to moist soils, exposed ridges, and cushion communities, often just below snowbanks on the high southern mountains in Otago and Southland at an altitude of 1200–2000 m s.m. Blooms from the late November – January depending on the altitude and the yearly retreat of snowbanks. Fruits are recorded in January.

Collections. New Zealand – South Island: Otago: Black Peak, 1800–2400 m s.m., HECTOR s.n. (AK, GH, K, LD, MEL), – Black Peak Range, 1500 m s.m., MACKAY s.n. (K); Coronet Peak, NE of summit, 44° 55′ S, 168° 44′ E, 1525 m s.m., 18 Feb. 1966, GIVEN s.n. (CHR); Dunstan Mts, 45° 04′ S, 169° 21′ E, 26 Nov. 1968, CONNER s.n. (CHR), – Near Leaning Rock, 5 Mar. 1950, MCNEUR s.n. (CHR), – 1200–1500 m s.m., Nov. 1889, PETRIE s.n. (CHR, WELT); Mt Cardrona, 44° 53′ S, 169° 01′ E, 1800 m s.m., Jan. 1923, WALL s.n.

(WELT); Mt Pisa, 44° 52′ S, 169° 11′ E, 1500–1800 m s.m., Nov. 1968, CONNER s.n. (CHR), – PETRIE s.n. (CHR, WELT), – Nov. 26, WALL s.n. (CHR), – 15 Jan. 1950, ZOTOV s.n. (CHR); Old Man Range, 65 km N of Dunstan Mts, 45° 25′ S, 170° 10′ E, 29 Oct. 1969, RITCHIE s.n. (CHR), – 8 Feb. 1973, VAN STEENIS 22679, 22714 (L), – Clutha Valley, PETRIE s.n. (WELT); Remarkables Skifields, 12 km west of Queenstown, 45° 02′ S, 168° 48′ E, 1550 m s.m., 9 Jan. 1995, SWENSON & MARTINSSON 345 (AK, CHR, K, S, UPS). **Southland**: Eyre Mts, 45° 18′ S, 168° 20′ E, ridge near peak NE of Eyre-Von Saddle, 1584 m s.m., 21 Nov. 1989, GARNOCK-JONES 1907 (CHR), – Ridge from hut in upper Mataura to summit, 1500 m s.m., 21 Nov. 1972, GIVEN 72925 (CHR); Garvie Mts, 45° 25′ S, 168° 55′ E, 1800 m s.m., 11 Jan. 1934, HEINE s.n. (WELT); Mid Dome, 1350 m s.m., 9 Feb. 1961, CONNER s.n. (CHR), – 22 Nov. 1988, RANCE s.n. (CHR), – 45° 35′ S, 168° 32′ E, just below summit, 1400 m s.m., 7 Jan. 1995, SWENSON 343 (AK, CHR, K, S, UPS); Mt Dick, Lake Wakatipu, 1370 m s.m., Jan. 1962, PRICKETT s.n. (CHR).

5. *Abrotanella rosulata* (HOOK. f.) HOOK. f., Handb. New Zealand Fl., p. 139 (1864).

≡ *Ceratella rosulata* HOOK. f., Fl. Antarct. **1**: 25, t. 18 (1844).

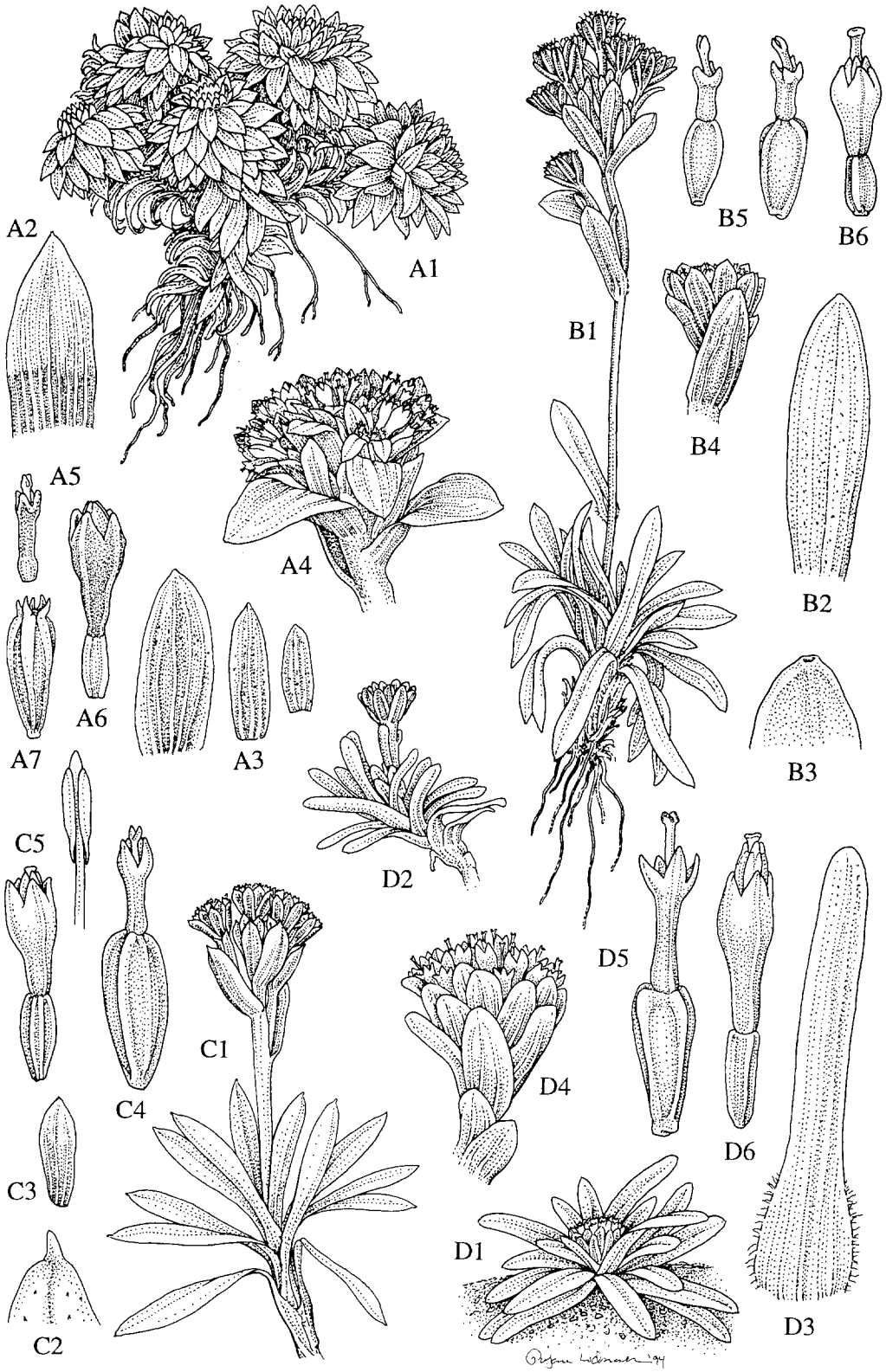
Type: Lectotype selected here: New Zealand, Campbell's Island; On hills 1200 ft, HOOKER 1606 (K). – Isolectotypes: BM, GH, L, MEL, P, UPS.

Note. HOOKER described this species in his Flora Antarctica 1844, with a note describing the distribution; "Campbell's Island; in crevices of rocks at the tops of the mountains, at elevation of 1400 ft; very sparingly." Among the specimens from the Antarctic Expedition (1839–1843) very little of this text is noted on the same sheet. Notations are as follows: "J. D. H., Campbell's Island, Antarct. Exp. 1839–1843" (BM); "Campbell's Island, Fl. Ant." (GH); "on hills, 1200 ft." in Kew (K) a specimen that also holds some drawings; "J. D. Hooker s.n." (L); "on hills" (P); "Campbell's Island, HOOK. f." (MEL, UPS). It is clear that all of these sheets are from the Antarctic Expedition, most plausibly one collection, and are thus all syntypes. For reasons similar to *Abrotanella forsteroides* and *A. caespitosa*, the Kew specimen (K) has been chosen as lectotype.

The central florets in this species were stated by HOOKER (1844), as well as depicted, to be 3 to 4-lobed. Any 3-lobed corolla, however, has not been seen in the material studied.

Abrotanella rosulata is closely allied to *A. spathulata* and *A. scapigera* from which it differs by having sessile capitula, ovate leaves, and differently coloured florets. HOOKER's (1844) name *Ceratella, cerato* of Greek origin meaning horn, alludes to the small horns on the cypselas.

Densely caespitose or cushion-forming herbs. Leaves spreading, stellately arranged, oblong-ovate, conspicuously striate nerved, flat, (2-) 4–8 × 1.5–2.5 mm; apex acute-apiculate; margins glabrous. Capitula subsessile in the rossette, 3–6; peduncle rarely elongated in fruit; bracts dimorphic, 1–3, the lower leaf-like, the upper phyllary-like. Phyllaries 7–11, linear-oblong, acute, with 3 translucent ducts, ± 3 mm long. Outer florets c. 8, (3-) 4-lobed, tubular or narrowly cyathiform, white but soon turning brown when withering, 1 mm long; vascular tissue absent. Central florets 2–4, functionally male, purple, 1.5–2.0 mm long; vascular tissue central; anthers ± 0.7 mm long. Cypsela obovoid, somewhat 4-angled,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distinctly ribbed, minutely papillose, 1.5–2.0 mm long; ribs protruding into small horns at apex. 2n = 18 (Beuzenberg & Hair 1984). Fig. 5 A.

Distribution and habitat. Endemic to Campbell and Auckland Islands – New Zealand (Fig. 6). Cushions among rocks and crevices, from 170 to 400 m s.m., This species is found mainly on Campbell Island but a few specimens have been found on Auckland Island, too. These specimens are slightly aberrant in having an elongated scape, but they do possess typical horned cypselas. Anthesis is from January until fruiting in March.

Selected specimens. New Zealand – Auckland Island, 50° 35′ S, 166° 00′ E, Feb. 1945, Findlay s.n. (CHR), – Jan. 1890, Kirk s.n. (WELT). **Campbell Island,** 52° 30′ S, 169° 05′ E, Hooker s.n. (K, P), – 15 Jan. 1890, Kirk s.n. (CHR, WELT), – 1943, Sorensen s.n. (CHR); Col Ridge, near St Col Peak, 215–275 m s.m., 24 Mar. 1970, Meurk s.n. (CHR); Eboule Peak, south ridge and summit above western cliffs, 100–300 m s.m., 13 Jan. 1976, Given 9383 (CHR); Lyall Ridge, 170 m s.m., 17 Dec. 1946, Brockie s.n. (CHR, WELT), – 4. 1. 1945, Oliver s.n. (CHR); Mt Agimuth, 10 Jan. 1947, Sorensen s.n. (WELT); Mt Honey, summit area, 540 m s.m., 15 Jan. 1976, Given 9214 (CHR); Perseverance Harbour, saddle between Mt Lyall and Col Peak, 1 Apr. 1927, Du Rietz 2357 (GB, S); St. Col Peak, 300 m s.m., 1. 3. 1946, Sorensen s.n. (CHR).

6. *Abrotanella spathulata* (Hook. f.) Hook. f., Handb. New Zealand Fl., p. 139 (1864).

≡ *Trineuron spathulatum* Hook. f., Fl. Antract. **1**: 23, t. 17 (1844).

Type: Lectotype selected here: New Zealand, Auckland's Group; On soft earth at the top of the hills at the head of Rendezvous Harbour, Dec. 1840 (K). – Isolectotypes: BM, GH, L, P, UPS.

Note. This species is one among several that was discovered during the Antarctic Voyage (1839–1842), described as *Trineuron spathulatum* (Hooker 1844) and later transferred to *Abrotanella* (Hooker 1864). In the original description, both Auckland and Campbell Island are cited as localities. Specimens from these islands are syntypes. The expedition reached the Auckland Islands on 20 November 1840, remained here until 13 December until continuing on to Campbell Island (Cheeseman 1925). Most of the labels bear neither collector nor number but are annotated as "Antarc. Exp., Auckland Islands" or "Campbell Island", and assumed to be collected by Hooker himself. As the Auckland Islands were visited first, the material from this locality has been chosen as lectotype.

Abrotanella spathulata is closely allied to *A. rosulata*, from which it differs in having a stem, pedunculate capitula, and oblanceolate leaves; it differs from *A. scapigera* by its obtuse leaf apex and purple florets.

