

**TAXONOMIC REVISION OF *CELMISIA* SUBG. *LIGNOSAE* S. LATO
(ASTERACEAE: ASTEREAE),
WITH AN OVERVIEW OF THE GENUS**

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ABSTRACT

Celmisia belongs to the recently circumscribed subtribe Celmisiinae, which is endemic to Australasia (Australia, New Guinea, and New Zealand), and is one of the most characteristic elements of New Zealand's subalpine and alpine environments. *Celmisia* is currently classified into five subgenera, of which *Caespitosae*, *Glandulosae*, and *Lignosae* are endemic to mainland New Zealand and are treated and taxonomically revised here under a broader concept of subg. *Lignosae*, which incorporates the two former ones. Subg. *Lignosae* s. lato includes resinous cushion-like shrubs with axillary monocephalic capitulescences, ray florets white, ligulate, and pistillate, and disc florets yellow, tubular, and perfect. In the revision presented here, subg. *Lignosae* s. lato comprises 26 species and 4 varieties. Two new combinations are made: *C. sinclairii* var. **allanii** (W. Martin) Saldivia **comb. nov.**, and *C. sinclairii* var. **durietzii** (Cockayne & Allan ex W. Martin) Saldivia, **comb. nov.** The following names are synonymized: *Celmisia allanii* var. *canescens*, *Celmisia brevifolia*, *Celmisia discolor* var. *ampla*, *Celmisia glandulosa* var. *latifolia*, *Celmisia glandulosa* var. *longiscapa*, *Celmisia hieraciifolia* var. *gracilis*, *Celmisia hieraciifolia* var. *oblonga*, *Celmisia incana*, *Celmisia incana* var. *nivalis*, *Celmisia incana* var. *petiolata*, *Celmisia intermedia*, *Celmisia lateralis* var. *villosa*, *Celmisia macmahonii* var. *hadfieldii*, and *Celmisia membranacea*. Two names (*Celmisia incana* var. *nivalis*, *Celmisia allanii* var. *canescens*) are neotypified and one (*Celmisia robusta*) is lectotypified. An identification key and descriptions, distribution maps, and photographs are provided for all the accepted species. Additionally, an overview of the genus *Celmisia* is presented.

The recently proposed subtribe Celmisiinae Saldivia (Saldivia, p. 19 in Nesom 2020) is a rich and morphologically and ecologically diverse Australasian endemic lineage (Saldivia 2021; Saldivia et al. 2020; Saldivia & Nicol 2023; Nicol et al. 2024). Although centered in New Zealand, Celmisiinae is also important in Australia and the tropical island of New Guinea (Figure 1). It includes small trees, erect or plagiotropic shrubs, subshrubs, or perennial herbs with large leaves that range from sea level to hundreds of meters above the tree line. Typically, axillary capitulescences, alveolate-epaleate receptacles, caudate anthers, and a dense layer of tomentum covering the abaxial surface of the leaves are the morphological character states defining the subtribe (Saldivia 2021; Saldivia et al. 2020; Saldivia & Nicol 2023).

There are ca. 160 recognized species in Celmisiinae, which are divided into the following genera: *Celmisia* Cass., *Damnamenia* Given, *Macrolearia* Saldivia, *Pachystegia* Cheeseman, *Pleurophyllum* Hook.f., and *Olearia* Moench in part. The latter, however, needs a new generic circumscription because its type, *O. tomentosa* (Wendl.) DC., belongs to a different subtribe, Brachyscominae (Nesom 2020). Recent phylogenomic developments have demonstrated that all the *Olearia* species belonging to Celmisiinae form a monophyletic group which also includes *Pachystegia* (Nicol et al. 2024). A new generic affiliation for this clade, for which *Shawia* J.R. Forst & G. Forst. (Forster & Forster 1776) has nomenclatural priority, has been suggested (Nicol et al. 2024). Formal new generic arrangements are in preparation (Saldivia & Nicol, unpublished data).

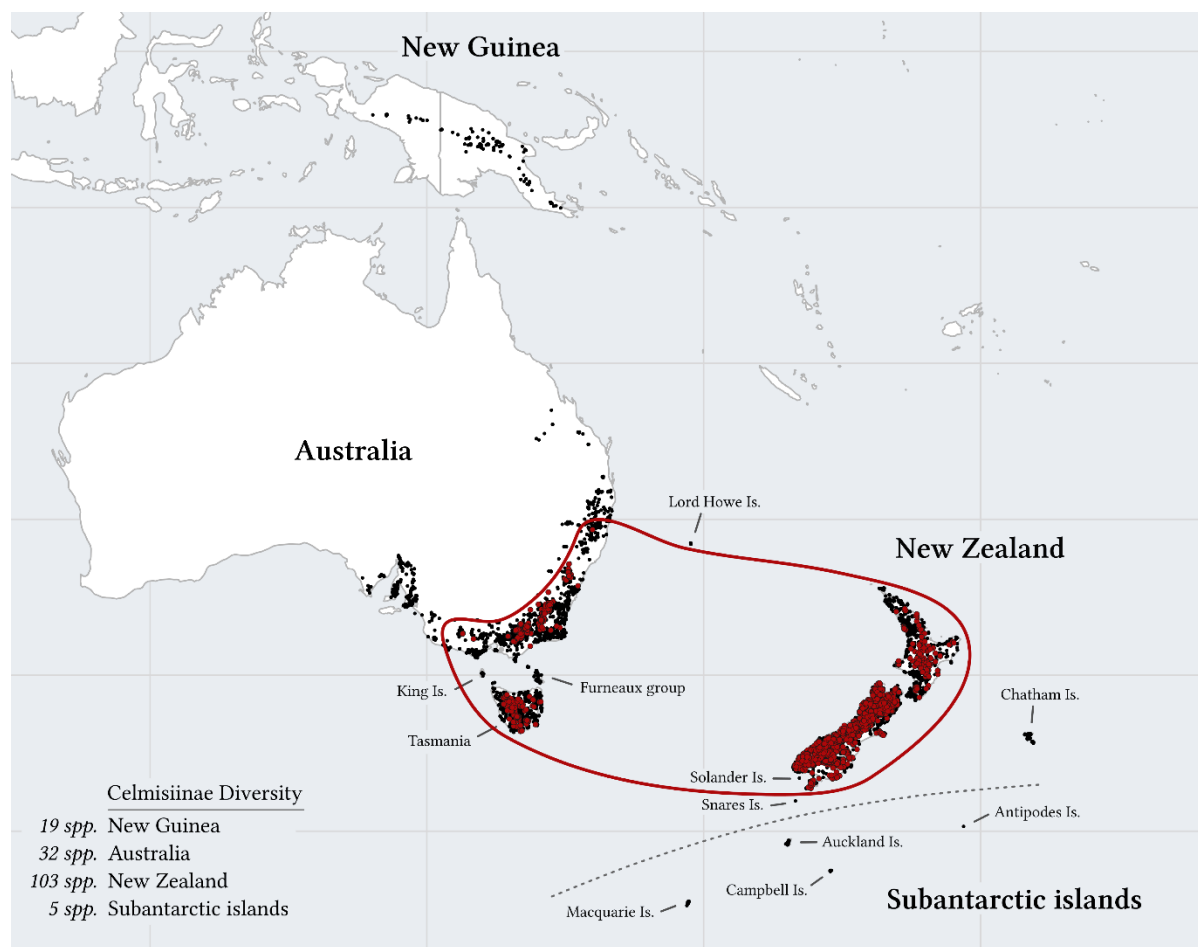


Figure 1. Distribution and diversity of Celmisiinae highlighting the distribution of *Celmisia* in red. Modified from Nicol (2023).

Celmisia includes ca. 60 species endemic to the three main islands of New Zealand (Allan 1961; Given & Gray 1986; Schönberger et al. 2021; Saldivia 2023), 6 species endemic to southeast mainland Australia (Victoria and New South Wales) mainly in the Australian Alps, the Blue Mountains, and the Grampians (Given & Gray 1986; Gray & Given 1999), including the type species *Celmisia longifolia* Cass. and 2 species endemic to Tasmania that are more or less widespread over the island (Given & Gray 1986; de Salas & Baker 2015) (Figure 1).

Celmisia is the third largest genus of vascular plants in New Zealand and the richest in New Zealand's mountainous environment (McGlone et al. 2018; Schönberger et al. 2021). However, some species can also be found in lowland reaches (Given & Gray 1986), and a few are restricted to coastal environments (e.g., *C. lindsayi* Hook.f., *C. mackaui* Raoul). *Celmisia* species are also one of the most characteristic elements of the subalpine and alpine vegetation in New Zealand (Mark & Adams 1995). In Australia, the genus is similarly concentrated in the alpine, subalpine, and upper montane tracts of the Australian Alps and associated ranges (Given & Gray 1986; Costin et al. 2000). The genus is mainly characterized by habit, with its species ranging from subshrubs with an herbaceous appearance (mostly herbaceous aerial structures arising from a woody hypogeous rhizome) to prostrate or procumbent cushion-like shrubs, axillary monocephalic capitulescences born from bracteate peduncles, white (occasionally mauve) ray pistillate florets, and yellow perfect disc florets (Allan 1961; Given 1969a; Saldivia 2023).

Generic description: A complicated taxonomic history

Henri Cassini's work in the early 1800s has been regarded as the true foundation of synantherology (Bonifacino et al. 2009). Cassini brilliantly delineated the main lines of the morpho-taxonomy of the Asteraceae family that are in some ways still in use. He also described over 391 genera within the Asteraceae (Flann et al. 2010). Yet, at this taxonomic rank, his work has also been sharply criticized for being inaccurate and confusing (Bentham 1873: 338), a situation supported in part by the current acceptance of only a third (130) of his published generic names (Flann et al. 2010). *Celmisia* is one of many complicated taxonomic histories of Cassini's generic names. Nordenstam (2002, 2003) provided a partial chronological summary of the main events regarding the description of *Celmisia*, but focused on the nomenclature of the South African genus *Capelio* B. Nord. which includes *Capelio tabularis* (Thunb.) B. Nord. (= *Celmisia rotundifolia* Cass.), the species upon which *Celmisia* was first described. Below, I provide a detailed updated account of the taxonomic and nomenclatural history of *Celmisia*.

* Cassini (1817a: 32) briefly described the genus *Celmisia* without a type species. He only mentioned that its radiate capitulum was similar to the Eurasian *Ligularia* Cass., a genus in the tribe Senecioneae.

* Cassini (1817b: 356–357) gave a more detailed description of *Celmisia*, described *Celmisia rotundifolia*, and provided diagnostic characters against *Ligularia sibirica* (L.) Cass.

* Cassini (1825: 259–260) described a second species, *Celmisia longifolia*, based on specimen(s) collected by C. Gaudichaud in the Blue Mts., New Holland (Australia, New South Wales). He mentioned that all the characters are consistent with those of *Celmisia* (*C. rotundifolia*) except for the receptacle, which is alveolate in *C. longifolia*, and also that the female flowers lack the rudiments of stamens.

* Gaudichaud (1826a, b) provided a description and illustration of *Celmisia longifolia*.

* de Candolle (1836: 209–210) proposed that the two *Celmisia* species described by Cassini (*C. rotundifolia* and *C. longifolia*) have differences indicative of different generic placement, and accordingly, split them into two genera. He retained the generic name *Celmisia* for the second described species (*C. longifolia*). While he acknowledged that his decision was contrary to the nomenclatural rules of priority, he argued that *C. longifolia* had already been in use by C. Gaudichaud (1826a, b). He also described *Celmisia spathulata* A. Cunn. ex DC. (basonym of *Amblysperma spathulata* (A. Cunn. ex DC.) D.J.N. Hind; Hind 2014). For the original *C. rotundifolia* he erected the genus *Aliciope* DC. with two species endemic to the Cape Province, South Africa, for which the currently accepted name is *Capelio* (see details in Nordenstam 2002, 2003).

* Robinson (1913: 510–514) placed *Celmisia* back to its original sense as a small South African genus described upon *C. rotundifolia* (= *Capelio tabularis*) because de Candolle's taxonomic proposal was against the 'International rules of botanical nomenclature.' On the other hand, for the Australasian species referred to *Celmisia* with the type *C. longifolia*, he erected the new name *Elcismia* B.L. Rob. (anagram of *Celmisia*) with new combinations for 54 of the 74 published names under *Celmisia* at that time. However, Robinson's correct proposal was not followed by New Zealand botanists, probably because of the claim by Cockayne (1914) that "it would be a matter for deep regret if a name so universally recognized as *Celmisia* had to be abandoned. It seems to me that New Zealand botanists would do well to wait until the next Botanical Congress, so as to see if *Celmisia* cannot be placed in the list of nomina conservanda."

* Sprague (1929: 94) following the large number of published names under the genus *Celmisia*, and because Robinson's (1913) proposal had not been adopted, successfully proposed the conservation of *Celmisia* Cassini in F. Cuvier, Dict. Sci. Nat. 37: 259. Dec 1825 against *Celmisia* Cassini, Bull. Sci.

Soc. Philom. Paris 1817: 32. Feb 1817. Therefore, *Celmisia* Cass. (1825) is conserved with the conserved type *C. longifolia* Cass., against the rejected *Celmisia* Cass. (1817) with the type *C. rotundifolia* (Wiersema et al. 2018+).

The South American species of *Celmisia*

Schultz Bipontinus (1856) transferred the three species of the South American (central and northern Andes) *Aster* sect. *Oritrophium* Kunth to *Celmisia* without giving any argument other than “Exceptionally interesting is the new *Celmisia Lechleri*, because it provides me with a new proof, that this genus, so far observed only in Australia and the surrounding islands, is represented in great numbers in South America.” However, Bentham & Hooker (1873) did not follow Schultz Bipontinus’ proposal and transferred sect. *Oritrophium* from *Aster* L. to *Erigeron* L., leaving *Celmisia* restricted to Australasia.

Solbrig (1960) analyzed the morphology of the South American members of the genus *Erigeron* and its possible affinities with *Celmisia*. He concluded, based on some characters (habit, capitulescence, phyllary pubescence, stylar appendage of the disc florets, shape of the cypsela, base of the anthers, and receptacle surface) that sect. *Oritrophium* belongs to *Celmisia* and made the necessary new combinations. Nevertheless, Solbrig’s (1960) interpretations were probably biased towards preconceived taxonomic ideas. For example, he found some differences between the three *Erigeron* sections in the length and indumentum of the phyllaries, but he made no comment about *Celmisia* for this character. Regarding the stylar appendage shape, he linked sect. *Oritrophium* with *Celmisia* because of the subulate appendage, showing *Celmisia gracilentata* Hook.f. as an example. However, within *Celmisia*, the stylar appendage shape has considerable variation, and in other species listed by him as part of his study, the appendage is not subulate (e.g., *C. discolor* Hook.f., *C. sinclairii* Hook.f.).

Cuatrecasas (1961), probably not aware of Solbrig’s (1960) work, elevated sect. *Oritrophium* to the generic rank based mainly on the infertility of the disc florets, which present no stigmatic area along the style branches. Cuatrecasas (1997) reaffirmed his view of *Oritrophium* (Kunth) Cuatrec. as a genus distinct from *Celmisia* by pointing out that in this genus, the central disc florets are hermaphroditic. Surprisingly, Solbrig (1960) had commented on and illustrated this attribute, but dismissed it as a relevant generic character within his analysis.

Taxonomic works after Cuatrecasas (1961) about South American Astereae have kept Cuatrecasas’ view maintaining *Oritrophium* separated from *Celmisia* (Cuatrecasas 1997; Nesom 1992, 1994; Nesom & Robinson 2007). Recent molecular phylogenetic studies based on nuclear ribosomal sequence data (Karaman-Castro 2006; Brouillet et al. 2009) also confirm *Celmisia* and *Oritrophium* as different genera not directly related within the tribe and belonging to different subtribes (Nesom 2020).

Description of species and infraspecific taxa

Since Hooker (1853), new species of *Celmisia* have been described as part of the main treatments or compilations of the New Zealand vascular flora (Hooker 1864; Kirk 1899; Cheeseman 1906, 1925; Allan 1961). Nevertheless, the morphological delimitation of the taxa mentioned in those works are chiefly based on subtle vegetative characters that do not allow unequivocal identification of the species. In Australia, the 8 recognized *Celmisia* species have been stable since their descriptions. However, in New Zealand, there are about 116 validly published names in *Celmisia*, almost twice as many as currently accepted valid taxa. There has been a reasonably steady pace of descriptions of taxa in *Celmisia* (disregarding its acceptance), from Forster’s description of the New Zealand endemics *Aster holosericeus* G. Forst. (≡ *Celmisia holosericea* [G. Forst.] Hook.f.) and *Aster coriaceus* G. Forst. (≡ *Celmisia coriacea* [G. Forst.] Hook.f.) in 1786 to Gray and Given’s (1999) description of three species endemic from mainland Australia (Figure 2).

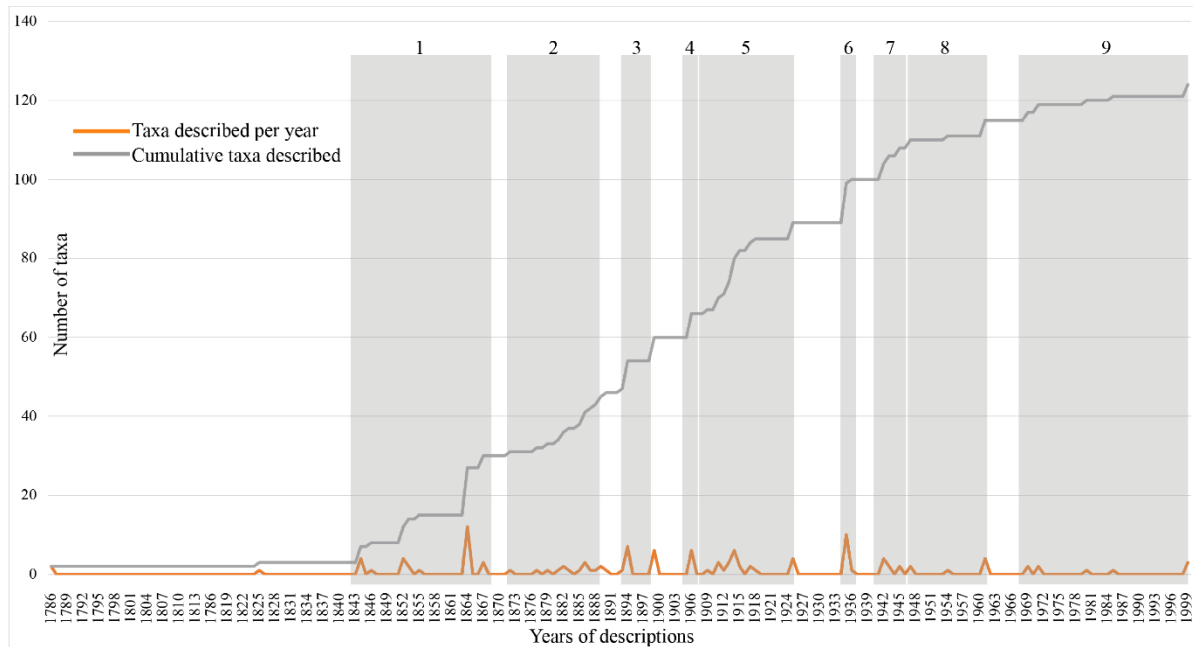


Figure 2. Chronology of the description of taxa in *Celmisia* and the principal authorities. 1: J.D. Hooker; 2: J. Buchanan, W. Colenso, and D. Petrie; 3: T. Kirk; 4: T.F. Cheeseman; 5: L. Cockayne, D. Petrie, and T.F. Cheeseman; 6: W. Martin; 7: G. Simpson and J.S. Thomson; 8: H.H. Allan; 9: D.R. Given and collaborators.

The authors who described nearly 94% of all the taxa described in *Celmisia* are also shown in Figure 2. Since Forster's (1786) description of the first two species of *Celmisia* (as *Aster*) and Cassini's description of the type species *C. longifolia* in 1825, J.D. Hooker has been the leading figure. Between 1844 and 1867, he described 24 taxa, of which 23 are currently accepted (not considering this revision, Schönberger et al. 2021). After Hooker (1867), about 85 taxa were described by mostly local New Zealand botanists (i.e., born in New Zealand or who traveled early to live in New Zealand) such as T.F. Cheeseman, T. Kirk, L. Cockayne, and H.H. Allan. The most recent species descriptions were made by D.R. Given and collaborators (Given 1969b, 1971, 1980; Lee & Given 1984; Gray & Given 1999) who described 9 species from New Zealand and Australia.

Infrageneric taxonomy of *Celmisia*

The first attempt to divide *Celmisia* into infrageneric taxa was made by Hooker (1844), who erected *C. subg. Ionopsis* Hook.f. for the Auckland and Campbell islands' endemic *Celmisia vernicosa* Hook.f. Allan (1961) divided the New Zealand species (he did not treat the Australian ones) into three sections, and several subsections and series, and commented that "I have not found any correlated flower or fruit characters to justify the erection of subgenera." He split the New Zealand species into two main groups, sect. *Celmisia*, including herbs arising from simple to branched hard stocks with leaves chiefly arranged in dense tufts, and sect. *Lignosae* Allan, which include subshrubs with leaves imbricated along the branches. A third section, *Antarcticae* Allan (\equiv subg. *Ionopsis*) was recognized for *C. vernicosa*. However, despite those taxonomic attempts to organize *Celmisia*, it was Given (1969a) who proposed a subgeneric taxonomic treatment for *Celmisia* also including the Australian species and based on several floral and vegetative characters.

Given's treatment was substantially different from Allan (1961). He reorganized the genus into 5 subgenera: subg. *Celmisia* (12 spp.) and subg. *Pelliculatae* (Allan) Given (26 spp.), both distributed in New Zealand and both with a few endemic Australian species, and subg. *Glandulosae* (Allan) Given (monotypic), subg. *Caespitosae* (Allan) Given (two spp.), and subg. *Lignosae* (Allan) Given (26 spp.), all endemic to New Zealand. Subgenera *Celmisia*, *Pelliculatae*, and *Lignosae* are also arranged into several sections and series. Given (1969a) also recognized J.D. Hooker's subgenus

lonopsis (\equiv *Celmisia* sect. *Antarcticae*) for *Celmisia vernicosa*; however, he later (Given 1973) transferred it to the new monotypic genus *Damnamenia*. This taxonomic scheme was slightly modified by Given & Gray (1986, Table 1), who informally presented names for the Australian taxa *Celmisia tomentella* M. Gray & Given, *C. pugioniformis* M. Gray & Given, and *C. costiniana* M. Gray & Given, and elevated *C. latifolia* (F. Muell. ex Benth.) M. Gray & Given (\equiv *C. longifolia* Cass. var. *latifolia* F. Muell. ex Benth.) to species rank. These taxonomic novelties were formally described by Gray & Given (1999). The ‘*Celmisia longifolia* complex’ was regarded by Given & Gray (1986) as a small complex of about three taxa with glabrous achenes. Still, no subsequent taxonomic treatment for that complex has been published.

Subgenus	Section	Series	Species (Australian species in bold)
<i>Celmisia</i>	<i>Celmisia</i>		<i>C. adamsii</i> , <i>C. alpina</i> , <i>C. gracilentia</i> , <i>C. graminifolia</i> , <i>C. major</i> , <i>C. longifolia</i> complex
	<i>Pulvinatae</i>		<i>C. argentea</i> , <i>C. clavata</i> , <i>C. sessiliflora</i> , <i>C. saxifraga</i>
	<i>Nanae</i>		<i>C. laricifolia</i> , <i>C. similis</i>
<i>Lignosae</i>	<i>Lignosae</i>	<i>Lignosae</i>	<i>C. gibbsii</i> , <i>C. hectori</i> , <i>C. lateralis</i> , <i>C. ramulosa</i> , <i>C. rupestris</i>
		<i>Angustifoliae</i>	<i>C. angustifolia</i> , <i>C. brevifolia</i> , <i>C. walkeri</i>
	<i>Rosulatae</i>	<i>Rosulatae</i>	<i>C. allanii</i> , <i>C. bonplandii</i> , <i>C. discolor</i> , <i>C. durietzii</i> , <i>C. inaccessa</i> , <i>C. incana</i> , <i>C. lyndsayi</i> , <i>C. macmahonii</i> , <i>C. sinclairii</i> , <i>C. viscosa</i>
		<i>Montanae</i>	<i>C. haastii</i>
		<i>Abbreviatae</i>	<i>C. densiflora</i> , <i>C. prorepens</i>
	<i>Serratae</i>		<i>C. cockayniana</i> , <i>C. dallii</i> , <i>C. hieracifolia</i> , <i>C. holosericea</i>
<i>Glandulosae</i>		<i>C. glandulosa</i>	
<i>Caespitosae</i>		<i>C. bellidioides</i> , <i>C. thomsonii</i>	
<i>Pelliculatae</i>	<i>Pelliculatae</i>	<i>Pelliculatae</i>	<i>C. dubia</i> , <i>C. insignis</i> , <i>C. monroi</i> , <i>C. morganii</i> , <i>C. rutlandii</i> , <i>C. semicordata</i>
		<i>Linearifoliae</i>	<i>C. lyallii</i> , <i>C. petriei</i> , <i>C. polyvena</i> , <i>C. spedenii</i> , <i>C. vespertina</i> , <i>C. markii</i> , <i>C. asteliifolia</i> , <i>C. costiniana</i> , <i>C. pungioniformis</i> , <i>C. tomentella</i>
	<i>Lanceolatae</i>		<i>C. armstrongii</i> , <i>C. coriacea</i>
	<i>Petiolatae</i>		<i>C. cordatifolia</i> , <i>C. hookeri</i> , <i>C. mackaii</i> , <i>C. spectabilis</i> , <i>C. traversii</i> , <i>C. verbascifolia</i> , <i>C. latifolia</i> , <i>C. sericophylla</i> (probably)

Table 1. Taxonomic scheme by Given and Gray (1986) with additions by Gray & Given (1999). *C. philocremna* Given was not assigned.

Currently, the taxonomy of *Celmisia* at species rank remains unclear for most of the genus. *Pelliculatae* is the only subgenus that has been almost completely reviewed in several works (Given 1969b, 1972, 1975, 1980, 1984; Gray & Given 1999; Lee & Given 1984). There are no taxonomic revisions for any of the remaining four subgenera.

Phylogenetics and phenetics of *Celmisiinae* with emphasis in *Celmisia*

The recent nuclear phylogenomic analyses of *Celmisiinae* by Nicol et al. (2024), which used coalescent-based (Accurate Species TRee ALgorithm, ASTRAL) and concatenated-based methods (IQ-TREE), unequivocally showed three main clades: the *Pleurophyllum* Clade (which includes *Damnamenia*, *Macrolearia*, and *Pleurophyllum*, see Saldivia et al. 2022), *Shawia* (including *Olearia* pro parte and *Pachystegia*), and *Celmisia*. In all the concatenation IQ-TREE phylogenies, the *Pleurophyllum* Clade was recovered as sister to the rest of *Celmisiinae* (Figure 3A), whereas this occurred only in 2 of the 8 summary coalescent phylogenies using ASTRAL. In the other 6 ASTRAL phylogenies (Figure 3B), the *Pleurophyllum* Clade was recovered with *Celmisia*, and together they were sister to *Shawia*.

Based on phylogenetic analyses of the nuclear ribosomal regions ITS (internal transcribed spacer) and ETS (external transcribed spacer), Saldivia et al. (2020) and Saldivia (2021) recovered *Celmisia* separated in two non-sister clades. One clade, *Celmisia* s. stricto, with subgenera *Celmisia* and *Pelliculatae*, and the other clade, *Lignosae* s. lato, including subg. *Lignosae* with subgenera *Caespitosae* and *Glandulosae* nested in it. However, in Nicol et al. (2024) samples of *Celmisia* s. stricto (i.e. subgenera *Celmisia* and *Pelliculatae*) were recovered together but nested within *Celmisia* subg.

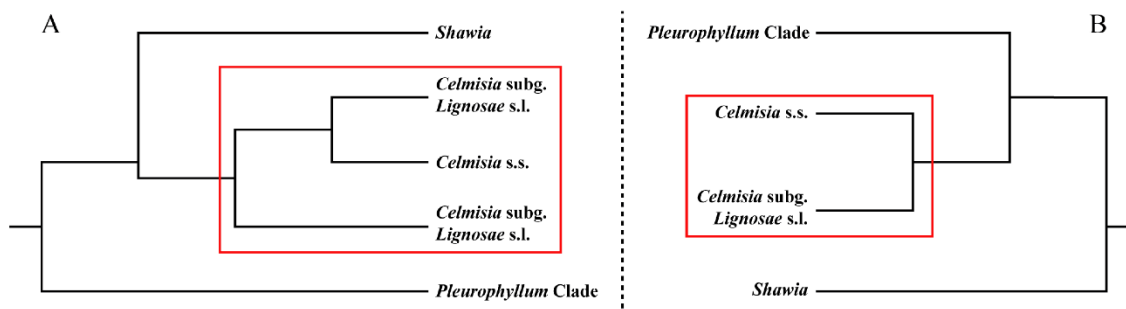


Figure 3. A. Summarised tree of the concatenated-based (IQ-TREE) and some of the coalescent-based (ASTRAL) phylogenies by Nicol et al. (2024). B. Summarised tree of six of the ASTRAL phylogenies and the morphological hierarchical clustering method, both from Nicol et al. (2024).

Lignosae s. lato in 13 trees (Figure 3A, red rectangle). There were 3 coalescent-based trees in which *Celmisia* s. stricto and *Celmisia* subg. *Lignosae* s. lato were recovered as sister groups (Figure 3B, red rectangle).

Nicol et al. (2024) also implemented a hierarchical clustering method of 66 qualitative morphological characters for 151 out of 159 species scored by Saldivia (2021). This analysis recovered *Celmisia* divided into 2 sister clusters equivalent to *Celmisia* s. stricto and *Lignosae* s. lato (Figure 3B, red rectangle) as in the 3 coalescent-based trees mentioned above.

It is important to note that the sampling in the phylogenomic analyses by Nicol et al. (2024) was uneven regarding *Celmisia*, with a bias towards *Lignosae* s. lato. Only four of the 38 taxa in *Celmisia* s. stricto were included compared to 22 of the 28 taxa in *Lignosae* s. lato. Although the four species from *Celmisia* s. stricto were always recovered as a clade, their position was sensitive to filtering methods and alignment sets, and the support for their position relative to *Lignosae* s. lato was variable (Nicol et al. 2024). Genomic characters relevant to their effective placement may not have been recovered or could have been filtered in some cases. The 3 trees that did recover a distinction between *Celmisia* s. stricto and *Lignosae* s. lato included intron ‘flanking’ data, which were three to six times larger than the exon data. In addition to data availability for distinction, mutation rates from these flanking regions may be closer to neutral substitution rates compared to the potentially regulated exon regions, meaning that the intron data also may contain more relevant information for distinguishing shallower evolutionary relationships (Nicol et al. 2024). Nonetheless, more sampling is needed from *Celmisia* s. stricto to solve this issue.

In any case, the separation of *Celmisia* in *Celmisia* s. stricto and *Lignosae* s. lato is strongly supported by morphology (Figure 3B), with 2 clear diagnostic characters regarding habit and resinosity. In *Celmisia* s. stricto, plants are subshrubs with mostly herbaceous aerial structures arising from a woody hypogeous rhizome or short vertical stem, versus prostrate or procumbent cushion-like shrubs in *Lignosae* s. lato. *Celmisia* s. stricto lacks resins, versus *Lignosae* s. lato, in which all species produce resins as exudations (viscosity) or glandular trichomes. The study by Nicol et al. (2024) did not find support for the infrageneric taxonomic framework by Given & Gray (1986) at any taxonomic rank (i.e., subgenera, section, series).

Scope of this study: *Celmisia* subg. *Lignosae* s. lato.

Lignosae was described as a section by Allan (1961), who included 22 species of “Subshrubs with hard woody stems and branches; leaves imbricate along the branches, sheaths long-persistent; disc-florets yellow.” However, his diagnosis was not consistent with the species included. He divided *Lignosae* into two main groups, and one of them, subsect. *Rosulatae* Allan, which includes taxa with

“living leaves concentrated in rosulate clusters at tips of branchlets,” clearly does not fit with the description of his section.

Given (1969a) treated *Lignosae* at subgeneric rank, modifying Allan’s concept substantially (Table 2) and included 25 species. He defined it based on several floral and vegetative characters, like leaf glandularity, involucre shape, anatomy of the trichomes of the disc corolla, and morphology of the style branch appendages. The main changes of Given (1969a) concerning the previous proposal (Allan 1961) were the exclusion of ser. *Nanae* Allan, which he included in subg. *Celmisia*, and the inclusion of subsections *Stoloniferae* Allan and *Serratae* Allan (Table 2). After the subgeneric proposal by Given (1969a) and the description of 2 new species (Given 1971), the taxonomy of subg. *Lignosae* has not been studied any further.

Given (1969a) and Given & Gray (1986)			Allan (1961)				
Subgenus	Section	Series	Species	Series	Subsection	Section	
<i>Lignosae</i>	<i>Lignosae</i>	<i>Lignosae</i>	<i>C. hectori</i>	<i>Discoloratae</i>	<i>Rosulatae</i>	<i>Lignosae</i>	
			<i>C. rupestris</i>	<i>Robustae</i>	<i>Imbricatae</i>		
			<i>C. lateralis</i>				
			<i>C. ramulosa</i>				
			<i>C. gibbsii</i>				
		<i>C. walkeri</i>					
		<i>Angustifoliae</i>	<i>C. brevifolia</i>	<i>Discoloratae</i>	<i>Rosulatae</i>		
			<i>C. angustifolia</i>				
			<i>C. incana</i>				
			<i>C. discolor</i>				
	<i>C. durietzii</i>						
	<i>Rosulatae</i>	<i>Rosulatae</i>	<i>C. lindsayi</i>	<i>Lanatae</i>	<i>Viscosae</i>		
			<i>C. bonplandii</i>				
			<i>C. allanii</i>				
			<i>C. macmahonii</i>				
			<i>C. sinclairii</i>				
		<i>Abbreviatae</i>	<i>C. viscosa</i>	<i>Not treated</i>	<i>Abbreviatae</i>		
			<i>C. inaccessa</i>				
			<i>C. densiflora</i>				
			<i>C. prorepens</i>			<i>Elongatae</i>	<i>Stoloniferae</i>
			<i>C. glabrescens</i>				
	<i>Serratae</i>	<i>Montanae</i>	<i>C. haastii</i>	<i>Discoloratae</i>	<i>Rosulatae</i>	<i>Celmisia</i>	
			<i>C. cockayniana</i>				
			<i>C. holosericea</i>				
			<i>C. dallii</i>				<i>Serratae</i>
<i>C. hieracifolia</i>							
<i>Celmisia</i>	<i>Pulvinatae</i>	<i>C. sessiliflora</i>	<i>Nanae</i>	<i>Imbricatae</i>	<i>Lignosae</i>		
	<i>Nanae</i>	<i>C. argentea</i>					
		<i>C. laricifolia</i>					

Table 2. Comparison between the delimitation of *Lignosae* (highlighted in gray) by D.R. Given (Given 1969a, Given & Gray 1986) and H.H. Allan (1961). In bold, the type species of each taxon under Given’s proposal. *C. philocremna* was not assigned by Given & Gray 1986.

Subgenera *Caespitosae* and *Glandulosae* were first described as subsection and series, respectively, by Allan (1961), in which *Caespitosae* includes *C. bellidioides* Hook.f., *C. thomsonii* Cheeseman, and *C. parva* Kirk, and *C. glandulosa* Hook.f. was the only member of *Glandulosae*. Given (1969a) elevated both to the subgeneric rank, and kept the same structure at the species level, but he did not include *C. parva* in his analysis. Based on morphology, *C. parva* should be placed in subg. *Pelliculatae*, and so it is excluded from this taxonomic revision.

As stated in the previous section, based on results from Saldivia et al. (2020), Saldivia (2021), and Nicol et al. (2024), these 3 subgenera (i.e., *Lignosae*, *Caespitosa*, and *Glandulosae*) are treated here as *Celmisia* subg. *Lignosae* s. lato.

METHODS

This taxonomic revision is based on the examination of herbarium specimens and the study of populations of most of the species in the field. I undertook extensive fieldwork across the South Island (four seasons, 2015–2016, 2016–2017, 2017–2018, and 2018–2019) and one trip to Stewart Island in December 2017 (Figure 4, both islands are part of mainland New Zealand). The species I could not study in the field were *C. cockayniana* Petrie, *C. gibbsii* Cheeseman, *C. glabrescens* Petrie, *C. inaccessa* Given, *C. macmahonii* Kirk, and *C. thomsonii*. Plant collections were conducted under permits from the Department of Conservation of New Zealand (Authorization Number: 50879-FLO and Landcare Research concession number CA-31615-OTH).

I examined ca. 2600 specimens, including types, from the principal New Zealand herbaria (AK, CHR, OTA, and WELT), complemented with the study of online images of mainly type specimens from B, BM, GOET, K, LE, M, and P through Global Plants Initiative (<https://plants.jstor.org/>) or from the herbaria websites. The herbarium acronyms follow Thiers (2023+). Nomenclature follows the Shenzhen Code (Turland et al. 2018). Typifications have been treated by Saldivia (2023), except for two neotypes and one lectotype designated in this study.

Floral structures were studied after being rehydrated in boiling water for 1–2 minutes. Morphological characters were assessed using a dissecting photomicroscope (Leica EZ4D, Zurich, Switzerland) and a compound light microscope (Zeiss Axiostar Plus, Carl Zeiss, Oberkochen, Germany) equipped with a digital camera (Canon PowerShot A620, Canon Inc., Tokyo, Japan). For the compound light microscopy, samples were mounted with purified water. Measurements were made mainly on herbarium specimens. However, as far as possible, descriptions were complemented with field observations of living plants. This is especially relevant to the shape of the involucre at anthesis, as it often loses its natural shape when it is dry. For instance, cylindrical involucres at anthesis often become campanulate when completely dry. Florets color also refers to living material based on field observations, data from labels of herbarium specimens, or previous works.

Almost all the specimens studied were mapped. Those few specimens which had georeferenced data were directly added to the map, otherwise the locations mentioned in the specimens' labels were located using the digital platforms NZ Topo Map (<https://www.topomap.co.nz/>) and New Zealand Gazetteer (<https://gazetteer.linz.govt.nz/>). The symbols representing localities were placed as accurately as possible, given the information on the labels. These locations are considered rigorous, given the scale of presentation of the maps and the size of the symbols (i.e., dots: ca. 2830 ha, squares: ca. 3600 ha). In some cases where the locality data were not clear enough and could equally represent more than one locality from different geographic areas, the specimen was not mapped. Main cities, lakes, and the Alpine Fault are shown in the maps as geographic references.

The classification of the Alpine vegetation of New Zealand follows Mark & Adams (1995). Comments on habitat for each species follow the same reference complemented with field observations. These are meant to indicate the main habitat preferences of each species, even though the species can occur occasionally in a wider elevation range (Figure 6). Photographs were taken by the author unless otherwise indicated.