Fig. 5. *A Abrotanella rosulata* (Given 9383, *A*7 from Sorensen s.n.); *B A. spathulata* (Sorensen s.n.); *C A. scapigera* (Simpson 8192, *B*4–5 from Burbidge 3355); *D A. nivigena* (Sterling 47, *D*2 from Adair 1004). *A*1–*D*1 Habit; *D*2 habit in fruiting stage; *A*2–*B*2, *D*3 leaves; *B*3, *C*2 leaf apex; *A*3 two types of leaf-like bracts (left) and phyllary (right); *C*3 phyllary; *A*4–*B*4, *D*4 capitula among leaf-like bracts; *A*5–*B*5, *C*4, *D*5 outer florets with mature cypselas (except *A*5); *A*6–*B*6, *C*5, *D*6 central florets with reduced and empty cypselas (*C*5 at left, anther with long sterile tails); *A*7 cypsela. Scales: *A*1–*D*1, *D*2 (× 1.5); *A*2–*B*2, *A*3, *C*3–*D*3 (× 6); *A*4–*B*4, *D*4 (× 4); *B*3, *C*2, *A*5–*D*5, *C*4, *A*6–*B*6, *D*6, *A*7 (× 11); *C*5 anther (× 17)

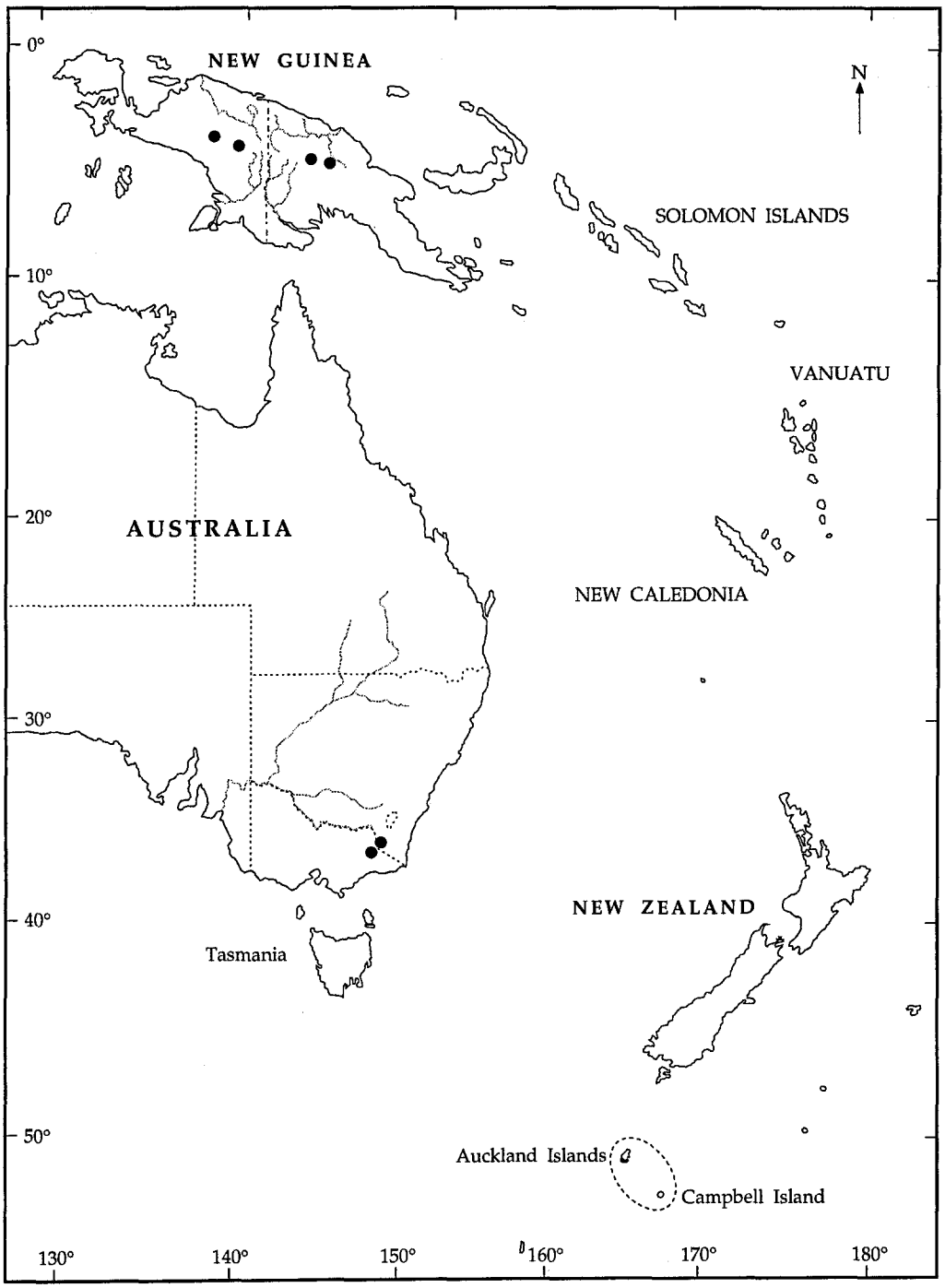


Fig. 6. Map showing the distribution of *Abrotanella nivigena* (●), and of *A. rosulata and A. spathulata* confined to Auckland and Campbell Islands (dashed circles). Note that the distribution areas of other species confined to Tasmania and New Zealand are shown in Figs. 7 and 9

Originally the generic name *Trineuron* was presumably chosen to draw attention to the three "nerves" in the phyllaries and cypselas. The epithet *spathulata* describes the shape of the leaves, although oblanceolate would be more appropriate.

Caespitose plants, often creeping, up to 5 (-10) cm tall. Leaves spreading to erectopatent, oblanceolate, with a conspicuous mid-rib, keeled, 10–20 × 1.5–3.5 mm; apex obtuse; margins glabrous or sparingly hairy. Capitula 2–8, corymbosely arranged, on a branched, sparsely pubescent, few-leaved stem, pedunculate; peduncle elongated in fruit; bracts dimorphic, 2–3 (-4), the lower leaf-like, the upper phyllary-like. Phyllaries 8–11, oblong, obtuse-acute, with 3 translucent ducts, ± 3 mm long. Outer florets 8–12, tubular or narrowly cyathiform, 3–4-lobed, purple or rarely with a white tube and purple lobes, 1 mm long; vascular tissue absent. Central florets 3–5, functionally male, purple, 1.5 mm long; vascular tissue central; anthers ± 0.8 mm long. Cypsela obovoid, often lightly flattened, distinctly ribbed, minutely papillose, 1.5–2.0 mm long; apex smooth, obtuse. 2n = 18 (Beuzenberg & Hair 1984). Fig. 5 B.

Distribution and habitat. Endemic to Campbell and Auckland Islands – New Zealand (Fig. 6). Grasslands and moist, boggy soils, from sea-level to 450 m s.m. but less common below 150 m s.m. (Cheeseman 1925). Flowering season is between December and February, when fruits start to mature, but central florets may persist longer.

Abrotanella spathulata has been reported from the South Island, New Zealand, but all such reports seem to be erroneous. Several of these collections were studied by Allan (1961) and he considered them all as belonging to other taxa.

Selected specimens. New Zealand – Auckland Island, 50° 35′ S, 166° 00′ E, Jan. 1890, Kirk s.n. (WELT); Carnley Harbour, 12 Jan. 1890, Kirk s.n. (CHR, WELT), – 150–240 m s.m., 28 Dec. 1943, Dawbin s.n. (CHR); Clody Peak, 460 m s.m., 28 Dec. 1962, Godley 1529 (CHR); Hooker Hills, Feb. 1945, Findlay 49682 (CHR); Mt Eden, 420 m s.m., 28 Dec. 1962, Godley 1380 (CHR); Tops behind Chambres, 450 m s.m., 1941–45, Wenham s.n. (CHR). **Campbell Island**, 52° 30′ S, 169° 05′ E, 12 Jan. 1909, Aston s.n. (AK, WELT), – Buchanan s.n. (WELT), – Antarctic Expedition, 1839–1843, Hooker 1446 (K); Agimuth-Courjolles Ridge, 9 Feb. 1946, Sorensen s.n. (CHR); Beeman Hill, Feb. 1945, Findlay 49738 (CHR); Col Ridge, near St Col Peak, 215–245 m s.m., 24 Mar. 1970, Meurk s.n. (CHR); Lyall Ridge, 17 Dec. 1946, Brockie s.n. (WELT), – 2 Apr. 1927, Oliver s.n. (WELT); Mt Honey, summit area, 540 m s.m., 15 Jan. 1976, Given 9201 (CHR); Mt Lyall, Moubray Hill, near point where ridge turns southeast towards Moubray, 300–350 m s.m., 22 Dec. 1975, Given 9281 (CHR, K); Perseverance Harbour, between Mt Lyall and Tucker Cove, 1 Apr. 1927, Du Rietz 2562: 1 (GB, S, UPS); St Col Peak, 27 Feb. 1947, Brockie s.n. (CHR), – Immediately southwest of summit on ridge leading to sea, 0.5 km from fence line, 200–240 m s.m., 21 Jan. 1976, Given 9294 (CHR), – Slopes of, 3 Feb. 1946, Sorensen s.n. (CHR); Tucker Cove Valley, 11 Dec. 1946, Brockie s.n. (CHR, WELT), 13 Feb. 1947 (Welt), – 22 Mar. 1947, Sorensen s.n. (WELT).

7. *Abrotanella scapigera* (F. Muell.) Benth., Fl. Austral. **3**: 553 (1866).

≡ *Trineuron scapigerum* F. Muell., Hooker's J. Bot. Kew Gard. Misc. **9**: 301 (1857).

Type: Lectotype selected here: Australia, Tasmania, Mount La Perouse [43° 30′ S, 146° 45′ E], Stuart s.n. (K).

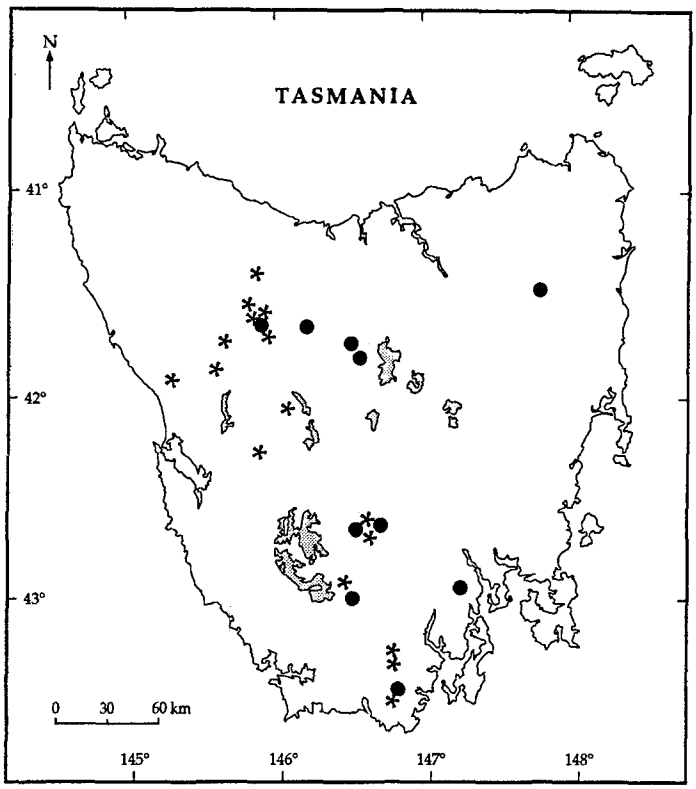


Fig. 7. Distribution of *Abrotanella forsteroides* (●) and *A. scapigera* (*)

Note. Only two sheets of syntypes, in K and MEL, respectively, have been found of *Abrotanella scapigera*. In the protologue, published in England, MUELLER (1857) stated the habit and collector as: "In monte La Perouse Tasmaniea astro-occidentalis, STUART". This collection is one specimen held at Kew. In those days, the usual practice was to publish results both in Europe and Australia. Thus, MUELLER (1858) published a second description in Australia, where in the habit and collector were stated as; "... Mr. CHARLES STUART, who succeeded last season in forcing his way into the wilderness of Mount Lapérouse [sic] ... With the two preceding plants, discovered by C. STUART and A. OLDFIELD". The type sheet in Kew comprises both these collections from Mt La Perouse but the type sheet in Melbourne holds only the collection made by A. OLDFIELD. Both collections are in the same floral stage but OLDFIELD's is much more plentiful. HOOKER (1860), describes the species for a third time.

FERDINAND MUELLER was the Director of the Herbarium in Melbourne for 50 years and most of his types are placed there. Considering this, OLDFIELD's collection seems to be a suitable lectotype. However, since OLDFIELD's collection was not cited in the protologue, STUART's collection is chosen as lectotype.

Abrotanella scapigera is closely allied to *A. rosulata* and especially to *A. spathulata*, two species lacking the vascular tissue in the outer florets and having purple central florets instead of white. *Abrotanella scapigera* also differs from *A. spathulata* by having apiculate leaves and in the development of a flowering stem from *A. rosulata*. In the description MUELLER wrote "caule scapiformi" in italics,

drawing the attention to the almost leafless flowering stem, an unusual character for *Abrotanella*, after which the specific epithet was given.

Loosely caespitose plants, often creeping, up to 10 cm tall. Leaves spreading to erectopatent, oblanceolate, with a conspicuous mid-rib, keeled, often sparingly hairy, 6–20 (-35) × 1.5–3.0 (-4.0) mm; apex apiculate; margins glabrous or sparingly hairy. Capitula 2–10, corymbosely arranged, on a branched sparsely pubescent, few-leaved stem, pedunculate; peduncle elongated in fruit; bracts dimorphic, 2–3 (-6), the lower leaf-like, the upper phyllary-like; lateral capitula often with less florets than central. Phyllaries 8–12 (-14), linear-oblong, acute, with 3 translucent ducts, 3.0–3.5 mm long. Outer florets 8–17, cyathiform, (5-) 4-lobed, white, 1 mm long; vascular tissue central. Central florets 3–11, functionally male, (5-) 4-lobed, white, 1.5–2.0 mm long; vascular tissue central; anthers ± 1.1 mm long; tails fairly long. Cypsela obovoid, often slightly flattened, distinctly ribbed, minutely papillose, 1.7–2.2 mm long; apex smooth, obtuse. 2n = 18 (Beuzenberg & Hair 1984). Fig. 5 C.

Distribution and habitat. Endemic to the Tasmanian mountains – Australia (Fig. 7). Occasional in moist, low alpine grasslands, amongst cushion plants, sometimes in shelter of low shrubs, from 950–1400 m s.m. In flower from middle of December to February.

Collections. Australia – Tasmania: Black Bluff, 41° 27′ S, 145° 58′ E, Jan. 1909, Sutton 1790 (K, MEL); Frenchmans Cap, summit, West-east District, 42° 16′ S, 145° 49′ E, 1443 m s.m., 8 Jan. 1981, Buchanan 473 (HO); Moonlight Ridge, Southwest District, 43° 28′ S, 146° 45′ E, 950 m s.m., 22 Mar. 1984, Buchanan 3058 (HO); Cradle Mts National Park, 41° 40′ S, 145° 57′ E, Pencile Pine Creek, Cradle Valley, 15 Dec. 1926, Lindon s.n. (HO), – Top of ridge west of Lake Dove, 1310 m s.m., 25 Feb. 1970, Raven 25992 (CHR), – Western edge of Crater Lake, 1240 m s.m., 19 Jan. 1983, Short 1775 (MEL), – Near Kitchen Hut, 10 Jan. 1977, Simpson 8192 (CHR), – Top of ridge west of Lake Dove, 1300 m s.m., 28 Dec. 1994, Swenson & Martinsson 337 (HO, K, S, UPS); Lake Pedder National Park, summit area of Mt Eliza, 42° 57′ S, 146° 26′ E, 1400 m s.m., 4 Jan. 1977, Willis s.n. (MEL); Lake St Clair, 42° 05′ S, 146° 10′ E, 1220 m s.m., Th. & B. Gulliver s.n. (MEL); Mt Field National Park, 42° 40′ S, 146° 33′ E, 21 Dec. 1972, Rakowsky s.n. (HO), – Newdegate Pass, 1280 m s.m., 6 Feb. 1977, Dobson 77129 (CHR), – Newdegate Pass, north side, 1280 m s.m., 12 Mar. 1990, Jackson s.n. (HO), – Summit of Mt Field West plateau, 1 Mar. 1970, Raven 26054 (CHR), – Naturalist Peak, 15 Feb. 1989, Short 3427, Griffen, Looker & Walsh (MEL), – Plateau between Mt Field West and Naturalist Peak, 1390 m s.m., 14 Jan. 1978, Smith 406 (HO), – Tarn 500 m west of K Col Hut, 1200 m s.m., 25 Dec. 1994, Swenson & Martinsson 336 (HO, S, UPS); Mt Hartz National Park, Hartz Saddle, 43° 15′ S, 146° 46′ E, 11 Feb. 1980, Morris 8053 (HO), – 1050 m s.m., 30 Dec. 1994, Swenson & Martinsson 339 (HO, S, UPS); Mt Inglis, Central Highland District, 41° 43′ S, 145° 53′ E, 1120 m s.m., 25 Feb. 1983, Moscal 1921, 1958 (HO); Mt La Pérose, Hill one, 980 m s.m., 31 Jan. 1983, Forbes 1338 (MEL), – Oldfield s.n.(K, MEL), –? s.n. (MEL); Mt Read, Central Highland District, 41° 51′ S, 145° 32′ E, 3 Jan. 1968, Curtis s.n. (HO, K), – West, southwest slope, 5 Jan. 1972, Lambert 809 (K); Mt Rufus, valley running down toward Mt Huegel, 42° 08′ S, 146° 05′ E, 25 Jan. 1949, Burbidge 3355 (CANB, K); Mt Zeehan, 41° 55′ S, 145° 20′ E, 1894, Fitzgerald s.n. (MEL); North ridge of The Calf, 43° 21′ S, 146° 48′ E, 980 m s.m., 3 Jan. 1988, Collier 3079 (HO).