Specific and infraspecific taxonomic concepts

The species is fundamental in the taxonomic hierarchy and the level to which all other categories directly relate (Stuessy 2009). The species concept is of long-standing debate, and many concepts have been proposed (e.g., Cracraft 2000; Christenhusz 2020; Nathan & Cracraft 2020). And

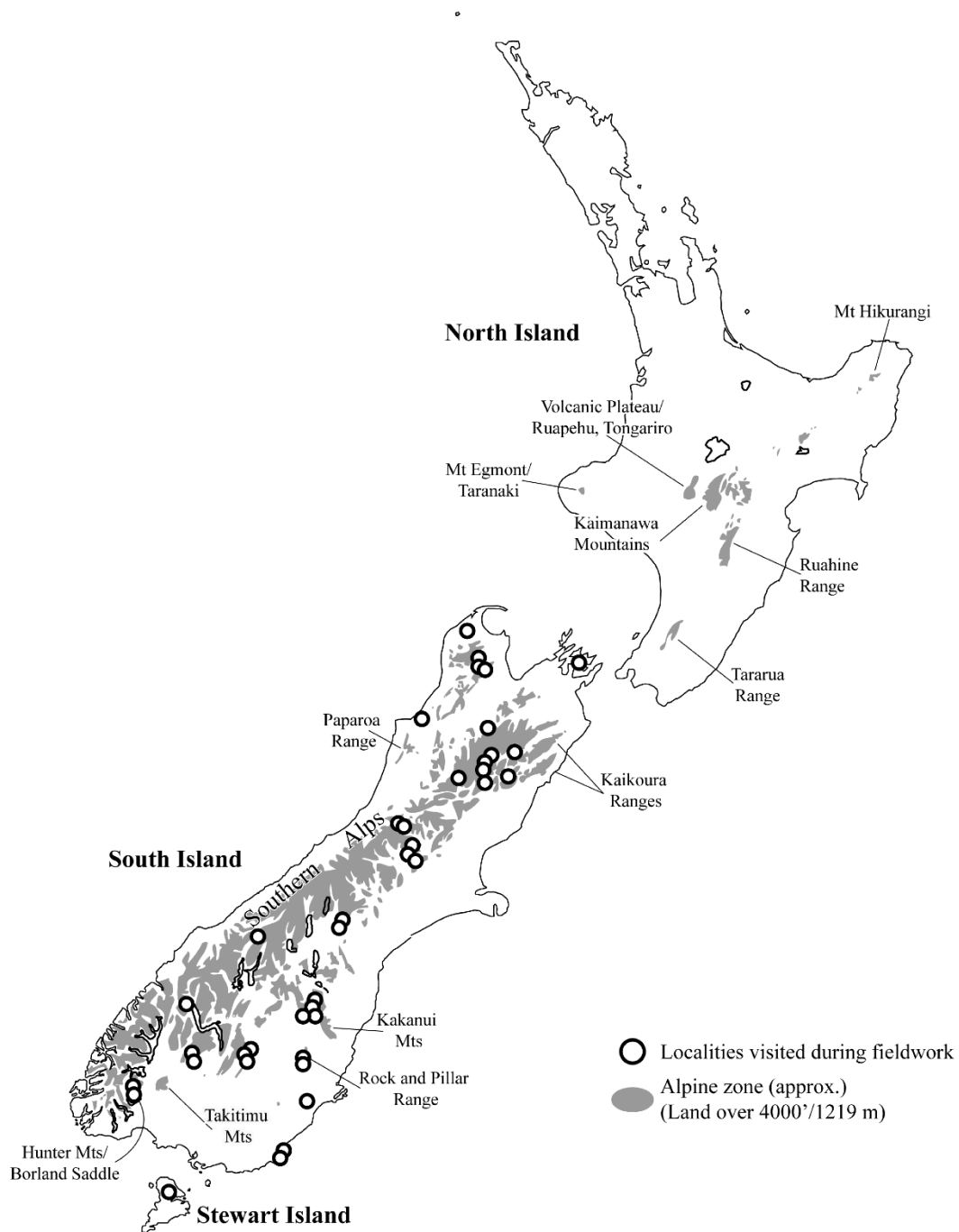


Figure 4. Mainland New Zealand (North, South, and Stewart Islands) showing an approximate alpine zone where most of the species treated here are naturally distributed. Circles indicate the localities visited during fieldwork.

considering that many different modes of speciation occur, an agreement will probably never be reached.

In the absence of population genetic studies, as in the group studied here, the available information considered to propose a species concept, comes mainly from morphological and distributional data. However, the recent phylogenomic study by Nicol et al. (2024) is used here to inform taxonomic decisions in few taxa (see below comments on each species). Therefore, a pragmatic

approach which uses morphological cohesiveness as a proxy for proposing hypotheses of species delimitation, is the most feasible alternative. This approach assumes that as a product of reproductive isolation, to a greater or lesser degree, different species are genetically different and hence morphologically distinctive. Indeed, in plants, it is not common to have reproductive isolation without morphological change (Stuessy 2009). In the same way, different levels of connectivity (genetic exchange) could lead to stronger or weaker morphological boundaries between species. Accordingly, here I accept species as “assemblages of individuals with morphological features in common and separate from other such assemblages by correlated morphological discontinuities in a number of features” (Davis & Heywood 1963 as cited by Knapp et al. 2017). Nevertheless, I am also following the reasoning of Cronquist (1947), who in the context of revising *Erigeron* (Astereae) in North America wrote that “In *Erigeron*, as in many other genera of the Compositae, it is impractical to insist on absolute constancy and absence of intergrades as the specific criterion. There are many entities which, although they must be recognized in any reasonable system as species, do occasionally intergrade with related entities through the production of apparently fertile hybrids.”

In the group analyzed here, most of the recognized species have well-defined morphological characters. Individuals with intermediate morphology (i.e., specimens whose morphological characters are such as to make their taxonomic position uncertain, Cronquist 1947) are rare. In the cases where I could not find clear morphological discontinuities among taxa currently accepted at the species level, I opted for synonymization or the acceptance of infraspecific taxa.

Regarding infraspecific taxa, subspecies and variety are most widely defined as being coherent evolutionary subsets — with geographic, ecologic, and/or often implied phylogenetic integrity — of species (Hamilton & Reichard 1992). However, there is no agreement regarding the definitions and limits between these two concepts, at least among plant taxonomists. Botanists from the USA and Europe have used both terms in roughly the same sense (Hamilton & Reichard 1992). Likewise, Davis & Heywood (1963) mentioned that because Linnaeus used only variety, many botanists have never adopted subspecies, or have regarded it as synonymous with variety. In the same line, Du Rietz (1930) pointed out that the term variety has been used very often merely as a synonym of form. Besides the morphological differences, other authors (Cronquist 1947; Davis & Heywood 1963; Thorne 1978) have considered phytogeographic segregation as the main difference between subspecies and varieties, which is absent or minimal in the latter. Whatever definitions had been taken by taxonomists, in a biological context what Nesom & Lipscomb (2005) said seems logical: “Intraspecific population systems, however, like species themselves, vary continuously in degree of differentiation and reproductive isolation, and if varieties and subspecies both are treated as morpho-geographic taxa, then a biological distinction between the two ranks is arbitrary.” A more pragmatic approach (Formulation 1, in Nesom & Lipscomb 2005) suggests that “tertiary ranks [i.e., Art. 4.2, Turland et al. (eds.) 2018] be used only in conjunction with secondary ranks [Art. 4.1, Turland et al. (eds.) 2018] between family and genus, between genus and species, and below species, [...]”. This approach is also in concordance with the current Code (Turland et al. (eds.) 2018) and is followed here. Accordingly, subspecies should be used when varieties need to be grouped. However, it should be noted that Note 1 in Article 4 still leaves the issue open to divergent interpretations.

Because of the uncertainties regarding the definitions and use of infraspecific taxa, I have tried to avoid their use. However, in three cases (*C. ramulosa* Hook.f., *C. haastii* Hook.f., and *C. sinclairii*), this has been unavoidable. *Celmisia ramulosa* exhibits a syndrome of morphological characters that makes it unmistakable and difficult to relate to any other species. It presents, however, an allopatric east-west differentiation regarding its leaf morphology, with scant intermediate specimens collected at the distributional boundary. These differences have long been recognized at varietal rank. The same is applied to *Celmisia haastii* Hook.f., in which the two varieties recognized show absolute allopatry. Regarding *C. sinclairii*, it is as a variable species composed of three varieties that were previously

recognized at specific rank (*C. allanii* W. Martin, *C. durietzii* Cockayne & Allan ex W. Martin, and *C. sinclairii*). The taxonomic history of these varieties dates back to Hooker (1864), and there has been confusion regarding their identities (see notes in the species description). These three entities differ in the levels of glandularity and indumentum covering the leaves, upon which their identification in most cases is not difficult. However, they are sympatric in the north of the South Island, and individuals with intermediate morphology are not uncommon.

RESULTS

Morphology

A. Habit and architecture

All the species are considered shrubs because of the development of hard woodiness in the main axes. Only the new-growing shoots show a temporarily herbaceous consistency. The term subshrub or suffrutex is not applicable here as it is usually defined for plants lignified only at the base (FontQuer 2001). Plagiotropy defines the general architecture of *Lignosae* s. lato from which the following types can be identified. More than one habit type can be identified for the same species.

Cushion: almost all the taxa here recognized fit under this category. Cushions are here understood following Parsons & Gibson (2009), who defined them as “Chamaephytes or hemicryptophytes that, growing singly, take on a hemispherical or subhemispherical shape due to the close branching of their shoots and their short internodes.” Three subcategories of cushions are recognized.

Semi-erect decumbent (sometimes ascending): main axis growing orthotropically a few centimeters and then profusely branched plagiotropically, first horizontal or obliquely and the extremes finally erect (orthotropic) again (*C. ramulosa* var. *tuberculata* G. Simpson & J.S. Thomson and sometimes *C. ramulosa* var. *ramulosa*).

Loose: lax sprawling plants with the shoots close to each other but visible, easily differentiated from each other (*C. ramulosa* var. *ramulosa*, *C. lateralis* Buchanan, *C. gibbsii*, *C. viscosa* Hook.f., *C. macmahonii*, *C. walkeri* Kirk, *C. angustifolia* Cockayne, *C. lindsayi*, *C. inaccessa*, *C. discolor*, *C. bonplandii* (Buchanan) Allan, *C. sinclairii*, *C. hieraciifolia* Hook.f., *C. densiflora* Hook.f.).

Compact: *C. philocremma* Given is the only species in *Lignosae* s. lato that forms hard and tight cushions in which only the apices of the branches are visible. This habit is the same as in, for example, several high altitude *Raoulia* Hook.f. ex Raoul species (e.g., *R. rubra* Buchanan and *R. eximia* Hook.f.) from New Zealand, or some *Azorella* Lam. species (e.g., *A. madreporica* Clos and *A. compacta* Phil.) from the Andes.

Mat: Foweraker (1917) defined a mat-plant as follows: “one whose main branches lie prostrate on the ground and, as a rule, radiate in all directions from a center of growth; the vertical branches are very short and compacted together so that the plant forms a close mat of little depth.” He also mentioned that the only difference between cushion and mat is in the length of the vertical (orthotropic shoots) branches that are longer in the cushions, so that the whole growth is deeper and tends to assume a hemispherical form. Therefore, for many alpine, subalpine, or montane plants, the boundary between the cushion and mat is not clear and the same species can grow as a cushion or mat depending on exposure, soil properties, or other factors.

Mat with long profuse branching: plants covering extensive areas and being difficult to differentiate between individuals. The plants (singular plants or groups of individuals) keep a constant height and loose branching (*C. hectorii* Hook.f., *C. rupestris* Cheeseman, *C. walkeri*).

Mat with short radial branching: the plants grow prostrate at ground level (*C. holosericea*, *C. dallii* Buchanan, *C. cockayniana*?, *C. hieraciifolia*, *C. inaccessa*, *C. discolor*, *C. bonplandii*, *C. sinclairii*, *C. densiflora*).

Hygrophilous: mats with part or all the branches, apart from the tips with the new season leaves, hypogeous. Two species mostly restricted to moist areas and snowbanks are placed in this category (*C. haastii* and *C. prorepens* Petrie, with the latter often found on the margins of snowbanks).

Creeping plants: a few species do not produce cushions or mats arising from a central point. *Celmisia bellidioides* and *C. thomsonii* produce epigeous, branched runners with adventitious roots at nodes, forming cushions by agglomeration of short branches at the end of runners. These two species are restricted to rocky outcrops and scree slopes. On the other hand, *C. glandulosa* and *C. glabrescens* produce more or less hypogeous, stoloniferous rhizomes and grow in bogs or permanent wet areas.

Among cushions and mats, rooting is restricted to the main central system and to the proximal part of the main branches. However, as in old plants of some species (e.g., *C. viscosa*) the center usually dies, some branches develop adventitious roots and eventually established as an independent individual clone.

B. Foliage

Phyllotaxis is always alternate and mostly 2/5 with very short internodes. Therefore, the stem is covered by overlapping sheaths. Leaves are sessile, although, in most of the species the lamina is attenuate or abruptly constricted towards the base (i.e., decurrent) or in the transition zone with the sheath, leaving the mid-vein bordered by two lateral (one on each side) thin bands of the limb. In this case, the leaves are defined as pseudo-petiolate.

Leaves are well-differentiated into lamina and sheath. The sheath is the base of the leaf that remains attached to the stem, and is usually semiclasping, covering nearly half of the stem diameter. The sheath is parallel-sided, hyaline, glabrous in both surfaces in most species, and only in some species lanose at the margins. The venation of the sheath is always parallel without differentiation between mid and secondary veins.

The lamina shape ranges from linear to obovate or oblanceolate, and less commonly tending to elliptic, deltoid, or oblong. The primary venation type should be defined as pinnate craspedodromous (Hickey 1973), in which the secondary veins arise from the midvein and terminate at the margin. In most species the secondary veins are suprabasal (i.e., borne near the base) or rarely basal (e.g., *C. macmahonii*), and run parallel to each other following the margin shape and gradually diminish apically ending at a tooth. However, in *Celmisia* the veins actually originate at the base of the sheath and are consistently parallel. What is above referred to as "arise" refers to the structure of the veins above the constriction area between the sheath and lamina, with the midvein often composed of several central veins from the sheath. In a few species (e.g., *C. ramulosa*, *C. lateralis*), only the midvein is visible, although secondary vascular bundles can be identified when observing transverse sections of the leaves under the microscope. The exception is *C. viscosa*, in which the venation is strictly parallel with eight or more conspicuous veins, without distinction between mid and secondary veins, running parallel along the length of the lamina (i.e., parallelodromous).

C. Resinosity and trichomes

All species in *Lignosae* s. lato are resinous, a feature absent in the remaining subgenera *Celmisia* and *Pelliculatae*. Resin exudations and/or glandular trichomes are present in leaves, peduncles, and phyllaries. Glandular trichomes are commonly biseriate with (Figure 5E, F) or without (Figure 5D) a conspicuous stalk. Other types of glands that are not attached to the epidermis of the

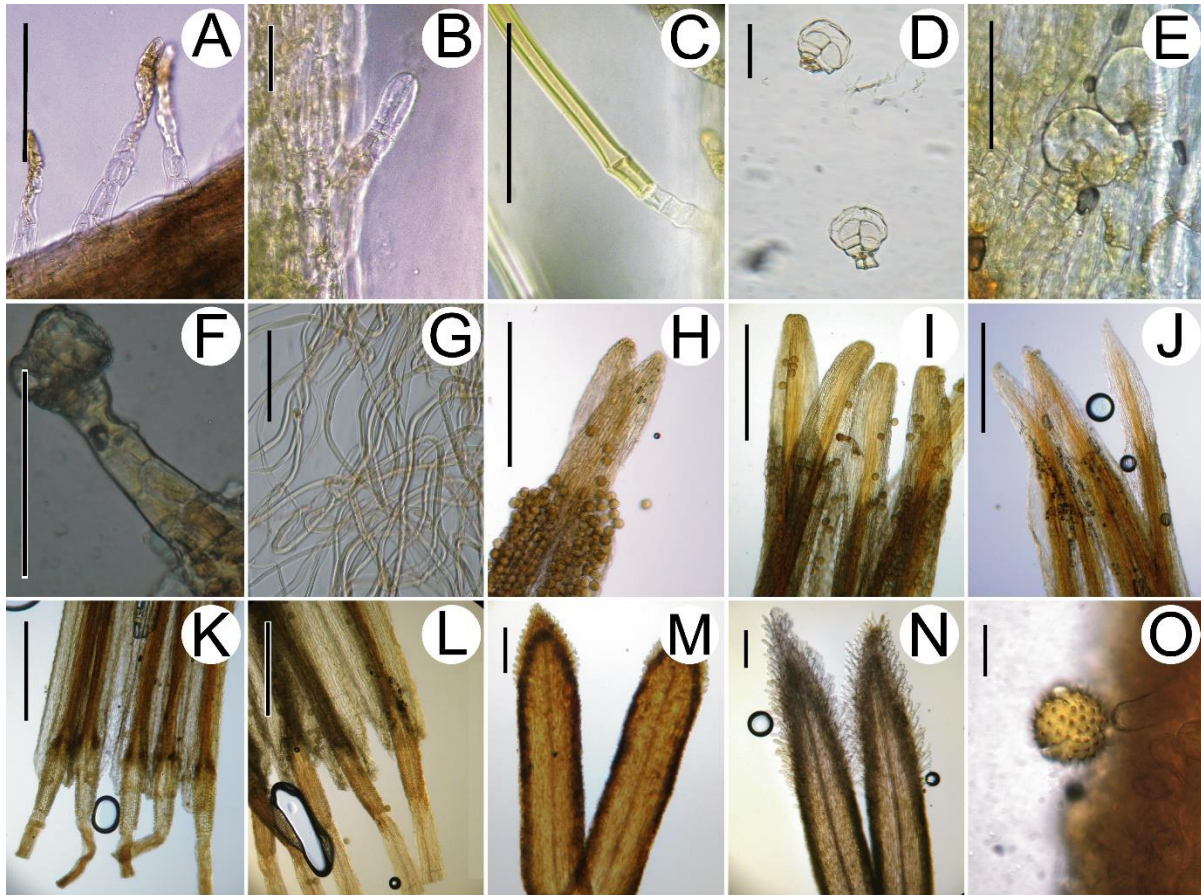


Figure 5. Biseriate eglandular trichomes: A. *C. thomsonii* (OTA 44722); B. *C. angustifolia* (OTA [*P. Saldivia* 2593]). Silky trichome: C. *C. philocremna* (OTA [*P. Saldivia* 2550]). Biseriate glandular trichomes: D. *C. hectorii* (OTA [*P. Saldivia* 2559]); E, F. *C. ramulosa* (OTA [*P. Saldivia* 2570]). Aseptate flagellate trichomes: G. *C. densiflora* (OTA [*P. Saldivia* 2547]). Anthers apical appendages: H. *C. cockayniana* (CHR 519515); I. *C. thomsonii* (OTA 44722); J. *C. sinclairii* var. *allanii* (OTA [*P. Saldivia* 2623]). Anthers bases, filament collar, and filament: K. *C. lindsayi* (OTA [*P. Saldivia* 2516]); L. *C. prorepens* (OTA [*P. Saldivia* 2531]). Stigmatic bands and apical appendages of the style branches of the disc florets: M. *C. discolor* (OTA [*P. Saldivia* 2626]); N. *C. glandulosa* (OTA [*P. Saldivia* 2567]). Pollen grain: O. *C. densiflora* (OTA [*P. Saldivia* 2547]). Scale bars: A, C, M, N: 200 μ m; B, D: 50 μ m; E–G: 100 μ m; H–L: 500 μ m; O: 20 μ m.

leaves are also present in some species (e.g., *C. densiflora*). The presence and absence of glandular trichomes are constant characters within species and useful for discrimination among them. Biseriate eglandular trichomes (Figure 5A, B) are common on disc corollas but are often scattered. *Celmisia philocremna* is the only species with both biseriate eglandular and silky (Figure 5C) trichomes covering the disc corolla's surface.

Most of the species present a layer of indumentum (often white) covering the abaxial surface of the leaves and, in some species, also the adaxial surface. The indumentum is made up of flagellate aseptate trichomes of different lengths that are flat or terete (Figure 5G). Other types of eglandular trichomes are rare; however, when they occur, these are diagnostic characters at species level. For example, *Celmisia hectorii* is the only species with eglandular biseriate trichomes covering the phyllaries along the abaxial midvein.

D. Capitulescences

Capitula are axillary and solitary (monocephalous). The only exception is found in *Celmisia cockayniana*, a little-known species endemic to Marlborough and overall most similar to *C.*

hieraciifolia, with which it is allopatric. Peduncles with one or two smaller lateral capitula have been found only in two old specimens of *C. cockayniana* (see species description) — I did not find this attribute in any of the other specimens I examined.

Other examples of peduncles bearing several capitula have been occasionally reported in *Celmisia coriacea* (Given 1973) and *C. spectabilis* Hook.f. (Elder 1974). However, these species belong to subg. *Pelliculatae*.

E. Capitula, florets, and pollen

Involucres are commonly short cylindrical at anthesis, although in a few species campanulate. The number of phyllary series, shape, and trichome ‘types are informative characters for discriminating species (see Taxonomic key). Phyllaries are coriaceous, often green to purplish, and resinous. The receptacle is alveolate and epaleate.

Capitula are radiate, with pistillate ray florets and hermaphrodite disc florets. Staminodes occasionally occur in some species; I observed them in some florets of *Celmisia holosericea* and *C. philocremna*. Staminodes are scattered across Celmisiinae but are constant in *Macrolearia* (Saldivia et al. 2022).

Anthers are caudate with the appendages (tails) shorter than the filament collar, which in turn is slightly wider than or of the same width as the filaments (Figure 5K, L). The apical appendages are usually deltoid to linear-deltoid, and the apex is straight, rounded, or rarely truncate (Figure 5H–J). The style branches exposure is pronate, with stigmatic bands well-developed along $\frac{3}{4}$ (rarely less) of the branches length (Figure 5M, N).

Cypselae are fusiform-cylindrical, with almost constant five (rarely four or six) conspicuous ribs and covered on twin trichomes of variable density. The only species with glabrous cypselae is *Celmisia haastii*. Pollen is equinulate, ca 20 μm diameter in all the species (Figure 5O).

Chromosome number

In Celmisiinae, the ploidy level is unusually high (Given & Gray 1986). Hair (1980) reported 12-ploidy (considering $x=9$ as the base number for Astereae, Given & Gray 1986; Brouillet et al. 2009; Semple & Watanabe 2009) for all the species accepted here, with $n=54$ (or $2n=108$), and accessory chromosomes for five species. Nicol et al. (2024) discussed the evolutionary and taxonomic implications of the high ploidy level in Celmisiinae.

Geographic distribution, habitat, and phenology

All species treated in this study are endemic to the three main islands of New Zealand. Twenty-one are endemic to the South Island. *Celmisia discolor*, *C. hieraciifolia*, and *C. glandulosa* are distributed in the North and South Islands. *Celmisia sinclairii* is the only species extended across the three main islands (North, South, and Stewart), and *C. glabrescens* is endemic to Stewart Island.

Species in this group are typically subalpine and alpine (Figure 6), many associated with rocky outcrops, ridges, or crevices among different vegetation types. Following the classification of the alpine vegetation by Mark & Adams (1995), the species treated here are a conspicuous element of the Low-Alpine vegetation, primarily associated with the Snow tussock (*Chionochloa* Zotov spp.)-herbfield and Herbfield types. Some species occur in the High-Alpine vegetation, mostly in Cushion vegetation (i.e., *Celmisia ramulosa* var. *tuberculata*, *C. philocremna*, *C. angustifolia*), and Snowbank (e.g., *C. haastii*, *C. prorepens*) vegetation types. Others, as reported by Given & Gray (1986), have a facultative distribution in areas below the alpine vegetation limit, like open areas, rocky outcrops, and stream beds (e.g., *C. bonplandii*, *C. densiflora*, *C. sinclairi* var. *durietzii*, *C. glandulosa*, *C. walkeri*). *C. glandulosa* and the poorly known *C. glabrescens* dwell exclusively on bogs, with the latter only

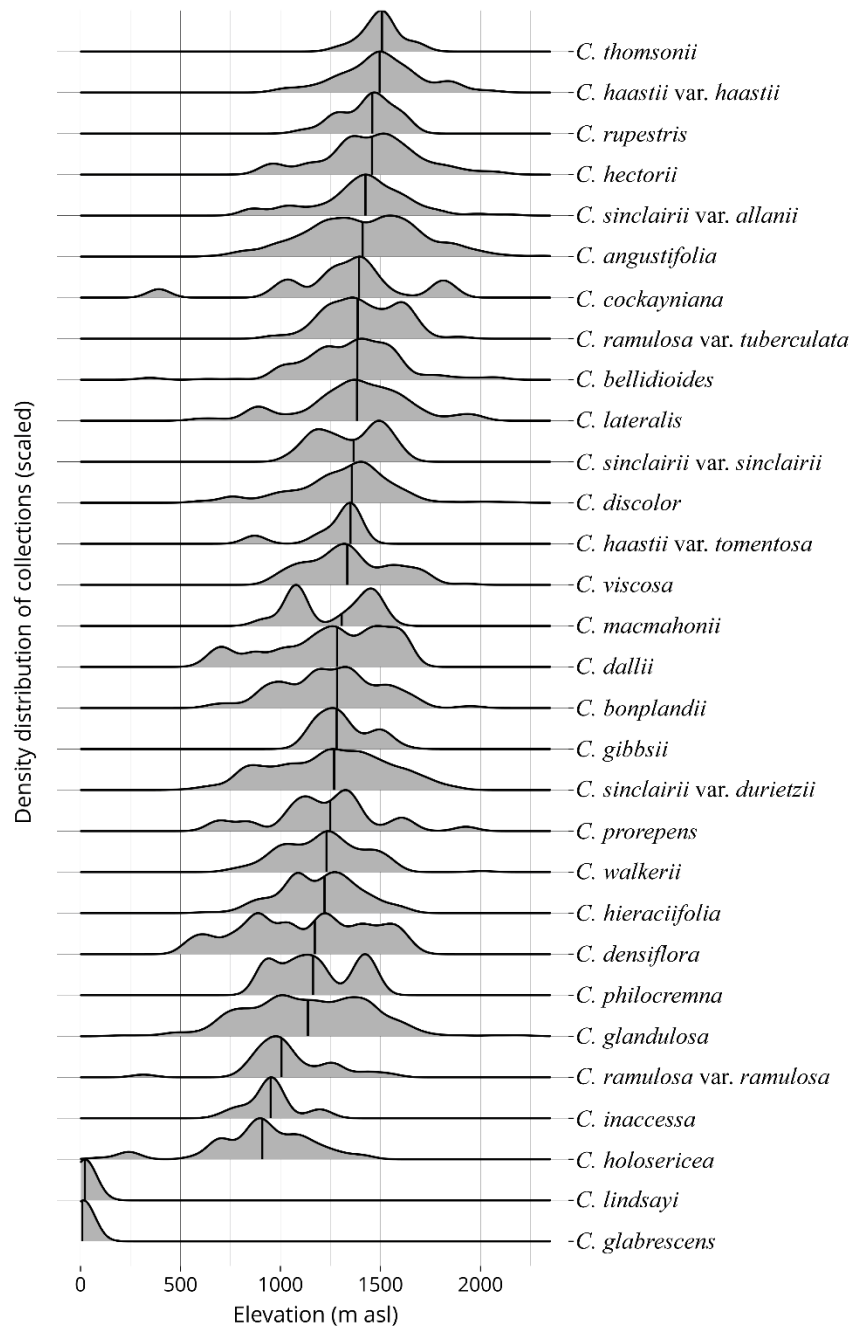


Figure 6. Elevation profiles for taxon species of *Lignosae* s. lato accepted in this study based on studied specimens. Elevation values were extracted from the georeferenced collections using SRTM (Shuttle Radar Topography Mission) data available from WordClim v2 (Fick & Hijmans 2017).

known from the low-altitude wetland of the Freshwater River in Stewart Is. *Celmisia holosericea*, endemic to Fiordland (Southland), is the only species ranging from the coast to the alpine zone (Low-Alpine vegetation). The most remarkable species in terms of habitat is *C. lindsayi*, the only strictly coastal species with a restricted distribution on the southeast coast of the South Island (The Catlins, Otago), where it inhabits coastal cliffs and rocky outcrops.

Celmisia species, like most of the alpine flora, have a short reproductive cycle due to the limited growing season (Mark 1970). Based on my field experience and herbarium studies, the species treated

here typically flower from late November to mid-February, and fruiting lasts until late March. This period matches the phenology data for 15 *Celmisia* species at the Craigieburn Range (mountains of central Canterbury, east of the main divide) reported by Gosden (2012). From the same area, Spence (1989) mentioned flowering in December and fruit dispersal in January-February for *C. viscosa*, and flowering and fruit dispersal in January and February-March respectively for *C. discolor*. Clarke (1968) reported similar flowering phenology for *C. discolor* at Cupola Basin (Travers Range, Nelson Lakes National Park) from December to March.

Also, like many alpine species, floral bud initiation in *Celmisia* is generally in the previous year. Mark (1970) reported autumn initiation and successful overwintering of floral primordial for 81 alpine species (out of 100 examined), including 12 of species considered in this revision (out of 23 of *Celmisia* s. lato). Floral bud abortion (at different levels) over winter was higher in *Celmisia* s. lato, and most significant in *C. hectorii*. Remarkably, Mark (1970) also reported floral initials in late April for *Celmisia lindsayi*, the only strict coastal species, which is probably the species with the earliest flowering in mid-October.

Another important aspect of many alpine New Zealand species is the irregular flowering from season to season. Seasons with heavy flowering or masting occur intermittently and often synchronously among species within a genus and sometimes even between genera (Mark 1970; Wardle 1978; Campbell 1981). Campbell (1981) monitored the flowering of five alpine species over 9 years and found that *Celmisia viscosa* showed markedly infrequent flowering, with the time between significant flowering peaks of at least 8 years, and probably 13 years when comparing data from other studies. Causes for mast flowering in *Celmisia* are not well-understood. Still, recent advances in the comprehension of this phenomenon from climatic (Kelly et al. 2013) and genetic (Samarth et al. 2019) perspective have included *C. lyallii* Hook.f. as a model species.

Hybridization

The only study focusing on hybridization among *Celmisia* species is an unpublished master's thesis by Gosden (2012) titled 'What prevents hybridization in *Celmisia*?' She performed experiments of pre- and postzygotic hybridization barriers on 15 *Celmisia* species at the Craigieburn Range, including 6 species (*C. angustifolia*, *C. discolor*, *C. glandulosa*, *C. haastii*, *C. viscosa*, *C. walkeri*) including in this study. In relation to pre-zygotic barriers, Gosden (2012) tested whether phenology and pollinators act as barriers preventing hybridization. Regarding phenology, specifically flowering time, Gosden (2012) found some evidence of temporal segregation between species, but not enough to conclude that it was acting as a strong reproductive isolating barrier. Likewise, she found that *Celmisia* species shared similar insect flower visitors. Overall, Gosden (2012) concluded that *Celmisia* species are weakly isolated by both differences in flowering time and flower visitor preferences.

Given & Gray (1986) wrote that "Although evidence [for hybridization] in *Celmisia* is almost solely from the field, it does appear that hybrids are of frequent occurrence." However, based on my field and herbaria studies, there is little evidence of hybridization in *Lignosae* s. lato (see Allan 1961: 652–655). Individuals with intermediate or anomalous morphology that could be interpreted as hybrids occur occasionally, but the putative parental species are not always evident (see Taxonomic treatment for details).

Clarkson (1988, 1993) convincingly reported an intergeneric hybrid between *Olearia arborescens* (G. Forst.) Cockayne & Laing and *Celmisia gracilentia* (subg. *Celmisia*) and also provided an overview of putative *Celmisia* × *Olearia* hybrids. Intergeneric hybrids involving species of *Lignosae* s. lato have been reported by Simpson and Thompson (1942) as possibly *O. avicenniifolia* (Raoul) Hook.f. × *C. durietzii* (*C. sinclairi* var. *durietzii* in this revision). However, from the description, it is not possible to accurately interpret the putative parental species (Burrows 1986). Clarkson (1988) also mentioned an unpublished work by Druce (1977), where he listed the same plant described by Simpson

and Thompson (1942) as *C. durietzii* × *O. arborescens*, and also listed *C. incana* Hook.f. (*C. discolor* in this revision) × *O. arborescens*. Unfortunately, apart from Clarkson (1988), the mentioned intergeneric hybrids are purely speculative.

Common names

In New Zealand, species of *Celmisia* are widely known as Mountain Daisies, and often a reference to the specific epithet is added to the common name (e.g., Hector's Daisy for *Celmisia hectorii*). Tikumu is the indigenous Māori name that refers to large-leaved, montane-alpine species of *Celmisia*. However, this name has been mostly applied to *Celmisia semicordata* Petrie (Lord et al. 2010) in subg. *Pelliculatae*, which is not part of the group here studied.

TAXONOMIC TREATMENT

As explained in the previous sections, in this revision, I am considering subg. *Lignosae* in a broad sense, including the subgenera *Caespitosae* and *Glandulosae*. Several lines of evidence indicate that these three subgenera form a clade where the two latter ones are nested in *Lignosae*. However, in the recent phylogenomic study by Nicol et al. (2024), this topology is not conclusive, pending further analyses.

Celmisia* subg. *Lignosae (Allan) Given, New Zealand J. Bot. 7: 406. 1969. **TYPE:** *Celmisia ramulosa* Hook.f.

Celmisia subg. *Caespitosae* (Allan) Given, New Zealand J. Bot. 7: 409. 1969. **TYPE:** *Celmisia bellidioides* Hook.f.

Celmisia subg. *Glandulosae* (Allan) Given, New Zealand J. Bot. 7: 409. 1969. **TYPE:** *Celmisia glandulosa* Hook.f.

Plagiotropic **shrubs** up to 35 cm tall (excluding the capitula); loose or hard compact cushions, mats, or creeping plants, resinous, with the foliage usually clustered at the distal part of the branches, and the mid and proximal parts covered mainly by the sheaths of the old leaves. **Leaves** coriaceous or subcoriaceous, often resinous and sticky, alternate, 2/5 phyllotaxis at least clearly visible in the new shoots; lamina obovate, oblanceolate, linear, linear-oblong to slightly deltoid, 0.2–30 cm long, base often attenuate, decurrent forming a pseudopetiole, or truncate; apex shape convex, rounded or straight; venation pinnate craspedodromous with secondary veins mostly suprabasal, parallel to each other following the lamina outline, rarely secondary veins absent; adaxial surface glabrous, glabrescent, farinaceous, glandular or with scattered stalked or non-stalked glandular trichomes, sericeo-pubescent, lanose, satiny, or arachnoid; abaxial surface covered by dense layer of a cottony, felty, or satiny indumentum in most of the species, with scattered stalked or non-stalked glandular trichomes, or with scattered scurfy scales, or rarely glabrous; margin flat or revolute, mostly serrate or untoothed; sheath glabrous or abaxial surface covered in indumentum as the leaves, multinerved, often partially enclosing the stem (up to half of its circumference). **Capitula** solitary (but see comments on *C. cockayneana*), radiate, axillar, pedunculate; peduncles more or less flat or hemispheric in cross-section, resinous, glandular and/or lanose, covered with few to many linear foliaceous bracts. **Involucres** cylindrical to less frequently campanulate at anthesis. **Receptacle** rounded, alveolate, epaleate. **Phyllaries** arranged in 4–10 series, subequal or becoming gradually larger from the external to the inner ones, appressed, spread, or recurved, mostly linear to linear-oblong or linear-deltoid, mid-vein well-marked, resinous, glandular and/or lanose indumentum variably present; the tip of the inner series patent or recurved at anthesis by the development of the limb of the ray florets. **Ray florets** pistillate (staminodes rarely present), fertile, few to many arranged in 1–4 series, limb conspicuous, trilobate, white or rarely mauve. **Disc florets** hermaphrodite, 10–ca 250; corolla more or less tubular to infundibuliform, yellow, pentalobate with the lobes often reflexed at anthesis, with eglandular biseriate trichomes (rarely with scattered silky indumentum) or glabrous; androecium 5–synantherous, appendages acute or obtuse deltoid to oblong lanceolate, filament collar the same width or slightly wider (but not swollen) than the

filament, base caudate; style branches linear, stigmatic bands covering ($\frac{1}{2}$ –) $\frac{3}{4}$ or more of the branch length, appendages deltoid, style branch exposure pronate. **Pappus** of numerous barbellate flat bristles with closely spaced teeth, white to buff or rarely ferruginous, irregular in length (two different types only in *C. philocremna*), arranged in 1–3 rows, often with an external row of diminutive setae. **Cypselae** linear, fusiform-cylindrical, 2–6 mm long, 4–6 ribbed, slightly compressed, with twin and glandular (in a few species) trichomes, or rarely glabrous; carpopodium forming a ring and shallow foramen.

Key to the species of subg. *Lignosae* s. lato

1. Abaxial surface of leaves covered with a dense (epidermis not visible or visible only along the midvein) or occasionally thin layer of arachnoid, cottony, felty, or satiny, white, silver, or ferruginous indumentum made of flat or terete flagellate aseptate or silky trichomes.
 2. Abaxial surface of leaves covered with a thin layer of arachnoid white indumentum; creeping stoloniferous plants (adventitious roots at nodes with hypogeous branching), forming patches or connected loose cushions at the end of the main axes.....7. **C. glabrescens**
 2. Abaxial surface of leaves covered with a dense layer of arachnoid, cottony, felty, or satiny, white, silver, or ferruginous indumentum; non-creeping plants, forming individual loose cushions or mats.
 3. Lamina untoothed, strongly revolute, < 25 mm long.
 4. Tight, compact cushion; scape and phyllaries densely covered with a silky white indumentum; leaves 12–25 mm long8. **C. philocremna**
 4. Loose cushions or small ascending shrubs; scape and phyllaries lacking silky white indumentum; leaves 3.5–8 mm long 3. **C. ramulosa**
 3. Lamina dentate or serrate, flat to slightly revolute; if untoothed, the leaves are > 30 mm long.
 5. Lamina linear, linear-oblongate, or rarely linear-oblong; if linear-oblongate, then slightly wider at the upper third, and the broadest part of the lamina equal or narrower than the sheath; lamina not abruptly constrained at the bottom.
 6. Adaxial surface of the leaves covered with a white-silvery thin layer of flat flagellate aseptate trichomes, forming a loose pellicle.
 7. Phyllaries covered with long biseriate eglandular trichomes 10. **C. hectorii**
 7. Phyllaries covered with short non-stalked glandular trichomes 11. **C. rupestris**
 6. Adaxial surface of the leaves lacking a white-silvery thin layer of flat flagellate aseptate trichomes forming a loose pellicle.
 8. Lamina with eight or more parallel ribs and no mid-vein differentiated..... 12. **C. viscosa**
 8. Lamina with prominent mid-vein and 1–2 secondary veins more or less parallel to the mid-vein.
 9. Lamina covered on both surfaces with a dense grey satiny tomentum, which turns buff to ferruginous when dry; secondary veins not visible as hidden beneath the indumentum 13. **C. macmahonii**
 9. Lamina not as above; adaxial surface glabrous-viscid or rarely covered with a thin layer of arachnoid white indumentum; when dry, the secondary veins (and some third order) on the adaxial surface, are noticeably raised and contrasting in color with the lamina.
 10. Peduncle covered with biseriate stalked glandular trichomes..... 15. **C. walkeri**
 10. Peduncle glabrous-viscid or covered with non-stalked glandular trichomes 14. **C. angustifolia**

5. Lamina oblanceolate, obovate, obovate-elliptic, elliptic, conspicuously wider at the mid or upper third of the lamina, with the broadest part wider (or less commonly of the same width) than the sheath; lamina attenuate to often abruptly constrained at the bottom of the lamina forming a pseudopetiole.