8. *Abrotanella nivigena* (F. Muell.) Benth., Fl. Austral. **3**: 554 (1866).

≡ *Trineuron nivigenum* F. Muell., Trans. Philos. Soc. Victoria **1** : 105, t. 40 (1855).

Type: Lectotype selected here: Australia, New South Wales, snowy summits of the Munyang Mountains, Jan. 1855, MUELLER s.n. (MEL). – Isolectotypes: K, L, MEL.

= *Abrotanella papuana* S. MOORE, Trans. Linn. Soc. London, Bot. **9**: 86 (1916). – Lectotype selected by ROYEN (1983): New Guinea, Dutch New Guinea [WNG], 1912–13, Utakwa River to Mt Carstensz, 10333–12076 ft., KLOSS s.n., 31-1-12 (BM). – Isolectotype: L.

Note. The notation "5000 to 6000 ft." given in MUELLER's original description is not written on the syntype label. A more precise notation of the type locality was made by WILLIS 1946 on the sheet, where he wrote "apparently on the higher part of Kosciusko Plateau".

Abrotanella papuana was implicitly lectotypified by ROYEN (1983), where he stated "BM: holotype". Possibly, he was unaware of the duplicate (isolectotype) in the Leiden herbarium.

The Latin epithet *nivigena* is composed of *nivis* = snow and *gena* = eye, and in English it is called snow-wort.

Creeping, caespitose or mat-forming herbs. Leaves spreading-erect, linear, mid-ribbed, 7–15 × 1.0–1.5 (-2.0) mm; apex obtuse-retuse; margins hairy at base, somewhat recurved. Capitula (sub-) sessile in flower; peduncle elongating up to 2 cm in fruit, sometimes hairy; bracts ± 6, leaf-like. Phyllaries 8–14 (-16), oblong, acute-obtuse, with 1 or 3 translucent ducts, 3.0–3.5 mm long. Outer florets 7–17, cyathiform, 3–4-lobed, white or tube white and lobes purple, 1.6–1.9 mm long; vascular tissue central. Central florets 4–12, functionally male, 3–4-lobed, coloured as outer florets, 2.0–2.8 mm long; vascular tissue central; anthers 1.0–1.2 mm long. Cypsela obovoid, ± 3–4-angled, distinctly ribbed, minutely papillose, 2 mm long; apex indistinctly rimmed. Fig. 5 D.

Australian and New Guinean populations differ insignificantly in some characters. Plants from New Guinea lack the 3-lobed central florets, having fewer outer florets (< 10), and sometimes a peduncle with brownish or whitish, septate hairs. Leaf shape, as seen on herbarium material, is spreading to erectopatent on Australian plants but more erect on specimens from New Guinea.

Distribution and habitat. South-east Australia, on the highest peaks, and in the mountains of New Guinea (Fig. 6). In open, wet areas, bogs, herbfields, grasslands, and rock crevices in water spray of small falls. Grows between 1750–2100 m s.m. in Australia and between 3200–4100 m s.m. in New Guinea. It seems that the New Guinea populations are more common in bogs than plants from Australia. I have not seen this species in the field, but none of the other species I have collected have ever been found in a bog. Flowering time is between December and January in Australia but continuing through February in New Guinea. The species is rare in Australia but locally common in New Guinea.

Collections. Australia – New South Wales: Australian Alps, MUELLER s.n. (MEL); Mt Kosciusko, 36° 27′ S, 148° 16′ E, Snowy Ridge near bridge below Seaman's Hut, 1220 m s.m. II. III. 1972, ALLSRAY & TOTTERDELL 6611 (MEL), – Below Mt Stillwell, 1900 m s.m., Jan. 1958, COSTIN 0036 (CANB), – 2130 m s.m., Jan. 1899, MAIDEN & FORSYTH s.n. (MEL), – Near Chalet Kosciusko, c. 1800 m s.m., 9 Mar. 1949, SKOTTSBERG 68 (GB, S), – 2100 m s.m., 1 Jan. 1884, STERLING 47 (MEL), – 11 Feb. 1973, TOTTERDELL 368 (CANB); Munyang Mountains (apparently Kosciusko plateau), 1800–2130 m s.m., Jan. 1874, MUELLER s.n.

(MEL). **Victoria**: Big River, c. 1 mile E of Spion Kop summit, Bogong High Plains, 1740 m s.m., 3 Feb. 1949, WILLIS s.n. (MEL); Victorian alps, MULLER s.n. (P); White Rocks Creek, 1.8 km NW of Mt Nelse North, Bogong High Plains,1740 m s.m., 9 Jan. 1981, ADAIR 1004 (MEL).

New Guinea, Indonesia – Irian Jaya: Mt Oranje (Mt Trikora), 3400–3500 m s.m., 15 Feb. 1913, VERSTEEG 2491 (A, K, L); MT Trikora (Wilhelmina), northern slope, 4100 m s.m., Sep. 1938, BRASS & MEYER-DREES 10157 (A, L), – 2 km east of the top, 3700 m s.m., Sep. 1938, BRASS & MEYER-DREES 10388 (A, L), – (P62), east rim of upper Somalak valley, near landslide, 11 Aug. 1984, MANGEN 1010 (L), – below "Trikora Pass", 3750 m s.m., 15 Aug. 1984, MANGEN 1068 (L), – Somalak valley, 3750 m s.m., 23 Aug. 1983, MANGEN 827 (L), – below "False Peak", north of the summit, 3750 m s.m., 11 Aug. 1984, MANGEN 969 (L). **Papua New Guinea**: Mt Ambua, South Highland, Tari Subdistrict, 6° S, 143° E, 3520 m s.m., 29 Jul. 1966, KALKMAN (A, CANB, K, L, LAE); Kubor Range, Western Highlands, Mt Kantz, 3860 m s.m., VINK 16190 (L), – Mt Kinkain, 3620 m s.m., 4 Aug. 1963, VINK 16273 (A, CANB, K, L, LAE, US), – Summit Mt Kinkain, 3730 m s.m., 16 Jul. 1963, VINK 16106 (L, LAE), – Mt Sigal Mugal, summit area, 5° 59′ S, 144° 28′ E, 30 Sep. 1972, SMITH 15581 (CANB).

9. *Abrotanella linearis* BERGGR., Minn. Fysiog. Sällsk. Lund **8**: 14, t. 3,fig. 28–38 (1878).

Type: Lectotype selected here: Novae Zelandiae, [South Island, Westland], In monte Kelley's Hill alpinum [42° 46′ S, 171° 34′ E], Martio 1874, BERGGREN s.n. (LD). – Isolectotypes: K, S, WELT (not seen).

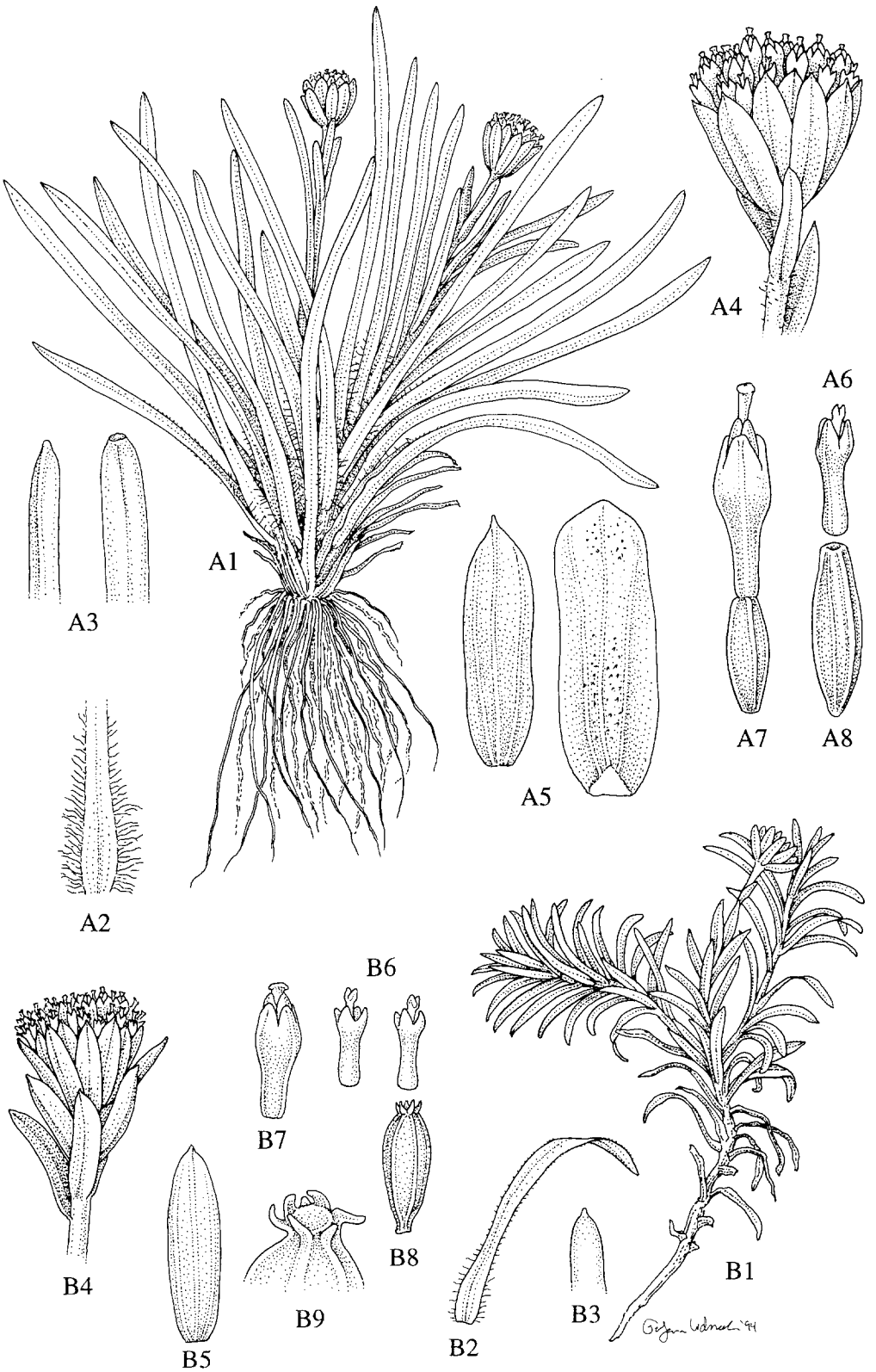
= *Abrotanella filiformis* PETRIE, Trans. Proc. New Zealand Inst. **47:** 51 (1915). – Lectoytpye selected here: New Zealand, Stewart Island, Wet puddles at head of Paterson's inlet, 1876, PETRIE s.n. (WELT). – Isolectotype AK.

= *Abrotanella linearis* var. *apiculata* SIMPSON & THOMSON, Trans. Proc. New Zealand Inst. **73**: 170 (1943). – Lectotype selected here: New Zealand, sources of the Freeman River, 1000–1200 m s.m, SIMPSON & THOMSON s.n. (CHR). – Isolectotype: CHR.

Note. The syntypes of *Abrotanella linearis* in Kew (K) and, according to ALLAN (1961), in Wellington (WELT) read "... February 1874" which should be compared to "... Martio 1874" written on the syntypes in Lund (LD) and Stockholm (S). Some text on the labels is printed but the locality and months are in BERGGREN's handwriting. The written text is almost identical except for some minor details, which show that the labels were written on two separate occasions. It could be questioned whether these sheets are of the same collection. All specimens seen, however, are very similar and at the same ontogenetic stage (late fruiting). Moreover, a list of the BERGGREN's localities compiled by R. SANTESSON (pers. comm.) shows that BERGGREN visited Kelly's Hill on 6–8 of March 1874. I am convinced therefore that the specimens belong to one original collection and that the "February" annotation is erroneous.

Concerning the syntypes of *Abrotanella filiformis* two sheets have been found. Type material of PETRIE, when available, is housed in Wellington (WELT), and therefore chosen as lectotype.

The type material of *Abrotanella linearis* var. *apiculata* was lodged at the Herbarium of Plant Research Bureau, Wellington. This herbarium is today a part of Landcare Research, Christchurch (P. GARNOCK-JONES, pers. comm.).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B9

Plants loosely caespitose, often creeping; stems slender, sparsely hairy, up to 12 cm tall. Leaves spreading-erect, linear, with a prominent mid-rib, (10-) 15–80 × 0.5–2.0 mm; apex retuse, obtuse or apiculate; margins most often hairy from base to half of their length. Capitula 1 (-3), pedunculate; peduncle glabrous or hairy, elongated in fruit; bracts 2–6 leaf-like. Pyllaries (8-) 10–14 (-19), oblong, acute-obtuse, with 3 translucent ducts. Outer florets 10–15, cyathiform, 4-lobed, white, 1.5–1.7 mm long; vascular tissue central or rudimentary. Central florets 8–16, functionally male, white, 2 mm long; vascular tissue central; anthers 1.0–1.2 mm long. Cypsela ellipsoid, straight or slightly curved, ribbed, glabrous, 1.5–2.5 mm long; apex rimmed or minutely beaked. 2n = 18 (Beuzenberg & Hair 1984). Fig. 8 A.

Traditionally this species is treated as two taxa, namely *Abrotanella linearis* and *A. filiformis*. Simpson & Thomson (1943) described *A. linearis* var. *apiculata*, with a vague locality description, from Fiordland, South Island. The type locality was identified by Wilson (1987) as: New Zealand, South Island, Fiordland, Fowler Pass above the South Fiord of Lake Te Anau. Several authors have drawn the attention to these plants and the morphological variation (Cheeseman 1925, Allan 1961, Wilson 1987). The types of all three taxa were studied by Wilson (1987) and he concluded that *A. linearis* var. *apiculata* is synonymous with *A. filiformis*, distinct from *A. linearis*, and restricted to Stewart Island and Fiordland. He also assumed that these two species meet in this area. To separate the two species, an obtuse versus a mucronate leaf apex was suggested as diagnostic character by Wilson (1987). Other supposedly distinguishing characters from the literature are: plants ± hairy, leaves 3–7 cm long, scape 1–10 cm long, phyllaries 7–14 and subacute, and flowers exceeding the phyllaries in *A. linearis* versus plants glabrous, leaves 0.8–1.2 cm long, scape 0.5–1.2 cm long, phyllaries 8–10 and obtuse-subacute, and few flowers not exceeding the phyllaries in *A. filiformis*. As Allan (1961) pointed out, there is a rather diverse series of specimens determined as *A. filiformis* in the herbaria. I believe that all the material, both from South Island and Stewart Island, belongs to a very variable taxon showing variation in several traits from the north to the south of its distribution. Although plants from Stewart Island have a more or less mucronate leaf apex, specimens from this morphocline often show polymorphism in all the characters mentioned above, especially in leaf apices. In the far north of South Island, province of Nelson, there are extreme specimens with leaves up to 8 cm long and 2 mm wide, subacute leaf apices, acute phyllaries, and hairy leaf margins and stem. In the province of Southland, some specimens are much smaller, about 2 cm high, slender and less hairy in all vegetative parts, with leaves about 1–2 cm long, < 1 mm wide, a ± apiculate leaf apex, obtuse-subacute phyllaries, and fewer florets in the capitula. Furthermore, characters typical for *A. filiformis*, such as florets few in the capitula and not extending

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Fig. 8. *A Abrotanella linearis* (Rowley s.n., *A*8 from Heine s.n.); *B A. pusilla* (Petrie s.n. *B*4–5 from Melville & al. 5519). *A*1–*B*1 Habit: *A*2 base of leaf with hairy margins; *B*2 leaf; *A*3–*B*3 leaf apex; *A*4–*B*4 capitula with leaf-like bracts; *A*5 acute (left) and obtuse phyllary (right, from Druce s.n.); *B*5 phyllary; *A*6–*B*6 outer florets; *A*7–*B*7 central florets; *A*8–*B*8 mature cypselas; *B*9 cypsela apex. Scales: *A*1–*B*1 (× 2); *A*2–*B*2 ; *A*3–*B*3; *A*4–*B*4 (× 6); *A*5–*B*5; *A*7–*B*7; *A*8–*B*8 (× 11); *B*9 (× 40)

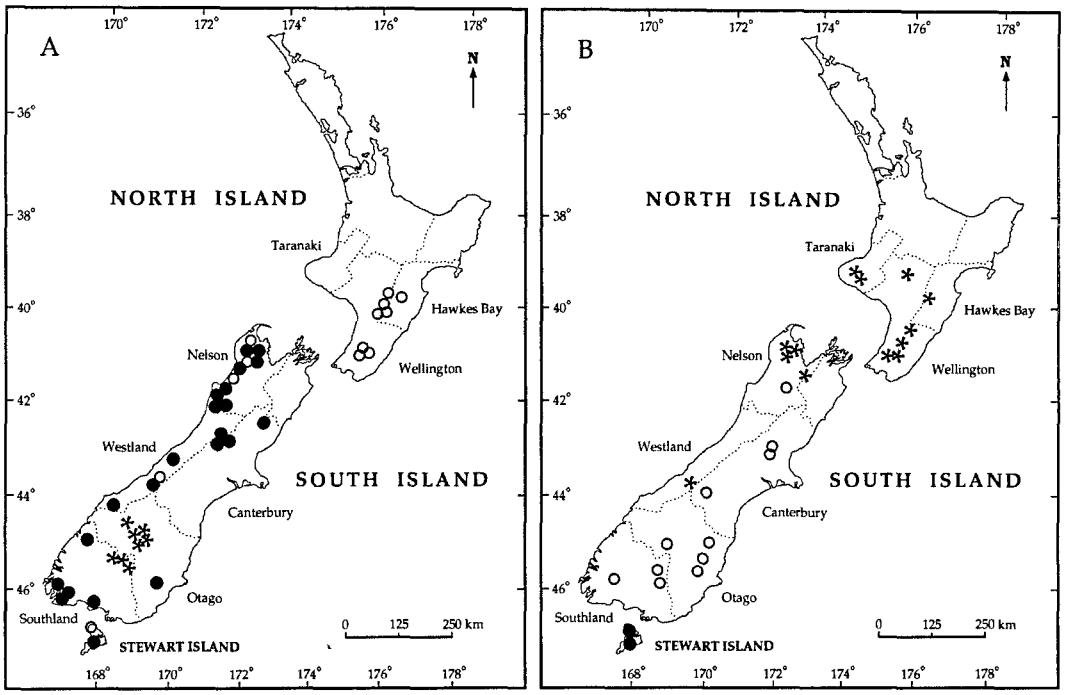


Fig. 9. Distribution of *Abrotanella* in New Zealand. *A Abrotanella inconspicua* (*), *A. linearis* (●), and *A. pusilla* (○). *B Abrotanella caespitosa* (○), *A. fertilis* (*), and *A. muscosa* (●)

above the 8–10 phyllaries, are fairly common in young capitula of traditional *A. linearis* just beginning to flower. Since it is impossible to separate the two species on a consistent morphological basis, only one taxon is recognized here. Finally, to understand the infraspecific taxa, if any, and the variation, a more thoroughly study based on biosystematics is needed.

Distribution and habitat. South and Steward Islands – New Zealand (Fig. 9 A). A fairly common species on subalpine forest floors of *Nothofagus*, alpine moist grasslands, seepage areas, and among rocks, at an altitude of 700–1400 m s.m. on South Island and 250–670 m s.m. on Stewart Island. Occasionally it can be found in lower altitude, especially along floodplains. CHEESEMAN (1925) reported it at sea level on Stewart Island but this is doubtful since no such collection has been seen. It flowers from December to February on South Island. Flowering specimens on Stewart Island have been recorded as early as September.

Selected specimens. New Zealand – South Island: Mt Arthur, BUCHANAN s.n. (WELT), – 1160 m s.m., 28 Dec. 1933, HEINE s.n. (WELT), – below 1200 m s.m., Mar. 1879, MACKAY s.n. (WELT). **Canterbury**: Arthur's Pass National Park, 42° 54′ S, 171° 36′ E, 1200 m s.m., Jan. 1880, CHEESEMAN 5/80 (AK, K), – Twin Creeks, 1220 m s.m., Jan. 1928, LAING s.n. (CHR), – Temple Basin, 1220 m s.m., 25 Feb. 1970, MARK s.n. (CHR); Mt Rolleston, 42° 55′ S, 171° 31′ E, 1240 m s.m., 5 Jan. 1897, COCKAYNE 600 (WELT), – 1200 m s.m., Feb. 1937, LOTHIAN s.n. (GH, K); Mt Technical, 42° 25′ S, 172° 21′ E, SIMPSON s.n. (CHR). **Nelson**: Arthur's Range, track between Flora Saddle and Arthur's Hut, 41° 12′ S, 172° 42′ E, 1300 m s.m., 19 Jan. 1995, SWENSON & MARTINSSON 349 (AK, CHR, K, S, UPS); Cedar Creek near Denniston, 41° 44′ S, 171° 48′ E, 11 Feb. 1913, PETRIE s.n. (WELT); Garibaldi Ridge, 41° 10′ S, 172° 15′ E, 1200 m s.m., Mar. 1980, DRUCE s.n.

(CHR); Glasgow Range, 3.5 km south of Mt Glasgow, southern slope, 41° 37′ S, 172° 04′ E, 1150 m s.m., 17 Jan. 1995, SWENSON 347 (AK, CHR, S, UPS); Gouland Downs, NW Nelson, 40° 54′ S, 172° 20′ E, 700 m s.m., Jan. 1969, DRUCE s.n. (CHR); Herbert Range, Kakapo Saddle, 41° 22′ S, 172° 21′ E, 945 m s.m., 15 Oct. 1959, MCNABB s.n. (CHR); Mt Arthur Plateau, 41° 13′ S, 172° 41′ E, CHEESEMAN s.n. (K, WELT), – bush near Balloon Hut, GIBBS s.n. (CHR); Mt Augustus, 41° 41′ S, 171° 51′ E, 11 Dec. 1912, MORGAN s.n. (WELT); Mt Stormy, 41° 15′ S, 172° 07′ E, eastern side, 1000 m s.m., 17 Jan. 1985, MCLENNAN s.n. (CHR); Mt Wise near Reefton, 42° 05′ S, 171° 40′ E, 1300 m s.m., 8 Dec. 1950, ARDLEY s.n. (WELT); Perry Saddle, 40° 54′ S, 172° 24′ E, NW Nelson, 900 m s.m., Jan. 1973, DRUCE s.n. (CHR). **Otago**: Blue Mts, 9 Jan. 1940, CRANWELL & MOORE s.n. (CHR). **Southland**: Bald Hill, Longwood Range, 46° 10′ S, 167° 50′ E, 780 m s.m., 18 Jan. 1987, RANCE (CHR); Barrier Peak, 44° 50′7 S, 167° 44′ E, between head of Stillwater River and Doon River, 915–1070 m s.m., Jan. 1970, ANDERSON s.n. (CHR); Head of Kiwi Burn, east of Preservation Inlet, 46° 08′ S, 166° 46′ E, 8 Jan. 1967, DORIZAC s.n. (CHR); Head of main NW branch of Big River, 46° 00′ S, 166° 53′ E, 700 m s.m., 9 Jan. 1967, DORIZAC s.n. (CHR); Lake Monk, Fiordland, 46° 12′ S, 167° 02′ E, 24 Jan. 1960, SIMPSON 1978 (CHR); Waitutu State Forest, floodplain of Angus Burn, 46° 14′ S, 168° 08′ E, 200 m s.m., 13 Jan. 1984, OGLE 1140 (CHR); Wet Jacket Arm, ridge crest west of Mt Pender, 45° 40′ S, 166° 51′ E, 1030–1130 m s.m., Feb. 1972, GIVEN 72451 (CHR). **Westland**: Alex Knob, 43° 25′ S, 170° 09′ E, Westland National Park, 1250 m s.m., 10 Feb. 1969, WARDLE s.n. (CHR); Arthur's Pass, 43° 37′ S, 169° 34′ E, 1060 m s.m., Jan. 1880 CHEESEMAN s.n.(WELT), – Kelly's Hill, c. 1000 m s.m., Jan. 1893, PETRIE s.n. (WELT); Lower Cascade River, 900 m s.m., 2 Jan. 1970, ROWLEY s.n. (CHR); Mt Fox, 44° 50′ S, 169° 48′ E, near Franz Josef, 1020 m s.m., 1/11 1966, KIRCHER s.n. (CHR); Mt Rajah, 42° 00′ S, 171° 35′ E, Paparoa Range, 915 m s.m., 14 Jan. 1967, MOORE & CLARKE s.n. (CHR); Mt Ranyihaipo, 1400 m s.m., Dec. 1928, ALLEN s.n. (K); Mt Rochfort, 1000 m s.m., 8 Apr. 1976, SIMPSON 7839 (CHR); Sewell Peak, Feb. 1921, WALL s.n. (CHR).

Stewart Islnad: KIRK s.n. (GH); Fraser Peak, 47° 11′ S, 167° 32′ E, 240 m s.m., Aug. 1887, KIRK 962 (K, WELT), – 24 Jan. 1887, KIRK s.n. (WELT); Mt Anglem, 46° 43′ S, 167° 55′ E, Mar. 1970, RITCHIE s.n. (CHR); Mt Rakeahua, 46° 56′ S, 167° 53′ E, 670 m s.m., 5 Jan. 1968, LEASK (WELT), – Track up to summit, 500 m s.m., 5 Jan. 1995, SWENSON & MARTINSSON 341 (CHR, S, UPS); Pegasus Sound, NOV. 1907, ASTON s.n. (WELT); Port Pegasus, Bald Cove, 240 m s.m., 21 Sep. 1969, RITCHIE s.n. (CHR); Table Hill, 47° 00′ S, 167° 52′ E, Jan. 1940, MOORE s.n. (CHR).

10. *Abrotanella pusilla* (HOOK. f.) HOOK. f., Handb. New Zealand Fl. 139 (1864).

≡ *Trineuron pusillum* HOOK. f., Fl. New Zealand **1**: 131 (1853).

Type: Lectotype selected here: New Zealand [North Island], Snowy places among the Ruahine Mountains, COLENSO 1581 (K). – Isolectotype: AK.

Note. Only two type sheets of *Abrotanella pusilla* have been found. The material found in Auckland (AK) is most probably, according to the notes on the envelope, a piece of the material in Kew. Accordingly, as discussed above, HOOKER's material in Kew is selected as lectotype.

Since COLENSO's collection, no specimens are collected until 1907 when PETRIE and ASTON climbed Mt Hector on the North Island (CHEESEMAN 1914). This species was originally named *pusillus* after its smallness.

Small, creeping plants with rooting branches, forming loose mats. Leaves loosely imbricate, linear, recurved, 4–10 × 0.5–0.7 mm, apex apiculate; margins glabrous or hairy near the base. Capitula shortly pedunculate; peduncle elongated to 2.5 cm in fruit; bracts 4–8, leaf-like. Phyllaries (10-) 12–14 (-19), linear-

oblong, acute or apiculate, with 1 or 3 translucent ducts, 2.5 mm long. Outer florets 11–19, narrowly cyathiform, (3-) 4-lobed, white, 1.0–1.5 mm long; vascular tissue absent. Central florets 3–8, functionally male, white, 1.0–1.7 mm long; vascular tissue central; anthers 0.6–0.8 mm long. Cypsela ellipsoid-obovoid, sometimes slightly flattened, glabrous, with 4–6 ribs protruding into small horns at apex, 1.0–1.8 mm long. 2n = 18 (BEUZENBERG & HAIR 1984). Fig. 8 B.