11. Leaves longitudinally furrowed and wrinkled; margin conspicuously serrate, with a deep rounded sinus, often plicate and shallowly undulate 17. **C. densiflora**

11. Leaves flat or longitudinally furrowed but not wrinkled; margin obscurely to conspicuously serrate, without a deep rounded sinus, not plicate or undulate.

12. Outer 2–3 series of phyllaries subtending the capitulum, conspicuously wider and longer than the rest.

13. Phyllaries covered with biseriate stalked glandular trichomes.

14. Indumentum of the abaxial surface of the leaves loose, arachnoid, not resinous, white, peeling off like cotton when pulled with forceps or scalpel; diminutive non-stalked glands beneath and not attached to the white indumentum; midvein visible 20. **C. cockayniana**

14. Indumentum of the abaxial surface of the leaves thick, dense, felted, resinous, pale yellow, pale orange, or buff (often turning white after one season), peeling off like a layer when pulled with forceps or scalpel; diminutive non-stalked glands lacking; midvein not visible, hidden beneath the indumentum 19. **C. hieraciifolia**

13. Phyllaries lacking biseriate stalked glandular trichomes.

15. Margin of the leaves with a rim of indumentum (coming from the abaxial surface), conspicuously bordering the adaxial surface; midvein not visible (or visible only at the base) on the abaxial surface of the leaves, hidden beneath indumentum 21. **C. dallii**

15. Margin of the leaves without a rim of indumentum bordering the adaxial surface; midvein visible along the abaxial surface of the leaves, or not visible only at the tip 22. **C. holosericea**

12. Outer 2–3 series of phyllaries not subtending the capitulum, similar to the other series.

16. Cypselae glabrous 9. **C. haastii**

16. Cypselae covered with twin trichomes.

17. Phyllaries covered with biseriate stalked glandular trichomes. 23. **C. discolor**

17. Phyllaries resinous, lacking biseriate stalked glandular trichomes.

18. Leaves oblanceolate-oblong, oblanceolate-elliptic, or elliptic, base attenuate (rarely decurrent forming a pseudopetiole), 6–15 cm long, remotely denticulate; phyllaries tightly appressed; plants from coastal cliffs of southern Otago 24. **C. lindsayi**

18. Leaves obovate to oblanceolate, base decurrent forming a pseudopetiole, often < 5 cm, conspicuously serrate; phyllaries, at least the outer ones, spread or recurved; plants from the alpine zone.

19. Phyllaries appressed to spread or semi-patent, slightly recurved only at the tips; lamina usually < 2 cm long, obovate to short oblanceolate; adaxial surface green, glabrous, or with some arachnoid white pubescence along the main veins; living leaves distributed along most of the branches' lengths; plants semi-erect, decumbent 14. **C. angustifolia**

19. Phyllaries, in at least the outer two to three series, recurved at about half of their length; lamina usually > 3 cm long, oblanceolate to linear-oblanceolate; adaxial surface green, glaucous, or uniformly covered with a loose arachnoid or dense grayish-white indumentum; living leaves clustered at the distal part of the branches forming apical rosettes; plants prostrate, decumbent.

20. Leaves broadly oblanceolate-sphatulate, (–1.8)2–2.5(–3) cm wide; adaxial surface lustrous, green, glabrous; margin with ca 10 distant teeth along each side of the lamina; sheaths purple; involucre 9–12 mm wide 25. **C. bonplandii**
20. Leaves oblanceolate (rarely elliptic), 0.8–1.6 cm wide; adaxial surface dull, green glaucous, covered with white to amber glands, or by a soft arachnoid to dense lanose indumentum; margin with (–4)6–10 distant teeth emerging most of the time on the edge of the adaxial surface along each side of the lamina; sheaths mostly white-hyaline to green or less commonly green-purplish; involucre 5–8 mm wide . 26. **C. sinclairii**
1. Abaxial surface of leaves glabrous, glandular, viscid, or partially covered with tiny scurfy scales (50 µm) and/or with a loose arachnoid indumentum mainly near the base (epidermis visible).
21. Leaves sessile, truncate to slightly attenuate towards the base, untoothed to obscurely toothed; adult leaves less than 20 mm long.
22. Lamina oblong-obovate (rarely oblong-oblanceolate); margin obscurely toothed (with 2–3 distant small teeth along each side of the top half of the lamina); apex shape rounded; disc corollas with sparse long biseriate non-glandular trichomes 400–500 µm long; creeping plants with epigeous stout branched runners, forming patches or connected loose cushions at the end of the main axes.
23. Phyllaries densely covered with biseriate stalked glandular trichomes, dark purple; leaves sparsely covered with biseriate stalked glandular trichomes 2. **C. thomsonii**
23. Phyllaries lacking biseriate stalked glandular trichomes, green with a light purple tinge at the margins; leaves glabrous 1. **C. bellidioides**
22. Leaves linear-oblanceolate to slightly deltoid; margin untoothed; apex shape straight; disc corollas without sparse long biseriate non-glandular trichomes; non-creeping plants forming individual loose cushions.
24. Phyllaries covered with biseriate stalked glandular trichomes; lamina almost glabrous to densely covered with biseriate stalked glandular trichomes, flat 5. **C. lateralis**
24. Phyllaries (except the margins) glabrous; leaves lacking biseriate stalked glandular trichomes, sparsely covered with minute deciduous scurfy scales, revolute 4. **C. gibbsii**
21. Leaves pseudopetiolate, conspicuously toothed; adult leaves more than 20 mm long (occasionally less in *C. glandulosa*).
25. Leaves longitudinally furrowed and wrinkled; margin conspicuously serrate, with a deep rounded sinus, often plicate and shallowly undulate 16. **C. prorepens**
25. Leaves flat or longitudinally furrowed but not wrinkled; margin obscurely to conspicuously serrate, without a deep rounded sinus, not plicate or undulate.
26. Creeping stoloniferous plants (adventitious roots at nodes with (hypogeous branching), forming patches or connected loose cushions at the end of the main axes 6. **C. glandulosa**
26. Non-creeping plants forming individual loose cushions or mats.
27. Abaxial surface of leaves glabrous or often with some white arachnoid deciduous indumentum along the margin; phyllaries covered with biseriate stalked glandular trichomes.... 18. **C. inaccessa**
27. Adaxial surface of leaves covered with white to amber glands; phyllaries resinous, lacking biseriate stalked glandular trichomes 26. **C. sinclairii**

1. CELMISIA BELLIDIOIDES Hook.f., Handb. N. Zealand Fl. 135. 1864. **TYPE: NEW ZEALAND.** Middle [South] Island, Tarndale, in loose shingle, 5000 ft, Feb 1861, *Sinclair* 8 (holotype: K 882169 [image!]).

Stout, creeping, decumbent, much-branched **shrub**, forming small loose cushions or patches up to 1 m across at the end of the main axes, up to 10–15 cm tall. **Leaves** more or less clustered at the distal part of the branches forming loose apical rosettes, sessile, new leaves straight upwards but spreading with age; lamina oblong-obovate (rarely oblong-ob lanceolate), coriaceous, 0.7–1.5(–1.7) × 0.3–0.5(–0.6) cm, apex angle obtuse, apex shape rounded, base attenuate to decurrent; adaxial surface glabrous, green, lustrous, midvein conspicuous, impressed; abaxial surface glabrous, pale green; midvein conspicuous, slightly impressed, and two faint secondary veins running parallel on each side of the midvein following the leaf margin; margin obscurely toothed, with 2–3 distant small teeth along each side of the top half of the lamina, and often a terminal one at the end of the midvein, lanose to arachnoid towards the base, flat; sheath parallel-sided, glabrous, lustrous, purple; venation parallel, multi-nerved. **Peduncle** 4–8(–30) cm long, glabrous, purple, or purple greenish (rarely green), with few distant foliaceous bracts 6–9 mm long, linear-oblong, green, apex angle acute, apex shape straight. **Involucre** cylindrical to slightly campanulate at anthesis, 8–9 × 5–7 mm. **Phyllaries** arranged in 4–5 series subequal in length, appressed to slightly spread at anthesis, viscid, linear-oblong to linear-lanceolate, apex angle acute, straight, green to purplish at the margins, 6–8 × 1.3–1.6 mm. **Ray florets** 20–25, arranged in 2 rows, white. **Disc florets** 40–50, tube 4.5–5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse long biseriate non-glandular trichomes 400–500 µm long; anther thecae 2 mm long; appendage 0.4 mm long, linear-lanceolate to deltoid, apex shape straight or rounded; bases tailed 200 µm long; filament collar slightly wider than the filament; style branches ca. 1.2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.5 mm long, apical papillae 50–60 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 3–4 mm long, 5-ribbed, clad in twin trichomes. Fig. 7.

Distribution: South Island, widespread but less frequent in the east (Fig. 8).

Habitat: Subalpine to high alpine (900–1800 m). Commonly found on wet rocky outcrops, ridges, and cliffs.

Etymology: Refers to its similarity to species of the European daisy genus *Bellis* L.

Other descriptions: Kirk (1899: 292), Cheeseman (1906: 317; 1925: 957), Allan (1961: 631).

Illustrations: Mark & Adams (1995: plate 52).

Additional collections. SOUTH ISLAND. Tasman. Arnst Basin, St Arnaud Range, Nelson Lakes National Park, 1550 m, 26 Jan 1991, *K. Dickinson s.n.* (OTA 61229); Cliffs overlooking Lookout Ra. [Range]-Owen Ra. [Range] saddle, 1128 m, 22 Jan 1968, *C. Bell s.n.* (WELT SP095822); Cobb Valley, 1957, *A.E. Esler s.n.* (AK 215595); Cobb Valley Mts., Jan 1905, *F. Gibbs s.n.* (WELT SP046477); Cobb Valley, near Lake Peel, Jan 1971, *R. Chinnock s.n.* (WELT SP095821); Cobb Valley, Rock at water's edge in gorge, 792 m, 31 Mar 1905, *T.F. Cheeseman s.n.* (CHR 125070); east branch of Sabine Range, wet rocks, 5 Sep 1951, *M.J.A. Simpson 19791* (CHR 121049); Glenroy Valley, 1285 m, 18 Jan 1985, *W.D. Burke 348* (CHR 421124); Head of Baton Valley, 23 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005852/A-B); Iron Hill, 1219 m, 30 Dec 1942, *R. Mason s.n.* (CHR 36071); Iron Hill in water course, Nelson, 1432 m, 30 Dec 1942, *R. Mason s.n.* (CHR 36087); Iron Hill, wet rocks, 14 Feb 1953, *J.A. Peterson s.n.* (CHR 77942); Lake Peel, 1490 m, 10 Jan 2019, *P. Saldivia 2673* (OTA); Luna Lake, north branch, Wangapeka River, 24 Jan 1971, *Simpson s.n.* (CHR 220002); Mt Arthur, near summit, Jan 1962, *G. Rickards s.n.* (WELT SP096308); Mt Cobb, Peel Range, cliff, 1249 m, Mar 1982, *A.P. Druce s.n.* (CHR 369992); ridge west of Lake Sylvester, 1680 m, 18 Feb 2018, *P. Saldivia 2622*

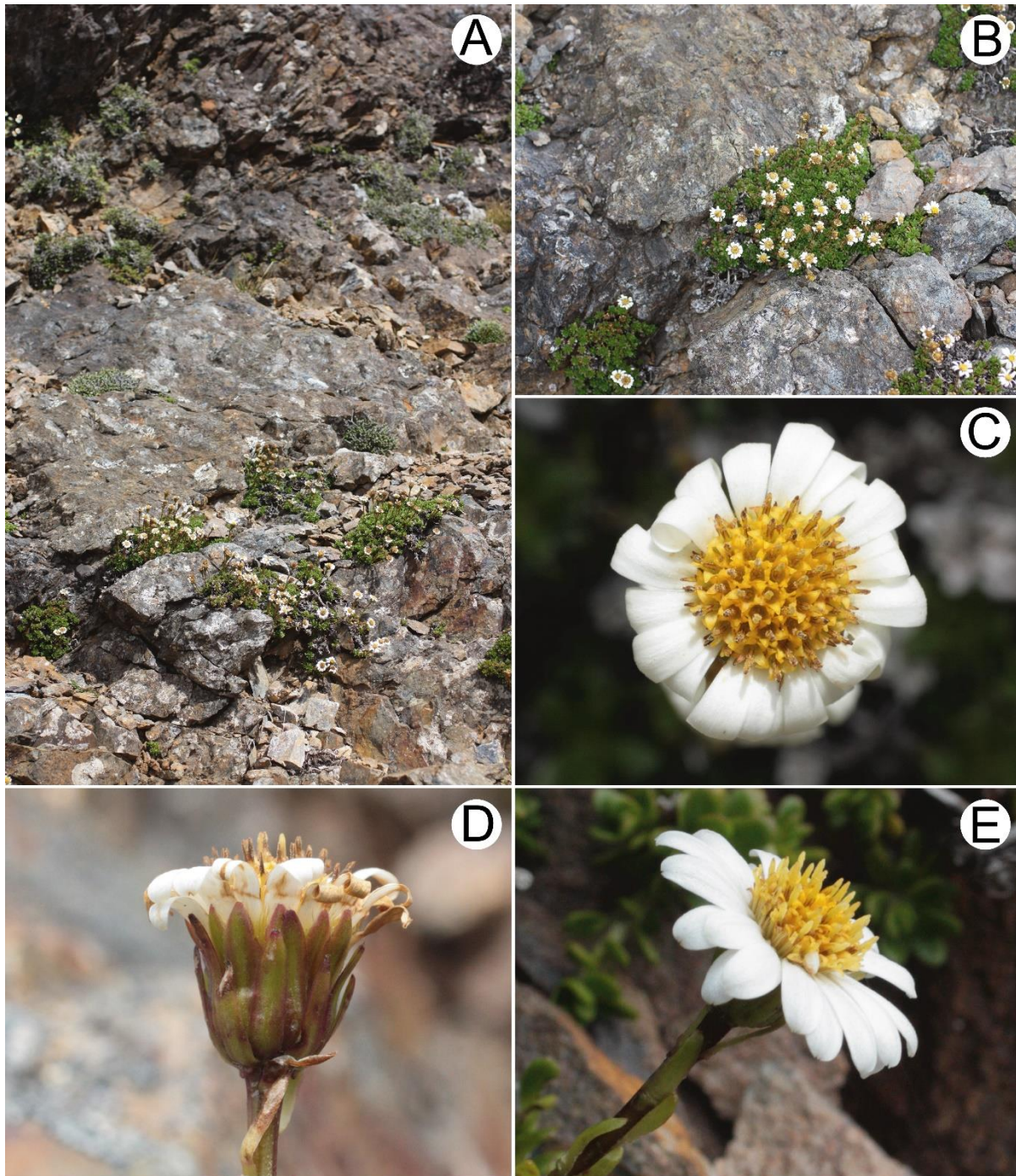


Figure 7. *C. bellidioides*: A–B. Habitat and habit; C. Capitulum (top view); D. Involucre; E. Capitulum (lateral view). A–E from OTA (*P. Saldivia* 2673, Lake Peel, Tasman).

(OTA); source of Baton River, 1158 m, 11 Jan 1968, *B. Sneddon s.n.* (WELT SP091084) **Marlborough.** Awatere Valley, upper Yeo Stream, 1300 m, 19 Nov 1997, *P.J. de Lange* 3444 (AK 234978); Hanging, stems upright, Black Birch Stream, Jan 67, *H. Wilson s.n.* (CHR 254817); Mt Schiza, wet rock faces, Jan 1933, *W. Martin s.n.* (CHR 50054); upper Wairau River Valley, S facing bluffs to N of river, 1400 m, 1 Feb 2005, *A.E. Wright* 13258 (AK 291530). **West Coast.** Cave Camp, *J. Buchanan s.n.* (WELT SP046504); Garibaldi ridge, NW Nelson, Limestone scree, 1219 m, 2 Jun 1905, *A.P. Druce s.n.* (CHR 358481); Mt Bovis, 1066 m, *W.L. Townson* 527 (AK 9974); *ibid.*, 1220

m, *W.L. Townson s.n.* (AK 243688); *ibid.*, *W. Thomson s.n.* (WELT SP046450); Mt Harmon, Axis spur, *L. Cockayne s.n.* (AK 32144); Mt Peel, 1524 m, 20 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23149); *ibid.*, Jan 1881, *T.F. Cheeseman s.n.* (AK 9975); Otira Gorge, Feb 1890, *Ball s.n.* (AK 263762); Peg Leg [Pegleg] Creek, 850 m, *L. Cockayne s.n.* (WELT SP046479); Peg Leg Creek gorge, 750 m, Jan 1898, *L. Cockayne s.n.* (AK 32142); Peg Leg Creek, wet rocks in shade, gorge, 810 m, 24 Jan 1898, *L. Cockayne* 1923 (CHR 290177); Razorback, Griffin Range, 20 Jan 1924, *W. Mackay s.n.* (CHR 108501); Stocking [Stauchon?] Glacier, Mt. Sefton, Dec 1924, *A. Wall s.n.* (CHR 290178); upper Matukituki Valley, Hectors Col, 1500 m, 2 Jan 1966, *P.B. Hutton s.n.* (AK 109015); upper Waitatoto Valley, 548 m, 22 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20891); *ibid.*, 22 Jan 1967, *A. Mark & M.L. Burke s.n.* (CHR 619908); upper Waitangi[taona] R[iver] Whataroa, 12 Jan 1950, *J. Ardley s.n.* (WELT SP063633). **Canterbury.** Arthur's Pass, wet rocks near punchbowl, 30 Dec 1953, *G. Brownlie s.n.* (CHR 355962); Arthur's Pass, 1066 m, Jan 1880, *T.F. Cheeseman s.n.* (AK 9973); *ibid.*, 1 Jan 1956, *M.E. Sexton s.n.* (AK 248844, 252024); *ibid.*, by Bealey Head bridge & below = Twin Creek, *M. Sutherland s.n.* (WELT SP064893); *ibid.*, summit, 5 Jan 1950, *J.A. Hay s.n.* (CHR 108365); *ibid.*, Edge of liff near punchbowl, 762 m, 11 Dec 1928, *R.M. Laing s.n.* (CHR 3334487); *ibid.*, Halpins Creek, 4 Nov 2003, *S.J. Wagstaff & M.I. Dawson s.n.* (CHR 570443); *ibid.*, Punch Bowl, 28 Dec 1953, *P. Hynes s.n.* (AK 32451); Ashburton, collector unknown (OTA 16415); Ashburton Range, *T. Kirk s.n.* (AK 11744); *ibid.*, [Ashburton Peak], *T.H. Potts s.n.* (WELT SP046466); Bealey Chasm, 11 Feb 1986, *D.R. Given* 14247 & *M. Gray* (CHR 511986); Bealey Gorge, *T. Kirk s.n.* (WELT SP046501); Bealey stream, Arthurs Pass, 29 Nov 1961, *R. Melville* 5471 (CHR 13091); Bealey Valley, 1000 m, 21 Dec 2004, *M. Ito* 04-1221-03 (CHR 574408); *ibid.*, 10 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046473); Broken River, 27 Dec 1909, *W.R.B. Oliver s.n.* (WELT SP005853); Ghost Creek, Mt. Torlesse, 1371 m, 9 Jan 31, *L.B. Moore s.n.* (CHR 50053); *ibid.*, 1350 m, 9 Jan 1931, *L.B. Moore & L.M. Cranwell s.n.* (AK 32143); Craigie Burn Mts [Craigieburn Range], 1524 m, Jan 1893, *D. Petrie s.n.* (WELT SP046452); Craigieburn Forest Park, middle reaches of Chamois Stream, below waterfall, 1060 m, 17 Jan 1998, *P.J. Bellingham* 882 (CHR 515348); Craigieburn Range, 1585 m, Jan 1893, *D. Petrie s.n.* (WELT SP095820); Dee Gorge, Mar 1916, *B.C. Aston s.n.* (WELT SP046747); Godley R Valley upper, 1524 m, 27 Jan 1958, *D. Scott s.n.* (OTA 4453); Godley Valley, Lake Tekapo, 1066 m, 25 May 1969, *OUSA s.n.* (OTA 26289); Gorge of Havelock Valley, above Veil Creek, 1066 m, Jan 1972, *D.R. Given* 72096 (CHR 223092); Halpins Creek, Bealey Valley, 13 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046472); Havelock River, Two Thumb Range, 1066 m, Feb 1991, *A.P. Druce* 259 (CHR 469184); Head of Clarence Valley, Spenser Mts., Damp place on rocks, 1463 m, 19 Feb 1947, *R. Mason s.n.* (CHR 58277); Kowhai River, Seaward Kaikoura Range, 1495 m, Dec 1980, *P.A. Williams s.n.* (CHR 309601); Lake Tekapo, Godley Valley, Dec 1963, *C. Challies s.n.* (WELT SP095823); Maniototo Co [County]., Mt Ida, Dec 1908, *B.C. Aston s.n.* (WELT SP046451); Mt Cook, Jan 1898, *J. Adams s.n.* (AK 15635); Mt Ida, *D. Petrie s.n.* (AK 9972, WELT SP046971); *ibid.*, Mar 1907, *B.C. Aston s.n.* (WELT SP046503); Mt Ida, Maniototo, 1524 m, Jan 1911, *D. Petrie s.n.* (CHR 658201); Mts. at head of Lake Tennyos [Tennyson], 4 Apr 1946, *H.H. Allan s.n.* (CHR 108502); near the high bridge over the Bealey River, *T. Kirk s.n.* (WELT SP046469); Parapet Rock, Waiho Valley, 1249 m, 17 Jan 1976, *P.W. Wardle s.n.* (CHR 166626); probably Broken River, *J. Adams s.n.* (AK 15642); Tapuaenuku [Tapuae-o-Uenuku], 29 Feb 1916, *B.C. Aston s.n.* (WELT SP046502); Temple Basin, 1341 m, 27 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 25752); Twin Creek, Arthur's Pass, 883 m, 30 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 25982); Unknown River, 1127 m, collector unknown (CHR 569210); upper Unknown River, *A. Huber s.n.* (CHR 569240); Waimakariri Basin, Broken River, Cave camp [Murderers Cave], 762 m, *L. Cockayne s.n.* (WELT SP046471); Waimakariri Falls, Arthur's Pass, 1250 m, 30 Jan 1971, *D.R. Given* 71011 (CHR 205547); west ridge of Mt. d'Archiac above Godley Hut, 1400-1500 m, 23 Feb 1977, *D.R. Given* 9743 (CHR 323274); Western region of Amuri Co. [County], *W. Morrison s.n.* (WELT SP046455); White River, 1219 m, *L. Cockayne s.n.* (WELT SP046478). **Otago.** Dart Valley, below Cascade saddle, 1371 m, 11 Mar 1978, *P. Sommerville s.n.* (OTA 37029); Dart Valley, upper, 1219 m, 27 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20948); Earnslaw, W. ridge, *G.E. Holloway s.n.* (OTA 2485); Ewe Burn, *H.B. Matthews s.n.* (AK 9971); Forbes Mts., above Paradise, West Otago,

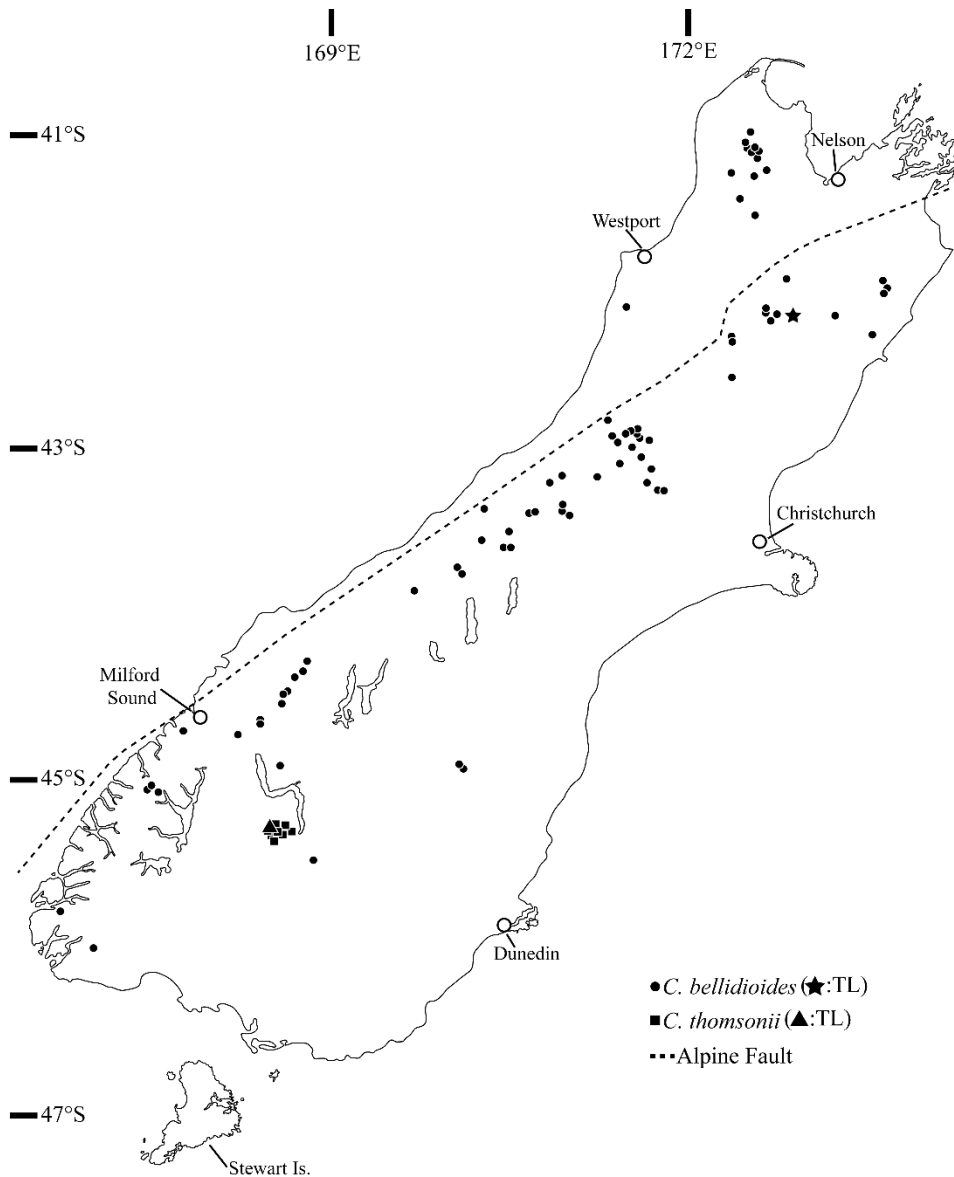


Figure 8. Distribution map of *C. bellidioides* and *C. thomsonii* in the South Island of New Zealand. TL: Type locality.

1524 m, 2 Dec 1967, *A. Mark s.n.* (OTA 27303); Glacier Burn Track, 1117 m, 5 Feb 2017, *P. Saldivia* 2543 (OTA); Harris saddle, upper Routeburn Valley, 1219 m, 11 Dec 1967, *A. Mark & M.L. Burke s.n.* (OTA 21142); Lake Wanaka? Edwary?, *collector unknown* (CHR 108368); Malte Brun, 2100 m, 30 Jan 1965, *B.M.F. Smith s.n.* (OTA 13927); Maniototo Co., Eweburn Creek, 975 m, *D. Petrie s.n.* (WELT SP046453/A-B); *ibid.*, W. branch Eweburn Creek, 914 m, 2 Jan 2002, *H.J. Matthews s.n.* (WELT SP046454); Moonlight Creek, Walls, *G.E. Holloway s.n.* (OTA 2484); Mt Ida on Eweburn, Feb 1922, *W. Martin s.n.* (WELT SP046987); Snowy Creek, Dart Valley, 573 m, 25 Jan 1968, *A. Mark & M.L. Burke s.n.* (CHR 619906); *ibid.*, 1463 m, 25 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20821). **Southland.** Barrier Peaks area, Fiordland, 1158 m, 10 Jan 1970, *J. Anderson 14* (CHR 655617); Bottom end, Wapiti Lake, granite, 1 Jan 1971, *J.C. Anderson s.n.* (CHR 207170); Dome Burn, Garvie Mts., wet cliff, Mar 1987, *A.P. Druce s.n.* (CHR 395326); Dusky Bay, Mts., Jul 1863, *J. Hector & J. Buchanan s.n.* (WELT SP045218); head of true left branch of Poison Piver, Poison Bay, 450 m, 1 Feb 1976, *P. Ryan s.n.* (CHR 519517); Lake Monk, Fiordland, wet rocks, 23 Jan 1916, *M.J.A. Simpson s.n.*

(CHR 115914); Lake Wapiti, upper Dome Valley Fiordland, 1066 m, 1 Jan 1971, *A. Mark s.n.* (OTA 30525); Mark Hut at head of Clarke Tributary, of Landsborough, rock wall of steep water course, 822 m, 19 Feb 1972, *P.W. Wardle s.n.* (CHR 223905). **District unknown.** Nelson, *collector unknown* (WELT SP046475); Nelson District, Jan 1905, *F. Gibbs s.n.* (WELT SP046449); Nelson Mts., *T. Kirk s.n.* (WELT SP046468); Southern Alps, *collector unknown* (WELT SP044589); Timms Ck. area, 25 Jan 55, *J.B. Hair & E.J. Beuzenberg s.n.* (CHR 10138); *R. Laing s.n.* (WELT SP086569); sine loco, *collector unknown* (CHR 22304, WELT SP046476).

2. CELMISIA THOMSONII Cheeseman, Trans. & Proc. New Zealand Inst. 48: 211. 1915 (1916). **TYPE:** **NEW ZEALAND.** South Island, Eyre Mts, Central Otago, in rocky crevices on faces of cliffs, alt. 5000–6000 ft, *W.A. Thomson & J. Speden s.n.* (holotype: AK 9976!).

Creeping, decumbent, much-branched **shrub**, forming small loose cushions or patches up to 0.5 m across at the end of the main axes, up to 10–15 cm tall. **Leaves** clustered at the distal part of the branches forming loose apical rosettes, sessile, new leaves straight upwards but spreading with age; lamina oblong-obovate (rarely oblong-oblancheolate), coriaceous, 0.7–1.5 × 0.25–0.5 cm, apex angle obtuse, apex shape rounded, sometimes mucronate; base attenuate to decurrent; adaxial surface with sparse biseriate stalked glandular trichomes, green, midvein conspicuous, slightly impressed; abaxial surface glabrous or with scattered biseriate stalked glandular trichomes, green, midvein conspicuous, slightly impressed, 1–2 faint secondary veins running parallel on each side of the midvein following the leaf margin; margin obscurely toothed, with 2–3 distant small teeth along each side of the top half of the lamina, and often a terminal one at the end of the midvein, lanose to arachnoid towards the base, flat; sheath parallel-sided, glabrous, lustrous, white-greenish to purple; venation parallel, multi-nerved. **Peduncle** (–)5–8 cm long, covered with biseriate stalked glandular trichomes, purple to green, with few distant foliaceous bracts 6–8 mm long, linear-oblong, green with purple tips, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 7–8 × 4–6 mm. **Phyllaries** arranged in 4–5 series, subequal in length, densely covered with biseriate stalked glandular trichomes, linear-oblong to linear-lanceolate, apex angle acute, straight, dark purple, 5.5–7.5 × 1–1.3 mm. **Ray florets** ca. 20, arranged in 2 rows, white. **Disc florets** 40–50, tube 4–4.5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse long biseriate non-glandular trichomes ca. 400 µm long; anther thecae 2 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape truncate to rounded, bases tailed 200 µm long, filament collar same width as the filament; style branches ca. 1.2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 60–70 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2–3 mm long, 4–5-ribbed, clad in twin trichomes. Fig. 9.

Distribution: South Island. Southland, restricted to the northern part of the Eyre Mts, north of the Eyre Creek, between the Eyre Peak and the Symmetry Peaks (Fig. 8).

Habitat: High alpine (1300–1800 m). Along the main ridges, in shady, wet rock crevices, sheltered from direct rain and snowfall.

Etymology: After W.A. Thomson, who collected the type specimen.

Other descriptions: Cheeseman (1925: 958), Allan (1961: 632).

Additional collections. SOUTH ISLAND. Southland. Billy Creek, Eyre Mts., 4 Jan 1984, *P.B. Heenan s.n.* (CHR 415986); Bowels of the Earth Creek, head of, 1400 m, 9 Jan 1987, *B. Fayan & G. McSweeney s.n.* (OTA 43782); Eyre Mts., 1524 m, *W.A. Thomson s.n.* (CHR 10321); *ibid.*, 19 Feb 1925, *J. Speden s.n.* (WELT SP046464/A,B[middle two left-hand branches excluded],C); Eyre Peak, 21 Nov 1972, *A. Mark s.n.* (OTA 32872); *ibid.*, bluffs at southwest of summit of Mtn., 1740 m, 21 Nov 1972, *D.R. Given 72911* (CHR 228599); *ibid.*, southern cirque headwall, 1470 m, 9 Jan 1987, *A. Mark*

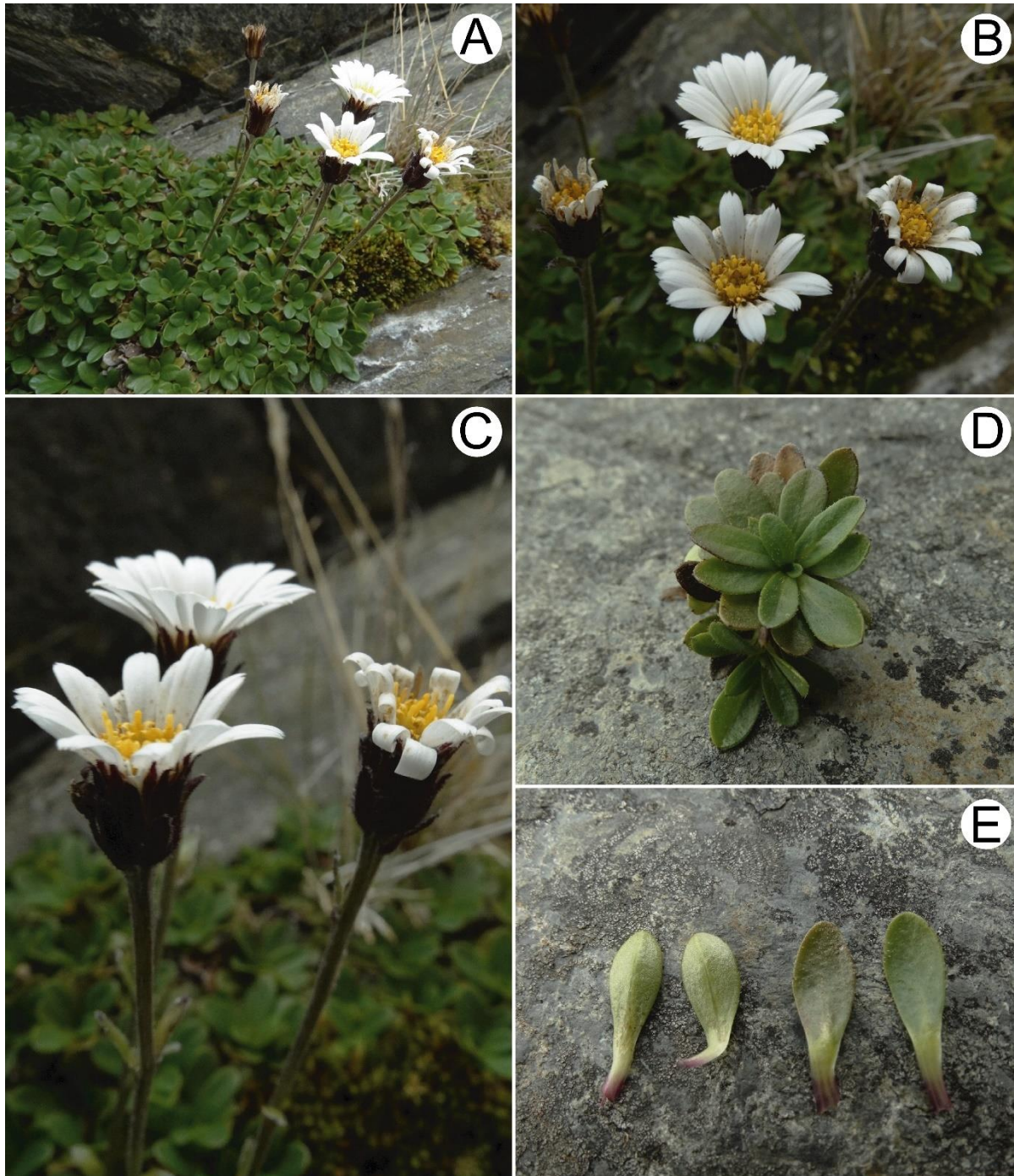


Figure 9. *C. thomsonii*: A. Habit; B. Capitulum (top view); C. Capitulum (lateral view); D. Terminal cluster of leaves (top view); E. Leaves, adaxial surface (two leaves on the left) and abaxial surface (two leaves on the right). A–E by Rowan Hindmarsh-Walls, the Eyre Mts, Southland.

& *K. Dickinson s.n.* (OTA 44722); Firewood Creek, ridge to north of Firewood Creek, 1500 m, 10 Jan 1987, *A. Mark & B. Fayan s.n.* (OTA 43783); Head of Bowels of the Earth catchment, 1400 m, 9 Jan 1987, *B. Fagan et al. s.n.* (CHR 394996); Long Burn, Eyre Mts., crevice in cliff, 1553 m, Mar 1991, *A.P. Druce 64* (CHR 468989); near Symmetry Peaks, Eyre Mts., 1600 m, 6 Feb 1988, *A. Mark s.n.* (OTA 46238); ridge crest leading from hut at head of Mataura to summit of Eyre Peak, 1520 m, 21 Nov 1972, *D.R. Given 72922 et al.* (CHR 233133).

3. CELMISIA RAMULOSA Hook.f.

Procumbent or decumbent **shrub** up to 20–35 cm tall, densely ramified forming loose cushions with radial branching or with a short erect main axis and decumbent branches up to ca. 25 cm long. **Leaves** densely imbricate (stem not visible) along the branches, sessile, appressed (antrorse) to patent; lamina ericoid, linear-oblong, oblong-ovate to slightly deltoid, coriaceous, thick, (–3.5)5–7(8) × 1.5–2(–2.5) mm, apex angle obtuse, apex shape rounded, entire or mucronate, base truncate, widened at the transition area towards the sheath; adaxial surface glabrous or sometimes with small stalked glandular trichomes and some scattered aseptate flagellate trichomes in the apex and along the margins, lustrous and smooth, or scabrous; green, only midvein visible, slightly impressed; abaxial surface densely covered with a soft white tomentum of flagellate aseptate trichomes, venation not visible, hidden beneath the indumentum; margin untoothed, strongly revolute and often cucullate, apex obtuse, entire or mucronate; sheath parallel-sided, white to semi hyaline, glabrous, and margin obscurely fimbriate, venation parallel, 3–5 nerved. **Peduncle** 2–6 cm long, covered with loose lanose indumentum and biseriate stalked-glandular trichomes, with foliaceous bracts 3–5 mm long, linear-deltoid, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 7–9 × 4–5 mm. **Phyllaries** arranged in 4–5 series gradually longer from the outer to the inner ones, appressed at anthesis or with some of the outer ones slightly recurved, abaxial surface covered with lanose indumentum and glandular trichomes of variable density, midvein well-marked, green-purple; outer ones linear-oblong 4–5 × 1–1.5 mm, base slightly widened, apex angle acute, apex shape straight or rounded; inner ones linear to linear-lanceolate 6.5–8 × 1.2–1.5 mm, apex angle acute, apex shape straight, margin fimbriate towards the apex. **Ray florets** 17–20, arranged in one or two rows, white. **Disc florets** 12–18, tube 3.5–4.5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, corolla with scattered biseriate glandular trichomes (100–150 µm) around the filaments insertion zone and crowded at the tip of the corolla lobes; anther thecae 1.8–2.5 mm long, appendage 0.5 mm long, oblong-lanceolate, apex shape rounded; bases tailed 150 µm long, filament collar slightly wider than the filament; style branches 1.2–1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length, sterile appendage deltoid, 0.5 mm long, apical papillae 50–70 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and diminutive outer setae; bristles irregular in length, 3–5 mm long with the longest ones reaching or exceeding the corolla lobes. **Cypselae** 2.5–3.5(4.5) mm long, 5–6 ribbed, sparsely covered with twin trichomes, and sometimes some scattered glandular trichomes. Fig. 10.