Distribution and habitat. North, South, and Stewart Islands – New Zealand (Fig. 9 A). *Abrotanella pusilla* is the only New Zealand species in the genus with a disjunct distribution, comprising all three main islands. It is not known if it is a true disjunction or if the species is overlooked. On the North Island it grows in the Ruahine and Tararua Ranges. It is fairly common to the north-western mountains of Nelson, South Island, then disappears, and reappears with a few finds in southern Westland. Recently, in 1987, WILSON reported it from Mt Anglem on Stewart Island. This specimen is in fruit and the typical horns are, as in other material from southern Nelson and Westland, poorly developed. This low, mat-forming herb grows in moist rock crevices and outcrops, herbfields, or near water such as brooks, pools, and tarns, at an altitude between 1000–1700 m s.m. The flowering season is from early December to February, fruiting from middle of January.

Collections. New Zealand – North Island: Hawkes Bay: Mangaweka, 39° 49′ S, 176° 05′ E, Ruahine Range, 1700 m s.m., Feb. 1968, DRUCE s.n. (CHR); Mokai Patea Range, 39° 50′ S, 176° 20′ E, NW Ruahine Range, 1500 m s.m., 18. Feb. 1951, MOAR 666 (CHR). **Wellington**: Field Peak, Tararua Range, 1100 m s.m., 10 Feb. 1972, DRUCE s.n. (CHR); Mt Hector, 40° 57′ S, 175° 17′ E, Tararua Range, 17 Mar. 1957, DRUCE s.n. (CHR), – 1000–1250 m s.m., 29 Jan. 1907, PETRIE s.n. (AK, WELT); Mt Holdsworth, 41° 15′ S, 175° 20′ E, Tararua Range, 12 miles NW of Masterton, 1300 m s.m., 6 Dec. 1961, MELVILLE & DRUCE 5519 (CHR, K), –? s.n. (K); Park's Peak, Ruahine Range, 1050 m s.m., 31 Jan. 1933, BACHER s.n. (WELT); Ruapai Peak, Tararua Range, 1200 m s.m., 16 Jan. 1946, ZOTOV & ROBERTS s.n. (CHR); Tararua Range, Jan. 1930, ZOTOV s.n. (US); Whanahuia Range, 39° 55′ S, 176° 05′ E, 1400 m s.m., Feb. 1946, DRUCE s.n. (CHR).

South Island: Nelson: Aorere Peak; 41° 01′ S, 172° 29′ E, 1500 m s.m., Jan. 1980, DRUCE s.n. (CHR); Herbert Range, 41° 20′ S, 172° 20′ E, Tarn Basin, 1350 m s.m., Mar. 1983, DRUCE s.n. (CHR); Glasgow Range, 3.5 km south of Mt Glasgow, southern slope, 41° 37′ S, 172° 04′ E, 1150 m s.m., 17 Jan. 1995, SWENSON 348 (AK, CHR, S, UPS); Mt Centre, Jan. 1977, DRUCE s.n. (CHR); Mt Kendall, 41° 22′ S, 172° 25′ E, 1650 m s.m., Mar. 1983, DRUCE s.n. (CHR); Mt Luna, 41° 24′ , 172° 24′ E, Arthur's Range, 1490 m s.m., Feb. 1982, DRUCE s.n. (CHR); Mt Pyramide, 41° 15′ S, 172° 23′ E, Garibaldi Ridge, 1370 m s.m., Mar. 1983, DRUCE s.n. (CHR); Mt Ranolf, 41° 06′ S, 172° 31′ E, Peel Range, Mar. 1982, DRUCE s.n., (CHR); Mt Zetland 41° 24′ S, 172° 16′ E, Allan Range, 1430 m s.m., Jan. 1981, DRUCE s.n. (CHR). **Westland**: Lake Sweeney, 43° 47′ S, 169° 23′ E, 1250 m s.m., WARDLE & CAMPBELL s.n. (CHR); Tarn basin between Waka Basin and Mt Myers, 43° 35′ S, 169° 54′ E, Copland Range, 1300 m s.m., 26 Feb. 1969, WARDLE & JOYER s.n. (CHR).

Stewart Island: Mt Anglem, 46° 44′ S, 167° 56′ E, summit ridge, 4 Feb. 1980, WILSON s.n. (CHR).

11. ***Abrotanella caespitosa*** PETRIE ex KIRK, Trans. Proc. New Zealand Inst. **24**: 420 (1892).

Type: Lectotype selected here: New Zealand, South Island, Otago, Mt Kyeburn [44° 56′ S, 170° 18′ E], 4000 ft., Dec. 1889, PETRIE s.n. (AK).

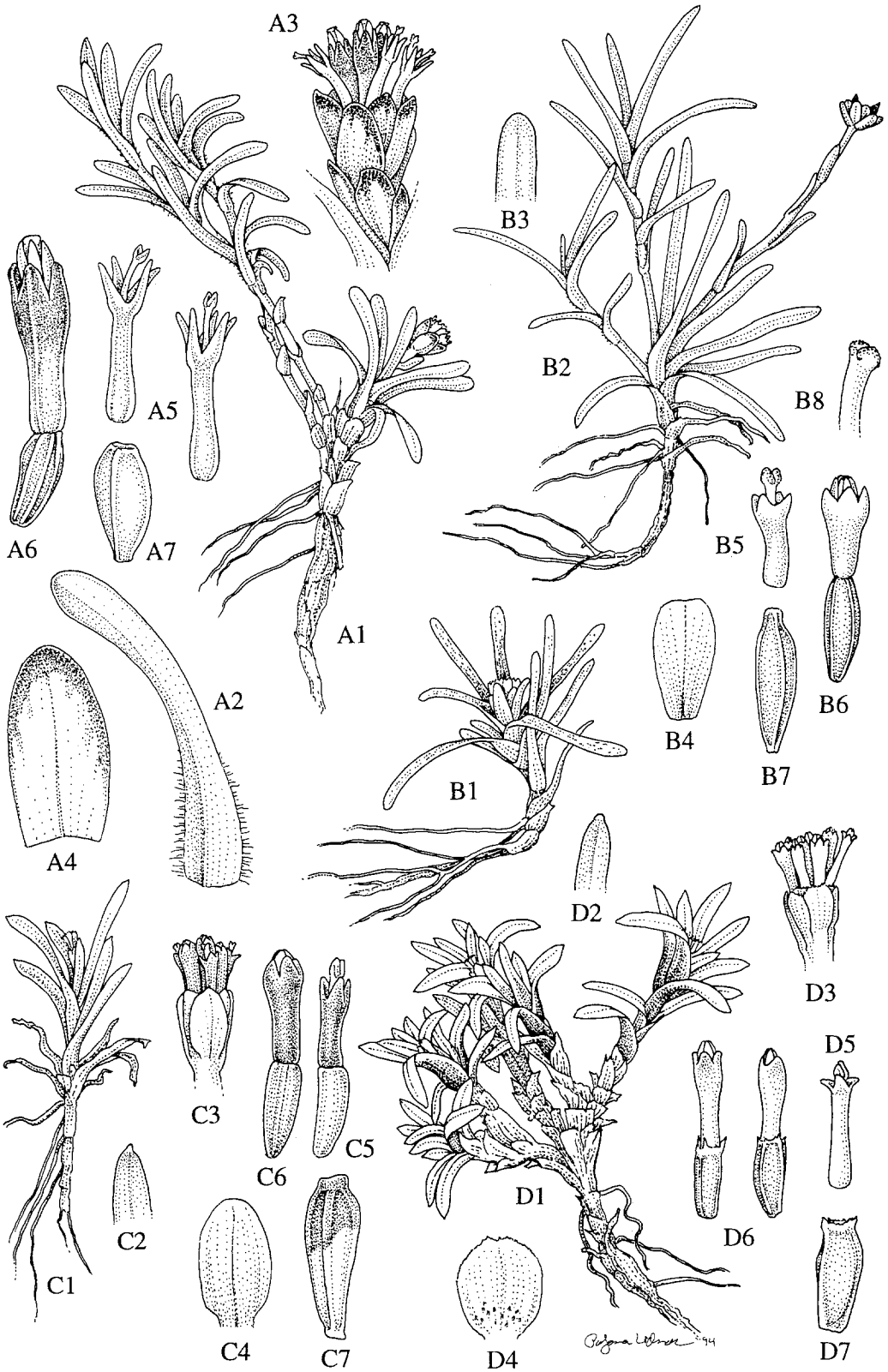
Note. There are two syntypes of this species, in AK and WELT, respectively, and both match the original description. The altitude and collecting date assigned on the labels differ to some extent, however: "4000 ft., Dec. 1889" (AK) and "3500 ft., Nov. (late) 1889" (WELT), respectively. Since the annotations differ, I do believe that the material is from two separate collections made by PETRIE. The former specimen is in a slightly better condition and the type material of KIRK is normally placed in the herbarium in Auckland. Therefore, the former collection has been selected as the lectotype.

Abrotanella caespitosa is a poorly known species. In herbaria it has been considered as a presumably new species called "Rock and Pillar". Herbarium material identified under this vernacular name falls within the variation of *A. caespitosa*. On the other hand, the name *A. caespitosa* has long been used for the habitally similar new species, *A. fertilis*, described below. *Abrotanella caespitosa* belongs to the group of species with non-fertile central florets in contrast to the hermaphroditic of *A. fertilis*. All florets have central vascular tissue in the corolla lobes, which is absent or poorly developed in the new species, and reach the lobe apex, distinctly seen as small nerves.

Low, creeping plants, forming loose to dense mats. Leaves linear, erectopatent, 7–13 × 1.0–1.3 mm; apex obtuse; margins narrowly scariose, hairy at the base. Capitula subsessile; peduncle elongated up to 1 cm in fruit; bracts 1–2, leaf-like. Phyllaries 7–10, oblong, obtuse, with 3 inconspicuous translucent ducts, 2.0–2.5 mm long. Outer florets 5–7, cyathiform, (5-) 4-lobed, white or tube white and lobes purple, 1.3–2.0 mm long; vascular tissue central. Central florets 4–5, functionally male, coloured as outer florets but soon turning brown, 1.8–2.5 mm long; vascular tissue central; anthers 1.1–1.2 mm long. Cypsela obovoid, ± terete, ribbed, glabrous, c. 1.6 mm long; apex indistinctly rimmed. Fig. 10 A.

Distribution and habitat. South Island – New Zealand (Fig. 9 B). Growing in dry to moist subalpine grasslands, herbfields, seepage areas, along water margins of small streams, and often found below snowbanks, from 1000–1550 m s.m. On drier soils it forms more higher and robust mats or cushions than on moist soils. Flowering season is, depending on the altitude and the yearly retreat of snowbanks, in December through January.

Collections. New Zealand – South Island: Mt Arthur, 1500 m s.m., Jan. 1886, CHEESEMAN s.n. (AK); MORRISON s.n. (WELT). **Canterbury**: Ben Ohau Range, Glentanner stn, 44 03°′ S, 170° 02′ E, 1000 m s.m., 11 Dec. 1967, COLLETT s.n. (CHR); Craigieburn Mts, 1500 m s.m., Jan. 1893, PETRIE s.n. (AK, WELT), – 1500 m s.m., Dec. 1918 WALL s.n. (CHR). **Nelson**: Hope Range, Buller Valley, 41° 30′ S, 172° 30′ E, 1370 m s.m., Jan. 1881, CHEESEMAN s. n. (AK). **Otago**: Mt Ida Range, 1050 m s.m., ? 759 (K); Mt Kyeburn, 44° 56′ S, 170° 18′ E, Nov, 1889 (late), PETRIE s.n. (WELT), – 1000 m s.m., PETRIE s.n. (WELT); Remarkables Skifields, 12 km west of Queenstown, 45° 02 S′, 168° 48′ E, 1500–1550 m s.m., 9 Jan. 1995, SWENSON & MARTINSSON 344 (AK, CHR, S, UPS) and 346 (AK, CHR, K, S, UPS); Rock and Pillar Range, 45° 25′ S, 170° 10′ E, 1350 m s.m., Nov. 1970, GIVEN 70504 (CHR), – 1 DEC. 1969, MACMILLAN 69/308 (CHR), – 1300 m s.m., 1:12:1969, MARK s.n. (WELT), – 1200 m s.m., Nov. 1892, PETRIE 602 (WEL). **Southland**: Hunter Mts, 45° 40′ S, 167° 25′ E, ridge to basin south of Mt Burns from Borland Saddle, 1160 m s.m., 12 Nov. 1990, MACMILLAN (90/121), FIFE & TANGNEY (CHR); Mt Whitecomb, 45° 36′ S, 169° 05′ E, Nov. 1923, SPESON s.n. (WELT); Umbrella Mountains, 45° 35′ S, 169° 05′ E, 1350 m s.m., 15 Dec. 1985, DICKSON & MARK s.n. (CHR).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12. *Abrotanella fertilis* Swenson, spec. nova.

Type: Holotype: New Zealand, South Island, Nelson, Peel Range, along track between Balloon Hut and Starvation Ridge, 41° 11′ S, 172° 37′ E, 1250 m s.m., 20 Jan. 1995, Swenson & Wedin 350 (UPS). – Isotypes: AK, CHR, K, L, S.

Note. This species resembles but is not closely allied to *Abrotanella caespitosa* (Swenson, unpubl.). It is distinguished by having retuse phyllaries, an elongating scape in fruit, fertile central florets (to which the specific epithet refers), and lack of vascular tissue in at least outer florets.

Descriptio. Herbae repentes ramificantes tegetes formates. Folia linearia effusa, 10–25× 0.7–1.7 mm, apice obtuso, margine glabro vel versus basim sparsim pubescenti. Capitula subsessilia sub anthesi, pedunculis elongatis usque ad 2 cm in statu fructificanti; bracteae 0–3, foliaceae. Phyllaria 6–8, obovata, retusa, ductibus translucidis 3, 1.5–2.0 mm longis. Flosculi exteriores 2–4, tubiformes, 3–4-lobati, flavidi-albi, 1.2–1.4 mm longi; textura vascularis absens. Flosculi centrales 7–11, perfecti, ± tubiformes, 4-lobati, concolores cum floribus exterioribus, 1.4–1.8 mm longi; textura vascularis centralis vel rudimentalis; antherae brevissimae, c. 0.6 mm longae. Cypselae ellipsoideae, costatae, glabrae, c. 2 mm longae, collo apicali parvos.

Low, creeping, branching, and mat-forming herbs. Leaves linear, spreading, 10–25 × 0.7–1.7 mm; apex obtuse; margins glabrous or sparingly hairy at the base. Capitula subsessile in flower; peduncle up to 2 cm in fruit; bracts 0–3, leaf-like. Phyllaries 6–8, obovate, retuse, with 3 translucent ducts, 1.5–2.0 mm long. Outer florets 2–4, tubular, 3–4-lobed, pale yellow to white, 1.2–1.4 mm long; vascular tissue absent. Central florets 7–11, perfect, ± tubular, 4-lobed, coloured as outer florets, 1.4–1.8 mm long; vascular tissue central or rudimentary; anthers c. 0.6 mm long. Cypsela ellipsoid, ribbed, glabrous, c. 2 mm long; apex with a minute rim. Fig. 10 B.

Distribution and habitat. North and South Islands – New Zealand. Mainly on the North Island but widely and disjunct distributed, possibly only bypassed, on the South Island (Fig. 9 B). Probably a rare or occasional species on moist, bare, sloping soils, on ridges, along brooks, and tracks in tussock grasslands. Normally between 900–1450 m s.m. but may descend to 600 m s.m. along tracks. Blooms in January to February.

Collections. New Zealand – North Island: Hawkes Bay: Ohutu Ridge, 39° 36′ S, 176° 08′ E, NW Ruahine Range, 1240 m s.m., 20 Jan. 1992, Macmillan 92/64 (CHR); SW

Fig. 10. *A Abrotanella caespitosa* (Macmillan 90/121, Fife & Tangney, *A*7 from Petrie s.n.); *B A. fertilis* (Druce s.n. *B*1 from Macmillan 92/64); *C A. linearifolia* (Swenson & Martinsson 304, *S*7 from Villagran 5658); *D A. trilobata* (Swenson & Martinsson 319, *D*7 from Swenson & Martinsson 321). *A*1–*D*1 Habit when flowering; *B*2 habit when fruiting; *A*2 leaf with a narrow scarious margins; *C*2–*D*2, *B*3 leaf apex; *A*3, *C*3–*D*3 capitula; *A*4–*D*4 phyllaries; *A*5 outer florets with central vascular tissue, 4-lobed (left) and 5-lobed (right); *B*5–*D*5 outer florets lacking vascular tissue, 4-lobed in *B*5 and *C*5, 3-lobed in *D*5; *A*6 central floret with central nervation and empty cypsela; *B*6–*D*6 central florets lacking nervation but with developing cypselas: in *D*6, 3-lobed (left) and 2-lobed (right); *A*7–*D*7 mature cypselas; *B*8 divided style of a central floret. Scales: *A*1–*D*1, *B*2 (× 2); *A*2, *C*2–*D*2, *A*3–*D*3 (× 6); *A*4–*D*4, *A*5–*D*5, *A*6–*D*6, *A*7–*D*7 (× 11), *B*8 (× 20)

of Takapari; 40° 25′ S, 175° 55′ E, South Ruahine Range, 1140 m s.m., Mar. 1970, DRUCE s.n. (CHR); Whana Huia Range, Ruahine Mts, near Rangiwahia Hut, 39° 53′ S, 176° 02′ E, 27 Jan. 1995, GARNOCK-JONES 2225 (UPS, WELTU). **Taranaki**: Mt Egmont Ranges, 39° 20′ S, 174° 05′ E, 1460 m s.m., Jan. 1887, CHEESEMAN s.n. (AK), – Pouakai Range, 1200 m s.m., 19 Feb. 1958, HAMLIN 820 (WELT). **Wellington**: Kaiparoro, 40° 42′ S, 175° 34′ E, Tararua Range, 760 m s.m., Mar. 1970, DRUCE s.n. (CHR); Mt Hector, 40° 57′ S, 175° 17′ E, Tararua Range, 17 Mar. 1957, DRUCE s.n. (CHR); – 1050–1300 m s.m., 29 Jan. 1907, PETRIE s.n. (WELT); Omega, 41° 00′ S, 175° 18′ E, Tararua Range, 1100 m s.m., Feb. 1944, DRUCE s.n. (CHR), – 1160 m s.m., Feb. 1944, DRUCE s.n. (CHR); Renata Peak, Tararua Range, 40° 59′ S, 175° 11′ E, 920 m s.m., 24 Jan. 1995, SWENSON & GARNOCK-JONES 351 (AK, CHR, S, UPS); Tongariro National Park, south-western slope of Mt Ruapehu, north of track to Blyth Hut, 500 m east of road, 39° 20′ S, 175° 30′ E, 1180 m s.m., 27 Jan. 1995, SWENSON & MARTINSSON 352 (AK, CHR, K, S, UPS).

South Island: Nelson: Flora Saddle, 44° 11′ S, 172° 44′ E, Arthur Range, 23 Feb. 1946, OLIVER s.n. (WELT); Gouland Downs, 40° 54′ S, 172° 20′ E, 600 m s.m., Jan. 1969, DRUCE s.n. (CHR); Mt Richmond, 41° 29′ S, 173° 24′ E, Jan. 1904, MCMAHON s.n. (WELT); Peel Range, 41° 07′ S, 172° 34′ E, Camp L, 1300 m s.m., Mar. 1982, DRUCE s.n. (CHR). **Westland**: West of Lake Sweeney, 43° 47′ S, 169° 25′ E, 1000 m s.m., 9 Feb. 1978, WARDLE & CAMPBELL s.n. (AK).

13. *Abrotanella linearifolia* A. GRAY. Proc. Amer. Acad. Arts **5**: 137 (1862).

Type: Lectotype selected here: [Chile, Isla Hoste, Hardy Peninsula], Orange Harbour, & c., Fuegia, U.S. South Pacific Exploring Exp. 1838–42 (GH). – Isolectotypes: P, US.

= *Abrotanella crassipes* SKOTTSB., Nat. Hist. Juan Fernandez and Easter Island **2**: 188 (1921). – Lectotype selected here: Chile, Juan Fernandez, Masafuera, Los Inocentes, 1325–1400 m s.m., 9/3 1917, CARL O. INGA SKOTTSBERG 502 (GB). – Isolectotypes: BISH (not seen), BM, K, LD, P, S, UPS, US.

= *Abrotanella moseleyi* SKOTTSB., Nat. Hist. Juan Fernandez and Easter Island **2**: 190 (1921). – Type: Lectotype selected here: [Chile, Magallanes], Challenger Expedition, Otway Harbour, Gulf of Penas, Patagonia, Jan. 1876 recd. Jun. 1876, MOSELEY s.n. (K). – Isolectotype: BM.

Note. From the United States Exploring Expedition (see GRAY 1854), three syntypes (GH, P, US) of *Abrotanella linearifolia* exist. The short original description by GRAY (1862) is based upon a collection containing two different new taxa. GRAY who did not realise this mix-up, described the cypselas in the protologue as "... cupulato truncato nunc sub-4-dentato nunc plane 4-aristulato superatis". From his protologue it is obvious that he described these taxa as one species and considered the morphological differences as variation. One syntype holds both species, the sheet held at the Smithsonian Institution (US). The material from Harvard University (GH), where many of GRAY's types are held, contains only one of the two species.

These two species, *Abrotanella linearifolia* and *A. purpurea,* differ chiefly from each other by linear-oblanceolate leaves, apiculate leaf apex, 2–5 outer florets, ± tubular central florets, and rimmed cypselas versus linear leaves, obtuse leaf apex, 3-5 outer florets, campanulate central florets, and crowned cypselas. The phyllaries were described as having 2–3 nerves. I, as did SKOTTSBERG (1921), find them to be one-nerved. Two characters given as "outer florets 2–3" and "leaf

outline linear to subspathulate" (here interpreted as oblanceolate) best suit the first of the two species discussed above. Following Article 9 in the Code, the name *Abrotanella linearifolia* is therefore attached to the species with 2–5 outer florets, linear-oblanceolate leaves, and apiculate leaf apex.

Confusion of these two species is understandable since both, as far as known, grow in close association and they are, without a close examination, very similar. The second species is here separated and described, based on another collection, as *Abrotanella purpurea*.

In 1921, SKOTTSBERG described *Abrotanella crassipes* and *A. moseleyi* without having seen the type of *A. linearifolia*. His protologue of the former species is very detailed showing fine line-drawings of phyllaries, cypselas, and florets, florets which are not present on any of the syntypes. He also pointed out that *A. crassipes* may not be confined to Masafuera of the Juan Fernandez Islands, but possibly conspecific with *A. moseleyi* from the southern Chilean archipelago. Since he never saw the type of *A. linearifolia*, SKOTTSBERG could not have been aware of the mixed identity of GRAY's species, but he was right in postulating that some of these species could be conspecific. Both species described by SKOTTSBERG have to be reduced to synonymy.

To choose a lectotype or to designate the single collection (SKOTTSBERG 502) housed where he worked (Gothenburg) as the holotype of *Abrotanella crassipes* could be questioned. Only one collection was listed in the protologue, namely SKOTTSBERG 502. Following the recommendation under Article 9A.4 in the Code, one should assume that this specimen is the holotype. All syntypes seen, however, are determined by SKOTTSBERG, and thus seen by him; therefore it is evident that he used further material of the same collection. The name therefore needs to be lectotypified and the syntype in the Botanical Museum of Gothenburg (GB) is selected.

Abrotanella linearifolia is closely allied to *A. trilobata*. The former is distinct in having 4-lobed, purple corollas, and a cypsela without a crown, whereas the latter has two-coloured, most often 3-lobed corollas, and crowned cypselas.

Low, branching herb, forming mats or small cushions. Leaves linear-oblanceolate, spreading to erectopatent, (5-) 10–15 × 0.8–1.0 mm; apex apiculate; margins glabrous. Capitula subsessile in flower, in fruit on a peduncle up to 2 cm long; bracts leaf-like or absent. Phyllaries 5–8, oblong-elliptic, obtuse-truncate, 1.5–2.0 mm long. Outer florets 2–5, tubular, 4-lobed, purple, 1.0–1.5 mm long; vascular tissue absent. Central florets 3–10, perfect, purple, 1.3–1.6 mm long; vascular tissue absent; anthers 0.6–0.8 mm long. Cypsela obovoid-ellipsoid, ribbed, glabrous, 1.5–2.5 mm long; apex rimmed. Fig. 10 C.

Distribution and habitat. Archipelago of southernmost Chile, Chiloé, and Masafuera (Juan Fernandez Islands) (Fig. 11). It often forms small cushions or lax mats in open habitats such as sloping fens, seepage areas, and alpine moors. *Abrotanella linearifolia* is recorded from sea level in the very south archipelago to 1400 m s.m. on Masafuera, sometimes found in association with *A. purpurea*. It flowers from December to February.

Collections. Chile: Senio Aguila, 31 Jul. 1972, GODLEY 806 (K). **Ciloé**: Isla Grande de Chiloé, Cordillera de Piuché, 42° 24′ S, 74° 01′ W, 500 m s.m., 13 Feb. 1984, VILLAGRÁN 5658 (CONC), – c. 800 m s.m., 1914, WERDERMANN 281 (CONC, S). **Juan Fernandez**

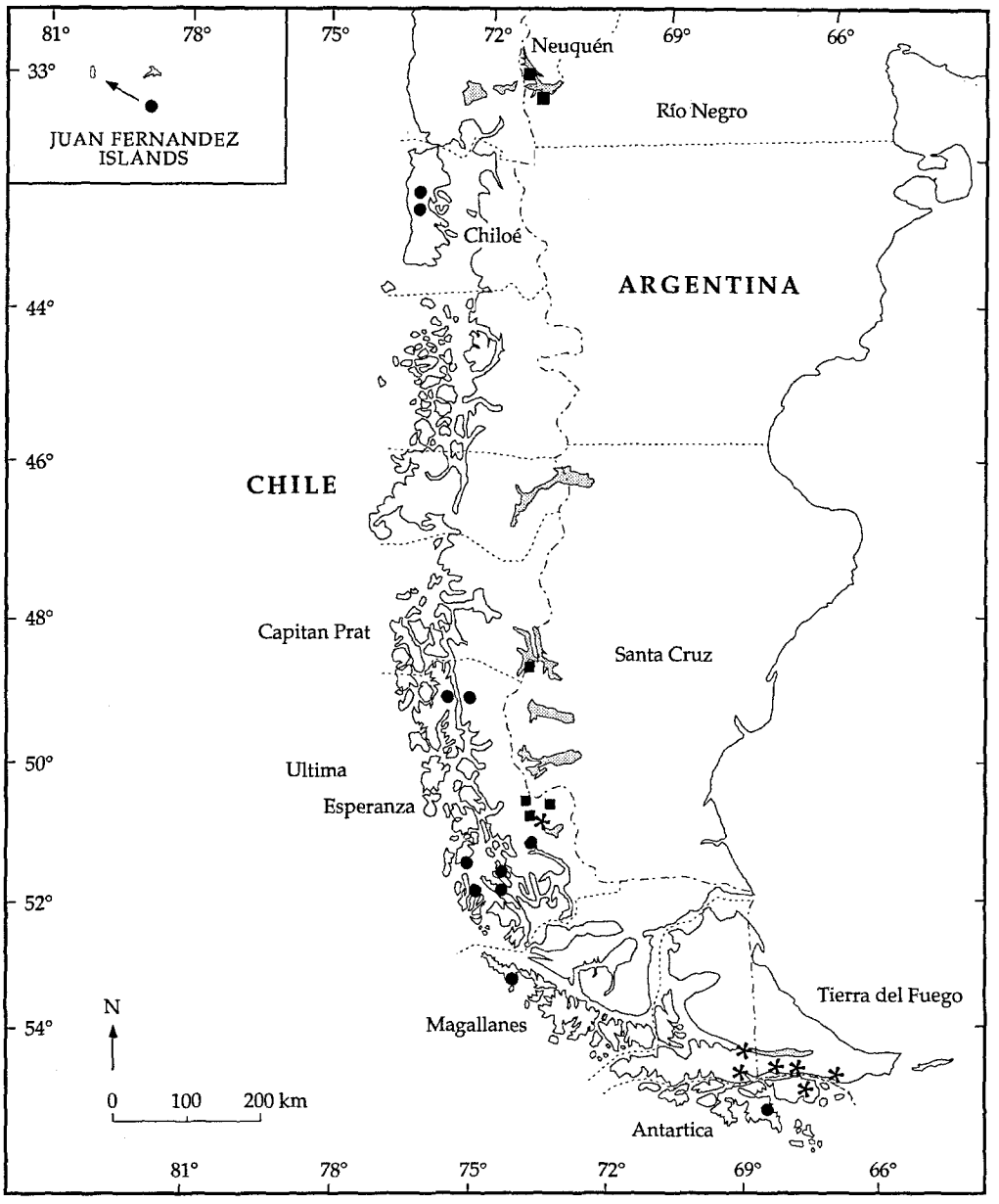


Fig. 11. Distribution of *Abrotanella linearifolia* (●), *A. trichoachaenia* (■), and *A. trilobata* (*)