Two varieties are recognized based mainly on leaf morphology and allopatric distribution. A few specimens from the Eyre Mts. have some intermediate morphological features. Nicol et al. (2024) recovered them as sister taxa.

Key to varieties of *C. RAMULOSA*

1. Adaxial surface of the leaves smooth; visible portion of the abaxial surface deltoid; leaves spread to patent (rarely appressed), 5–7(–8) mm long3.1. *C. ramulosa* var. *ramulosa*
1. Adaxial surface scabrous; visible portion of the abaxial surface linear; leaves mostly appressed (antrorse) to the stem, 3.5–5(–7) mm long.....3.2. *C. ramulosa* var. *tuberculata*

3.1. CELMISIA RAMULOSA [var. **RAMULOSA**], Handb. N. Zealand Fl. II: 733. 1867. **TYPE: NEW ZEALAND.** Middle [South] Island, Dusky Bay mountains, alt. 3500 ft, 1865, *J. Hector 13* (holotype: K 882095 [image!] ex Herbarium Hookerianum).

Distribution: South Island. Southland, confined to Fiordland National Park. From Skippers Range (east of Martins Bay) in the north to Dusky Sound in the south (Fig. 11).

Habitat: Low alpine (800–1400 m), confined to rocky outcrops and open areas in steep bluffs or snow tussock (*Chionochloa* spp.) herbfield.

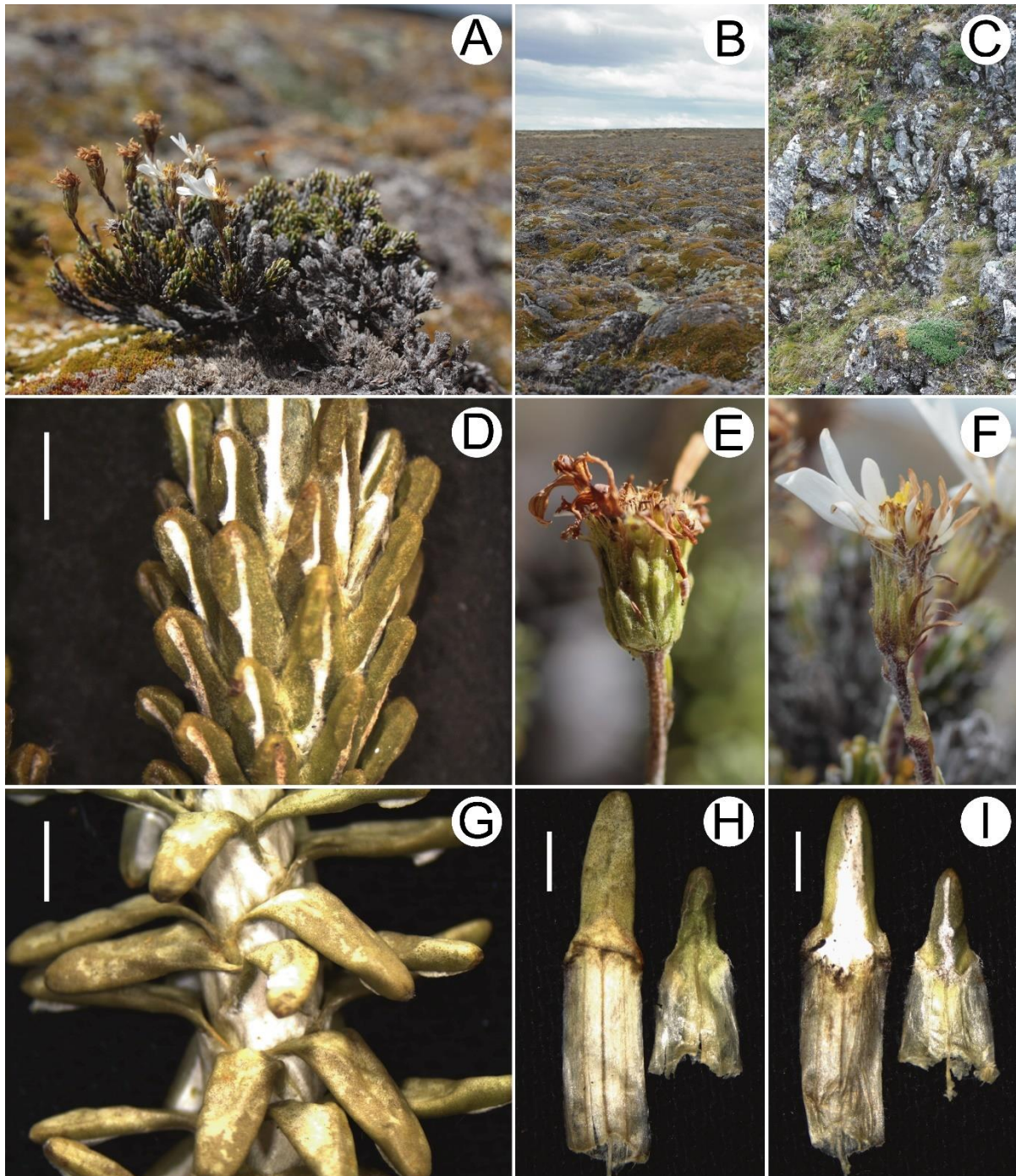


Figure 10. *C. ramulosa* var. *tuberculata*: A. Habit; B. Habitat; F. Capitulum; D. Leaves. *C. ramulosa* var. *ramulosa*: C. Habitat; E. Capitulum; G. Leaves. H. Adaxial surface of the leaves of var. *ramulosa* (left) and var. *tuberculata* (right). I. Abaxial surface of the leaves of var. *ramulosa* (left) and var. *tuberculata* (right). Var. *ramulosa* from OTA (*P. Saldivia* 2570, Borland Saddle, Fiordland); var. *tuberculata* from OTA (*P. Saldivia* 2528, Old Man Range). Scale bar: 2 mm.

Etymology: The specific epithet refers to the profuse ramification of the stem (many branchlets).

Other descriptions: Kirk (1899: 281), Cheeseman (1906: 301; 1925: 936), Allan (1961: 617).

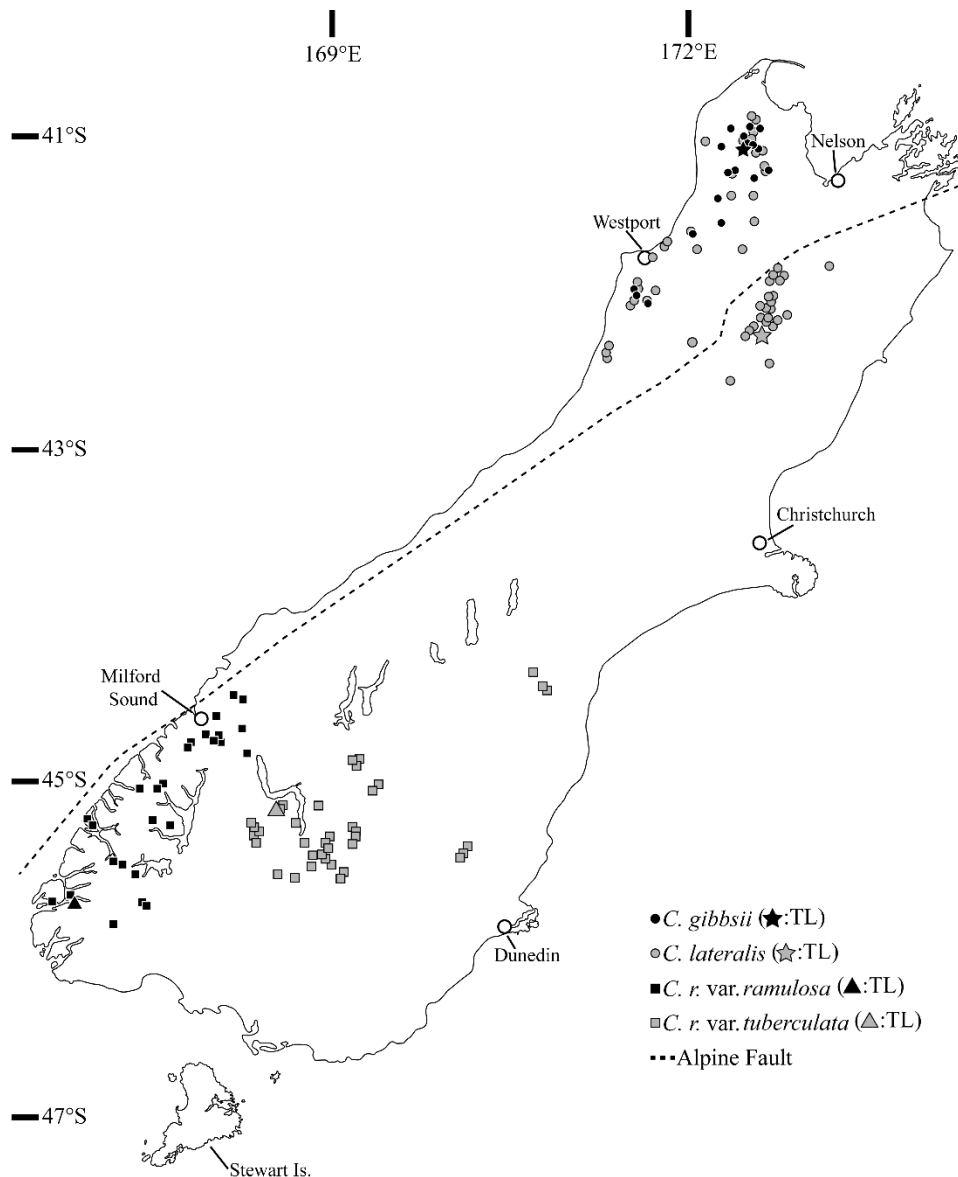


Figure 11. Distribution map of *C. ramulosa*, *C. gibbsii*, and *C. lateralis*, in the South Island of New Zealand. TL: Type locality.

Additional collections. SOUTH ISLAND. West Coast. West Coast, *J. Buchanan s.n.* (WELT SP048013). **Otago.** Route Burn, north branch, 1066 m, 11 Dec 1967, *A. Mark & M.L. Burke s.n.* (OTA 22116); *ibid.*, Valley north branch, 1066 m, 11 Dec 1967, *A. Mark & M.L. Burke s.n.* (OTA 21076). **Southland.** Alabaster Pass, 975 m, 29 Jan 1974, *A. Mark & W. Lee s.n.* (OTA 35656); All Round Peak, Secretary Island, 1066 m, 5 Feb 1967, *A. Mark s.n.* (OTA 19030); Borland saddle, 1186 m, 5 Mar 2017, *P. Saldivia 2570* (OTA); *ibid.*, Hunter Mts., Fiordland, 1066 m, 7 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 62769); *ibid.*, steep bluffs, 975 m, 7 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 23039); Cleddau River source, 17 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP048007); Clinton Saddle, *L. Cockayne s.n.* (WELT SP045859); Doubtful Sound, Mt Troup, 1170 m, 8 Jan 1956, *T.C. Chambers s.n.* (AK 242412); *ibid.*, 1190 m, 8 Jan 1956, *T.C. Chambers s.n.* (AK 263837); Gertrude saddle, 1066 m, 12 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 218988); *ibid.*, 1440 m, 15 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 123085); Homer and Hollyford River Junction, 12 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP048011); Homer Cirque, 26 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP048008); Homer Forks, 12 Dec 1944,

W.R.B. Oliver s.n. (WELT SP005795); Homer saddle, 1341 m, Dec 1943, *R.R. Forster & J.T. Salmon s.n.* (WELT SP005794); Homer to Gertrude Saddle, Apr 1954, *O. Sansom s.n.* (WELT SP005791); Homer Tunnel, 930 m, 17 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 123084); Lake Eyles, above, Murchison Mts., 1220 m, 11 Feb 1973, *A. Mark s.n.* (OTA 33943); Lake Hauroko, Princess Mts., *G.M. Thomson s.n.* (AK 9682); Lake Thomson, Fiordland, 944 m, 24 May 1962, *A. Mark s.n.* (OTA 7153); *ibid.*, 1005 m, 14 Feb 1970, *C.A. Powell s.n.* (OTA 60591); Leslie tops, Caswell Sd [Sound], 29 Mar 1949, *W.R.B. Oliver s.n.* (WELT SP005792); McKinnons Pass, 17 Jan 1959, *M.E. Sexton s.n.* (AK 248903); Milford Sound Track, Feb 1922, *R. Laing s.n.* (WELT SP045856); Mt Barber, 3 Mar 1927, *W.R.B. Oliver s.n.* (WELT SP048012); Mt Burns, 1371 m, 22 May 1967, *A. Mark J. Wells s.n.* (OTA 18958, 18962); *ibid.*, near saddle overlooking an un-named lake, 1341 m, 7 Jan 1979, *B. Sneddon s.n.* (WELT SP091103); Mt Hodges, Dusky Sound, 1158 m, 16 Jun 1969, *D.J. Lyttle s.n.* (OTA 34134); Mt Tutoko, saddle, 1066 m, 22 Feb 1967, *A. Mark J. Wells s.n.* (OTA 18123); near Homer Tunnel, 21 Apr 1905, *O. Fletcher s.n.* (AK 263836); Percy saddle, 1158 m, 9 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 219053); ridge above Borland saddle, 1266 m, 31 Jan 1978, *J.F. West s.n.* (OTA 64532); Secretary Island, 1036 m, 1 Feb 1959, *J. Murray s.n.* (OTA 6878); Secretary Island, summit ridge, 1066 m, 18 Feb 1959, *G.T.S. Baylis s.n.* (OTA 4983); Stillwater River, upper, 1220 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30618); Takahe Valley, Murchison Mts., 1460 m, 12 Dec 1972, *A. Mark s.n.* (OTA 32948); Cultivated ex Mt Bonpland, *T.F. Cheeseman s.n.* (AK 9680); Cultivated in Mr Matthew's garden [Dunedin], ex plant from Mt. Bonpland, Nov 1892, *collector unknown* (WELT SP096213). **District unknown.** sine loco, 30 Dec 1968, *collector unknown* (OTA 17017).

3.2. C. RAMULOSA var. **TUBERCULATA** G. Simpson & J.S. Thomson, *Trans. & Proc. Roy. Soc. New Zealand* 72: 34 .1942. **TYPE: NEW ZEALAND.** South Island, Rough Peaks, Lake Wakatipu, Feb 1936, *G. Simpson s.n.* (holotype: CHR 50003!).

Distribution: South Island. Southeast Canterbury, Central Otago, and northeast Southland. From The Hunter Hills (Mt. Nimrod and Mt. Nessing area) in the north to Mid Dome and East Dome in the South (Fig. 11).

Habitat: High alpine (1200–1800 m), being part of the cushion and dwarfed herbfield vegetation (Mark & Adams, 1995).

Etymology: The specific epithet refers to the adaxial surface of the leaves, which are tuberculate (i.e., with small wart-like outgrowths).

Other descriptions: Allan (1961: 617–618).

Illustrations: Mark & Adams (1995: plate 54), Eagle (2006: 763, erroneously labeled as variety *ramulosa*).

Additional collections. SOUTH ISLAND. Canterbury. Hunters Hills, Mt Nessing, 21 Mar 1980, *D.R. Given 12383* (CHR 494955); *ibid.*, Hunters Hills, Mt Nimrod saddle, north of Mt Nimrod summit, 1402 m, 19 Apr 1979, *D.R. Given 11714* (CHR 498139). **Otago.** Gem Lake, cirque, 1400 m, 14 Dec 1985, *K. Dickinson & A. Mark s.n.* (OTA 42782); *ibid.*, ridge, 1320 m, 10 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 42783); Gorge Creek, head of, 1676 m, 12 Feb 1966, *J. Wells s.n.* (OTA 28135); Leaning Rock, Dunstan Mts., 1600 m, 2 Feb 1984, *D.R. Given 13572 & C. Frampton* (CHR 416085); Mt Pisa, 1372 m, *D. Petrie s.n.* (WELT SP048010); *ibid.*, 1584 m, 29 Dec 1984, *M. Heads s.n.* (OTA 41347); *ibid.*, east side, 1219 m, 1 Feb 1951, *P. Wardle s.n.* (OTA 2482); Mt Pisa Plateau, 9 Mar 1921, *L. Cockayne s.n.* (WELT SP046614); Mt Whitecoomb, Western catchment, 1300 m, 22 Dec 1985, *B.D. Rance & K. Dickinson s.n.* (OTA 43039); Old Man Range, 1524 m, 13 Mar 1965, *M.J. Merrilees s.n.* (OTA 13558); *ibid.*, 1615 m, 30 Dec 1963, *A. Mark s.n.* (OTA 9087); *ibid.*, 1625 m, 29 Oct 1985, *B.D. Rance & S. Halloy s.n.* (OTA 44104); *ibid.*, 1644 m, 15 Jan 2017, *P. Saldivia 2528–2529* (OTA); *ibid.*, near Obelisk, 16 Oct 1949, *I.A. McNeur s.n.* (CHR 79620); *ibid.*, 1–2 km east

of Obelisk, summit ridge, 26 Nov 1988, *J.C. Smith-Dodsworth s.n.* (AK 187011); *ibid.*, flat summit, 1584 m, 17 Dec 1958, *A. Mark s.n.* (OTA 6344); *ibid.*, Fraser River west aspect, summit ridge, 1645 m, 20 Nov 1958, *A. Mark s.n.* (OTA 6330); *ibid.*, headwaters of Campbell Creek, 9 Dec 1985, *C. Ogle s.n.* (WELT SP089226); *ibid.*, summit, *J.E. Holloway s.n.* (OTA 2481); Remarkables [Range], Nevis Valley side, 1615 m, 12 Dec 1964, *B. Sneddon s.n.* (WELT SP091138); Rock and Pillar, 1310 m, *A. Wall s.n.* (CHR 289007); Rock and Pillar Range, 1188 m, 12 Dec 1969, *J.S. Dugdale s.n.* (CHR 197981); *ibid.*, 1200 m, 1 Mar 1972, *G.A. Parmenter s.n.* (OTA 33031); *ibid.*, 1219 m, 1 Dec 1969, *N. Adams s.n.* (WELT SP041355); *ibid.*, 13 Dec 1964, *N. Adams s.n.* (OTA 9877); *ibid.*, eastern slopes, 1524 m, 30 Nov 1970, *D.R. Given 60485* (CHR 212677); *ibid.*, low scrub on outcrop close to seepage, 12 Jan 1969, *B.H. Macmillan s.n.* (CHR 199642); *ibid.*, summit, 1219 m, 20 Apr 1969, *C.L. Powell s.n.* (OTA 28130); Rough Peaks, Lake Whakatipu, *G. Simpson & J.S. Thomson s.n.* (AK 170505); Thomsons Creek (Dunstan), summit ridge, 1615 m, 3 Dec 1958, *A. Mark s.n.* (OTA 6345). **Southland.** Blue Lake, between Garvie Mts. and Waikaia River, 1310 m, 20 Dec 1975, *J.M. Chaffey s.n.* (CHR 307670, 307671); Dome Burn, upper, north Nokomai Ecological District, 1300 m, 27 Nov 1986, *K. Dickinson & A. Mark s.n.* (OTA 44297); East Dome, Central Nokomai Ecological District, 1325 m, 8 Dec 1986, *A. Dickinson & K. Dickinson s.n.* (OTA 44294); Eyre Creek, upper, 1066 m, 26 Nov 1970, *A. Mark s.n.* (OTA 30603); *ibid.*, 1219 m, 20 Nov 1969, *A. Mark s.n.* (OTA 26693); Eyre Mts., between Windley and main branch of Eyre Creek in scrub zone, 1219 m, 27 Nov 1970, *D.R. Given s.n.* (CHR 212670); Garvie Mts., 914 m, 12 Sep 1966, *J.B. Hair s.n.* (CHR 200843); *ibid.*, 1524 m, 11 Jan 1934, *E.M. Heine s.n.* (WELT SP048006); *ibid.*, south end, 12 Dec 1965, *J. Dawson s.n.* (WELT SP096214); *ibid.*, summit Plateau, 1767 m, 15 Jan 1965, *A. Mark s.n.* (OTA 10248); Helen Peaks, Eyre Mts., 1500 m, 12 Jan 1987, *A. Mark & K. Dickinson s.n.* (OTA 44719); Hummock Peak, Eyre Mts., 1066 m, 30 Dec 1969, *A. Mark s.n.* (OTA 27233); Mid Dome, 1460 m, 10 Dec 1986, *K. Dickinson s.n.* (OTA 44295); Mt Dick, 25 Apr 1921, *L. Cockayne s.n.* (AK 34916); Mt Tennyson, South Garvies, 1400 m, 26 Nov 1986, *K. Dickinson s.n.* (OTA 44293); Titan Rocks, Garvie Mts., 1249 m, 24 Oct 1966, *A. Mark s.n.* (OTA 15054); *ibid.*, 1250 m, 5 Nov 1986, *K. Dickinson s.n.* (OTA 44296).

- 4. CELMISIA GIBBSII** Cheeseman, *Man. N. Zealand Fl.*: 300. 1906. **TYPE: NEW ZEALAND.** South Island, Nelson-Mt Cobb (to the north of the Mt Arthur Plateau), *F.G. Gibbs s.n.* (lectotype: AK 9692! designated by Allan 1961: 618).

Decumbent **shrub** 20–30 cm tall, densely ramified forming loose cushions with more or less radial branching, branches decumbent or ascending. **Leaves** laxly imbricate along the branches, sessile, patent; lamina ericoid, linear to slightly deltoid, coriaceous, thick, 10–20 × 1.8–2.5 mm, apex angle acute, apex shape straight, base truncate, green; adaxial surface glabrous or with scattered diminutive stalked glandular trichomes, lustrous and smooth, or scabrous, midvein impressed; abaxial surface from partially covered with tiny scurfy scales (50 µm) and loose arachnoid indumentum, to mostly glabrous, or with scattered diminutive stalked glandular trichomes, midvein conspicuous, and expanded into a flattened middle zone (Fig. 12D) of linear-deltoid shape that makes up most of the abaxial surface; margin untoothed, thick, revolute; sheath parallel-sided, glabrous, purplish, venation parallel, 3–nerved. **Peduncle** 4–7(–8) cm long, glabrous, purplish, with foliaceous bracts 5–7.5 mm long, linear-oblong, apex angle acute or obtuse, apex shape rounded. **Involucre** cylindrical at anthesis, 7.5–9 × 4.5–6 mm. **Phyllaries** arranged in 5–6 series gradually longer from the outer to the inner ones, appressed at anthesis, glabrous or partially covered with tiny scurfy scales, midvein well-marked, green with purplish tip and (sometimes) margins; outer phyllaries linear-oblong 4–5 × 0.9–1 mm, base slightly widened, apex angle acute or obtuse, apex shape straight or rounded; inner phyllaries linear to linear-lanceolate 7–9 × 1–1.3 mm, apex angle acute, apex shape straight, margin covered with short straight or curly trichomes towards the apex. **Ray florets** 15–22, arranged in two rows, white or occasionally mauve. **Disc florets** ca. 20, tube 3–4 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 1.5–1.8 mm long; appendage 0.4–0.5 mm long, oblong-lanceolate, apex shape rounded, bases tailed 100–150 µm long; filament collar same width as the filament; style branches ca. 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length, sterile appendage deltoid, 0.4 mm long,

apical papillae 20–30 μm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 3–4.5 mm long with the longest ones reaching the corolla lobes. **Cypselae** ca. 2–3 mm long, 5-ribbed, sparsely covered with twin trichomes and sometimes some scattered glandular trichomes. Fig. 12.

Distribution: South Island. Tasman and northern West Coast. From Anatoki, Douglas, and Gouland Ranges in the north to Paparoa Range (Mt Einstein and Mt Stevenson) in the south (Fig. 11).

Habitat: Low alpine (1000–1500 m). Mainly in rocky sites, sprawling among rocks and on outcrops (S. Walls, com. pers.)

Etymology: After Mr. F.G. Gibbs, an early collector in Nelson, who collected the type specimens.

Other descriptions: Cheeseman (1925: 936), Allan (1961: 618).

Additional collections. SOUTH ISLAND. Tasman. Aorere peak, 1585 m, Jan 1970, *A.P. Druce s.n.* (CHR 252156); Arthur Range, Baton Valley, subalpine, wet cliff, 1120 m, Feb 1991, *A.P. Druce 1327* (CHR 471919); Baton Saddle, 1280 m, 11 Jan 1968, *B. Sneddon s.n.* (WELT SP091112); Baton Saddle basin and Waingaro Peak, NE aspect, *S. Raaihen s.n.* (CHR 416539); Head of Baton River, 23 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005790/A-B); Head of Cobb Valley, 1219 m, Jan 1979, *A.P. Druce s.n.* (CHR 354844); *ibid.*, 1524 m, Feb 1977, *A.P. Druce s.n.* (CHR 310377); Lake Cobb, *A.P. Druce s.n.* (CHR 200819); Marble Peak, NW of Mt Benson, Lockett Range, tussock land, 1372 m, Mar 1982, *A.P. Druce s.n.* (CHR 389299); Mt Arthur, *O. Fletcher s.n.* (CHR 108411); Mt Cobb, *F. Gibbs s.n.* (CHR 289197, WELT SP096139); Mt Cobb, Jan 1911, *F.G. Gibbs s.n.* (CHR 10200); *ibid.*, 1432 m, Mar 1982, *A.P. Druce s.n.* (CHR 369993); Mt Douglas, Douglas Range, tussock land on a step S face, 1360 m, Feb 1995, *A.P. Druce s.n.* (CHR 395993); Mt. Gouland, 27 Jan 1966, *F. Soper s.n.* (CHR 175177); Mt Lockett, 1219 m, Mar 1903, *F.G. Gibbs 274* (AK 9693); N W Nelson, Mt Cobb, *F.G. Gibbs s.n.* (AK 9691); *ibid.*, 1066 m, *F.G. Gibbs s.n.* (K 882094 [image]); W Nelson, Glasgow Range, 1200 m, 18 Feb 1986, *E.A. Brown s.n.* (AK 278878); Waingaro Peak, Cobb Valley, *F.G. Gibbs s.n.* (CHR 289196); *ibid.*, NE aspect, 1463 m, *S. Raaijen s.n.* (CHR 416540); Yuletide Peak, Douglas Range, 1493 m, Jan 1977, *A.P. Druce s.n.* (CHR 311629). **West Coast.** Above Lake Aorere, 1341 m, Jan 1977, *A.P. Druce s.n.* (CHR 310462); Allen Range, Mt Zetland, Jan 1947, *R. Mason s.n.* (CHR 58222); 1280 m, May 1980, *A.P. Druce s.n.* (CHR 363449); *ibid.*, 1425 m, 18 Jan 1981, *B. Sneddon s.n.* (WELT SP091117); *ibid.*, Jan 1981, *A.P. Druce s.n.* (CHR 387116); Anatoki Range, 1550 m, Feb 1984, *A.P. Druce s.n.* (CHR 401058); Garibaldi Ridge, steep limestone slope facing SE, 1402 m, Mar 1980, *A.P. Druce s.n.* (CHR 358469); Glasgow Range, cliff, 1250 m, Feb 1986, *A.P. Druce s.n.* (CHR 395807); Mt Domett, 1310 m, Jan 1977, *A.P. Druce s.n.* (CHR 310482); *ibid.*, 1 Dec 1971, *J.S. Dugdale s.n.* (CHR 200818); Mt Einstein, Paparoa Range, alpine tussock and rocks on ridge top, 1000 m, 7 Oct 1979, *G. Loh s.n.* (CHR 370719); Mt Stevenson, 22 Dec 1950, *J.A. Veale s.n.* (CHR 84597); Mt Pyramid, Garibaldi Ridge, 1219 m, Mar 1983, *A.P. Druce s.n.* (CHR 389929); Paparoa Range, northwest slopes of Mt Euclid, 1067 m, 22 Feb 1984, *P. Brownsey s.n.* (WELT SP077775).

5. CELMISIA LATERALIS Buchanan, Trans. & Proc. New Zealand Inst. 4: 226, pl. XV. 1872. **TYPE: NEW ZEALAND.** South Island, Mountains near Lake Guyon, Nelson, Mar 1871, *H.H. Travers s.n.* (holotype: K 882097 [image!]).

Celmisia lateralis Buchanan var. *villosa* Cheeseman, Man. New Zealand Fl.: 302. 1906. **TYPE: NEW ZEALAND.** South Island, Mt Murchinson, Buller Valley, 3000–4000 ft, *W.L. Townson 565* (holotype: AK 24964!, AK 209507!, AK 209501!). Syn. nov.

Decumbent **shrub** 10–25 cm tall, densely ramified forming loose cushions with more or less radial branching, branches ascending and erect. **Leaves** imbricate along the branches, sessile, patent-

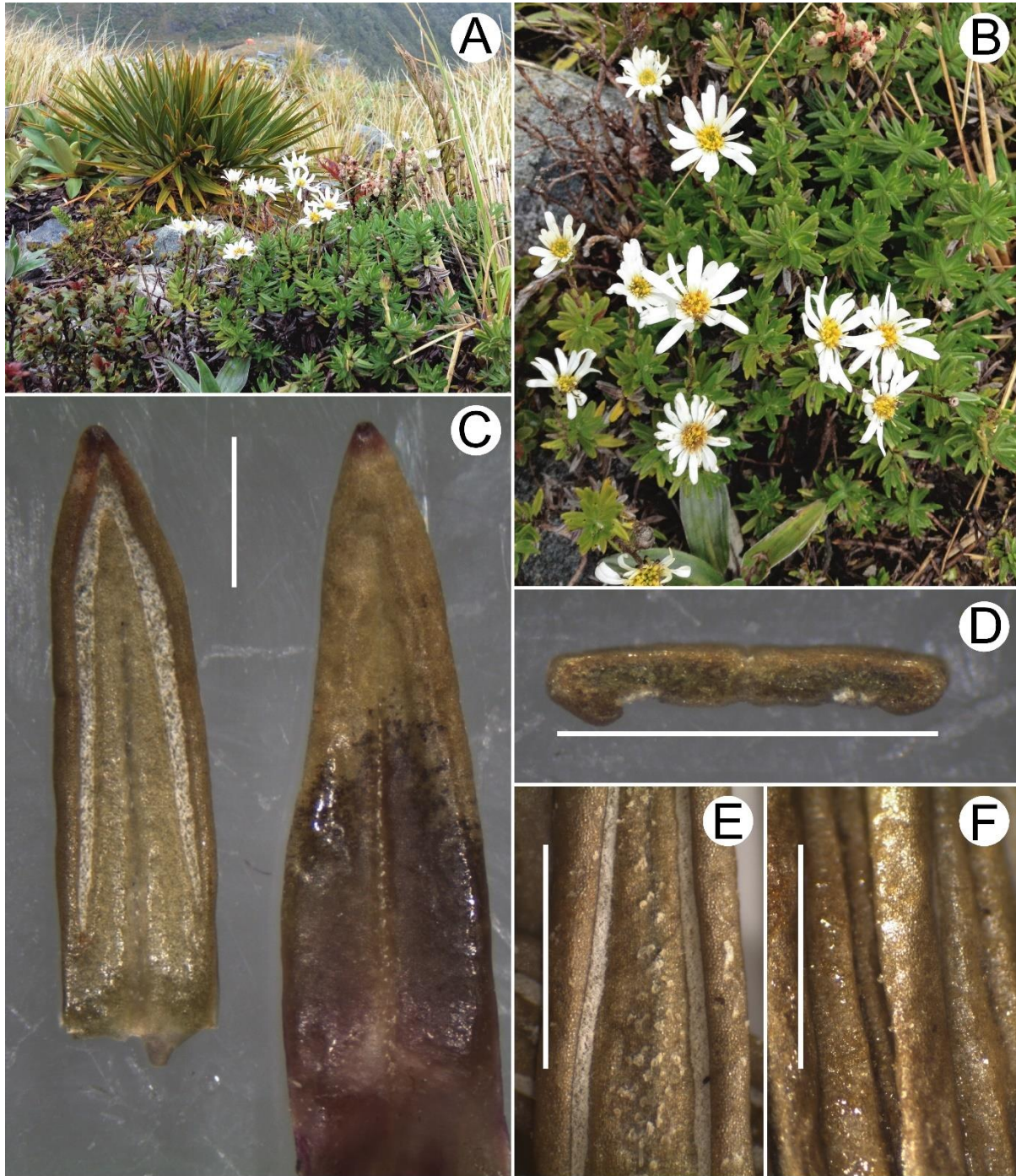


Figure 12. *C. gibbsii*: A–B. Habit; C. Abaxial (left) and adaxial (right) surfaces of a leaf; D. Cross-section of a leaf; E. Abaxial surface of a leaf showing scurfy scales; F. Leaves showing resinosity. C–D from CHR (310482), E from CHR (369993), and F from CHR (387116). Scale bar: 2 mm. A and B by Simon Walls at Mt Gibbs (Tasman).

ascending; lamina ericoid, linear-oblongate to slightly deltoid, coriaceous, slightly succulent, thick, 4.5–10(–12) × 1.2–1.5(–2) mm, apex angle acute, apex shape straight, often mucronate, base truncate; glabrous to densely covered with biseriate stalked-glandular trichomes, lustrous, green, midvein impressed on the adaxial surface and barely marked on the abaxial surface; margin untoothed, flat;

sheath parallel-sided, glabrous or lanose towards the top, green-whitish; venation parallel, multi-nerved. **Peduncle** 4–8(–9) cm long, covered with biseriate stalked-glandular trichomes and sometimes lanose in its southern limit (south of the Paparoa Range), green, with foliaceous bracts 4–7 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 6.5–8 × 3.5–5 mm. **Phyllaries** arranged in 5–6 series gradually longer from the outer to the inner ones, mostly appressed at anthesis but sometimes the outer row slightly spread, clad in biseriate stalked-glandular trichomes, midvein well-marked, linear-lanceolate, apex angle acute, straight to acuminate, green with a purplish tip; outer ones 3.5–4.5 × 0.6–0.9 mm; inner ones 6.5–8(–) × 1 mm, margin covered with short erect or curly trichomes towards the apex. **Ray florets** 15–20, arranged in two rows, white. **Disc florets** 10–16, tube 3.5–4 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 1.5–1.8 mm long; appendage 0.4 mm long, oblong-lanceolate, apex shape rounded; bases tailed 150–200 µm long; filament collar slightly wider than the filament; style branches 1.2–1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length, sterile appendage deltoid, 0.4 mm long, apical papillae 50–70 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and diminutive outer setae: bristles irregular in length, 3.5–4.5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2–3 mm long, 5-ribbed, covered with twin trichomes. Fig. 13.

Note: *C. lateralis* var. *villosa* was described based on: “Leaves densely clothed on both surfaces with soft glandular hairs” (Cheeseman 1906), whereas for the typical variety, Buchanan (1872) mentioned: “glabrous on both surfaces, or hispid [glandular trichomes] on the backs of young leaves; margin glandular ciliate.” Apart from the density of glandular trichomes, both taxa are identical, and plants with intermediate density from almost glabrous to densely glandular are not uncommon. Besides, the two varieties are found across most of the distribution of the species. Therefore, I recognize *C. lateralis* var. *villosa* as a synonym of the typical *C. lateralis*.

Distribution: South Island. Tasman, northern West Coast, southwestern Marlborough, and northern Canterbury. From the Boulder Lake area in the north to the south of Paparoa Range (Sewell Peak and Mt Davy) and Poplars Range (West of Hanmer Springs) in the south (Fig. 11).

Habitat: Low alpine (800–1700 m). Mainly in rocky outcrops and scree, but also in snow tussock-herbfield (Mark & Adams 1995).

Etymology: Refers to the lateral (axillar) position of the capitula. However, this is an attribute of all *Celmisia* species.

Other descriptions: Kirk (1899: 281), Cheeseman (1906: 301–302; 1914: plate 93; 1925: 935–936), Allan (1961:617).

Illustrations: Cheeseman (1914: plate 93), Mark & Adams (1995: plate 54), Eagle (2006: 765).

Additional collections. SOUTH ISLAND. Tasman. Above Boulder Lake, Brown Cow Mt., 7 Jan 1962, *P. Hynes s.n.* (AK 71397); alluvial scree slope south-east of Lake Peel, 1439 m, 11 Jan 2019, *P. Salsdivia 2683* (OTA); Bald Hill, Karamea, 1220 m, 17 Dec 1985, *S. McLennan s.n.* (CHR 419512); Boulder Lake, Brown Cow ridge, 1350 m, 8 Feb 1955, *J.A. Rattenbury s.n.* (AK 44275); *ibid.*, 1370 m, 8 Feb 1955, *J.A. Rattenbury s.n.* (AK 263820); Boulder Lake, Specimen Creek, 1 Jan 1957, *A.E. Esler s.n.* (AK 215594); Buller District, Mt Murchison, 1402 m, 1 Dec 1967, *B. Sneddon s.n.* (WELT SP091094); head of Travers Valley, Spenser Mts., 17 Dec 1947, *R. Mason s.n.* (CHR 58297); Hopeless Valley, 21 Mar 1964, *J.R. Fayer s.n.* (CHR 150054); Iron Hill, above Lake Sylvester, 1524 m, 9 Nov 1952, *J.A. Petterson s.n.* (CHR 77941); Iron Hill, near summit, Jan 1962, *G. Rickards s.n.* (WELT SP096316); Iron Hill, rocky cliff, 1645 m, 28 Mar 1964, *L.B. Moore s.n.* (CHR 151022); Lake Constance, Sabine River, 24 Nov 1959, *M.J.A. Simpson 1702* (CHR 121046); Lake Sylvester, 1463 m, 17 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 22111, 22241); Lake Sylvester, above lake, 1463 m, 10 Jan 1971, *A. Mark s.n.* (OTA 60556); Lookout Ra., summit ridge, 1615 m, 22 Feb 1969, *C. Bell s.n.*



Figure 13. *C. lateralis*: A. Habit; B. Capitulum (top view); C. Capitulum (lateral view); D. Leaves with sparse glandular trichomes; E. Leaves densely covered by glandular trichomes. A–B, D from OTA (*P. Saldivia* 2683, South of Lake Peel, Tasman), C from OTA (*P. Saldivia* 2624, Iron Hill, Tasman), and E from OTA (*P. Saldivia* 2619, Lake Sylvester, Tasman). E by Duncan Nicol.