Island: Masafuera, Los Inocentes, 33° 45′ S, 80° 45′ W, 1370 m s.m., 27 Jan. 1986, LANDERO 9350 (CONC), – South part above Quebrada Porras above Rodado del Sandalo, 1000 m s.m., 8 Feb. 1986, LANDERO & RUIZ 9585 (CONC), – 1300 m s.m., 5 Feb. 1986, STUESSY & SEPULVEDA 9543 (CONC). **Ultima Experanza**: Isla Piazzi, Caleta ocasión, Abra Leackey's Retreat, 51° 44′ S, 74° 01′ W, 1 m s.m., 17 Jan. 1976, DOLLENZ, MOORE, PISANO & SAENZ TBPA 1043 (BAB, HIP); Isla Rennell, 51° 45′ S, 74° 28′ W, 1050 m s.m., 23 Jan. 1976, ESKUCHE ch 53-8 (BAB, SI); Isla Vidal Gormaz, Seno Nantuel, Bahía María Angélica, 51° 53′ S, 74° 41′ W, Low altitude, 3 Feb. 1967, DOLLENZ, MOORE, PISANO &

SAENZ TBPA 1310, 1350, 1362 (BAB, HIP); Isla Virtudes, Canal Elias, Puerto Virtudes, 51° 33′ S, 74° 54′ W, 9 Feb. 1976, DOLLENZ, MOORE, PISANO & SAENZ TBPA 1421 (BAB, HIP), 1510 (HIP); Isla Wellington, Puerto Kaiser, 48° 48′ S, 74° 50′ W, 8 Apr. 1982, DOLLENZ 1097 (HIP), – Mainland, opposite Puerto Eden, 1060 m s.m., 21 Dec. 1958, GODLEY 745 (K), – Estero White, 23 Dez. 1958, GODLEY 780 (K); Parque Nacional Bernardo O'Higgins, Cerro Balmaceda, above Puerto Toro, 51° 24′ S, 73° 06′ W, 550 m s.m., 22 Dec. 1993, SWENSON & MARINSSON 304 (HIP, S, UPS).

14. *Abrotanella trilobata* SWENSON, spec. nova.

Type: Holotype: Argentina, Tierra del Fuego, Valley below Glaciar Martial, 15 km NNW of Ushuaia, 54° 47′ S, 68° 23′ W, 500 m s.m., 4 Jan. 1994, SWENSON & MARTINSSON 319 (UPS). – Isotypes: BAB, HIP, K, L, S.

Note. This new species is distinguished from *Abrotanella linearifolia,* to which it is closely allied, by having most often 3-lobed (hence the specific name) and two-coloured corollas, and crowned cypselas much like those of *A. submarginata.* Central florets may sometimes also be 2-lobed.

Descriptio. Herbae caespitosae, tegetes humiles formantes. Folia linearia, effusa vel erecto-patentia, 4–10 × 0.6–1.0 mm, apice apiculata, margine glabro. Capitula subsessilia sub anthesi, pedunculis elongatis usque ad 5 mm in statu fructificanti; bracteae foliaceae vel absentes. Phyllaria 5–10, late oblonga, obtusa-truncata, c. 1 mm longa, enervia, margine versus apicem denticulato. Flosculi exteriores (0-) 1–2, tubiformes, 3-lobati, 1.3–1.8 mm longi; tubus albus-viridis, lobi purpurei; textura vascularis absens. Flosculi centrales 5–11, perfecti (2-) 3-lobati, 1.3–1.6 mm longi, concolores cum floribus exterioribus; textura vascularis absens; antherae 1.0–1.5 mm longae. Cypselae obovoideae-ellipsoideae, costatae, glabrae, 1.0–1.5 mm longae, apice coronato.

Caespitose herbs, forming low mats. Leaves linear, spreading or erectopatent, 4–10× 0.6–1.0 mm; apex apiculate; margins glabrous. Capitula subsessile in flower; peduncle elongated up to 5 mm in fruit; bracts leaf-like or absent. Phyllaries 5–10, broadly oblong, obtuse-truncate, c. 1 mm long; nerve absent; margin towards the apex denticulate. Outer florets (0-) 1–2, tubular, 3-lobed, 1.3–1.8 mm long; tube whitish to greenish and lobes purple; vascular tissue absent. Central florets 5–11, perfect, (2-) 3-lobed, coloured as outer florets, 1.3–1.6 mm long; vascular tissue absent; anthers 0.5–0.7 mm long. Cypsela obovoid-ellipsoid, ribbed, glabrous, 1.0–1.5 mm long; apex crowned. Fig. 10 D.

The SWENSON & MARTINSSON 332 (UPS) specimen collected in the vicinity of SWENSON & MARTINSSON 324 in Parque Nacional Torres del Paine, Chile, is different from the nominal species. It was growing in association with *Abrotanella purpurea.* It has more or less tubular florets as *A. trilobata,* 3–4-lobed central florets, and a crowned cypsela apex as in *A. purpurea,* and some rudimentary vascular tissue in the central florets. The pollen is also stainable in lactic blue. The latter, however, is not sufficient evidence for full fertility and I have interpreted this collection as being a hybrid between *A. trilobata* and *A. purpurea.*

Distribution and habitat. Southernmost South America – Tierra del Fuego and Isla Navarino (Fig. 11). *Abrotanella trilobata* has a more eastern distribution than *A. linearifolia* and is still not known from the Chilean archipelago south and west of Isla Navarino. MOORE (1983) reported *A. linearifolia* from Isla de los Esta-

dos. It is possible, although no material has been seen, that these records belong to this new species. It forms mats on moist soils in open habitats such as sloping fens, seepage areas, and water margins along brooks, at an altitude of 450–750 m s.m., often in association with *Ourisia breviflora* BENTH., *Viola tridentata* MENZ. ex DC., and *Caltha sagittata* CAV.

Collections. Argentina – Tierra del Fuego: Sierra Sorando, Punta Segunda, 54° 51′ S, 68° 01′ W, 600–800 m s.m., 20 Feb. 1968, MOORE 1976 (K, LP); Ushuaia, Monte Portillo, north-east facing slope above timberline, 600–900 m s.m., 2 Oct. 1972, GOODALL 4237 (BAB); Valley below Glaciar Martial, 15 km NNW of Ushuaia, 54° 47′ S, 68° 23′ W, 530 m s.m., 4 Jan. 1994, SWENSON & MARTINSSON 316 (S, UPS).

Chile – Antarctica: Isla Navarino, Puerto Williams, 7 Jan. 1959, GODLEY 905 (K), – Valley north of Córdon de los Dientes, just below timberline, 54° 58′ S, 67° 38′ W, 500 m s.m., 28 Dec. 1993, SWENSON & MARTINSSON 311 (S, UPS), – Valley north of Córdon de los Dientes, west of Lago Salto, 54° 58′ S, 67° 42′ W, 480 m s.m., 29 Dec. 1993, SWENSON & MARTINSSON 313 (HIP, S, UPS). **Tierra del Fuego**: Cordón Pirámide, valley east of Yendegaia airfield, 54° 48′ S, 68° 53′ W, 450–600 m s.m., 29 Mar. 1971, GOODALL 3838 (BAB, HIP); Río Azopardo, 54° 29′ S, 68° 55′ W, 3 Mar. 1908, SKOTTSBERG 216 (BA, LP, UPS). **Ultima Esperanza**: Parque Nacional Torres del Paine, north-east slope of Cerro Ferrier, 51° 07′ S, 73′ 10′ W, 600–750 m s.m., 9 Jan. 1994, SWENSON & MARTINSSON 321, 324 (HIP, S, UPS).

15. *Abrotanella submarginata* A. GRAY, Proc. Amer. Acad. Arts **5**: 137 (1862).

Type: Lecotype selected here [Chile, Isla Hoste, Hardy Peninsula], Orange Harbour, Fuegia, U.S. Exploring Exp. (US). – Isolectotype: GH.

Note. Most of GRAY's type material is held in GH. Of the two syntypes found, the specimen in US is more complete, i.e., having both florets and cypselas in abundance, whereas the specimen in GH is one sterile plant. Since GRAY could impossibly have described the species from the latter specimen only, the specimen in US is therefore selected as lectotype.

The species was probably named *submarginata* (*sub-* = almost, *-marginata* = margined) to draw attention to the apically conspicuous but minutely membranous margined leaves.

Very minute herbs forming small cushions or mats, sometimes as solitary rosettes. Leaves linear, erectopatent, at the middle characteristically bent, 3–5 × 1.0 mm; apex retuse; margins glabrous, narrowly scariose at apex; leaf base almost amplexicaul. Capitula sessile; peduncle not elongated in fruit. Phyllaries 5–6, elliptic, obtuse-acute, c. 2.5 mm long. Outer florets 2–3 tubular, 4-lobed, purple, 1.6–2.0 mm long; vascular tissue absent. Central florets 3–4, perfect, 3–4-lobed, purple, 1.8–2.0 mm long; vascular tissue absent; anthers 0.7–0.9 mm long. Cypsela obovoid-ellipsoid, ribbed, hairy at base, c. 1.6 mm long; apex crowned. Fig. 12 A.

Distribution and habitat. Southernmost and western archipelago of Chile (Fig. 4). *Abrotanella submarginata* grows as solitary plants or as loose mats in crevices of rocks, seepage areas, on naked soil, and sloping fens or it forms small cushions on drier soil. It occurs at high watermark on the southernmost islands of Chile (MOORE 1983) to the islands and mainland of Ultima Esperanza, reaching an altitude of 700 m s.m. Flowering time is from December to early February.

CABRERA (1971) had not seen any material of *Abrotanella submarginata* from

Tierra del Fuego or Isla de los Estados, but believed that it occurred in these areas; however, although there are extensive collections of *A. emarginata* from these places, no material of *A. submarginata* has hitherto been collected.

Collections. Chile – Antartica: Isla Hoste, Orange Bay, Hardy Peninsula, 12 Jan. 1959, Godley 988 (K). **Ultima Esperanza**: Isla Atalaya, Reina Adelaida, 52° 21′ S, 74° 47′ W, 25 May 1908, Skottsberg 148 (UPS); Isla Rennell, North, Canal Smyth, 51° 54′ S, 74° 12′ W, 25 Jan. 1976, Dollenz, Moore, Pisano & Saenz TBPA 1184 (BAB, HIP), – NW, c. 350 m s.m., 30 Jan. 1976, Eskuche s.n. (SI); Isla Vidal Gormaz, Seno Nantuel Bahía María Angelica, 51° 53′ S, 74° 41′ W, 120 m s.m., 1 Feb. 1976, Dollenz, Moore, Pisano & Saenz TBPA 1267 (BAB, HIP); Isla Virtudes, Canal Elias, Puerto Virtudes, 51° 33′ S, 74° 54′ W, 10 Feb. 1976, Dollenz, Moore, Pisano & Saenz TBPA 1479 (BAB, HIP); Parque Nacional Bernardo O'Higgins, Cerro Balmaceda, above Puerto Toro, 51° 24′ S, 73° 06′ W, 730 m s.m., 22 Dec. 1993, Swenson & Martinsson 306 (HIP, S, UPS); Puerto Bella Vista, Lago Azul, 6 Dec. 1979, Roig, Dollenz & Méndez TBPA 5168 (BAB), – 380 m s.m., 10 Dec. 1979, Roig, Dollenz & Méndez TBPA 5326 (BAB); Seno Unión, North side, Ancón Sin Salida, 52° 09′ S, 73° 21′ W, 400 m s.m., 12 Jan. 1976, Dollenz, Moore, Pisano & Saenz TBPA 955 (BAB, HIP).

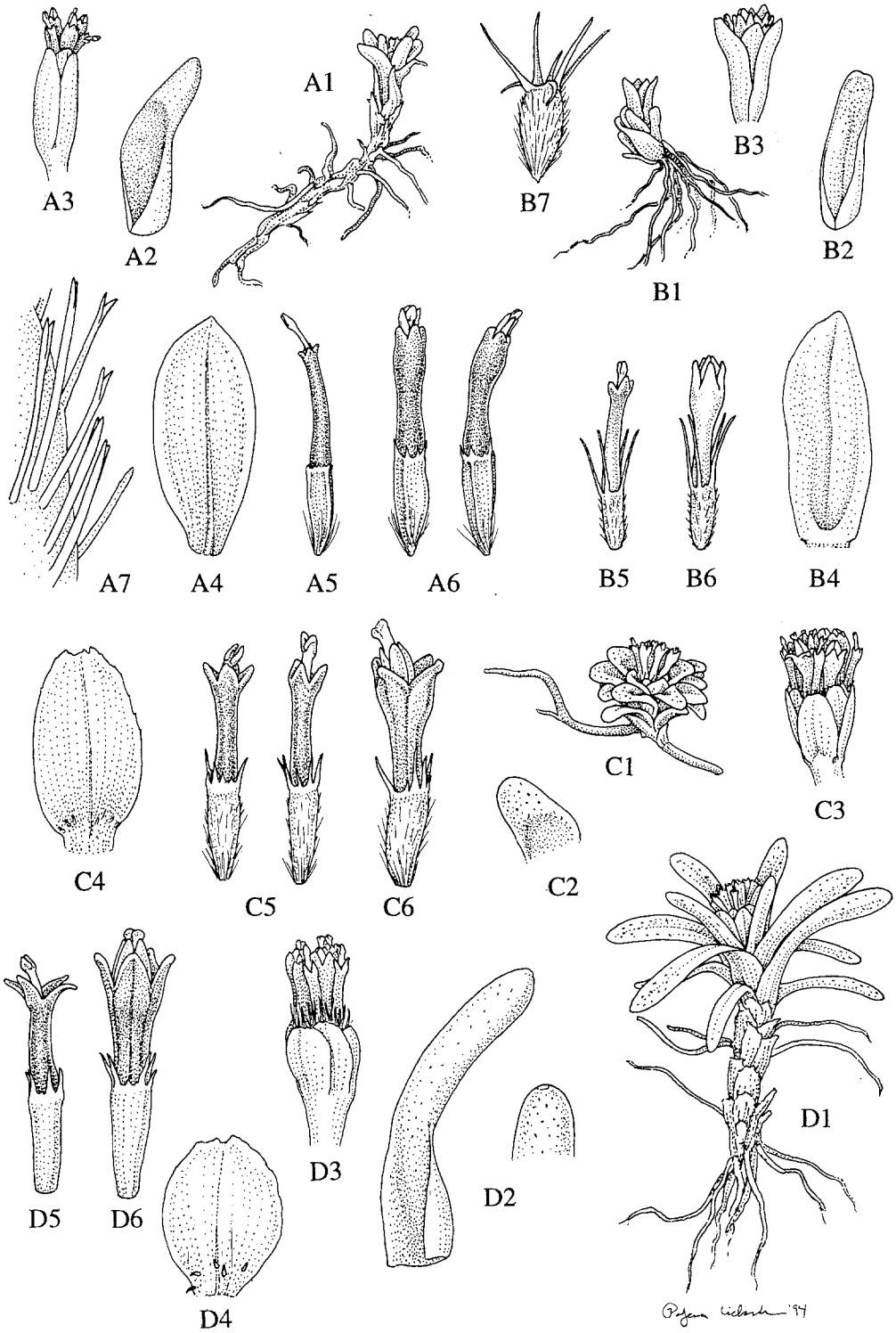
16. *Abrotanella muscosa* Kirk, Trans. Proc. New Zealand Inst. **24**: 422, t. 36 (1892).