(WELT SP096187); Mt Arthur, 914 m, *F.D. Spencer s.n.* (WELT SP004547); *ibid.*, 1219 m, *T.F. Cheeseman s.n.* (AK 9679); *ibid.*, 1372 m, *T. Cheeseman s.n.* (WELT SP004544); *ibid.*, 1524 m, Feb 1921, *A. Wall s.n.* (WELT SP096192); *ibid.*, 1524 m, Jan 1982, *A.P. Druce s.n.* (CHR 387621); Mt Arthur Plateau, 1219 m, *T.F. Cheeseman s.n.* (AK 9678); Mt Gomorrah, S. Arthur Ra., 1463 m, Mar 1982, *A.P. Druce s.n.* (CHR 389091); Mt Murchison, *W.L. Townson s.n.* (AK 243673); Mt Robert,

1413 m, 16 Feb 2018, *P. Saldivia 2614* (OTA); *ibid.*, slopes above Robert Lodge, 31 Dec 1955, *L.B. Moore s.n.* (CHR 108413, 108414); Rangimarie Tarn, Travers Ra., 15 Mar 1959, *M.J.A. Simpson 737* (CHR 121071); ridge between Douglas and Anatoki Ranges, 22 Feb 1946, *R. Mason s.n.* (CHR 34951); ridge west of Lake Sylvester, 1597 m, 18 Feb 2018, *P. Saldivia 2619* (OTA); slopes of Iron Hill, 1554 m, 22 Dec 1961, *W. Burke s.n.* (WELT SP096191); *ibid.*, 1649 m, 18 Feb 2018, *P. Saldivia 2624* (OTA); St Arnaud Range, 1600 m, *W. Martin s.n.* (CHR 50002); *ibid.*, cirques north of Peanter Peak, 1700 m, 25 Jan 1991, *K. Dickinson & A. Butler s.n.* (WELT SP096188); SW [southwest] Nelson, *W. Thomson s.n.* (WELT SP004538); Sylvester Lakes area, on scree on Iron ridge, 30 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 123086); Travers Range, 21 Mar 1961, *M.J.A. Simpson 3048* (CHR 120740); *ibid.*, 2nd Basin, 1219 m, 23 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 22110, 22242); *ibid.*, 5th Basin, 1524 m, 13 Feb 1971, *M.J.A. Simpson 6021* (CHR 220353); Travers Saddle, 1828 m, 27 Jan 1962, *M.J.A. Simpson & J.B. Monro s.n.* (CHR 521171). **Marlborough.** Bryant Ecological District, Nelson, *W.L. Townson s.n.* (AK 34915); Head of Paske Creek, Wairau, 1463 m, *P.W. s.n.* (CHR 519570); Island saddle, just north of road summit, 1380 m, 4 Jan 2002, *E.K. Cameron 10678* (AK 255630); montane region west of Amuri Co., *W.G. Morrison s.n.* (CHR 290093); Mt Princess, 15 Jan 1976, *J. Petterson s.n.* (WELT SP096186); 1371 m, *R.M. Laing s.n.* (CHR 10198); Mt Schiza, 1524 m, Jan 1932, *W. Martin s.n.* (WELT SP046919/A); Upper Wairau Valle, Jan 1989, *J.A. Petterson s.n.* (CHR 625220); Wairau Valley, herb field, 3 Jan 1973, *A.D. Robinson s.n.* (CHR 603925). **West Coast.** Aorere Peak, 1676 m, 17 Jan 1970, *W. Burke s.n.* (WELT SP096189); Buller Valley, 914 m, *collector unknown* (WELT SP004535); Garibaldi Ridge, 1341 m, Mar 1980, *A.P. Druce s.n.* (CHR 358516); Glasgow Ra., tussock land, 1240 m, Feb 1986, *A.P. Druce s.n.* (CHR 395809); Gordons Pyramid, 1 Jan 1941, *J.M. Dingley s.n.* (AK 50030); *ibid.*, 1400 m, 1 Feb 1953, *T.C. Chambers s.n.* (AK 263821, 263822); *ibid.*, 17 Jan 1941, *R. Mason s.n.* (CHR 28787); *ibid.*, rock in fellfield, 1432 m, 2 Jan 1951, *J.G. Hay s.n.* (CHR 108415); Gunner Downs, shrub-tussock land, 1188 m, Nov 1979, *A.P. Druce s.n.* (CHR 358595); Mt. Augustus, near summit, 10 Jan 1976, *M.J.A. Simpson 7749* (CHR 285242); Mt Davy, Paparoa Ra., 762 m, *P.G. Morgan s.n.* (AK 9677); *ibid.*, open herb land, 914 m, 13 Dec 1954, *G. Brownlie s.n.* (CHR 331428); Mt Frederick, 2 Apr 1912, *P. Morgan s.n.* (WELT SP004539/B); *ibid.*, side of Deep Creek, 914 m, 2 Apr 1912, *P. Morgan s.n.* (WELT SP004539/A, C); Mt Haast, Inangahua Catchment, 1371 m, 3 Dec 1967, *P.N. Johnson s.n.* (OTA 31773); *ibid.*, off SH7, 23 Jan 1978, *C. Ogle s.n.* (WELT SP089217); Mt. Kendall, 30 Dec 1947, *R. Mason s.n.* (CHR 58636); Mt Rochfort, *W.L. Townson s.n.* (AK 9675); *ibid.*, 1006 m, 25 Oct 1966, *B. Sneddon s.n.* (WELT SP091096); *ibid.*, (N. of Westport) near summit, 1006 m, 16 Jan 1979, *B. Sneddon s.n.* (WELT SP091095); Mts. near Greymouth, *R. Helms s.n.* (WELT SP004546); Mts. near Westport, *P.G. Morgan s.n.* (AK 9676); Mt. Stevenson, Paparoa Ra., Mar 1974, *J.R. Le Comte & G. Hooker s.n.* (CHR 259617); Mt. Watson, Paparoa Ra., fell fields, slopes, 1067 m, 14 Jan 1967, *L.B. Moore & J. Clarke s.n.* (CHR 174708); Paparoa Range, 914 m, *R. Helms s.n.* (WELT SP004545); *ibid.*, *R. Helms s.n.* (WELT SP004541); *ibid.*, *T. Kirk s.n.* (WELT SP004534, SP004542); *ibid.*, Sewell Peak, 21 Nov 1969, *I. Robins s.n.* (CHR 200958); *ibid.*, 22 Nov 1968, *D.G. Drury 68W/78* (CHR 188104). **Canterbury.** Christopher River, Spenser Mts, 22 Feb 1947, *R. Mason s.n.* (CHR 58294); Faerie Queene Basin, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP091097); probably Mt Cook district [wrong locality?], 1898, *J. Adams s.n.* (AK 15629); Head of East Sabine Va., Spenser Mts., 19 Feb 1947, *R. Mason s.n.* (CHR 58295, 58926); Island Pass, upper Wairau Valley, 1402 m, 25 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 22109); Matakitaiki R. [River], Mt. St. Patrick, Clarence River, moist slope, 1706 m, 8 Jan 1972, *B.H. Macmillan 72/65* (CHR 226054); Mt. Una, Spenser Mts., *A. Wall s.n.* (CHR 290401); Spenser Mts., above Matakitaiki River (West branch), Fairie Queene, 1700 m, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP083143); upper Clarence Valley, c. 1 km north of Lake Tennyson turnoff, left roadside bank, 18 Jan 2001, *J.C. Smith-Dodsworth s.n.* (AK 253058); Western region of Amuri Co. [County], *W. Morrison s.n.* (WELT SP004537); Waiiau Pass, Spenser Ra., 12 Jan 1970, *M.J.A. Simpson 5700* (CHR 204955). **District unknown.** Sine loco, *W. Bryant s.n.* (WELT SP004543); sine loco, *collector unknown* (WELT SP086593).

6. **CELMISIA GLANDULOSA** Hook.f., Bot. Antarct. Voy. II. (Fl. Nov.-Zel.). 1: 124. 1853. **TYPE: NEW ZEALAND.** Northern Island, Foot of Tongariro, *Colenso* 953 (lectotype: K 882070 [image!] ex Herbarium Hookerianum designated by Allan 1961: 630; isolectotype: WELT SP24131!).
- Celmisia glandulosa* Hook.f. var. *latifolia* Cockayne, Trans. & Proc. New Zealand Inst. 49: 57. 1917. **TYPE: NEW ZEALAND.** North Island, Egmont-Wanganui Botanical District-Mt Egmont; common as a member of the tussock-grassland and herb-field plant associations, 17 Jan 1905, *L. Cockayne s.n.* (holotype: WELT SP3291!). Syn. nov.
- Celmisia glandulosa* Hook.f. var. *longiscapa* Cockayne, Trans. & Proc. New Zealand Inst. 49: 58. 1917. **TYPE: NEW ZEALAND.** South Island, Fiord Botanical District, Upper Clinton Valley, on old moraine, *L. Cockayne* 7613 (holotype: WELT SP3292A!, WELT SP3292B!). Syn. nov.
- Celmisia membranacea* Colenso, Trans. & Proc. New Zealand Inst. 22: 470. 1889 (1890). **TYPE: NEW ZEALAND.** North Island, Open lands at Taupo [Tongariro on label], 1889, *H. Hill s.n.* (holotype: WELT SP24132!). Syn. nov.

Stoloniferous, loosely branched **shrub**, forming loose patches up to 1 m or more across and 5–10 cm tall. **Leaves** clustered at the distal part of the main branches and stolons, forming apical loose rosettes, pseudopetiolate, straight upwards to spreading; lamina oblanceolate to obovate, coriaceous, (–10)15–25(–30) × (–5)8–22 mm, apex angle obtuse or acute, apex shape straight, convex or rarely rounded, often mucronate, base decurrent; adaxial surface glabrous to densely covered with biseriate stalked glandular trichomes, green, midvein conspicuous, impressed, and 1–2 faint secondary veins running on each side of the midvein following the leaf margin; abaxial surface with sparse biseriate stalked glandular trichomes or glabrous, green or pale-green, midvein and secondary (and often 3–level) veins raised, conspicuous; margin with sparse biseriate stalked glandular trichomes, rarely glabrous, distantly serrate with mucronate teeth, flat; sheath parallel-sided, glabrous, mostly white-hyaline to green or purplish, multi-nerved. **Peduncle** 5–20 cm long, covered with biseriate stalked glandular trichomes, green to purple, with few distant foliaceous bracts 5–9 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 6–9 × 4–5 mm. **Phyllaries** arranged in 4–5 series gradually longer from the outer to the inner ones, appressed at anthesis, sometimes the outer ones spreading to slightly recurved, densely covered with biseriate stalked glandular trichomes, linear-lanceolate, apex angle acute, straight to acuminate, green, often with purple apices; outer ones 4–5 × 0.6–1 mm; inner ones 6–9 × 0.5–0.9 mm. **Ray florets** 15–30, arranged in 2–3 rows, white. **Disc florets** ca. 30, tube 5–5.5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2–2.5 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight; bases tailed 400–500 µm long; filament collar slightly wider than the filament; style branches ca. 2 mm long, linear, stigmatic bands reaching 1/2–3/4 of the branch length, sterile appendage deltoid, 0.8 mm long, apical papillae 80–100 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and diminutive outer setae; bristles irregular in length, 6–7 mm long with the longest ones reaching or exceeding the corolla lobes. **Cypselae** 2.5–3 mm long, 5–6-ribbed, covered with twin trichomes. Fig. 14.

Note: The varieties *latifolia* and *longiscapa* were described by Cockayne (1917) based on subtle characters of leaf morphology that are part of the variation of this polymorphic species. When studying herbarium specimens, these broader (var. *latifolia*) and narrower (var. *longiscapa*) forms, are united by not uncommon specimens with intermediate morphology. The same situation occurs with Colenso's *C. membranacea*, which is indeed identical to var. *latifolia*, and comes from the same typical area of *C. glandulosa* s. stricto (i.e., Tongariro-Taupo). Accordingly, I consider these three taxa as synonyms of *C. glandulosa*.

Distribution: North and South Islands. Mainly Taranaki, Manawatu-Wanganui, west Canterbury, south of the West Coast, Otago, and Southland. From the Volcanic Plateau, Taranaki (Mt Egmont),



Figure 14. *C. glandulosa*: A. Habit and leafy stolons ending in loose rosettes; B. Habit; C. Capitulum (lateral view); D. Peduncle showing glandularity; E. Involucre; F. Capitulum (top view). A from WELT (SP3292B); B–F from OTA (*P. Saldivia* 2567, Borland Saddle, Fiordland). Scale bar: 5 cm.

Kaweka, and Ruahine Ranges in the North Island (absent in the Tararua Range), to Fiordland in the South Island (absent in Tasman) (Fig. 15, 16).

Habitat: Subalpine to low alpine (600–1700 m). In bogs or wet open areas in snow tussock-herbfield and on the margin of riverbeds in subalpine scrub.

Etymology: Refers to the glandular trichomes abundant on peduncles and involucre.

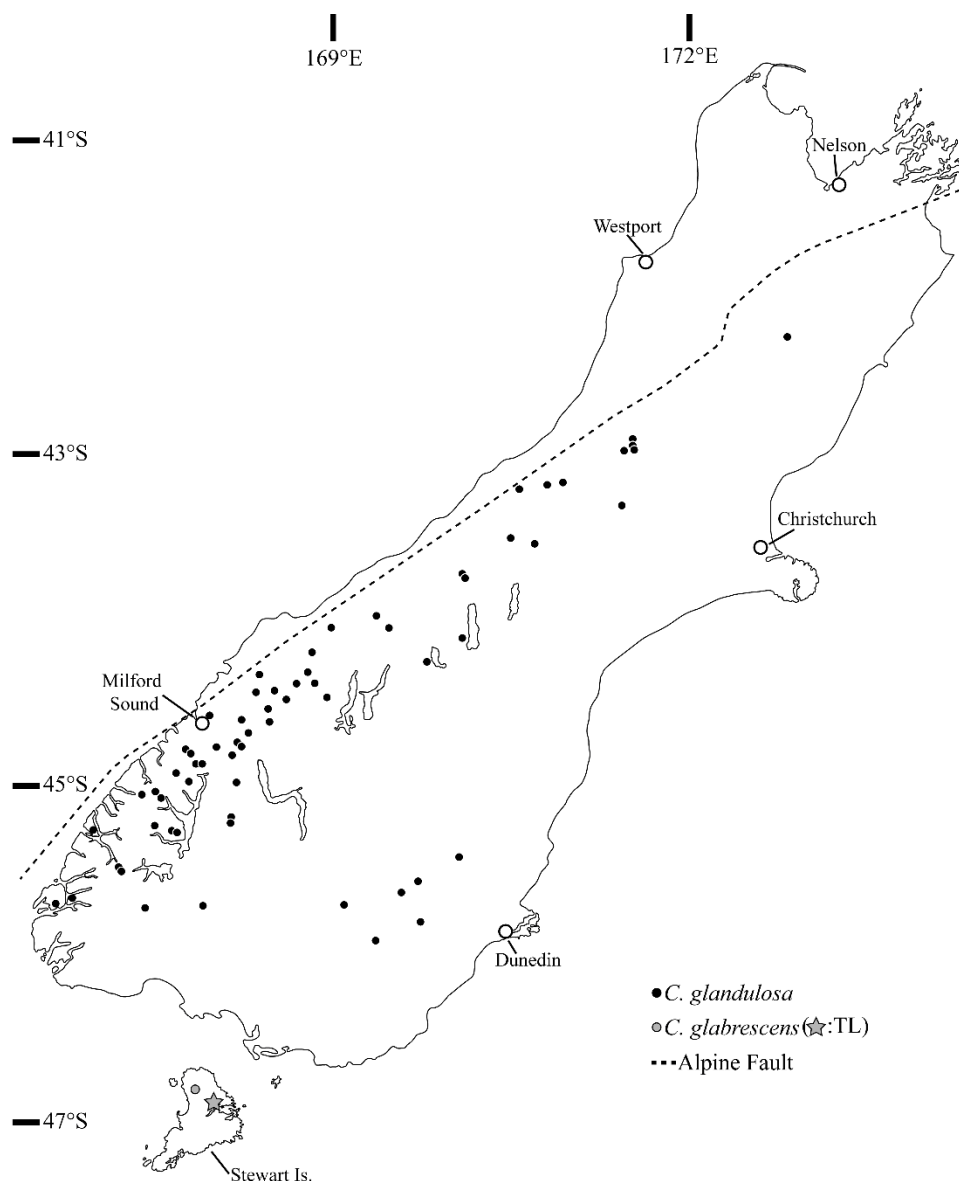


Figure 15. Distribution map of *C. glandulosa* and *C. glabrescens*, in the South and Stewart Islands of New Zealand. TL: Type locality.

Other descriptions: Kirk (1899: 293), Cheeseman (1906: 318; 1925: 958), Allan (1961: 630–631).

Illustrations: Mark & Adams (1995: plate 52).

Additional collections. NORTH ISLAND. Waikato. Base of Mt. Ngauruhoe, 1066 m, Jan 1905, *T.F. Cheeseman s.n.* (AK 9981, 9980); Tokaanu, Kakaramea, 19 Mar 1905, *J. Adams 114* (AK 15636); Volcanic Plateau, base of Ngarahoe [Ngauruhoe], 1158 m, Jan 1905, *T.F. Cheeseman s.n.* (CHR 10325). **Taranaki.** [W?]Manganui River, Egmont, 762 m, Feb 1967, *A.P. Druce s.n.* (CHR 189268); Bells Falls track, Mt Egmont, 24 Mar 1940, *E. Pickmere s.n.* (WELT SP045687); Egmont National Park, Pouakai Range, in saddle below Pouakai, 1200 m, 19 Feb 1958, *B. Hamlin s.n.* (WELT SP004985); Kahui [Hill], Mt Egmont, 823 m, 8 Jan 1937, *W.R.B. Oliver s.n.* (WELT SP045686); Manganui River, Taranaki, 762 m, Feb 1967, *A.P. Druce s.n.* (CHR 189268a); Mt Egmont, (WELT

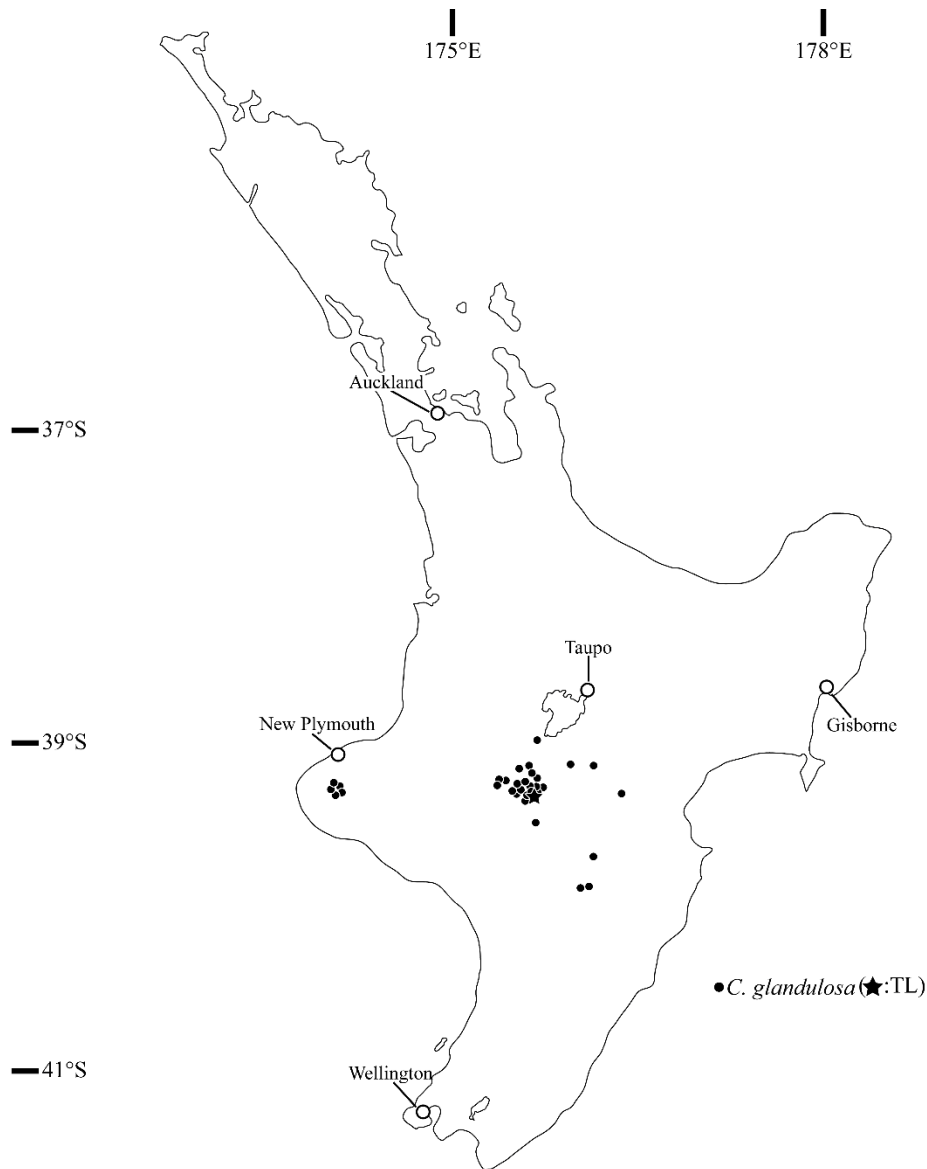


Figure 16. Distribution map of *C. glandulosa* in the North Island of New Zealand. TL: Type locality.

SP046762); *ibid.*, *T. Kirk s.n.* (AK 11745); *ibid.*, Mar 1910, *B.C. Aston s.n.* (WELT SP046508); *ibid.*, 10 Mar 1910, *B.C. Aston s.n.* (WELT SP045677); *ibid.*, Feb 1901, *B.C. Aston s.n.* (WELT SP045678); *ibid.*, Feb 1956, *P. Ralph s.n.* (WELT SP096133); *ibid.*, 1 Nov 1961, *M.E. Sexton s.n.* (AK 248852); *ibid.*, 1 Oct 1955, *M.E. Sexton s.n.* (AK 248853); *ibid.*, 17 Jan 1905, *L. Cockayne s.n.* (AK 32152); *ibid.*, 2 Feb 1932, *L.M. Cranwell s.n.* (AK 32145); *ibid.*, 22 Feb 1981, *B. Sneddon s.n.* (WELT SP091109); *ibid.*, 31 May 1943, *R.J. Lowrie s.n.* (AK 261300); *ibid.*, Mar 1887, *Ball s.n.* (AK 263782); *ibid.*, 548 m, Dec 1959, *A.P. Druce s.n.* (CHR 86482); *ibid.*, 1219 m, Feb 1912, *D. Petrie s.n.* (WELT SP045679); *ibid.*, 1219-1524 m, *J. Buchanan s.n.* (WELT SP046513); *ibid.*, below Wilkies Pools, 18 Jan 1934, *L.M. Cranwell s.n.* (AK 32151); *ibid.*, Dawson Falls, 24 Jan 1958, *P. Hynes s.n.* (AK 50544); *ibid.*, E. side, 1372 m, 20 Mar 1931, *W.R.B. Oliver s.n.* (WELT SP046506); *ibid.*, N. slope, 1463 m, 23 Nov 1967, *A. Mark & N. Adams s.n.* (OTA 22115); *ibid.*, near Morniganui [Manganui?] Hut, 1800 m, 26 Apr 1947, *I. Newman s.n.* (WELT SP096132); *ibid.*, Stratford Plateau, Jan 1953, *G. Bulmer s.n.* (WELT SP096123); Mt Taranaki, *W.L. Townson s.n.* (AK 245727); Mt Taranaki / Egmont, above Kapuni Hut, 1524 m, 21 Jan 1962, *C. Ogle s.n.* (WELT SP088421); Owakai Range, Taranki, 1219 m,

Mar 1962, *A.P. Druce s.n.* (CHR 116706); The Swamp, Taranaki, 914 m, Mar 1962, *A.P. Druce s.n.* (CHR 116528); Wilkin Pools close to Dawson Falls Mt. Taranaki Park, 2 Jul 2004, *I. Breitweiser 2180 & Rainervogt s.n.* (CHR 570582). **Manawatu-Wanganui.** Base of Mt Ruapehu, Desert Road, 30 Dec 1961, *P. Hynes s.n.* (AK 71425); Desert Road, 16 Jan 1964, *P. Hynes s.n.* (AK 100583); east of Ruapehu, Rangipo Plain, Jan 1889, *D. Petrie s.n.* (WELT SP045680); *ibid.*, 31 Jan 1916, *D. Petrie s.n.* (WELT SP045681); Hikurangi Range, Ruahine Range, 1371 m, Apr 1980, *A.P. Druce s.n.* (CHR 358750); Kaimanawa [Range], Jan 1911, *B.C. Aston s.n.* (WELT SP046761); Kaimanawa State Forest Park, poled track 2km ENE of junction of Desert Road and Bullock Track (to Tukino Skifield), about 700m NNW of radio mast, 1290 m, 12 Feb 1993, *J. Fox & M. Huaki s.n.* (WELT SP096534); Kaimanawas [Kaimanawa Range], Jan 1915, *B.C. Aston s.n.* (WELT SP046509); Mangaturuturu Valley, Ruapehu, 1310 m, Apr 1972, *A.P. Druce s.n.* (CHR 245046); Mokai Patea, extension of Ruahine Range, 1524 m, 19 Feb 1951, *N.J. Moore 653* (CHR 70092); Mt Ruapehu, 1432 m, 26 Feb 1952, *E. Moore s.n.* (CHR 75743); *ibid.*, 1930, *A.D. McKinnon s.n.* (AK 36738); *ibid.*, Whakapapaiti Strm, 23 Jan 1954, *W.R.B. Oliver s.n.* (WELT SP005861); near Waihohonu (Waiohonu), 14 Apr 1905, *J.E. Attwood s.n.* (AK 32160); NW Ruahine, Mangouhane [Maungamahue?], 1158 m, Jan 1945, *A.P. Druce s.n.* (CHR 63300); on bank of R. [River] Whakapapanui, nr 1st footbridge [and?] Haunted Whare, Jan 1921, *H. Carse s.n.* (WELT SP096136); Patea Plains, *J. Buchanan s.n.* (WELT SP046510); Ruahine Ecological Region and District, Whanahuia (Whana Huia) Range, 1320 m, 1 Apr 1980, *A.P. Druce s.n.* (AK 160037); Ruahine Ranges, headwaters of Waikamaka Stream below saddle, 1149 m, 23 Feb 1956, *B. Hamlin s.n.* (WELT SP045684); Ruahines, Mt. Tiraha, 1524 m, 8 Feb 1968, *B. Sneddon s.n.* (WELT SP091111); Ruapehu, 914 m, *W.L. Townson s.n.* (AK 9982); *ibid.*, *F.H. Spencer s.n.* (AK 9979); *ibid.*, top of Ohakune Mtn. Rd., 1 May 1981, *J.E. Braggins s.n.* (AK 264719); *ibid.*, western side, 1220 m, *F.E. Lancaster s.n.* (AK 263783); Ruapehu plateau, Rangipo desert, 2 Jan 1916, *D. Petrie s.n.* (AK 263784); SW slopes of Mt Ruapehu, top of Ohakune Mtn. Rd, Mangawhero Stream, margin, 1600 m, 31 Jan 1982, *E.K. Cameron 1181* (AK 270809); Three Kings Range, Waimanauwa Mts., 1127 m, Jan 1974, *A.P. Druce s.n.* (CHR 260262); Tongariro, 13 Apr 1905, *M.E. Sexton s.n.* (AK 32147); Tongariro - track to Tukinu ski field, eastern slope of Ruapehu, 1450 m, 2 Apr 1998, *Enzat 160* (CHR 493738); Tongariro National Park, *J.E. Attwood s.n.* (AK 32158); *ibid.*, 15 Apr 1905, *J.E. Attwood s.n.* (AK 32159); Tongariro National Park, Ruapehu, 14 Apr 1905, *J.E. Attwood s.n.* (AK 32148, 32149); Track from Desert Road to Waihohonu Hut, 1067 m, Dec 1966, *J. Knox s.n.* (WELT SP096134); upper Edge of Tikitiki Bush, Inland Patea (Ngamatea Rangitike), 1 Oct 1950, *B.G. Hamlin s.n.* (CHR 68825); upper Whanganui river, north ridge, 1433 m, 15 Apr 1994, *P. Wardle 94-65 & R.P. Buxton s.n.* (CHR 508542); Volcanic Plateau, Desert Rd, highest peak, *collector unknown* (AK 266232); Volcanic Plateau, Erua bogs, 1909, *E.P. Turner s.n.* (AK 32146); Waimarino, 29 Jan 1954, *W.R.B. Oliver s.n.* (WELT SP005862); *ibid.*, 6 Jan 1921, *H.B. Matthews & H. Carse s.n.* (AK 32150, 32153, 32154); Waimarino Plain, Dec 1919, *B.C. Aston s.n.* (WELT SP045672); *ibid.*, Dec 1920, *B.C. Aston s.n.* (WELT SP046505, SP046766); *ibid.*, 19 Dec 2005, *L. Cockayne s.n.* (WELT SP046625); *ibid.*, 6 Jan 21, *H. Matthews s.n.* (WELT SP045675/A-B); Waimarino, [Mt] Hauhungatahi, Jan 1918, *H. Carse s.n.* (WELT SP045673); Waiokotore Stream, NW Ruahine Range, 1097 m, Apr 1973, *A.P. Druce s.n.* (CHR 249005); Waiouru, beside the Desert Road, 15 Jan 1959, *I.L. Barton s.n.* (AK 213142); Whanahuia Range, west Rahine Range, 1371 m, Apr 1977, *A.P. Druce s.n.* (CHR 286750). **Hawke's Bay.** Eastern Kaweka Range, MacIntosh [MackIntosh] Country, 914 m, 13 Jan 1960, *I. Armitage s.n.* (WELT SP096135); Kaweka Range, 1524 m, Dec 1964, *A.P. Druce s.n.* (CHR 131796); Maungaharuru Range, 975 m, Dec 1969, *A.P. Druce s.n.* (CHR 209752); *ibid.*, 1097 m, Feb 1972, *A.P. Druce s.n.* (CHR 246320); Ngaruroro Valley, 13 Feb 1982, *A.E. Esler s.n.* (AK 215609). **District unknown.** Taupo?, *G.T. Mair s.n.* (WELT SP046512). **SOUTH ISLAND. West Coast.** Cave Camp, *A. McKay s.n.* (WELT SP078122); *ibid.*, *J. Buchanan s.n.* (WELT SP046511); Haast Pass, Westland Side, 1371 m, 19 Feb 1962, *G.T.S. Baylis s.n.* (OTA 6971); Horace Walker moraine Westland National Park, 1097 m, 19 Mar 1968, *J.R. Fryer s.n.* (CHR 179226); Mt Aspiring Range, Hector's Col, 1219 m, *D. Petrie s.n.*? (AK 9977); Mt Brewster, 9 Mar 1968, *A. Mark s.n.* (OTA 20707); *ibid.*, 1463 m, 19 Mar 1968, *A. Mark s.n.* (CHR 619921); Mt Brewster Track, 1460 m, 19 Feb 2017, *P. Saldivia 2551* (OTA); Mt Wilber,

1219 m, 28 Mar 1993, *P. Wardle et al. s.n.* (CHR 499861); Mts. near Mt Aspiring, 1372 m, *D. Petrie s.n.* (WELT SP046627); Mueller Valley, Turnbull River, 609 m, 20 Jan 1969, *A. Mark s.n.* (OTA 23466); slopes east of Mt Fox, 1188 m, 27 Feb 1967, *P. Wardle & J.R. Fryer s.n.* (CHR 166841); terrace of Orati River [Otira?], 457 m, 15 Jan 1938, *V.D. Zotov s.n.* (CHR 21115); Waitoto Valley, 1066 m, 20 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21146); Waitoto River/Drake River, 1360 m, 26 Feb 2013, *J. Mace s.n.* (CHR 645841); Williamson Flat, Arawhata R. Mt Aspiring N.P., 457 m, 16 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20829, CHR 619887). **Canterbury.** Above Sealy Lakes, 1402 m, Feb 1969, *H.D. Wilson & C. Meurk s.n.* (CHR 584692); Arthur's Pass, 10 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122043); *ibid.*, (WELT SP045685); *ibid.*, 28 Feb 1937, *W.B. Brockie s.n.* (CHR 222299); *ibid.*, 5 Mar 1968, *A. Mark s.n.* (OTA 21688); *ibid.*, Jan 1883, *T.F. Cheeseman s.n.* (AK 9978); *ibid.*, Feb 1927, *W.R.B. Oliver s.n.* (WELT SP046507); *ibid.*, Mar 1921, *W. Martin s.n.* (WELT SP046970); *ibid.*, 1 Jan 1956, *M.E. Sexton s.n.* (AK 248851, 252023); *ibid.*, 30 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP005858); *ibid.*, Jan 1927, *R.M. Laing s.n.* (CHR 334424); *ibid.*, 750 m, 1950, *A.E. Esler s.n.* (AK 215608); *ibid.*, 914 m, *T. Kirk s.n.* (OTA 16414); Arthur's Pass National Park, Temple Basin, 10 Jan 2008, *A. Sciligo s.n.* (CHR 646812); Arthur's Pass, roadside, 900 m, 20 Feb 1949, *R.C. Cooper s.n.* (AK 24307); Avoka Valley, Selwyn Co., 23 Feb 1945, *R. Mason s.n.* (CHR 51427); Dobson Memorial Arthur's Pass, 920 m, 3 Nov 2003, *D. Given 30317* (CHR 570369); Godley Glacier, near, 1036 m, 19 Nov 1958, *D. Scott s.n.* (OTA 4741); Hermitage, Mt Sebastopol, Red Lake, 30 Dec 1955, *K.M. Wood s.n.* (AK 242340); Lake Ohau, 1372 m, Jan 1949, *H. Talbot s.n.* (WELT SP005859); Mt Cook National Park, 23 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 242338); Mt Cook, near Hermitage, Sealy [Sealy] Range, 1524 m, 19 Feb 1911, *D. Petrie s.n.* (WELT SP045676); Mt Sebastopol, 3 Feb 1946, *G.T.S. Baylis s.n.* (OTA 2490); Mt Sebastopol, around Red Lake, 1050 m, 20 Jan 1965, *P. Hynes s.n.* (AK 104556); Mt Valiant, Huwdun Valley, 10661219 m, 2 Mar 1966, *D. Given s.n.* (CHR 175184); Mt Valiest, Arthur's Pass, 13 Feb 1966, *D. Given s.n.* (CHR 200823); Mts. west of Lake Ohau, 1066 m, Jan 1949, *H. Talbot s.n.* (CHR 269056); Pukaki Downs, 700 m, 14 Feb 1986, *B. Malloy s.n.* (CHR 617593); Red Lake, Mt Cook, 26 Feb 1958, *H.E. Connor s.n.* (CHR 98366); ridge east of Godley Hut, Godley Valley, 1500 m, 23 Feb 1977, *D. Given 9757* (CHR 323267); slopes of Wakefield spur, 1066 m, Mar 1969, *H. Wilson s.n.* (CHR 254839); summit area of Arthur's Pass, west of Monument, 2 Nov 1986, *D. Given 14243 & M. Gray* (CHR 511982); The Growler, Two Thumb Range, 1523 m, Feb 1991, *A.P. Druce 247* (CHR 469172); Unknown River, true left, 1143 m, 17 Feb 1984, *A. Huber s.n.* (CHR 569237). **Otago.** Blue Mts., 950 m, 13 Mar 2004, *A. Mark s.n.* (OTA 58803); Dart Valley, upper, *J.E. Holloway s.n.* (OTA 2489); Forbes Mts., above Cattle Flat, Dart Valley, 27 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21102, 21103); *ibid.*, 1066 m, 24 Jan 1968, *A. Mark & M.L. Burke s.n.* (CHR 619925); Forbes Mts., Mt Earnslaw, Kea Basin, Feb 1992, *A.P. Druce 1688* (CHR 475952); Hills opposite Mt Aspiring, 1219 m, *D. Petrie s.n.* (WELT SP046514); Lammerlaw Range, 670 m, *A. Mark s.n.* (OTA 35906); Mt Alta Range, W part., near Mt Aspiring, *D. Petrie s.n.* (WELT SP045674); Mt Holdsworth Track, 21 Jan 1984, *collector unknown* (OTA 59717); Ocean Peak, Harris saddle, 1188 m, 1 May 1963, *A. Mark s.n.* (OTA 7237); Old Man Range, 1310 m, Mar 1987, *A.P. Druce s.n.* (CHR 395345); Routebourn Falls, 25 Nov 1966, *D. Given 66405* (CHR 202010); Sugarloaf Pass, Rockburn Valley, 1219 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20470); upper Taieri Catchment, 950 m, 20 Jan 1979, *D. Holdsworth s.n.* (OTA 38669); Waipori River, Glendhu, 450 m, 15 Feb 1980, *J.F. West s.n.* (OTA 38567); Waipori River, grassland bank above river, Glendhu forest, 500 m, 15 Feb 1980, *J.F. West s.n.* (OTA 56139). **Southland.** Barrier Peaks, Lake Thomson, 853 m, 2 Dec 1970, *C. Powell s.n.* (OTA 28595); base of Takitimo Mts [Takitimu Mts.], 30 Dec 1912, *D. Petrie s.n.* (WELT SP045682); Borland Bog, 30 Mar 1996, *J. Steel s.n.* (OTA 48163); Borland Pass, 975 m, 2 Feb 1978, *J.F. West s.n.* (OTA 64521); *ibid.*, 1000 m, 2 Feb 1978, *J.F. West s.n.* (CHR 594009); Chime Garth Falls, Wilmot Pass area, 21 Feb 1959, *M.J.A. Simpson 1410* (CHR 116088); Clinton Valley, Jan 1892, *D. Petrie s.n.* (WELT SP045683, SP045683/A); Dusky Sound Fiordland, Head of Hut Creek Super Cove, 701 m, Feb 1972, *D. Given 72822* (CHR 230531); East entrance Homer Tunnel, 17 Feb 1987, *N.S. Lander 1495* (CHR 441901); Eglinton Valley, Key summit, 900 m, 16 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122053); *ibid.*, 1110 m, 1 Mar 1969, *P. Hynes s.n.* (AK 242341); Fiordland, McKinnon [Mackinnon] Pass, 914

m, 22 Feb 1967, *B. Sneddon s.n.* (WELT SP091110, SP091118); Fiordland, S of Wilmott Pass, 610 m, 9 Feb 1956, *T.C. Chambers s.n.* (AK 263780); Flats at Lake Monowai, Mar 1951, *G. Simpson Herbarium s.n.* (CHR 201338); Garvie Mts., 16 Feb 1975, *R. Powell s.n.* (CHR 363178); Harrison Valley, Sound, 762 m, 24 Feb 1967, *A. Mark & J. Wells s.n.* (OTA 18203); head of true left branch Poison River, Poison Bay, 890 m, 2 Feb 1976, *P. Ryan s.n.* (CHR 519540); Homer Tunnel, 20 Jan 1967, *B.S. Parris s.n.* (AK 129399); Lake Eyles, above, 326 m, 12 Feb 1973, *A. Mark s.n.* (OTA 33821); Leslie tops, Caswell Sound, 29 Mar 1949, *W.R.B. Oliver s.n.* (WELT SP005856); Leslie Valley, Caswell Sound, 457 m, 30 Mar 1949, *W.R.B. Oliver s.n.* (WELT SP005857); Livingstone Mts., E. slope, 1370 m, 19 Mar 1975, *A. Mark s.n.* (OTA 35180); Mararoa River Valley, Feb 1992, *A.P. Druce s.n.* (CHR 689066); Mary Peaks, Casual Sound area, 3 Apr 1949, *A.P. Poole s.n.* (CHR 67439); Milford Sound, Sinbad Gully, 600 m, 27 Feb 1975, *P. Johnson s.n.* (CHR 261638); Milford track, 2 Dec 1985, *H. Widdowson s.n.* (CHR 593441); Moose Creek, Henry Burn, Fiordland, Feb 1972, *D. Given 72418* (CHR 227497); Mt Burns, 1273 m, 4 Mar 2017, *P. Saldivia 2567* (OTA); Mt George, Fiordland, ridge northeast of peak of saddle at head of Elizabeth Burn, 11501400 m, 21 Mar 1977, *P. Garnock-Jones & B. Lee s.n.* (CHR 338373); Mt Hodges, Dusky Sound, 914 m, 16 Feb 1969, *D.J. Lyttle s.n.* (OTA 34109); Nitz Creek, Franklin Mts., 792 m, 30 Dec 1968, *D. Given 69061* (CHR 169665); Ocean Peak, 1249 m, 1 May 1963, *A. Mark s.n.* (OTA 7241); Olivine Ledge, West Otago, Ice Plateau, ledge, 1066 m, 17 Feb 1968, *A. Mark s.n.* (OTA 21713); Parasol Creek, east Umbrella Mts., 930 m, 30 Jan 1986, *K. Dickinson & B.D. Rance s.n.* (OTA 43933); Parasol Hill, eastern Umbrella Mts., 930 m, 30 Jan 1986, *K. Dickinson & B.D. Rance s.n.* (CHR 431408); Park Pass, Rockburn Valley, 1249 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20559); Secretary Island, 914 m, 1 Feb 1959, *J. Murray s.n.* (OTA 6877); Simonin Pass, Red Mts., 1036 m, 23 Jan 1975, *W. Lee & A. Mark s.n.* (OTA 35519); *ibid.*, 25 Jan 1975, *W. Lee & A. Mark s.n.* (OTA 35950); south of Wilmot (Wilmott) Pass, 9 Feb 1956, *T.C. Chambers s.n.* (AK 242345); Stillwater Valley, upper, 762 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30473); swampy red tussock grassland, Lake Orval, Takahe Valley, Murchison Mts., 2 Nov 1976, *I. Payton s.n.* (CHR 519543); Takahe Valley, 914 m, 1 Feb 1956, *G.T.S. Baylis s.n.* (OTA 3637); Takahe Valley, tussock flat above Lake, 18 Feb 1952, *W.R.B. Oliver s.n.* (WELT SP005860); West Burn, Livingstone Mts., 1000 m, 28 Mar 1973, *A. Mark s.n.* (OTA 35229); Wilmot Pass, 853 m, 9 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 22114). **District unknown.** Southern Alps, *collector unknown* (WELT SP044581).