Type: Lectotype selected here: New Zealand, Stewart Island, Summit of Rakiahua, [46° 57′ S, 167° 53′ E], Kirk s.n. (AK). – Isolectotype: K.

Note. The type locality for *Abrotanella muscosa* was given as "Stewart Island: Summit of Rakiahua; 2.300 ft", today spelled "Rakeahua" (H. D. Wilson, pers. comm.). Seven possible syntypes (AK, CHR, F, GH, two in K, WELT), all collected by Kirk, have been found and all of them are either fruiting or sterile. The annotations on the labels differ slightly in the given information and handwriting, but Kirk's signature is noted on the envelopes from F, GH, K, and WELT. The remaining material may have been distributed to different private herbaria, and later returned to the official institutions. Except for the specimens in Kew and Christchurch, no date is provided on the labels. The sheet in Kew contains two collections and they read "Jan. 1887", as does the material in Christchurch, and "Feb. 1887". The altitude "2.300 ft" is noted only on the first of these specimen in Kew but the words "Summit of ..." appear on the second specimen and on the specimen from Auckland. Kirk's type material is, when available, found normally in Auckland. None of these specimens is really in conflict with the protologue. The material belongs to at least two different collections, i.e., "Jan. 1887, 2.300 ft" and "Summit of Rakiahua, Feb. 1887", respectively. It is uncertain to which collection the material from F, GH, and WELT should be referred. With these facts, the collection annotated "Summit of ..." has been chosen as lectotype. The remaining syntypes are listed below.

The species name *muscosa,* which means moss-like, is given because of the anonymity and moss-like resemblance of the species. Kirk (1892) wrote" ... it resembles a *Tortula* or *Bryum* and may easily pass unnoticed and, with the exception of *Lemma*, is the smallest flowering plant in the colony" (i.e., New Zealand).

Very small, solarity or matted herbs with poorly developed roots. Leaves linear, erect, 4 × 0.7 mm; apex retuse; margins glabrous and scariose in upper half. Capitula sessile; peduncle not elongated in fruit. Phyllaries 5, oblong, obtuse-


A1
A2
A3
A4
A5
A6
A7
B1
B2
B3
B4
B5
B6
B7
C1
C2
C3
C4
C5
C6
D1
D2
D3
D4
D5
D6

acute, c. 3 mm long. Outer florets 1–2, tubular, 3–4-lobed, greenish with often purplish lobes, 1.4–1.7 mm long; vascular tissue absent. Central florets 2–3, perfect, 3–4-lobed, coloured as the outer florets, 1.7–1.8 mm long; vascular tissue marginal; anthers 0.7–0.9 mm long. Cypsela obovoid, often 4-angled, ribbed, hairy at base, c. 2 mm long including the awns at the apex. Fig. 12 B.

Distribution and habitat. *Abrotanella muscosa* is a common but poorly collected species endemic to the high areas of Stewart Island – New Zealand (Fig. 9 B). It grows in moist subalpine grasslands, rock crevices, often on fine and bare soils, from 600 m s.m. and above, but may descend almost to sea level along brooks (Wilson 1987). It flowers in December to January and sets fruit between January and March.

Collections. New Zealand – Stewart Island: Mt Anglem, summit ridge, 46° 44′ S, 167° 56′ E, 21 May 1964, ? s.n. (CHR); Mt Rakeahua, 46° 57′ S, 167° 53′ E, 675 m s.m., Jan. 1887, Kirk s.n. (CHR, K), – Kirk s.n. (F, GH, WELT), – 600 m s.m., 5 Jan. 1995, Swenson & Martinsson 342 (AK, CHR, K, S, UPS).

17. *Abrotanella trichoachaenia* Cabrera, Revista Chilena Hist. Nat. **38**: 85 (1934).

Type: Holotype: Chile, Magallanes, Ventisqueros del lago San Martín, 1000 m s.m., II – 1933, Donat s.n. (BA). – Isotype LP.

Note: *Abrotanella trichoachaenia* is similar to *A. submarginata* due to the basally hairy cypselas (Cabrera 1934). The latter species is distinguished by its purple, more or less tubular central florets versus the most often yellowish, campanulate central florets in *A. trichoachaenia*. Cabrera (1971) postulated a resemblance, based on crowned and glabrous cypselas, between *A. trichoachaenia* and *A. linearifolia*. Confusion between these two species has been resolved; the alleged resemblance resulted from a mixture of two species, *A. linearifolia* and *A. purpurea*. The specific epithet, *trichoachaenia*, refers to the hairy (setose) cypselas.

Cabrera (1971) reported glabrous cypselas for the Boelcke & Correa 7002 (BAB) collection. I have examined the same material and regard the cypselas as subglabrous rather than glabrous.

Plants solitary, forming small cushions, or low mats. Leaves linear, spreading 5–10× 1.0–1.5 mm; apex obtuse; margins glabrous. Capitula subsessile in flower; peduncle without bracts, elongated up to 4 mm in fruit. Phyllaries 6–9, oblong, obtuse, palmately 1–5-nerved, 2.0–2.2 mm long; margins towards the apex often denticulate. Outer florets 1–4 (-5), tubular or narrowly cyathiform, (3-) 4-lobed, yellowish, often with purplish bordered lobes, soon turning brown as withered,

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Fig. 12. *A Abrotanella submarginata* (Swenson & Martinsson 306); *B A. muscosa* (Kirk s.n., *B*3, 5–6 from Swenson & Martinsson 342); *C A. trichoachaenia* (Swenson 329, *C*3–6 from Swenson 331); *D A. purpurea* (Swenson & Martinsson 323). *A*1–*D*1 Habit; *A*2–*D*2 leaves and leaf apex (*D*2 right); *A*3–*D*3 capitula; *A*4–*D*4 phyllaries; *A*5–*D*5 4-lobed outer florets with cypselas, 3-lobed in *B*5 and *C*5 (right); *A*6–*D*6 central florets with cypselas, all 4-lobed except *A*6 (right); *A*7 detail of hairs typical for the three first species; *B*7 mature cypsela. Scales: *A*1–*D*1 (× 2); *A*2–*D*2, A3–*D*3 (× 6); *A*4–*D*4, *A*5–*D*5, *A*6–*D*6, *B*7 (× 11); *A*7 (× 80)

1.5–1.8 mm long; vascular tissue rudimentary in base; branches and base of style often purplish. Central florets 3–5 (-7), perfect, campanulate, (3-) 4-lobed, coloured and as long as the outer florets; vascular tissue marginal and central; anthers 0.8–1.2 mm long; endothecium polarized to radial. Cypsela obovoid-ellipsoid, nerved, hairy or rarely subglabrous, 1.5–2.2 mm long; apex crowned. Fig. 12 C.

Distribution and habitat. South American Andes – from the Province of Ultima Esperanza, Chile, 800 m. s.m., to Neuquén, Argentina, at 1600 m s.m. (Fig. 11). *Abrotanella trichoachaenia* forms mats or small cushions on fine, often bare and moist soil, seepage areas, rock crevices and in water sprays of small waterfalls, sometimes in association with *Abrotanella trilobata, A. purpurea*, and often with *Ourisia breviflora*. It is a rare and poorly known species.

Collections. Argentina – Neuquén: Parque Nacional Nahuel Huapí, Cerro Tres Lagunas, 18 Feb. 1953, BOELCKE & CORREA 7002 (BAB), – 1600 m s.m., 22 Mar. 1951, DIEM 1864 (SI); Laguna "Las Monjas", valle alto del Arroyo Vinagre, 5 Mar. 1945, DIEM 927 (SI), – Valley above Arroyo Sin Nombre, 1650 m s.m., 23 Jan. 1941, DIEM 123 (LP), – 18 Feb. 1945, DIEM 900 (SI), – Valley north of Cerro Tres Lagunas, 40 km WNW of San Carlos de Bariloche, 40° 55′ S, 71° 40′ W, 1600 m s.m., 26 Jan. 1994, SWENSON 331 (BAB, S, UPS). **Río Negro**: Parque Nacional Nahuel Huapí, Cerro Lopez, 5 Mar. 1941, MOREAU s.n. (BA), – 25 km W of San Carlos de Bariloche, 41° 05′ S, 71° 34′ W, 1550 m s.m., 24 Jan. 1994, SWENSON 329 (S, UPS).

Chile – Ultima Esperanza: Parque Nacional Torres del Paine, Cerro Agudo, 50° 49′ S, 73° 03′ W, 700 m s.m., 15–18 Jan. 1987, ARROYO & SQUEO 870064, 870170 (CONC), – Cerro Ferrier, north-east slope, 51° 07′ S, 73° 10′ W, 800 m s.m., 9 Jan. 1994, SWENSON & MARTINSSON 326 (CONC, HIP, K, S, UPS).

18. *Abrotanella purpurea* SWENSON, spec. nova.

Type: Holotype: Chile, Ultima Esperanza, Parque Nacional Torres del Paine, north-eastern slope of Cerro Ferrier, 750 m s.m., 51° 07′ S, 73° 10′ W, 9 Jan. 1994, SWENSON & MARTINSSON 323 (UPS). – Isotypes: CONC, HIP, K, L, S.

Note. This taxon has been mixed up with *Abrotanella linearifolia* due to a confusion of these two species. The species grow together in association and have not previously been separated out as taxa. *Abrotanella purpurea* is closely allied to *A. trichoachaenia* but has purple florets, hence the specific name, glabrous cypselas, and is slightly larger in the vegetative parts.

Descriptio. Herbae tegetes humiles vel pulvinos parvos formantes. Folia linearia, effusa, 5–10 (-20) × 1.2–1.5 mm, apice obtuso, margine glabro. Capitula subsessilia sub anthesi, pedunculis elongatis usque and 8 mm in statu fructificanti; bracteae 0–1, foliaceae. Phyllaria 6–9, late oblonga, obtusa, 2.0–2.2 mm longa, margine versus apicem ± denticulato. Flosculi exteriores 3–5, tubiformes vel anguste cyathiformes, 4-lobati, purpurei, 1.5–1.8 mm longi; textura vascularis basi rudimentalis. Flosculi centrales 3–8, perfecti, campanulati, 4-lobati, purpurei, 1.8–2.0 mm longi; textura vascularis marginalis et centralis; antherae breves, 0.8–1.2 mm longae; endothecium polare vel partim radiale. Cypselae obovoideae-ellipsoideae, nervatae, glabrae, 2.0–2.2 mm longae, apice coronato.

Herbs forming low mats or small cushions. Leaves linear, spreading, 5–10 (–20) × 1.2–1.5 mm; apex obtuse; margins glabrous. Capitula subsessile in flower; peduncle elongated up to 8 mm in fruit; bract leaf-like or absent. Phyllaries 6–9, broadly oblong, obtuse, 2.0–2.2 mm long; margins towards the apex

often ± denticulate. Outer florets 3–5, tubular or narrowly cyathiform, 4-lobed, purple, 1.5–1.8 mm long; vascular tissue rudimentary in base. Central florets 3–8, perfect, campanulate, 4-lobed, purple, 1.8–2.0 mm long; vascular tissue marginal and central, often poorly developed; anthers 0.8–1.2 mm long; endothecium polarized to radial. Cypsela obovoid-ellipsoid, nerved, glabrous, 2.0–2.2 mm long; apex crowned. Fig. 12 D.

Distribution and habitat. Chile (Fig. 4). *Abrotanella purpurea* is still known only from a few collections, disjunct with wide gaps, but it is probably not so rare. The known records are from Isla Hoste in the southern archipelago to the Province of Chiloé south of Puerto Montt (mainland), at an altitude of (0-) 200–750 m s.m. It forms mats on naked soils and in sloping fens or small, lax cushions on drier soils. Recorded in association with *Abrotanella linearifolia, A. trilobata,* and occasionally *A. submarginata.*

Collections. Chile – Antartica: Isla Hoste, Orange Harbour, & c., Fuegia, 1838–1842, U.S. Exploring Expedition s.n. (US). **Chiloé**: Lago Río Negro, Cerros al Este, 42° 42′ S 72° 34′ W, 200 m s.m., 11 Jan. 1986, Villagrán, Aguila & Leiva 6863 (CONC). **Magallanes**: Isla Santa Ines, Fiordo Helado, c. 600 m s.m., Jan. 1985, Peters s.n. (HIP); Punta Chipana?, 22 Mar. 1869, ? s.n. (K). **Ultima Esperanza**: Parque Nacional Bernardo O'Higgins, Cerro Balmaceda, above Puerto Toro, 51° 24′ S, 73° 06′ W, 730 m s.m., 22 Dec. 1993, Swenson & Martinsson 307 (HIP, S, UPS); Seno Ultima Esperanza, Lago Azul, mountain on south side, 51° 29′ S, 73° 19′ W, 640 m s.m., 12 Jan. 1977, Dollenz, Moore, Pisano & Saenz TBPA 1662 (BAB, HIP).

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