7. **CELMISIA GLABRESCENS** Petrie, Trans. & Proc. New Zealand Inst. 47: 50. 1914 (1915). **TYPE:** **NEW ZEALAND.** Steward Island, Meadow near Freshwater River, 100 ft, *D.L. Poppelwell s.n.* (lectotype: WELT SP2145! designated by Allan 1961: 630; isolectotype: WELT SP2145B!).

Stoloniferous, loosely tufted **shrub** 15–25 cm tall. Leaves clustered at the distal part of the main branches and stolons, forming loose apical rosettes, pseudopetiolate, straight upwards to spreading; lamina oblanceolate, subcoriaceous, 4.5–80 × 9–15 mm, apex angle acute, apex shape straight or convex, mucronate, base decurrent; adaxial surface glabrous, green, midvein conspicuous, impressed, and 1–2 faint secondary veins running on each side of the midvein following the leaf margin; abaxial surface with a thin arachnoid white indumentum made up of long aseptate trichomes, and some scattered non-stalked glandular trichomes beneath, midvein wide, conspicuously raised, and secondary faintly visible through the indumentum, raised; margin distantly serrate with mucronate teeth, flat; sheath parallel-sided, surfaces glabrous, margin lanose towards the top, white-hyaline to pale-green, lanose multi-nerved. **Peduncle** 12–30 cm long, glabrous, viscid, with few distant foliaceous bracts 15–20 mm long, linear, apex angle acute, apex shape straight. Involucre cylindrical at anthesis, 12–13 × 7–8 mm. **Phyllaries** arranged in 4–5 series gradually longer from the outer to the inner ones, appressed to slightly spreading or recurved (mainly the outer ones) at anthesis, glabrous to partially covered with non-stalked glandular trichomes, viscid, apex angle acute, straight to acuminate, green, often with purple apices; outer ones 6–8 × 0.9–1.2 mm; inner ones 10–12 × 0.8–1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 23–30, arranged in 1–2 rows, white. **Disc florets** many, 6.5–7, lobes deltoid. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and



Figure 17. *C. glabrescens*: A. Habit; B. Adaxial and abaxial surfaces of the leaves. C. Detail of a leafy stolon ending in loose rosette. D. Capitulum (lateral view). A, D from WELT (SP2145B); C from WELT (SP2145); B from WELT (SP46628). Scale bars: A: 5 cm. B–D: 2 cm.

diminutive outer setae; bristles irregular in length, 5–7 mm long. **Cypselae** 3–4 mm long, 5–6-ribbed, covered with twin trichomes. Fig. 17.

Notes: Cockayne (1917) commented about *Celmisia glandulosa* var. *longiscapa*: “It bears a good deal of resemblance to *Celmisia glabrescens* Petrie of Stewart Island, but the latter is separated by its still longer leaves, which are thinly tomentose beneath and which lack the strong network of veins”.

Agreeing with Cockayne, the development of stolons places *C. glabrescens* close to *C. glandulosa*. However, in addition to the indumentum of the abaxial surface of the leaves, the lack of biseriate stalked glandular trichomes in *C. glabrescens*, which are typical of *C. glandulosa*, also separates both species.

In December 2017, I undertook limited fieldwork around Freshwater River (Stewart Island), the type locality of *C. glabrescens*, but unfortunately, I could not find the species. The Freshwater River area is a vast and diverse wetland with different plant communities (personal observation), requiring several days to be appropriately explored.

Distribution: Stewart Island. Only known from two collections by D. Poppelwell; the type collection, and another from the headwaters of the Freshwater River (Fig. 16).

Habitat: Meadows and sandy soil.

Etymology: Glabrescent means becoming hairless or glabrous at maturity. However, this seems not to be an attribute of this species.

Other descriptions: Cheeseman (1925: 958–959), Allan (1961: 630).

Additional collections. STEWART ISLAND. Southland. Freshwater Valley, *D. Poppelwell s.n.* (CHR 822134); Freshwater River, *D. Poppelwell s.n.* (AK 9983, WELT SP46615, SP46628); Rugegeoy [Ruggedy Flat or Ruggedy Mountains], *D. Poppelwell s.n.* (WELT SP096137).

Notes: This species was not treated by Given (1969a) or Given & Gray (1986). Its morphology is puzzling, and the lack of modern material (it is only known from two collections from the same geographic area, see Figure 16) hampers a more in-depth assessment of this species.

8. CELMISIA PHILOCREMNA Given, New Zealand J. Bot. 9(3): 529. 1971, fig. 3 (c–g), 4. **TYPE: NEW ZEALAND.** South Island, Otago, Windley branch of Eyre Creek, Eyre Mts, 2 Jan 1966, *J. Douglas s.n.* (holotype: CHR 166411A!).

Shrub forming stout, hard, compact cushions, up 15 cm tall and 0.7 m diameter. **Leaves** densely imbricate (stem not visible) along the branches, sessile, appressed to patent; lamina ericoid, linear-oblong, coriaceous, fleshy, 12–25 × 3–4(–5) mm, apex angle obtuse, apex shape rounded, entire; base truncate, slightly expanded towards the base; adaxial surface with sparse short-stalked glandular trichomes, lustrous, scaberulous, green, only midvein visible, slightly impressed; abaxial surface densely covered with soft, felted, white tomentum made up of flagellate aseptate trichomes, midvein not visible; margin untoothed, strongly revolute and often slightly cucullate; sheath parallel-sided, white to semi hyaline, glabrous in the adaxial surface, and densely covered with the same indumentum as the lamina in the abaxial surface; venation parallel, multi-nerved. **Peduncle** 5–8 cm long, densely covered with silky white trichomes, with foliaceous bracts 10–17 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical to slightly campanulate at anthesis, 13–15 × 10–12 mm. **Phyllaries** arranged in 6–7 series, subequal in length, appressed at anthesis, adaxial surface glabrous and abaxial covered with silky white trichomes (as the peduncle), and diminutive (200 µm) sparse biseriate eglandular trichomes, midvein well-marked, green-purple, linear, 11–14 mm, apex angle acute, subulate, margins densely fimbriate. **Ray florets** ca. 25, arranged in 1–2 rows, white. **Disc florets** ca. 70, tube 6.5 mm long, lobes 1.5 mm long, deltoid, reflexed at anthesis, covered with silky (up to 1.2 mm) and biseriate eglandular trichomes (200 µm); anther thecae 2–2.2 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 200 µm long; filament collar slightly wider than the filament; style branches 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length, sterile appendage deltoid, 0.5 mm long, apical papillae 40–50 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row of intercalating long and short bristles, long ones 6–7 mm long, reaching or exceeding the corolla lobes, and short ones ca. 0.7 mm



Figure 18. *C. philocremna*: A. Habit; B. Capitulum (top view); C. Abaxial (left) and adaxial (right) surfaces of a leaf; D. Pappus showing the intercalate two kind of bristles; E. Involucre. A–E from OTA (*P. Saldivia* 2550, Eyre Mts, Southland). A by Matt Larcombe.

long. **Cypselae** 3–4 mm long, 5–6 ribbed, densely covered with long twin trichomes. Fig. 18.

Note: *C. philocremna* has been classified as *incertae sedis* within the subg. *Lignosae* (Given 1971) and the genus *Celmisia* (Given & Gray 1986). However, Nicol et al. (2024) confirmed that it belongs to subg. *Lignosae*, as proposed in this study.

Distribution: South Island. Southland, restricted to the southern part of the Eyre Mts, mainly south of Eyre Creek (Fig. 19).

Habitat: Low to high alpine (800–1600 m), confined to steep exposed rock bluffs in snow tussock-herbfield and fellfield.

Etymology: from the Greek *philocretnos* meaning ‘crag loving’.

Other descriptions: Given (1971: 529–532).

Illustrations: Mark & Adams (1995: plate 51).

Additional collections. SOUTH ISLAND. Southland. Bluffs on north side of head of Eyre Creek, between Dog Box Creek and saddle to the Lochie River, 1220 m, 31 Oct 1971, *D.R. Given* 71342 & *J. Anderson s.n.* (CHR 223028A); Cultivated, ex Eyre Mts., Eyre Creek, Feb 1970, *A. Mark s.n.* (CHR 202078A); Eyre Creek, upper, Eyre Mts., 1219 m, 26 Nov 1970, *A. Mark s.n.* (OTA 30617); *ibid.*, N. side, 1463 m, 20 Nov 1969, *A. Mark s.n.* (OTA 26681); Eyre Mts., 1186 m, 11 Feb 2017, *P. Saldivia* 2550 (OTA); *ibid.*, head of Eyre Creek, Dec 1961, *G.A. Tunnicliffe s.n.* (CHR 125678); Mt Bee, 1127 m, 9 Apr 1973, *C.D. Meurk s.n.* (OTA 34665); *ibid.*, northern end of Mt Bee ridge, 1100 m, 12 Jan 1987, *A. Mark & K. Dickinson s.n.* (OTA 60592, 60593).

9. CELMISIA HAASTII Hook.f.

Decumbent loosely branched **shrub**, forming small to large patches or mats, up to 10 cm tall. **Leaves** clustered at the distal part of the branches forming little rosettes, which are covered by decaying leaves and sheaths towards the base, pseudopetiolate; lamina oblanceolate-elliptic, coriaceous, (–30)40–60 × 10–12(–15) mm, apex angle acute or obtuse, apex shape straight to convex, mucronate, base decurrent; adaxial surface longitudinally grooved (5–6 more or less equally spaced grooves not coincident with the veins), glabrous, green, glaucous, with sparse non-stalked glandular trichomes, or covered by a pale-gray layer of tomentose indumentum, midvein conspicuous, slightly impressed, and two secondary parallel veins running on each side of the midvein following the leaf margin; abaxial surface covered (blade not visible) by a white layer of cottony to satiny indumentum of flagellate aseptate trichomes, and sparse non-stalked glandular trichomes, midvein raised, thick, conspicuous, secondary veins raised, often hidden beneath the tomentum; margin minutely distantly toothed and a terminal tooth at the end of the midvein, slightly revolute; sheath parallel-sided, surfaces glabrous, margin glabrous or lanose towards the top, pale green to purple; venation parallel, multi-nerved. **Peduncle** (–1)6–12(–14) cm long, glandular, often loosely lanose, green or purple, with abundant foliaceous bracts 12–16 × 2–3 mm, linear-deltoid, apex angle acute, apex shape straight. **Involucre** campanulate at anthesis, 11–16 × 10–16 mm. **Phyllaries** arranged in 8–9 series, subequal, appressed at anthesis, or the outer ones slightly recurved and spreading (rarely almost patent), densely covered of non-stalked glandular trichomes, outer phyllaries often with a loose arachnoid indumentum, linear-lanceolate, apex angle acute, straight to acuminate, green or purple, 8–15 × 1.5–1.8 mm. **Ray florets** 50–60, arranged in 2–3 rows, white. **Disc florets** ca. 120, tube 5–5.5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae ca. 2 mm long; appendage 0.5 mm long, deltoid, apex straight or rounded, bases tailed 200 µm long; filament collar slightly wider than the filament; style branches ca. 2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4–0.5 mm long, apical papillae 50–70 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–6 mm long with the longest ones reaching the corolla lobes. **Cypselae** 3–3.5 mm long, 5-ribbed, glabrous. Fig. 20.

Two varieties are recognized based on leaf indumentum and allopatric distribution. Nicol et al. (2024) recovered them as sister taxa.

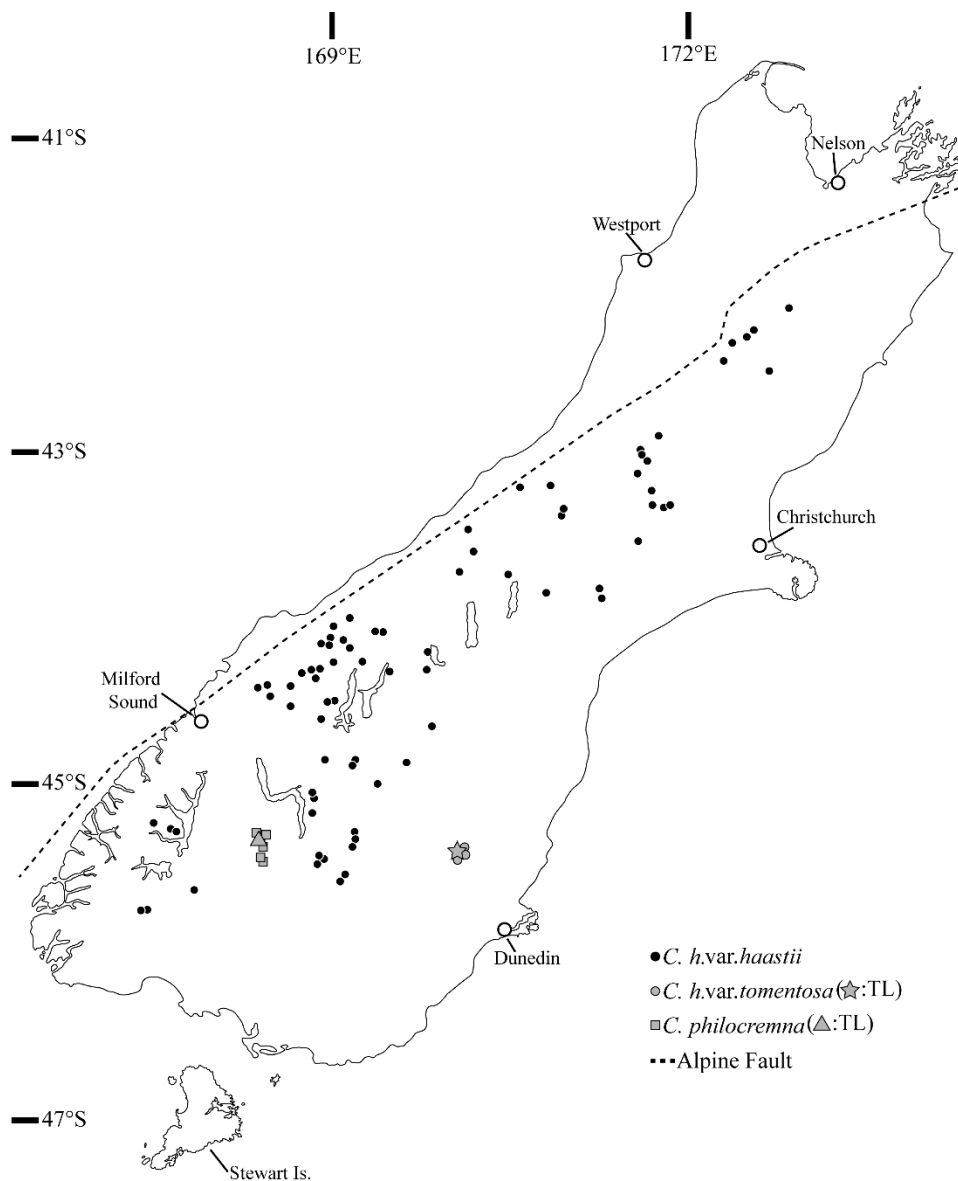


Figure 19. Distribution map of *C. philocremna* and *C. haastii*, in the South Island of New Zealand. TL: Type locality.

Key to varieties of *C. HAASTII*

1. Adaxial surface of the leaves glabrous, green or glaucous 9.1. *C. haastii* var. **haastii**
 1. Adaxial surface of the leaves covered by a pale-gray layer of tomentose indumentum
 9.2. *C. haastii* var. **tomentosa**

9.1. CELMISIA HAASTII [var. **HAASTII**], Handb. N. Zealand Fl.: 131. 1864. **TYPE: NEW ZEALAND.**
 Middle [South] Island, Otago, Lake District, alpine, 1864, *Hector and Buchanan 12* (lectotype:
 K 882081 [image!] ex Herbarium Hookerianum designated by Allan 1961: 625).

Distribution: South Island. Canterbury, south-central West Coast, Otago, and Southland.
 Widespread mainly across the mountains east of the main divide (Fig. 19).

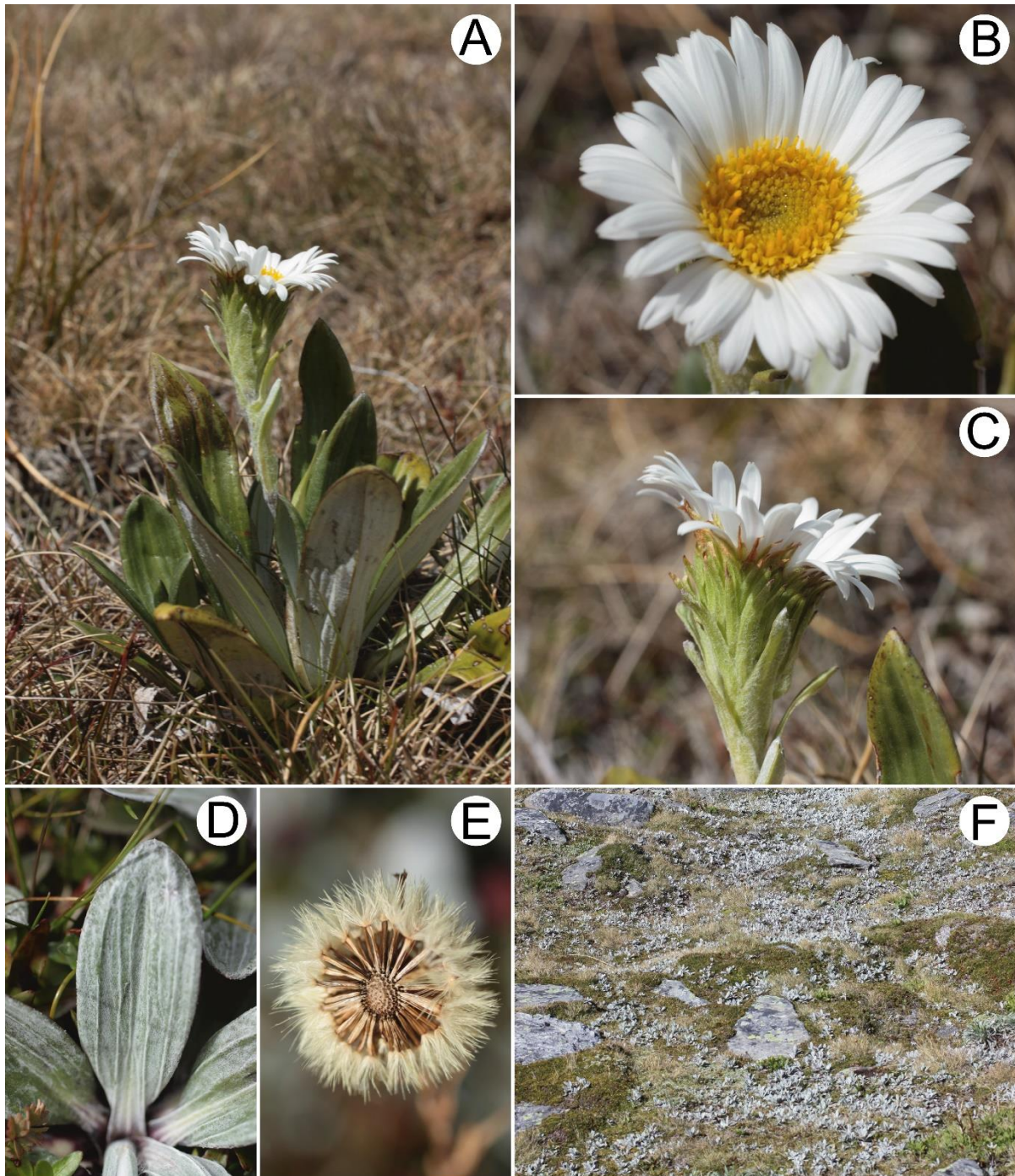


Figure 20. *C. haastii* var. *haastii*: A. Habit; B. Capitulum (top view); C. Capitulum (lateral view). *C. haastii* var. *tomentosa*: D. Adaxial surface of a leaf; E. Cypselae in dispersion, note that cypselae are glabrous; F. Habitat. A–C from OTA (*P. Saldivia* 2535, The Old Man Range, Central Otago). D–F from OTA (*P. Saldivia* 2557, Rock and Pillar Range, Central Otago).

Habitat: Low to high alpine (1200–2000 m), typically in snowbanks, but also common in wet boggy areas of snow tussock-herbfield.

Etymology: After Sir Julius von Haast, German geologist and explorer who founded the Canterbury Museum at Christchurch.

Other descriptions: Kirk (1899: 284), Cheeseman (1906: 305; 1914: Plate 94; 1925: 941), Allan (1961: 625).

Illustrations: Mark & Adams (1995: plate 53).

Additional collections. SOUTH ISLAND. West Coast. Arawhata River, upper, Mt Aspiring, 1525 m, 16 Jan 1968, *A. Mark s.n.* (OTA 20801); Drake Range, Ti Nahi Valley, Waitototo Range, 1370 m, 24 Jan 1969, *collector unknown* (OTA 25728); Five Fingers Range, 1280 m, 19 Jan 1968, *A. Mark s.n.* (OTA 21807); Grandeur ridge, upper Waitototo Valley, 1525 m, 20 Jan 1968, *A. Mark s.n.* (OTA 20607); Haast Pass, *R.A. Wilson s.n.* (WELT SP045621); Lindsay Creek, Okuru Valley, 1310 m, 17 Jan 1969, *A. Mark s.n.* (OTA 23418); Mt Brewster, 1465 m, 9 Jan 1966, *A. Mark s.n.* (OTA 13530); Mt Dispute, Mueller Valley, Turnbull Range, 1400 m, 18 Jan 1969, *A. Mark s.n.* (OTA 24408); *ibid.*, 1525 m, 18 Jan 1969, *A. Mark s.n.* (OTA 23509); Mt Moltke, 22 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005775); O'Leary Pass, Barrier Range, Dart Valley, 1525 m, 28 Jan 1968, *A. Mark s.n.* (OTA 20837, 20838); S of Maruia Springs, near Lewis Pass, Lucretia ridge, 1311-1463 m, 21 Jan 1978, *C. Ogle s.n.* (WELT SP089215); upper Te Naihi River, Waitototo Range, 1676 m, 23 Jan 1969, *A. Mark s.n.* (OTA 23444); Waipara River, upper, east side, 1370 m, 18 Jan 1968, *A. Mark s.n.* (OTA 20814). **Canterbury.** Arthur's Pass National Park, between Arthur's Pass and summit of Phipps Peak, 1524 m, 1 Dec 1965, *D.R. Given 65206* (AK 360928); Ashburton Range, *collector unknown* (OTA 16421); Ball spur, Tasman Glacier [Ball Glacier], 1829 m, 6 Apr 1905, *A. Wall s.n.* (WELT SP046458); Black Range, 1219 m, Jan 1880, *T.F. Cheeseman s.n.* (AK 9759); Blimit, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046540); Blimit cirque, 29 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046542); Craigieburn Mts. [Range], 24 Jan 1891, *L. Cockayne s.n.* (WELT SP046530); Craigieburn Range, Mt Cheeseman, slopes below lower tarn, 29 Jan 1947, *A. Wall & Molesworth s.n.* (AK 32180); Craigieburn Range, upper Cheeseman, 10 Jan 1931, *L.B. Moore & L.M. Cranwell s.n.* (AK 32176); Fox Peak, 1 Jan 1956, *A.E. Esler s.n.* (AK 215607); Hanmer, Mt Captain, 1219 m, Jan 1893, *T.F. Cheeseman s.n.* (AK 9760); Hooker Valley, Mt Olivier, Jan 1898, *T.F. Cheeseman s.n.* (AK 9757); lower Godley Valley, 1645 m, 29 Dec 1957, *Scott s.n.* (OTA 4236); Matakītaki River, Faerie Queene Basin, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP091122); Mt Cook, Jan 1898, *J. Adams s.n.* (AK 15610, 15611); Mt Cook district, Jan 1898, *J. Adams s.n.* (AK 15609); Mt Olivier, 1371 m, *T.F. Cheeseman s.n.* (AK 9753, 9756); *ibid.*, 1500 m, 17 Feb 1919, *L. Cockayne s.n.* (AK 34956); *ibid.*, 1676 m, *T.F. Cheeseman s.n.* (AK 9754, 9755); Mt Torlesse, 1859 m, *J. von Haast s.n.* (WELT SP046631); *ibid.*, 1920 m, Dec 1922, *A. Wall s.n.* (WELT SP077150); Mt Torlesse Range, 1372 m, 16 Dec 1891, *L. Cockayne s.n.* (WELT SP046461, SP046533); Mt Williams, 11 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP005773); *ibid.*, 14 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046539); Mts. above Lake Ohau, Jan 1949, *H. Talbot s.n.* (WELT SP005772); near Mt Cook, Sealy [Sealy] Range, 1524 m, 19 Feb 1911, *D. Petrie s.n.* (WELT SP046460); near Rakaia Glacier, Mar 1879, *J. von Haast s.n.* (WELT SP046632); Ohau Range, 1465 m, 2 Jan 1969, *A. Mark s.n.* (OTA 26012); slopes of Mt Peel, 1450 m, 2 Jan 1919, *H.H. Allan s.n.* (AK 34954); *ibid.*, 1219 m, Jan 1919, *H.H. Allan s.n.* (WELT SP046459); Spenser Mts., above Matakītaki River (west branch), Faerie Queene, 1700 m, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP083142); Spenser Mts., Mt Una, *F.G. Gibbs 585* (AK 9758); Torlesse Range, above Porters Pass, 21 Jan 1948, *W.R.B. Oliver s.n.* (WELT SP005774). **Otago.** Aspinall Mtn., East Matukituki Valley, 1219 m, 14 Dec 1968, *A. Mark s.n.* (OTA 23446); Ben Nevis, Hector Mts., 1830 m, 22 Feb 1965, *A. Mark s.n.* (OTA 12999); Dunstan Mts., 1219 m, Dec 1889, *D. Petrie s.n.* (WELT SP046637); Fraser River, Old Man Range, 1370 m, 20 Nov 1958, *A. Mark s.n.* (OTA 6326); Gem Lake, 1 km NE of Gem Lake, 1330 m, 10 Nov 1985, *B.D. Rance s.n.* (OTA 43009); Gillespie Pass, Siberia Young Valley, 1615 m, 31 Jan 1969, *A. Mark s.n.* (OTA 24399); Lake Alta Basin, Remarkables, 1786 m, 22 Jan 2008, *L. Dobbie s.n.* (OTA 62955); Lauder Creek, upper, Dunstan Mts., 1500 m, 10 Feb 1985, *A. Mark s.n.* (OTA 41618); L-Young River, S. side, 1465 m, 2 Feb 1969, *A. Mark s.n.* (OTA 23406); McKerrow Range, Makarora V., Mt Aspiring National Park, 1371 m, 4 Feb 1969, *A. Mark s.n.* (OTA 62766); McKerrow Range, Makarora Valley, 1370 m, 4 Feb 1969, *A. Mark s.n.* (OTA 23400); Mt Alta, 1219-1829 m, *J. Buchanan*

s.n. (WELT SP046532/A-B); *ibid.*, 1524-1829 m, *collector unknown* (WELT SP044575); Mt Arnold, *D. Petrie s.n.* (WELT SP046633); Mt Cardrona, 1770 m, 13 Feb 1979, *A. Mark s.n.* (OTA 38111); Mt Jumbo, Wilkin Valley, 1584 m, 11 Dec 1968, *A. Mark s.n.* (OTA 23593); Mt Pisa, 1829 m, *D. Petrie s.n.* (WELT SP046917); *ibid.*, 1829 m, 1885-1890, *D. Petrie s.n.* (AK 9752); Mt Pisa, N. of Cromwell, 1524 m, *D. Petrie s.n.* (WELT SP046456); Mt Sisyphus, East Matukituki Valley, 1371 m, 17 Dec 1968, *A. Mark s.n.* (OTA 23447); Old Man Range, 1493 m, 2 Dec 1963, *A. Mark s.n.* (OTA 9176); *ibid.*, 1524 m, 19 Jan 1970, *N. Adams s.n.* (WELT SP043002); *ibid.*, 1536 m, 15 Jan 2017, *P. Saldivia 2534* (OTA); *ibid.*, 1584 m, 1 Feb 1965, *A. Mark s.n.* (OTA 10375); *ibid.*, 1600 m, 19 Dec 2015, *P. Saldivia 2497* (OTA); *ibid.*, 1638 m, 15 Jan 2017, *P. Saldivia 2535* (OTA); *ibid.*, Symes Road, 1620 m, 17 Jan 1986, *B.D. Rance s.n.* (OTA 44102); Omarama saddle, 1675 m, 9 Jan 1967, *Wells s.n.* (OTA 17788); Pisa Range, 1880 m, 27 Feb 1964, *A. Mark s.n.* (OTA 8932); Remarkables, 1829 m, 17 Feb 1953, *W.R.B. Oliver s.n.* (WELT SP005771); Snowy Creek, Dart River, 1524 m, 25 Jan 1968, *A. Mark s.n.* (OTA 20652); Thomsons Creek (Dunstan), 1525 m, 3 Dec 1958, *A. Mark s.n.* (OTA 6312); Treble Cone, 1800 m, 5 Jan 1978, *A. Mark s.n.* (OTA 37106); upper Rastus Burn, Remarkables Range, 1540 m, *J.M. Lord s.n.* (OTA 61583); White Comb [Whitecoomb] Range, Nov 1923, *J. Speden s.n.* (WELT SP004447). **Southland.** Above Blue Lake, Garvie Mts., 1524 m, 14 Dec 1971, *A. Mark s.n.* (OTA 32300); Excelsior Peak, 1525 m, 2 Feb 1971, *A. Mark s.n.* (OTA 35683); Garvie Mts., 1372 m, 11 Jan 1934, *E.M. Heine s.n.* (WELT SP056780); *ibid.*, 1524 m, 11 Jan 1934, *E.M. Heine s.n.* (WELT SP046541); *ibid.*, 1770 m, 7 Jan 1964, *A. Mark s.n.* (OTA 12080); Lake Eyles, above, Murchison Mts., 1310 m, 11 Feb 1973, *A. Mark s.n.* (OTA 33956); Mt Burns, 1465 m, 22 May 1967, *collector unknown* (OTA 18996); Takahe Valley, 19 Feb 1952, *W.R.B. Oliver s.n.* (WELT SP005776); *ibid.*, 1220 m, 12 Dec 1972, *A. Mark s.n.* (OTA 32916); *ibid.*, tussock grassland above Lake, 18 Feb 1952, *W.R.B. Oliver s.n.* (WELT SP005777). **District unknown.** *Sine loco*, 1862, *J.F.J. von Haast 661* (K 882079 [image]); *sine loco*, *collector unknown* (OTA 17022); *sine loco*, *D. Petrie s.n.* (WELT SP046531); *sine loco*, *J.F.J. von Haast 57* (K 882080 [image]).

9.2. CELMISIA HAASTII var. **TOMENTOSA** G. Simpson & J.S. Thomson, *Trans. & Proc. Roy. Soc. New Zealand* 72: 34. 1942. **TYPE: NEW ZEALAND.** South Island, moist slopes near runnels on the Rock and Pillar Range, Otago, 1200-1500 m, *G. Simpson s.n.* (holotype: CHR 50011!).

Distribution: South Island. Otago. Remarkably this variety is restricted to the Rock and Pillar Range in Central Otago (Fig. 19).

Habitat: Low to high alpine (800–1500 m), typically in snowbanks.

Etymology: Refers to the tomentose indumentum of the adaxial surface of the leaves.

Other descriptions: Allan (1961: 625).

Illustrations: Mark & Adams (1995: plate 53).

Additional collections. SOUTH ISLAND. Otago. Rock and Pillar Range, 13 Dec 1964, *Adams s.n.* (OTA 9875); *ibid.*, 1310 m, 1 Mar 2017, *P. Saldivia 2557* (OTA); *ibid.*, 914 m, 23 Mar 1947, *G.T.S. Baylis s.n.* (OTA 2454); *ibid.*, 1150 m, 1 Mar 1972, *G.A. Parmenter s.n.* (OTA 32985); *ibid.*, 1219 m, 29 Oct 1966, *Wells s.n.* (OTA 15053); *ibid.*, 1220 m, 29 Nov 1967, *A. Mark s.n.* (OTA 27409); *ibid.*, 1270 m, 1 Feb 1979, *J. Talbot s.n.* (OTA 37777); *ibid.*, 1372 m, 1 Dec 1969, *N. Adams s.n.* (WELT SP041359); *ibid.*, moist slopes near runnels, 1200-1500 m, *G. Simpson & J.S. Thomson s.n.* (AK 106430).

10. CELMISIA HECTORII Hook.f., *Handb. N. Zealand Fl.*: 135. 1864. **TYPE: NEW ZEALAND.** Middle [South] Island, Otago, Mt Brewster, alt. 5–6000 ft, *J. Hector & J. Buchanan 53* (holotype: K 882078 [image!] ex Herbarium Hookerianum).

Procumbent **shrub** profusely branched, forming extended non-rooting mats up to 1 m or more across and up to 10–15 cm tall. **Leaves** clustered at the distal part of the branches, forming small rosettes, sessile; lamina linear-oblongate, coriaceous, 10–20 × 2–4(–6) mm, apex angle acute, apex shape straight, mucronate, base attenuate; adaxial surface covered with a white-silvery thin layer of flat flagellate aseptate trichomes forming a loose pellicle, green-glaucous, silvery, midvein conspicuous, sunken; abaxial surface densely covered (blade not visible) with a cottony indumentum of flagellate aseptate curly trichomes, and scattered non-stalked glandular trichomes, midvein raised, conspicuous, and at least two secondary veins (one at each side of the midvein) running parallel following the margin of the lamina, often hidden beneath the indumentum; margin with few distant small teeth along each side of the lamina, slightly revolute; sheath parallel-sided, surfaces glabrous, mostly white-hyaline but green or purplish towards the top (i.e., transition zone with the lamina), margin lanose towards the top, venation parallel, multi-nerved. **Peduncle** (–4)5–10(–12) cm long, with lanose-satiny indumentum, green (rarely purplish), with foliaceous bracts 7–15(–20) mm long, linear-oblong, apex angle acute, apex shape straight. **Involucre** campanulate at anthesis, 9–12 × 10–13 mm. **Phyllaries** arranged in 6 series gradually longer from the outer to the inner ones, appressed at anthesis, covered mainly along the midvein with patent long biseriate eglandular white (turning ferruginous when dry) trichomes, up to 1 mm long, and diminutive non-stalked glandular trichomes, linear-lanceolate, apex angle acute, straight, green with margins purple towards the apex, outer ones 5.5–7 × 0.9–1 mm, inner ones 9–10(–11) × 1–1.3 mm. **Ray florets** 30–35, arranged in 2–3 rows, white. **Disc florets** 35–40, tube 5–6 mm long, lobes 1.5 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2–2.5 mm long; appendage 0.6–0.7 mm long, oblong-lanceolate, apex shape straight or rounded; bases tailed 150–200 µm long, filament collar slightly wider than the filament; style branches ca. 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 30–40 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 5–6 mm long with the longest ones reaching the corolla lobes. **Cypselae** 3.5–4 mm long, 5–ribbed, covered with twin trichomes. Fig. 21.

Note: Kirk (1899: 292) mentioned its presence in the South of the North Island (Tararua Range by Budden), and Cheeseman (1906: 315) repeated Kirk's information. Later, Cheeseman (1914: plate 98; 1925: 955) commented that the record is probably wrong and based on a misidentification since he had not seen material from thence, and no new collections were known from that locality. A similar mistake made by Kirk (1899: 285) was the record of *Celmisia verbascifolia* Hook.f. on Campbell Island (see details on Cheeseman 1909: 415).

Distribution: South Island. Southern West Coast, southwest Canterbury, west Otago, and west Southland. From Aoraki area in the north to the mountains south of Mt Burns in the south (Fig. 22).

Habitat: Low to high alpine (800–2000 m). Fellfield and snowbanks. In the low alpine zone restricted to snow hollows and rocky exposed sites (Mark & Adams 1995).

Etymology: After Sir James Hector, geologist. An eminent figure in the scientific history of New Zealand.

Other descriptions: Kirk (1899: 291–292), Cheeseman (1906: 315–6; 1914: plate 98; 1925: 955), Allan (1961: 626).

Illustrations: Cheeseman (1914: plate 98 from AK 9955–9956), Mark & Adams (1995: plate 54).

Additional collections. SOUTH ISLAND. West Coast. Arawhata River, upper, 1676 m, 16 Jan 1968, *collector unknown* (OTA 20671); Five Fingers Range, Jo Valley, 1158 m, 19 Jan 1968, *collector unknown* (OTA 21139); Grandeur ridge, 1465 m, 20 Jan 1968, A. Mark *s.n.* (OTA 20857); *ibid.*, upper Waitatoto Valley, 20 Jan 1968, A. Mark & M.L. Burke *s.n.* (CHR 619912); lower Otoko saddle, 31 Dec 1948, R. Mason *s.n.* (AK 360936, CHR 64106); Mt Brewster, 1767 m, 5 Jan 1967,

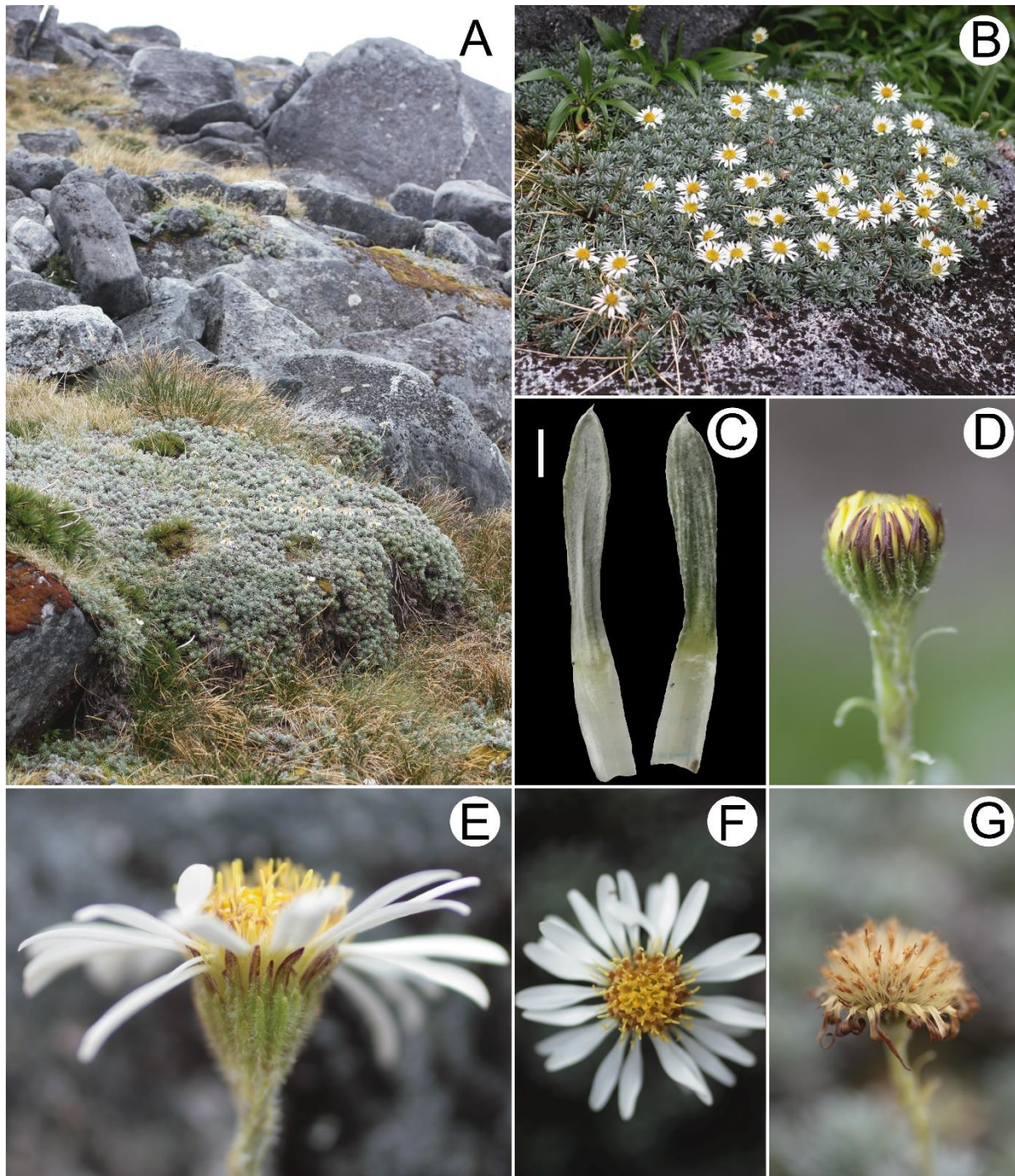


Figure 21. *C. hectorii*: A and B. Habit; C. Abaxial (left) and adaxial (right) surfaces of a leaf; D. Involucre before flowering; E. Capitulum (lateral view); F. Capitulum (top view); G. Capitulum before cypselae dispersion. B–G from OTA (*P. Saldivia* 2559, Mt Burns, Fiordland). A from the same locality but without collection. Scale bar: 2 mm.

collector unknown (OTA 17881); *ibid.*, 1981 m, 11 Feb 1968, *collector unknown* (OTA 28063); Mt Dispute, Mueller Valley, Turnbull Range, 1432 m, 18 Jan 1969, *collector unknown* (OTA 23476); O'Leary Pass, Barrier Range, Dart Valley, 1463 m, 28 Jan 1968, *collector unknown* (OTA 21884); Te Naihi River, upper, Waitototo Valley, 1706 m, 23 Jan 1969, *collector unknown* (OTA 23543); west slope of Mt. Gow, Landsborough Valley, 1554 m, 21 Feb 1972, *P.W. Wardle s.n.* (CHR 223863).

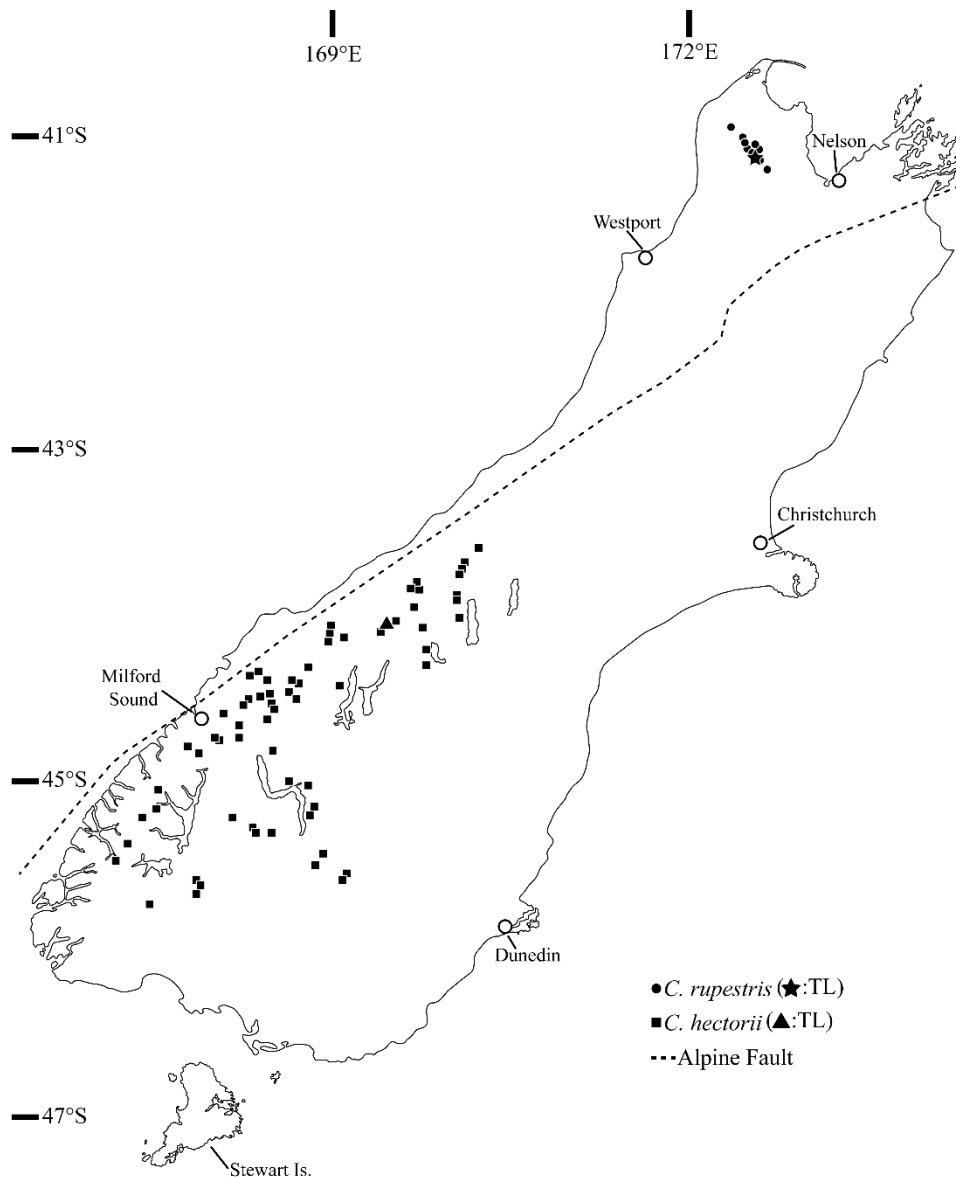


Figure 22. Distribution map of *C. hectorii* and *C. rupestris* in the South Island of New Zealand. TL: Type locality.

Canterbury. Ben Ohau Range, headwaters of Duncan Stream, 1615 m, 10 Feb 1986, *C. Ogle s.n.* (WELT SP089225); Lake Ohau, *H. Talbot s.n.* (CHR 68293); Mt Cook, *S.E. Dixon s.n.* (WELT SP045759); *ibid.*, Jan 1898, *J. Adams s.n.* (AK 15607, 15631, 15632); Mt Cook, near Hermitage, Sealy [Sealy] Range, 1372 m, 14 Feb 1911, *D. Petrie s.n.* (WELT SP045756/A-B); Mt Olivier, 1 Jan 1908, *T.F. Cheeseman s.n.* (AK 9954, 9955); *ibid.*, Jan 1898, *T.F. Cheeseman s.n.* (AK 9953); *ibid.*, 1828 m, *T.F. Cheeseman s.n.* (AK 9956); Mt Temple, Lake Ohau, Jan 1931, *A. Wall s.n.* (CHR 288023); Mts. above Lake Ohau, Jan 1949, *H. Talbot s.n.* (WELT SP005846); Mueller Hut, Mueller Glacier, Jan 1924, *A. Wall s.n.* (CHR 288025); Ohau Range, 1524 m, 2 Jan 1969, *collector unknown* (OTA 26031); Sealy Lakes, Jan 1967, *H. Wilson s.n.* (CHR 584964); Sealy Range, 1676 m, 2 Mar 1968, *collector unknown* (OTA 21667); *ibid.*, *D. Petrie s.n.* (CHR 10143); *ibid.*, 9 Jan 1953, *R. Mason 1583* (AK 360932); Sealy Range, Track to Mueller Hut, 1066 m, 1 Apr 1973, *Campbell s.n.* (OTA 36466); Sefton Bivouac, 1500 m, 31 Jan 1956, *T.C. Chambers s.n.* (AK 242351, 242351); *ibid.*, 1680 m, 13 Jan 1956, *T.C. Chambers s.n.* (AK 263801); slopes off Mt Hooker, near upper Clarke Gorge, 31 Dec 1948, *R.*

Mason s.n. (CHR 64107); Twin Stream Catchment, Ben Ohau Range, 1463 m, 10 Jan 1969, *A. Archer s.n.* (CHR 219785); *ibid.*, 1524-1828 m, 30 Nov 1979, *A. Archer s.n.* (CHR 258966). **Otago.** *Sine loco*, *J. Speden s.n.* (AK 9959); [Cultivated] Mr Matthew's garden, Dunedin, plant from Mt Earnslaw, Dec 1892, *H.J. Matthews s.n.* (WELT SP045762); Beans Burn, upper, 1524 m, 7 Dec 1967, *collector unknown* (OTA 21125); Ben Lomond, Lake Wakatipu, 1524 m, *D. Petrie s.n.* (WELT SP045763); Ben Nevis, Hector Mts., 1828 m, 22 Feb 1965, *collector unknown* (OTA 12921); Black Peak, *J. Buchanan s.n.* (WELT SP043184/A-B); Black Peak, Glenorchy, 21 Feb 1919, *P. Morgan s.n.* (WELT SP064829); Cascade saddle, 1584 m, 27 Jan 1968, *A. Mark s.n.* (OTA 20926); *ibid.*, below saddle, 1465 m, 4 May 1978, *P. Sommerville s.n.* (OTA 37381); Cascade saddle, upper Dart Valley, 1463 m, 27 Jan 1968, *A. Mark & M.L. Burke s.n.* (CHR 619902); Forbes Mts., 1615 m, 2 Dec 1967, *collector unknown* (OTA 27925); *ibid.*, above Cattle Flat, 1524 m, 27 Jan 1968, *A. Mark s.n.* (OTA 20767); French ridge, Mt Aspiring, 1524 m, 13 Feb 1954, *collector unknown* (OTA 1866); French ridge, West Matukituki Valley, 1584 m, 18 Dec 1968, *collector unknown* (OTA 23473); Gem Lake, 1350 m, 14 Dec 1985, *K. Dickinson s.n.* (OTA 43044); Gillespie Pass, Young Wilkin Valley, 1615 m, 31 Jan 1969, *collector unknown* (OTA 23566); head of east branch, Hunter Valley, old moraine, 28 Dec 1960, *M.M. Davidson s.n.* (CHR 119616); Hummock Peak, 1676 m, 30 Dec 1969, *collector unknown* (OTA 27151); Lake Wakatipu, Hector Mts., 1524 m, *D. Petrie s.n.* (WELT SP045761/B); Lake Wanaka, 22 Feb 1905, *J. Buchanan & A. MacKay s.n.* (WELT SP044577); Margaret Burn, 1371 m, 27 Jan 1968, *A. Mark s.n.* (OTA 20762); Mt Bonpland, *W. Martin s.n.* (CHR 634673); Mt Earnslaw, *E. Phillips s.n.* (AK 32137); Mt Tole, Wills Valley, Haast Range, 1706 m, 6 Feb 1969, *collector unknown* (OTA 23411); Mt Tyndall, head of shotover, 1371 m, 6 Feb 1953, *collector unknown* (OTA 3275); Mt Whitecoomb, cirque, 1340 m, 11 Dec 1985, *K. Dickinson s.n.* (OTA 43906); near Lake Wanaka, *J. Simpson s.n.* (CHR 108369); NW of Jane Peak, 1880 m, 30 Dec 1985, *collector unknown* (OTA 46338); Peak South of Ferguson Creek, Hunter Valley, 1280-1402 m, 4 Jan 1961, *I.E. Powell s.n.* (CHR 119609); Remarkable Mts. [The Remarkables], 914 m, *D. Petrie s.n.* (WELT SP045758); Route Burn, north branch, 1219 m, 10 Dec 1967, *collector unknown* (OTA 21087); Shotover saddle, 1524 m, 3 Jan 1949, *D. McQueen s.n.* (WELT SP045755); upper Beans Burn Valley, 1584 m, 7 Dec 1967, *A. Mark & M.L. Burke s.n.* (CHR 619901). **Southland.** Doubtful Sound, Mt Troup, 1470 m, 8 Feb 1956, *T.C. Chambers s.n.* (AK 44142); *ibid.*, 8 Jan 1956, *T.C. Chambers s.n.* (AK 45307); Eglinton Valley, Gertrude cirque, 1350 m, 15 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122052); Emily Pass, Routebourn Valley, 1767 m, 10 Dec 1967, *collector unknown* (OTA 21105); Excelsior Peak, 1219 m, 3 Feb 1971, *A. Mark s.n.* (OTA 31643); *ibid.*, 1524 m, 2 Feb 1971, *collector unknown* (OTA 34017); Excelsior Peak, W. side, 914 m, 2 Sep 1985, *collector unknown* (OTA 46457); Exposed site on Mt. Burns, 1590 m, 22 Jan 1978, *J.F. West s.n.* (CHR 594235); Eyre Creek, upper, 1524 m, 20 Nov 1969, *collector unknown* (OTA 26650); Eyre Mts., *J. Speden s.n.* (AK 9957); *ibid.*, Eyre Creek, Big Jungle Creek, 1269 m, 29 Dec 1995, *D. Glenny 6265* (CHR 509783); *ibid.*, Helen Peaks, 1750 m, 26 Dec 1995, *D. Glenny 6252* (CHR 509770); Eyre Peak, 1524 m, 21 Nov 1972, *collector unknown* (OTA 33043); *ibid.*, ridge from Hut in upper Mataura summit, 21 Nov 1972, *D. Given 72926* (CHR 233136); Fiery Peak, Humble Mts., 1463 m, 18 Feb 1968, *collector unknown* (OTA 21674); Fiordland, Doubtful Sd., Mt Troup, 1490 m, 8 Feb 1956, *T.C. Chambers s.n.* (AK 263802); *ibid.*, 8 Jan 1956, *T.C. Chambers s.n.* (AK 263803); Fohn Peak, upper Beans Burn Valley, 1524 m, 16 Feb 1968, *collector unknown* (OTA 20568); Garvie Mts., 1767 m, 13 Jan 1965, *collector unknown* (OTA 12100); *ibid.*, 13 Feb 1910, *L. Cockayne s.n.* (WELT SP045764); Gertrude saddle, 1219 m, 12 Jan 1968, *collector unknown* (OTA 218904); Green Lake, Fiordland, 1524 m, 9 Jan 1967, *Given 67034* (CHR 175015); Homer Cirque, 26 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP005845, SP045754); Homer saddle, 1219 m, 10 Jan 1968, *collector unknown* (OTA 218927); Homer to Gertrude saddle, Apr 1954, *O. Sansom s.n.* (WELT SP005844); Little Red Mt., 1219 m, 9 Dec 1969, *collector unknown* (OTA 27814); Livingstone Mts., eastern slope, 1580 m, 29 Mar 1975, *collector unknown* (OTA 35179); McKinnons Pass, *F.G. Gibbs s.n.* (AK 9958); *ibid.*, 20 Mar 1909, *T.F. Cheeseman s.n.* (CHR 130661); Mt Burns, 1311 m, 7 Jan 1979, *B. Sneddon s.n.* (WELT SP091123); *ibid.*, 1343 m, 4 Mar 2017, *P. Saldivia 2559* (OTA); *ibid.*, 1372 m, 24 Mar 1993, *P. Wardle 96/35 & R.P. Buxton s.n.* (CHR 511426); *ibid.*, 1463 m, 22 May 1967, *collector unknown* (OTA 18971);

ibid., 1524 m, 8 Jan 1968, *collector unknown* (OTA 23042); ibid., 1620 m, 2 Feb 1978, *collector unknown* (OTA 64522); Mt Burns, Hunter Mts., 1554 m, 13 Jan 1970, *J.I. Townsend s.n.* (CHR 202005); Mt Geogre, Fiordland, summit ridge area on east side, 1500 m, 21-25 Mar 1977, *P. Garnock-Jones & W. Lee s.n.* (CHR 306128); Mt McClimont, Olivine Mts., 1524 m, 30 Dec 1951, *P. Harrigan s.n.* (CHR 887267); Mt Soaker, summit, 1615 m, 30 Jan 1955, *collector unknown* (OTA 3698); Murchison Mts., West, 1400 m, 1 Jan 1981, *D. Bruce s.n.* (OTA 44456); north branch Clinton River, *R.A.S. Browne s.n.* (AK 23308); Ocean Peak, 1615 m, 1 May 1963, *collector unknown* (OTA 7251); Simonin Pass, Mt Limbo, 1402 m, 25 Jan 1975, *collector unknown* (OTA 35121); Stillwater River, upper, 1370 m, 30 Dec 1970, *collector unknown* (OTA 30620); Takitimu Mts., 1219-1524 m, Feb 1920, *A. Wall s.n.* (WELT SP045761); Takitimu Range, Tower Peak, northern slopes, 1407 m, 22 Nov 1989, *P.J. Garnock-Jones 1926* (CHR 465671); Tutoko saddle, 1676 m, 22 Feb 1967, *collector unknown* (OTA 18145); Wapiti Lake, TL sinkhole valley, Fiordland, 1250 m, 13 Dec 1985, *K.H. Platt s.n.* (CHR 519537); West Burn, 1520 m, 28 Mar 1975, *collector unknown* (OTA 35224); Woodrow Burn, South of Murchison, 1220 m, 13 Feb 1973, *collector unknown* (OTA 33908). **District unknown.** Arthur's Pass National Park [wrong locality?], 15 Jan 1936, *V.D. Zotov s.n.* (CHR 17411).

11. CELMISIA RUPESTRIS Cheeseman, Trans. & Proc. New Zealand Inst. 16: 409. 1884. **TYPE: NEW ZEALAND.** South Island, Ravines on Mt Peel, Nelson, alt. 5000 ft, Jan 1881, *T.F. Cheeseman s.n.* (lectotype: AK 9696! designated by Saldivia 2023: 42).

Decumbent, branched **shrub**, forming extended loose cushions or patches up to 20–30 m tall. **Leaves** more or less clustered at the distal part of the branches, which are covered with decaying leaves and sheaths towards to base, sessile; lamina linear-oblongate, coriaceous, 12–20(–25) × 1.5–2.5(–5) mm, apex angle acute, apex shape straight, mucronate, base attenuate; adaxial surface covered with a white-silvery thin layer of flat flagellate aseptate trichomes forming a loose pellicle, green-glaucous, midvein conspicuous, sunken; abaxial surface densely covered (blade not visible) with a white soft lanose indumentum of flagellate aseptate trichomes, midvein raised, conspicuous, and at least two secondary veins (one at each side of the midvein) running parallel following the margin of the lamina, often hidden beneath the indumentum; margin with 3–4 distant small teeth along each side of the lamina, and a terminal one at the end of the midvein, revolute; sheath parallel-sided, glabrous on the surfaces, margin minutely fimbriate towards the top, mostly white-hyaline to green or purplish towards the top, venation parallel, multi-nerved. **Peduncle** 4–10 cm long, covered with stalked glandular trichomes, purple, with few foliaceous bracts 7–10 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 6.5–8 × 4–4.5 mm. **Phyllaries** arranged in 6 series gradually longer from the outer to the inner ones, appressed at anthesis, covered with biseriate glandular trichomes, linear-lanceolate, apex angle acute, straight to acuminate, green with purple tips; outer ones 2.5–3.5 × 0.7–0.9 mm; inner ones 6–7(–8) × 0.8–1.1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 16–20, arranged in 1–2 rows, white. **Disc florets** 20–22, tube 3–4 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2 mm long, appendage 0.4–0.5 mm long, deltoid, apex shape straight or rounded, bases tailed 200–250 µm long, filament collar slightly wider than the filament; style branches 1–1.3 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.3–0.4 mm long, apical papillae 20–30 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 3–4 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5-ribbed, covered with twin trichomes. Fig. 23.

Distribution: South Island. Tasman and northern West Coast. Restricted to northwest Nelson, from Mt Gouland southeastward to Mt Arthur (Fig. 22).

Habitat: Low alpine (1100–1700 m). Restricted to rocky outcrops among snow-tussock-herbfield areas and alluvial scree facing south.

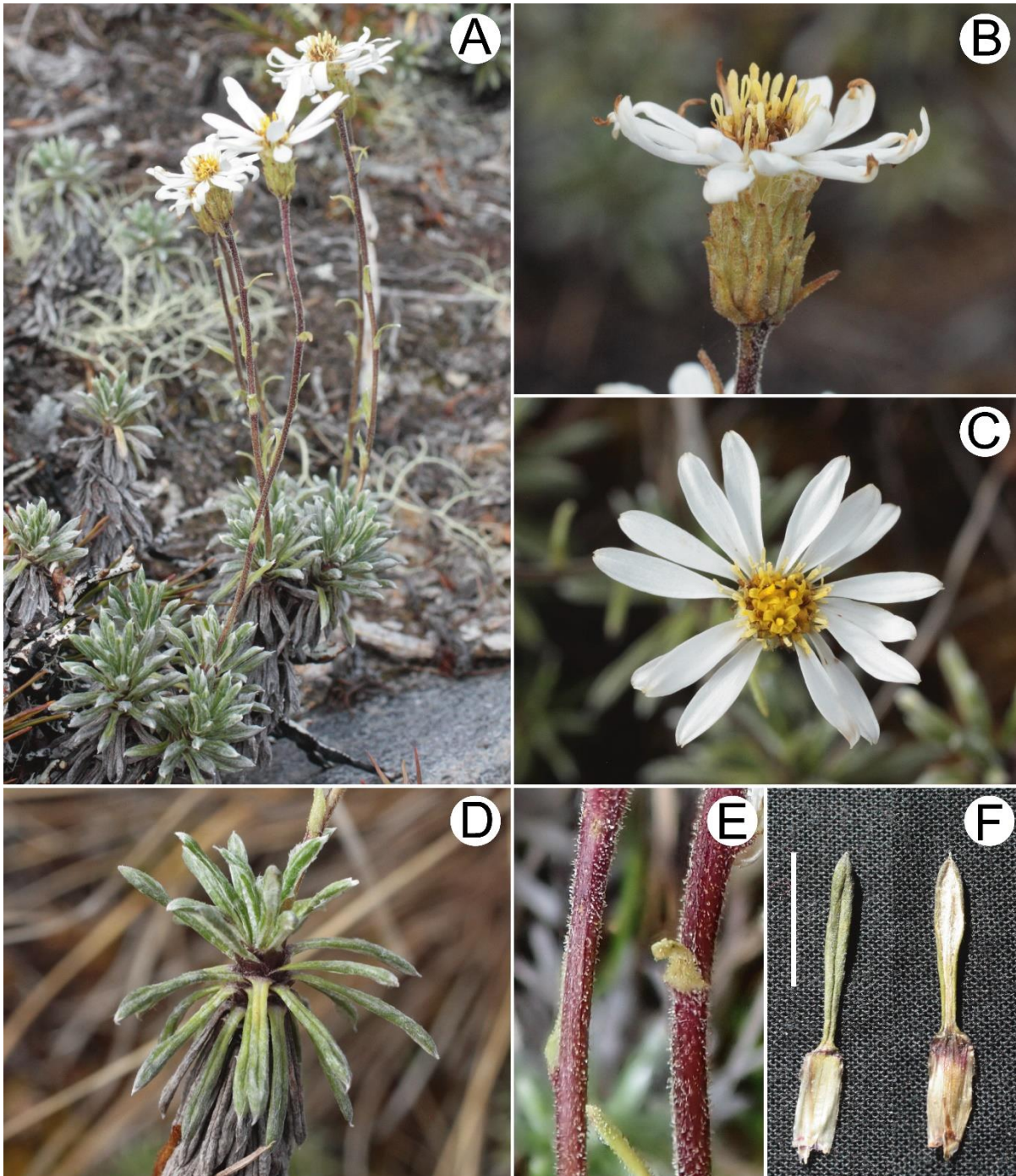


Figure 23. *C. rupestris*: A. Habit; B. Capitulum (lateral view); C. Capitulum (top view); D. Terminal cluster of leaves; E. Peduncles; F. Adaxial (left) and abaxial (right) surfaces of a leaf. A–F from OTA (*P. Saldivia* 2672, South of Lake Peel, Tasman). Scale bar: 1 cm.

Etymology: Refers to the rocky habitat of the species.

Other descriptions: Kirk (1899: 281), Cheeseman (1906: 300; 1925: 937), Allan (1961: 616).

Additional collections. SOUTH ISLAND. Tasman. Alluvial scree slope SE of Lake Peel, 1441 m, 11 Jan 2019, *P. Saldivia* 2681 (OTA); Cobb Pk. [Mt Cobb], 13 Jan 1967, *W. Burke s.n.* (CHR 622319, WELT SP096233); Cobb Valley, *F.G. Gibbs s.n.* (CHR 289020); *ibid.*, Camp Peak, *F.G.*

Gibbs s.n. (AK 9695); Cobb Valley, Mytton's Creek, 1 Jan 1957, *A.E. Esler s.n.* (AK 215593); head of Cobb V., 1524 m, Feb 1977, *A.P. Druce s.n.* (CHR 310379); Iron Hill, 30 Dec 1942, *R. Mason s.n.* (CHR 36098); Mt Arthur, *T.F. Cheeseman & J. Adams s.n.* (AK 15601); Mt Arthur Plateau, Dec 1907, *H.H. Travers s.n.* (CHR 289016, WELT SP046753); tussock-field between Balloon Hut and Lake Peel, 1354 m, 9 Jan 2019, *P. Saldivia 2672* (OTA); Mt Cobb, 25 Apr 1971, *T. Presto s.n.* (CHR 269057); *ibid.*, 17 Jan 1966, *B. Given & D. Leigh s.n.* (CHR 190244); *ibid.*, 1676 m, 17 Dec 1966, *D.R. Given 66439 & B.B. Given s.n.* (CHR 178822); Mt Cobb + Mt Peel, *F.G. Gibbs s.n.* (CHR 289018); Mt Goulard, Goulard Downs, Jan 1969, *J. Marston & F. Soper s.n.* (CHR 370536); Mt Prospect, Peel Range, rocky side of ridge, 1462 m, Nov 1980, *A.P. Druce s.n.* (CHR 389207); NW of Mt Benson, steep S. facing slope, 1463 m, Jan 1980, *A.P. Druce s.n.* (CHR 365444); Peel Ra., S.E. of Mt Peel, 1340 m, Dec 1986, *A.P. Druce s.n.* (CHR 395934). **West Coast.** Aorere Peak, *F.G. Gibbs s.n.* (AK 9694); *ibid.*, *W.A. Thomson s.n.* (CHR 108453); *ibid.*, Jan 1911, *F.G. Gibbs s.n.* (CHR 10202); Mt Peel, Jan 1886, *T.F. Cheeseman s.n.* (CHR 10201, AK 9697, 9698, 9699); *ibid.*, 12 Apr 1952, *G.B. Petterson s.n.* (CHR 75532); *ibid.*, 1372 m, *T.F. Cheeseman s.n.* (K 882099 [image], WELT SP004531, SP004532).

12. CELMISIA VISCOSA Hook.f., *Handb. N. Zealand Fl.*: 133. 1864. **TYPE: NEW ZEALAND.** Middle [South] Island, Prov. Canterbury, 1860–1861, *Sinclair and Haast 450* (lectotype: K 882076 [image !]) ex Herbarium Hookerianum designated by Allan 1961: 627).

Decumbent branched **shrub**, forming extended patches or cushions up to 20 cm tall. **Leaves** more or less clustered at the distal part of the branches, sessile; lamina linear, coriaceous, thick, 6–10(–15) × 0.6–0.8 cm, apex angle acute, apex shape straight or rarely rounded, base truncate; adaxial surface viscid, glabrous, covered with thick layer of wax, green or glaucous, midvein and secondary veins (commonly four on each side of the midvein) similar, equally spaced, conspicuous, parallel, deeply impressed (surface grooved); abaxial surface densely covered (blade not visible) with a thick white indumentum layer of flagellate aseptate trichomes, midvein and secondary veins conspicuously raised, more or less hidden beneath the indumentum; margin untoothed or with spaced diminutive teeth, flat; sheath parallel-sided, wider than the lamina, enclosing the stem, surfaces glabrous, margin glabrous or slightly lanose, mostly white-hyaline to green or purplish towards the top; venation parallel, multi-nerved. **Peduncle** 9–15(–20) cm long, densely covered with biseriate stalked glandular trichomes, glaucous to brownish, with abundant foliaceous bracts 15–25 mm long, linear-deltoid, apex angle acute, apex shape straight. **Involucre** campanulate at anthesis, 13–16 × 12–15 mm. **Phyllaries** arranged in 7–8 series gradually longer from the outer to the inner ones, appressed, sometimes with the tips slightly recurved at anthesis, or the outer ones slightly spread, densely covered with biseriate stalked glandular trichomes, linear-lanceolate, apex angle acute, straight to acuminate, green, turning brown or purple towards to apex, outer ones 6–9 × 1–1.2 mm, inner ones 12–16 × 0.9–1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 50–80, arranged in 3 rows, often mauve before opening and white at anthesis. **Disc florets** ca. 100, tube 4–5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae ca. 2.5 mm long, appendage 0.4 mm long, deltoid, apex shape straight or rounded; bases tailed 150–200 µm long, filament collar same width or slightly wider than the filament; style branches 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4–0.5 mm long, apical papillae 40–50 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4–5.5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes. Fig. 24.

Distribution: South Island. Marlborough, Canterbury, Otago, and Southland; a few records from West Coast and Tasman. Widespread on mountains east of the main divide, especially in the drier areas (Fig. 25).

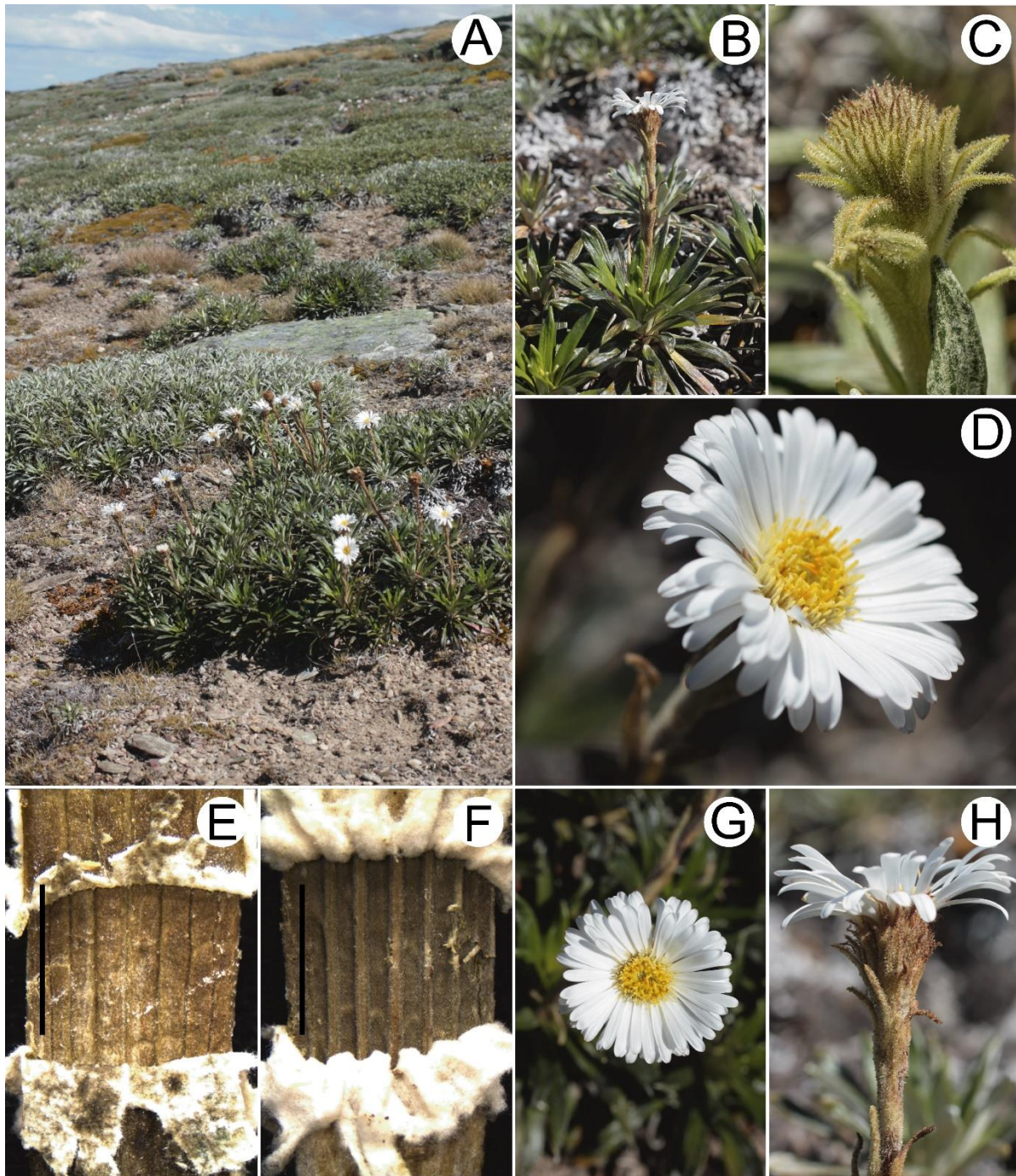


Figure 24. *C. viscosa*: A and B: Habit; C: Involucre before flowering, note the dense glandularity; D: Capitulum (top view); E: Adaxial surface of a leaf with layer of wax partially removed, note parallel venation; F: Abaxial surface of a leaf with layer of indumentum partially removed, note parallel venation; G: Capitulum (top view); H: Capitulum (lateral view). A–B and D–H from OTA (*P. Saldivia* 2536, The Old Man Range, Central Otago). C by Cara-Lisa Schloots at Easter Fiordland. Scale bar: 5 mm.

Habitat: Low to high alpine (900–1800 m), in snow tussock grassland and herbfield. In some depleted or overgrazing areas, it has become a dominant species of the low alpine, especially in Central Otago (e.g., Old Man Range).

Etymology: Refers to the abundant glandularity and resinosity of this species.

Other descriptions: Kirk (1899: 290–291), Cheeseman (1906: 312–313; 1914: Plate 97; 1925: 948), Allan (1961: 626–627).

Illustrations: Cheeseman (1914: Plate 97), Mark & Adams (1995: plate 56).

Additional collections. SOUTH ISLAND. Tasman. Nelson, Travers [Valley, Range...?], 1870, *H.H. Travers s.n.* (WELT SP046686). **Marlborough.** Island Pass, 1310 m, 25 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23056); Mt Balaclava, upper Wairau Valley, 1767 m, 16 Jan 1971, *A. Mark s.n.* (OTA 30858); Mt Fishtail, Jan 1904, *J. McMahon s.n.* (WELT SP077135); Mt Richmond, 1585 m, 20 Jan 1968, *B. Sneddon s.n.* (WELT SP091153); Mt Starveall, *W. Bryant s.n.* (WELT SP046787); *ibid.*, 28 May 1898, *F. Gibbs s.n.* (WELT SP046790); Mts. above the Wairau Gorge, Jan 1878, *T.F. Cheeseman s.n.* (AK 9846); Rachael Range, Wards Pass, 20 Dec 1994, *P.J. de Lange 2712* (AK 233444); Wairau [Valley], Mts. beyond Pine Valley [Range], *J. McMahon s.n.* (WELT SP046774). **West Coast.** Kelly's Hill, Otira River, 1219 m, Jan 1893, *D. Petrie s.n.* (WELT SP046772); O'Leary Pass, Barrier Range, 1158 m, 28 Jan 1968, *collector unknown* (OTA 21886). **Canterbury.** Sine loco, *J. Adams s.n.* (AK 34983); Amuri Co. [County], Mt. Miro Miro [Miromiro], 1524 m, 8 Feb 1914, *D. Petrie s.n.* (WELT SP046777); Craigieburn Mts. [Range], 1219 m, Jan 1896, *L. Cockayne s.n.* (WELT SP046773); Foggy Peak, Torlesse Range, 1676 m, 20 Dec 1963, *A. Mark s.n.* (OTA 8930); Lake Ohau, *J. Buchanan s.n.* (WELT SP046899/A-B); Mt Dobson, 1524 m, Jan 1883, *T.F. Cheeseman s.n.* (AK 9849); *ibid.*, 1690 m, 15 Jan 1959, *D. Scott s.n.* (OTA 5000); *ibid.*, 1811 m, 12 Feb 2018, *P. Saldivia 2594* (OTA); Mt Dobson Range, 1650 m, Jan 1898, *T.F. Cheeseman s.n.* (AK 9848); Mt Torlesse, *N.T. Carrington s.n.* (WELT SP046782); *ibid.*, *collector unknown* (WELT SP046786); *ibid.*, Feb 1896, *Ball s.n.* (AK 263865); *ibid.*, 900 m, Jan 1880, *T.F. Cheeseman s.n.* (AK 9847); Porters Pass, 20 Jan 1964, *P. Hynes s.n.* (AK 100446); slopes of Mt Torlesse above Porters Pass, 1020 m, 15 Feb 1949, *R.C. Cooper s.n.* (AK 24257); Torlesse Range, above Porters Pass, 21 Jan 1948, *W.R.B. Oliver s.n.* (WELT SP046791); Torlesse Range, Foggy Peak, 19 May 1905, *J.T. Salmon s.n.* (WELT SP096267); Torlesse Range, Foggy Peak ridge, 1300 m, 12 Dec 1997, *E.K. Cameron 9030* (AK 234997); Trelissick Distr[ic]t, *F.R. Chapman s.n.* (WELT SP046778); upper Waimakariri, Trelissick [Castle Hill], 1524 m, Jan 1891, *T. Kirk s.n.* (WELT SP046784); Waiiau State Forest, Mt Lakeman - east of main divide, 1570 m, Jan 1976, *D. Banks s.n.* (WELT SP096268). **Otago.** 3 Kings [Treble Cone], *J. Buchanan s.n.* (WELT SP046891); Black Peak, *J. Buchanan s.n.* (WELT SP046897); Hawkdun Range, 1000 m, 24 Dec 2015, *P. Saldivia 2504* (OTA); Mt Alta, 1981 m, 1 Feb 1973, *A. Mark s.n.* (OTA 33699); Mt Barff, 1219 m, 19 Dec 1969, *collector unknown* (OTA 23469); Mt St Bathans, 1524 m, Jan 1898, *B.C. Aston s.n.* (WELT SP046785); Mt Whitecomb, eastern catchment, 1300 m, 21 Dec 1985, *B.D. Rance & K. Dickinson s.n.* (OTA 43904); N. [north] from Roxburgh, Old Man Range, 1524 m, *D. Petrie s.n.* (WELT SP046780); Old Man Range, 27 Dec 1968, *A. Mark & N. Adams s.n.* (OTA 26079); *ibid.*, 1459 m, 15 Jan 2017, *P. Saldivia 2536* (OTA); *ibid.*, 1524 m, *D. Petrie s.n.* (WELT SP046783); Old Man range, 1-2 km east of Obelisk, summit ridge, 1700 m, 26 Nov 1988, *J.C. Smith-Dodsworth s.n.* (AK 187015); Old Man Range, c. 3.5 miles south of Obelisk, 1524 m, 11 Jan 1979, *B. Sneddon s.n.* (WELT SP091152); Old Man Range, Symes Road, 1630 m, 17 Jan 1986, *B.D. Rance & S. Halloy s.n.* (OTA 44105); Rock and Pillar Range, 24 Dec 1965, *A. Mark s.n.* (OTA 13532, 60633); *ibid.*, 24 Feb 1952, *G.T.S. Baylis s.n.* (OTA 2480); *ibid.*, Dec 1908, *B.C. Aston s.n.* (WELT SP046779); *ibid.*, 1249 m, 3 Jan 1964, *A. Mark s.n.* (OTA 9208); *ibid.*, 1300 m, 1 Feb 1979, *J. Jobland s.n.* (OTA 37806); *ibid.*, 1371 m, 20 Apr 1969, *C.L. Powell s.n.* (OTA 28061); *ibid.*, 1100 m, 1 Mar 1972, *G.A. Parmenter s.n.* (OTA 33000); *ibid.*, 1219 m, Nov 1892, *D. Petrie s.n.* (WELT SP046781); Wanaka district, *collector unknown* (WELT SP044578). **Southland.** Eldrig Peak, 1463 m, 28 Mar 1975, *collector unknown* (OTA 35394); Eldrig Peak, Hunter Mts., 1463 m, 28 Mar 1975, *C.D. Meurk s.n.* (OTA 60632); Excelsior Peak, 1557 m, 3 Feb 1971, *A. Mark s.n.* (OTA 31684); Garvie Mts., 16 Jan 1934, *E.M. Heine s.n.* (WELT SP046776); *ibid.*, 1524 m, 11 Jan 1934, *E.M. Heine s.n.* (WELT

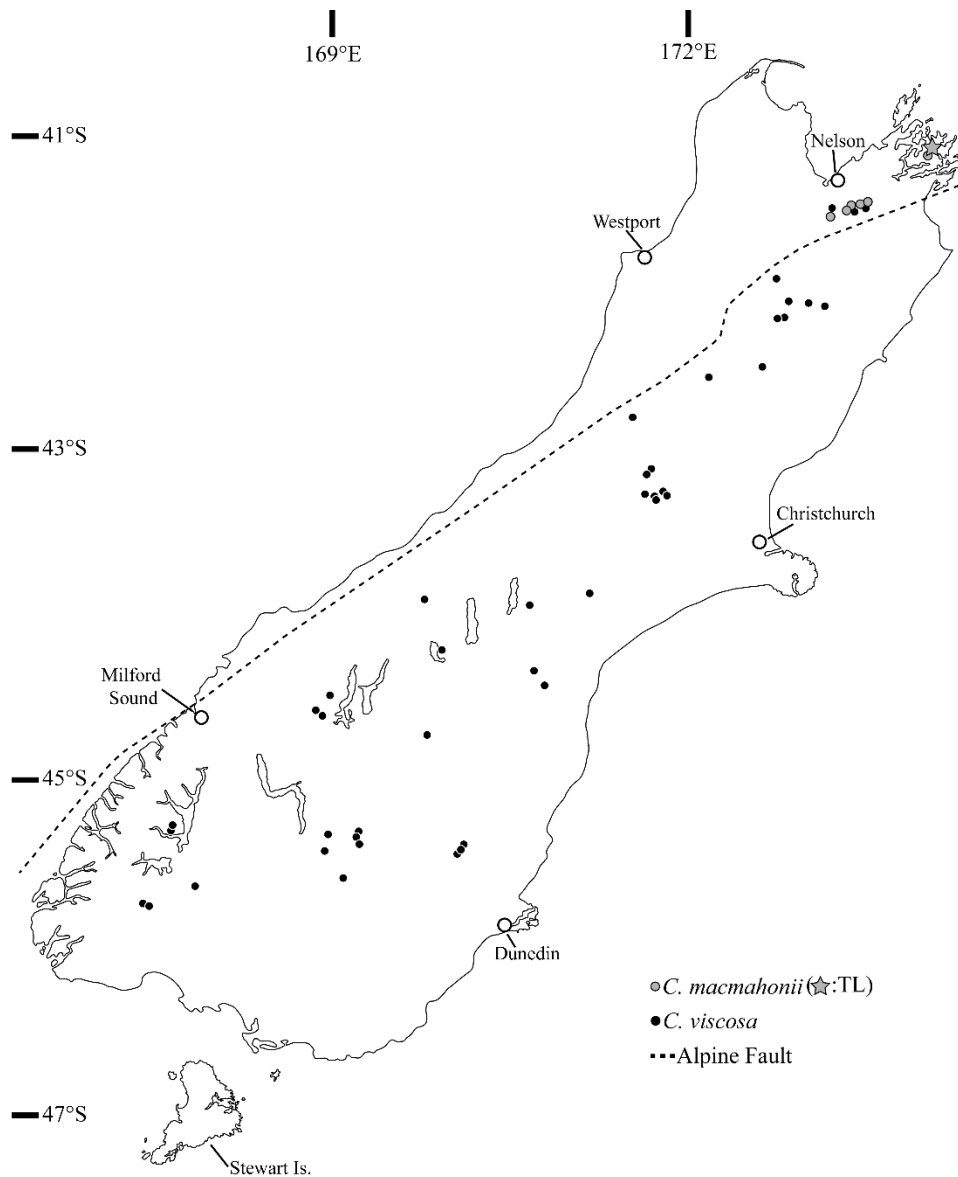


Figure 25. Distribution map of *C. viscosa* and *C. macmahonii* in the South Island of New Zealand. TL: Type locality.

SP046789); Mt Burns, 9 Jan 1969, *A. Mark s.n.* (OTA 26051); *ibid.*, 1371 m, 26 May 1967, *A. Mark & J. Wells s.n.* (OTA 18963, 18988); Murchison Mts, Takahe Valley, Dec 1949, *R.A. Falla s.n.* (WELT SP046775); Murchison Range, Mystery Burn, Mar 1951, *F. Newcombe s.n.* (WELT SP064710); ridge above Borland saddle, 1160 m, 31 Jan 1978, *J.F. West s.n.* (OTA 64524); Takahe Valley, 1100 m, 11 Dec 1972, *A. Mark s.n.* (OTA 32975); *ibid.*, 1220 m, 12 Dec 1972, *A. Mark s.n.* (OTA 32944). **District unknown.** *Sine loco, collector unknown* (AK 9850, OTA 17024); Nelson, *collector unknown* (WELT SP046788).

13. CELMISIA MACMAHONII Kirk, *Trans. & Proc. New Zealand Inst.* 27: 327. 1895. **TYPE: NEW ZEALAND.** South Island, Mt Stokes, 3000 ft, Jan 1893, *J. Macmahon s.n.* (lectotype: WELT SP3285! designated by Allan 1961: 628).

Celmisia macmahonii var. *hadfieldii* W. Martin ex Allan (1961: 628, 967). **TYPE: NEW ZEALAND.** South Island, Mt Richmond, Dec 1932, *W. Martin s.n.* (holotype: CHR 76115!). *Syn. nov.*

Stout, decumbent, short-branched **shrub**, forming more or less compact cushions up to 20 cm tall. **Leaves** more or less clustered at the distal part of the branches forming dense rosettes, sessile, erect to spread; lamina linear, coriaceous, 25–40 × 5–9 mm, apex angle acute, apex shape straight, base truncate or slightly attenuate, both surfaces densely covered (blade not visible) with a silky indumentum of long aseptate terete trichomes, the indumentum is shiny silver in live plants but it turns ferruginous once it is dry in herbarium specimens, midvein conspicuous, sunken in the adaxial surface and raised in the abaxial surface, at least two conspicuous secondary veins (one at each side of the midvein) running parallel following the margin of the lamina, impressed in the adaxial surface and raised in the abaxial surface, often hidden beneath the indumentum; margin untoothed, flat to slightly revolute and cucullate; sheath parallel-sided, glabrous in the adaxial surface, and densely covered with the same indumentum as the lamina in the abaxial surface; venation parallel, multi-nerved. **Peduncle** 6–12 cm long, densely covered with silky indumentum as in the leaves, with abundant foliaceous bracts 15–30 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical to campanulate at anthesis, 11–15 × 9–12 mm. **Phyllaries** arranged in 6–7 series, subequal in length, appressed to spread at anthesis, densely covered with silky indumentum as in the leaves, linear-lanceolate, apex angle acute, acuminate, green-silvery (ferruginous when dry) with purple tips, 9–13 × 0.9–1.2 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 40–60, arranged in 3–4 rows, white. **Disc florets** 60–70, tube 3–4 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2 mm long; appendage 0.4–0.5 mm long, deltoid, apex shape straight or rounded; bases tailed 200–250 µm long, filament collar slightly wider than the filament; style branches ca. 1.4 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.3–0.4 mm long, apical papillae 20–30 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 3–4 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes. Fig. 26.

Note: Allan (1961) described *C. macmahonii* var. *hadfieldii* based on leaf morphology. Leaves narrow obovate-oblong in typical *C. macmahonii* vs linear-subulate in *C. macmahonii* var. *hadfieldii*. However, these differences are poorly defined and fall within the range of variation of plants from Mt Stokes (*C. macmahonii* var. *macmahonii*) and Richmond Range (*C. macmahonii* var. *hadfieldii*). For example, the syntype AK 9964 of *C. macmahonii* var. *macmahonii*, shows no differences in leaf shape with the holotype of *C. macmahonii* var. *hadfieldii*. Accordingly, I regard the latter as a synonym of the typical *C. macmahonii*.

Distribution: South Island. Northwestern Marlborough. Restricted to Mt Stokes area in the Marlborough Sounds and Richmond Range (Fig. 25).

Habitat: Low alpine (800–1700 m), mainly in rocky outcrops and crevices, but also in rocky areas among open tussock grassland, herbfield, and semi-prostrated beech trees near the tree line.

Etymology: After J.H Macmahon, who collected the type specimens.

Other descriptions: Kirk (1899: 291), Cheeseman (1906: 316; 1925: 956), Allan (1961: 628).

Additional collections. SOUTH ISLAND. Marlborough. Below summit of Mt Stokes on ridge to Mt Macmahon, 1150 m, 29 Feb 1996, *J.C. Smith-Dodsworth s.n.* (AK 226312); Mt Fishtail, Nov 1922, *A. Wall s.n.* (CHR 290130); *ibid.*, 1524 m, *A. Wall s.n.* (CHR 290293, WELT SP047002); Mt Richmond, 5 Feb 1898, *F. Gibbs s.n.* (WELT SP044648); *ibid.*, Jan 1978, *J. Hayward s.n.* (CHR 356579); *ibid.*, *J. McMahan s.n.* (WELT SP077136); *ibid.*, *J.A. Morris s.n.* (WELT SP046759, SP047016); *ibid.*, *W. Martin s.n.* (WELT SP047014); *ibid.*, 1585 m, 20 Jan 1968, *B. Sneddon s.n.* (WELT SP091132); *ibid.*, 29 Dec 1974, *C.J. Webb & T.H. Webb 74113* (CHR 283719); Mt Richmond, between Wairau R[iver] and Pelorus Sound, *B.C. Aston s.n.* (WELT SP046999, SP047000); Mt



Figure 26. *C. macmahonii*: A. Plant showing habit; B. Terminal cluster of leaves with two capitula; C. Habit; D. Capitulum (top view). A from WELT (SP132216); B from WELT (SP9963); C and D by Cara-Lisa Schloots at Mt Rintoul, Richmond Range. Scale bar: 5 cm.

Richmond, Johnston Peak, 13 Mar 1969, *J.S. Dugdale s.n.* (CHR 200963); Mt Stokes, *J.H. MacMahon s.n.* (AK 9964); *ibid.*, *L. Cockayne s.n.* (WELT SP047013); *ibid.*, *T. Kirk & J.E. Holloway s.n.* (OTA 2451); *ibid.*, *J. McMahon s.n.* (WELT SP005847, SP077132); *ibid.*, Jan 1939, *A.J. Healy s.n.* (CHR 33350); *ibid.*, 14 Nov 1957, *M.B. Ashwin s.n.* (CHR 141671); *ibid.*, Feb 1927, *J. McMahon s.n.* (WELT SP047008); *ibid.*, 1 Dec 1927, *J.H. MacMahon s.n.* (AK 263826); *ibid.*, 6 Nov 1892, *J. McMahon s.n.* (WELT SP077144); *ibid.*, Nov 1923, *J.H. McMahon s.n.* (CHR 290125); *ibid.*, Sep 1923, *J.H.*

McMahon & D. Petrie s.n. (CHR 290124); *ibid.*, 1158 m, *H.J. Matthews s.n.* (WELT SP047001); *ibid.*, *P. MacMahon s.n.* (AK 9963); *ibid.*, *J.H. MacMahon s.n.* (AK 9965); *ibid.*, 1189 m, *J. McMahon s.n.* (WELT SP047004); *ibid.*, 1219 m, Feb 1984, *W. Martin s.n.* (CHR 489560); found at Mt Stokes, Marlborough, Mt Richmond, Nelson, 1158-1219 m, *MacMahon s.n.* (AK 132216); Mt Stokes, rocky ridge on south side of summit, 9 Jan 1978, *D.R. Given 11065* (CHR 315853); on cliffs facing west at southern end of Mt Stokes, 1097 m, 9 Apr 1975, *W. Burke s.n.* (WELT SP096218); Richmond Range, Johnston Peak, 26 Dec 1976, *C.J. Webb & T.H. Webb 76216* (CHR 321872); Richmond Range, Mt Fishtail, 2 Nov 1977, *J. Anderson s.n.* (CHR 323031); *ibid.*, 5 Mar 1979, *J. Hayward s.n.* (CHR 355612); *ibid.*, Mar 1974, *J.R. Le Comte & G. Hooker s.n.* (CHR 259607); *ibid.*, 1460 m, 21 Dec 1979, *B. Molloy s.n.* (CHR 386663); *ibid.*, 1524 m, Nov 1932, *J. Hadfield s.n.* (CHR 50048); *ibid.*, 1417 m, Jan 1982, *G. Rogers s.n.* (WELT SP096219); Richmond Range, Mt. Fishtail, rock face above Mt. Fishtail hut, 1365 m, 21 Jan 1997, *J.C. Smith-Dodsworth s.n.* (AK 231052); Richmond Range, saddle east of Mt Rintoul, 1500 m, 22 Oct 1995, *D. Glenny 6016* (CHR 502572); Richmond Range, The Armchair, *D. Purdie s.n.* (CHR 10319); Wairau Valley, mtn. at the back of Pine Valley Range, *J. McMahon s.n.* (WELT SP047007); Wairau Valley, Pine Valley Range, *J. McMahon s.n.* (WELT SP047005); Wairau, Mtn. beyond Pine Valley, *J. McMahon s.n.* (WELT SP047006).

14. CELMISIA ANGUSTIFOLIA Cockayne, Trans. & Proc. New Zealand Inst. 47:114. 1914. **TYPE: NEW ZEALAND.** South Island, Canterbury, in fellfield or steppe from the lower sub-alpine to the alpine belts on mountains drained by River Waimakariri, but not where the rainfall is excessive (on label: Mt Torlesse Range at 900 m), 30 Dec 1901, *L. Cockayne 1960* (lectotype: WELT SP45777! designated by Saldivia 2023: 35; isolectotypes CHR 288141!, K 882082 [image!], WELT SP45778!).

Celmisia brevifolia Cockayne ex Cheeseman (1925: 938). **TYPE: NEW ZEALAND.** South Island, Plateau of the Old Man Range in herb-moor, 1500 m. alt., 27 Mar 1919, *L. Cockayne 1970* (lectotype: K 77065 [image!] designated by Saldivia 2023: 35; isolectotype: WELT SP45774!). Syn. nov.

Decumbent loosely branched **shrub**, forming loose cushions or patches (rarely mats) up to 20–35 cm tall. **Leaves** more or less clustered at the distal part of the branches, which are covered with decaying leaves and sheaths towards to base, sessile or pseudopetiolate; lamina linear, linear-oblong, oblanceolate, obovate, coriaceous, thick, (–9)12–50 × (–2)5–9 mm, apex angle acute or obtuse, apex shape straight or less frequently rounded, rarely mucronate, base truncate, attenuate, or decurrent; adaxial surface viscid, glabrous, or rarely partially to completely covered by a white layer of arachnoid indumentum, green, glaucous, or white, midvein conspicuous, slightly impressed to raised, and two or three raised secondary veins running on each side of the midvein following the leaf margin (when dry, the secondary veins are noticeably raised and contrasting with the lamina, especially in the forms with oblanceolate-linear leaves); abaxial surface densely covered (blade not visible) by a thick white indumentum layer of flagellate aseptate trichomes, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin with 3–4 distant small teeth along each side of the lamina, and sometimes a terminal one at the end of the midvein, flat to slightly revolute; sheath parallel-sided, surfaces glabrous; margin glabrous or lanose, mostly white-hyaline to green towards the top; venation parallel, multi-nerved. **Peduncle** 4–12(–15) cm long, viscid, purple, with a few foliaceous bracts 8–18 mm long, linear-deltoid, apex angle acute, apex angle straight. **Involucre** cylindrical at anthesis, 8–12 × 4–6.5 mm. **Phyllaries** arranged in 5–7 series gradually longer from the outer to the inner ones, straight or with the tips slightly recurved, appressed at anthesis, or the outer ones slightly spreading (rarely almost patent), viscid, linear-lanceolate, apex angle acute, straight to acuminate, green or purple; outer ones 4–6 × 1–1.2 mm; inner ones 8–12 × 1–1.3 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 12–40, arranged in 2–3 rows, white. **Disc florets** 25–50, tube 3.5–4.5 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2 mm long; appendage 0.4 mm long, deltoid, apex shape straight or rounded; bases tailed

150–200 μm long; filament collar same width or slightly wider than the filament; style branches 1.3–1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.3–0.4 mm long, apical papillae 40–50 μm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 3.5–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5-ribbed, covered with twin trichomes. Fig. 27.

Notes: Cheeseman (1925) described *Celmisia brevifolia* without providing a diagnosis. He only commented: “This appears to be quite a distinct species, easily recognized by its much-branched woody base, numerous closely set oblong leaves, which are small for the size of the plant, short scapes, and densely silky achenes.” However, leaves from the same plant can be quite variable (Fig. 27F–I), and there is a continuous variation of all kinds of intermediate forms towards the typical *C. angustifolia*. These intermediate forms surround Central Otago and continue northwards where they finally merge with the typical *C. angustifolia* (Fig. 27J). Regarding the form with a white adaxial surface (Fig. 27B) of the leaves from the Two Thumb Range (see Saldivia 2023: 36), this co-occurs with identical plants but with glabrous adaxial surface, and plants with intermediate levels of indumentum density of the adaxial surface of the leaves are not uncommon.

The interpretation of this study is that the *Celmisia brevifolia*–*C. angustifolia* complex represents one species highly variable in leaf shape and indumentum. Looking only at the two extremes of the variation (i.e., plants from Central Otago and Torlesse Range) would likely lead to biased taxonomic conclusions. Accordingly, based on morphological and distributional evidence, I am treating *C. brevifolia* as a synonym of *C. angustifolia*.

Distribution: South Island. Canterbury, Otago, central and northeast Southland, and a few records from West Coast. Widespread on the mountains east of the main divide, from the Arthur’s Pass area in the north to Takitimu Mts. in the south (Fig. 28).

Habitat: Low alpine (750–2000 m). Drier slopes, rocky outcrops, and herbfield, less frequent in snow tussock-herbfield.

Etymology: Narrow-leaved.

Other descriptions: Cheeseman (1925: 939 as *C. novae-zealandiae*), Allan (1961: 618, 622–623).

Illustrations: Mark & Adams (1995: plates 54, 55), Eagle (2006: 763).

Additional collections. SOUTH ISLAND. West Coast. Cave Camp, *J. Buchanan s.n.* (WELT SP046907); Haast, *D.L. Poppelwell s.n.* (AK 32173); Haast Pass, *D. Poppelwell s.n.* (WELT SP046581); Lord River, tussock grassland, 1 Jan 1946, *R. Mason s.n.* (CHR 34810); Mt Aspiring, *D. Petrie s.n.* (AK 9729); on shingle slip under Otira Glacier, 1160 m, 25 Jan 1898, *L. Cockayne s.n.* (WELT SP046500). **Canterbury.** Sine loco, *J. Adams s.n.* (AK 34938); 1 Jan 1931, *L.B. Moore & L.M. Cranwell s.n.* (AK 32178); Ahuriri River, upper, 920 m, 1 Apr 1972, *A. Mark s.n.* (OTA 60405); Arthur’s Pass, *J.B. Armstrong s.n.* (WELT SP045784); 900 m, Jan 1898, *L. Cockayne s.n.* (AK 34933); Ashburton Mts., *T.H. Potts s.n.* (WELT SP046568); Avoca River, Black Range, 1524 m, summer 1955–1956, *M.J. Wright s.n.* (CHR 519588); Ben More, 8 Jan 1911, *W.R.B. Oliver s.n.* (WELT SP005740); Ben Ohau Range, Twin Stream, 1495 m, 20 Feb 1970, *A. Mark s.n.* (OTA 28286); Black Range, *D. Petrie s.n.* (WELT SP045782); *ibid.*, 1067 m, *T. Cheeseman s.n.* (WELT SP045785); *ibid.*, Jan 1880, *T.F. Cheeseman s.n.* (AK 9728); Cameron, moraine, *collector unknown* (CHR 50007); Cameron Hut. Arrowsmith Ra., 24 Jan 1978, *D.R. Given 11078* (CHR 323104); Cameron Valley, Apr 1946, *R.L. Oliver & J.F. Findlay s.n.* (CHR 55231); Canterbury Alps, *N.T. Carrington s.n.* (WELT SP046561); Cass River, upper, 1371 m, 27 May 1969, *OUSA s.n.* (OTA 26265); Castle Hill, above Whitewater River [Stream], 914 m, 31 Dec 1948, *A. Lush s.n.* (WELT SP004793/A-B); Coal Hill, Mt Peel area,

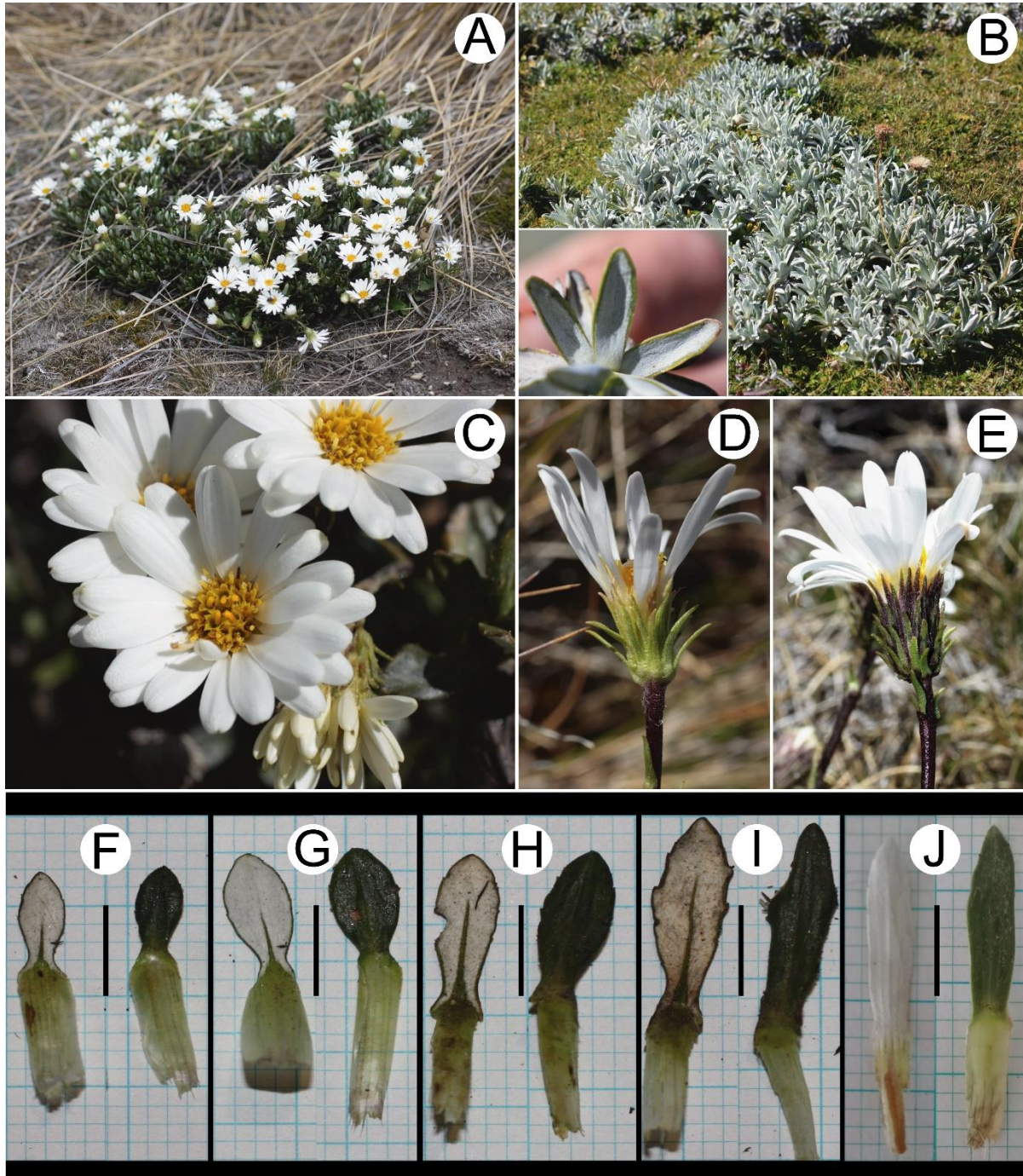


Figure 27. *C. angustifolia*: A and B. Habit; C. Capitulum (top view); D and E. Capitulum (lateral view); F to J. Abaxial (left) and adaxial (right) surfaces of the leaves. A, C, E–I from OTA (*P. Saldivia* 2527, The Old Man Range, Central Otago); B from OTA (*P. Saldivia* 2590, Mt Dobson, South Canterbury); D, J from OTA (*P. Saldivia* 2593, Mt Dobson). Note that F to I are from one branch of the same plant. Scale bar: 1 cm.

1402 m, 1 May 1979, *D.R. Given* 11782 (CHR 498290); Coal Hill, Rangitata, 24 Mar 1985, *B.P.J. Molloy & A.P. Druce* s.n. (OTA 63552); Craigburn Range, Porter Heights Ski Field, north side, 1320 m, 15 Jan 1998, *E.K. Cameron* 9156 (AK 235469); *ibid.*, Nervous Knob, 1275 m, 7 Jan 1970, *B.S. Parris & J. Croxall* s.n. (AK 122045); *ibid.*, 1402 m, 1 Jan 1968, *A. Mark & N. Adams* s.n. (OTA

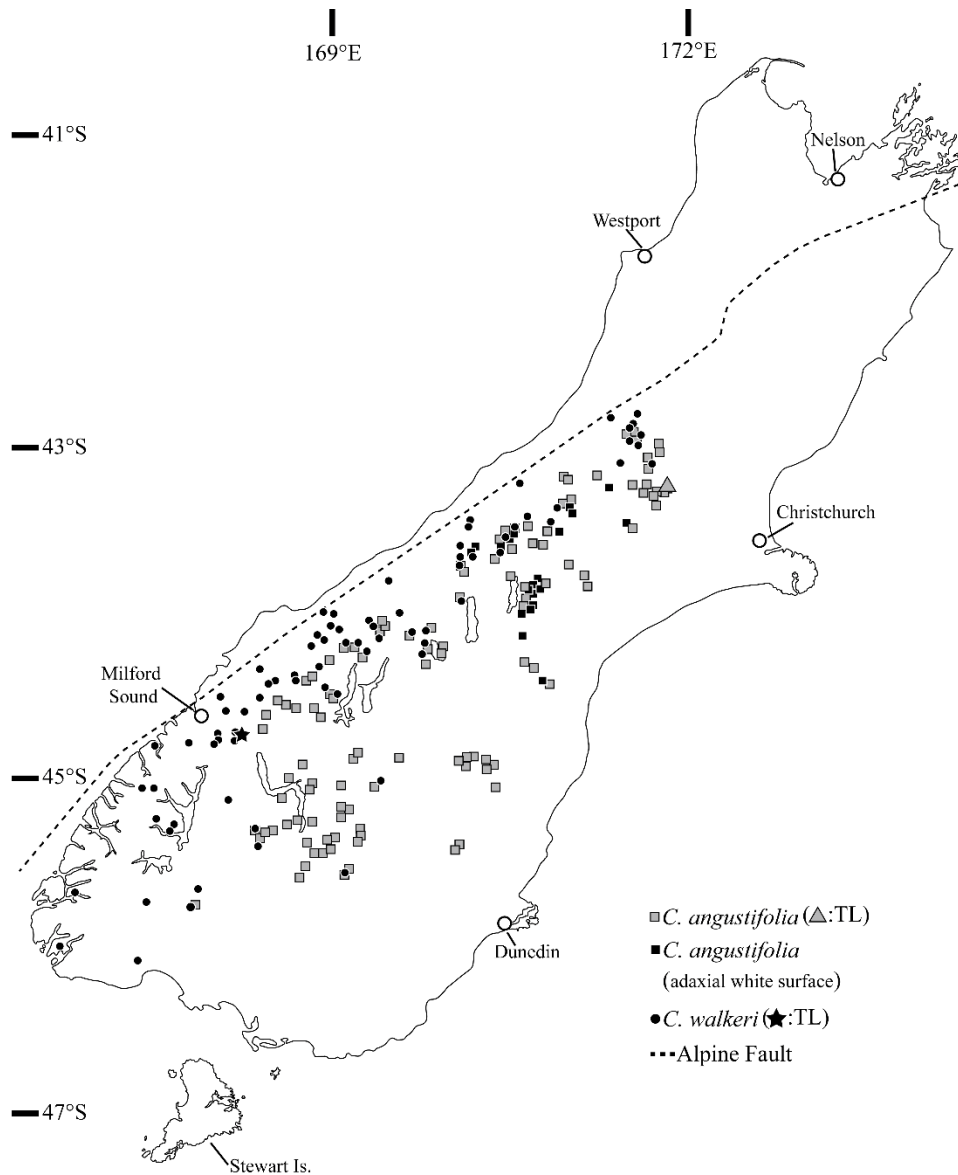


Figure 28. Distribution map of *C. angustifolia* and *C. walkeri* in the South Island of New Zealand. TL: Type locality.

27950); Craigie Burn Mts [Craigieburn Range], 1219 m, Jan 1893, *D. Petrie s.n.* (WELT SP045786); Diorite Downs, 3 Jan 1976, *A.R. Forne s.n.* (OTA 60663); Foggy Peak, 1076 m, 13 Feb 2018, *P. Saldivia* 2598 (OTA); *ibid.*, 1676 m, 19 Dec 1963, *A. Mark s.n.* (OTA 8937); Fox Peak, 1 Jan 1956, *A.E. Esler s.n.* (AK 215606); Godley River, 1097 m, 14 Jan 1961, *H.E. Connor s.n.* (CHR 122515); Godley Valley, lower, 1219 m, 28 Dec 1957, *D. Scott s.n.* (OTA 4245); *ibid.*, upper, 1371 m, 24 Feb 1958, *D. Scott s.n.* (OTA 4517, 4518); Hawkdun Range, Blue Duck Creek, *C. Ogle s.n.* (WELT SP089227); hills at Cass Valley, Jan 1919, *H.H. Allan s.n.* (WELT SP045783); Hooker Valley, Hermitage, 914 m, 3 Jan 1969, *A. Mark s.n.* (OTA 25642); Hooker Valley, near The Hermitage, 750 m, 8 Jan 1965, *P. Hynes s.n.* (AK 104769); Huxley Gorge Station, Ram Hill, 1 Dec 1951, *A.E. Esler s.n.* (AK 215604); Ida Range, 1220 m, 12 Jan 1985, *J. Keogh & M. Heads s.n.* (OTA 59715); Jagged Stream, Upper Rakaia, 1220 m, 11 May 2004, *M. McKay s.n.* (CHR 596870); Kiwi Stream, Wilberforce River, Rakaia, 1396 m, 21 Apr 2005, *T. Hay s.n.* (CHR 504505); L. Ohou [Lake Ohau], *J. Buchanan*

s.n. (WELT SP046903); Lake Lyndon, 823 m, 26 Nov 1966, *B. Sneddon & W. Burke s.n.* (WELT SP091089); Lake Ohau, *J. Buchanan s.n.* (WELT SP046908); *ibid.*, collector unknown (WELT SP046905); Lake Tekapo, Godley Valley, 1219 m, Dec 1963, *C. Challies s.n.* (WELT SP095819); *ibid.*, Classen Glacier moraine, 18 Jan 1964, *C. Challies s.n.* (WELT SP095817); Lake Tekapo, Mt Dobson, 1219 m, Jan 1883, *T.F. Cheeseman s.n.* (AK 9707, 9710); *ibid.*, 1524 m, Jan 1898, *T.F. Cheeseman s.n.* (AK 9708, 9709); Lees Valley, Puketeraki Range, 24 Feb 1967, *J. Le Comte s.n.* (CHR 177577); middle Rakaia Valley, Lake Monk (Lake Catherine), near Lake Coleridge, 1974-1975, *G.G. Hunter s.n.* (CHR 689167); Mounds of Misery Southwest of Poulter Hill, between Lochinvar Stream and Cox River, 800 m, 27 Feb 1984, *D.R. Given 13595* (CHR 405279); Mt Algidus, summit, 1402 m, 25 Mar 1984, *A. Huber s.n.* (CHR 569213); Mt Armstrong, 1867, *J.B. Armstrong s.n.* (CHR 634809); Mt Cook, Jan 1898, *J. Adams s.n.* (AK 15605, 15606, 15638, 15639, 15641); Mt Binsler, 1219 m, 14 Dec 1956, *C.J. Burrows s.n.* (CHR 519589); Mt Cook [National Park], Hooker Valley, 792 m, *L. Cockayne s.n.* (WELT SP045779); Mt Cook [National Park], near Hermitage, Kea Point, 12 Feb 1911, *D. Petrie s.n.* (WELT SP045780); Mt Dalgety, Dalgety Range, 1066 m, 3 Jan 1969, *A. Mark s.n.* (OTA 25628); Mt Dobson, 1524 m, 15 Jan 1959, *D. Scott s.n.* (OTA 4996); *ibid.*, 1811 m, 12 Feb 2018, *P. Saldivia 2589–2593* (OTA); *J. Adams s.n.* (AK 15602); Mt Edward, Two Thumb Range, 1219 m, 5 Jan 1938, *V.D. Zotov s.n.* (CHR 21126); Mt Enys, Craigieburn Range, 26 Dec 1937, *Barker 329* (CHR 21121); Mt Hamilton, Craigieburn Range, 1219 m, 19 Dec 1961, *R. & E.F. Melville s.n.* (CHR 133105); Mt Hutt, 1524 m, 6 Apr 1972, *B. Molloy s.n.* (CHR 386750); Mt Ida, 27 Jan 1938, *Barker 577* (CHR 50005); Mt Sebastopol, near Hermitage, 1200 m, 20 Jan 1965, *P. Hynes s.n.* (AK 104805); Mt Nessing, Hunter Hills, 21 Mar 1980, *D.R. Given 12393* (CHR 494965); Mt Nimrod, Hunter Hills, 1542 m, 20 Apr 1949, *A.P. Barker s.n.* (CHR 229771); Mt Olympus skifield, 1620 m, 5 Feb 1987, *J.E. Vickers s.n.* (CHR 593133); Mt Oxford, herbfield near summit, 28 Feb 1970, *D.M. Cawer s.n.* (CHR 202825); Mt Potts, 1768 m, 27 Mar 1968, *M.J.A. Simpson 5464* (CHR 184668); Mt Torlesse, 1220 m, 1867, collector unknown (CHR 634816); *ibid.*, *N.T. Carrington s.n.* (WELT SP046562); *ibid.*, 14 Nov 1909, *W.R.B. Oliver s.n.* (WELT SP005796); *ibid.*, Feb 1896, *Ball s.n.* (AK 263866); Mt Torlesse Range, near Dry River, 1067 m, 16 Dec 1891, *L. Cockayne s.n.* (WELT SP045787); Mts. above Lake Ohau, Jan 1949, *H. Talbot s.n.* (WELT SP005738); near Sealy Lakes, Sealy Range, 1372 m, 13 Dec 1966, *H. Wilson s.n.* (CHR 254774); Ohau Range, 1584 m, 2 Jan 1969, *A. Mark s.n.* (OTA 26009); Ohau Ski Field, basin, 1219 m, 15 Jan 1974, *C.D. Meurk s.n.* (OTA 34948, 34949); Porters Pass, 1371 m, 2 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 25702); *ibid.*, 1463 m, 2 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 25699); *ibid.*, 1964, *F.M. Warren s.n.* (AK 268341); *ibid.*, 20 Jan 1964, *P. Hynes s.n.* (AK 100993); Rangitata, 1524 m, *J.F. Armstrong s.n.* (WELT SP046563); Red Hills, slopes below beech, Rakaia, 23 Jan 1964, *H.E. Connor & A.H. MacRae s.n.* (CHR 173526); Richmond Ra., 1128 m, 16 Jan 1961, *H.E. Connor s.n.* (CHR 122509); ridge between Godley Glacier and Fitzgerald stream above Godley Mtn., 1650 m, 23 Feb 1977, *D.R. Given 9768* (CHR 478729); ridge northwest of The Hooligan, leading up from Jollie Brook, Hurunui R. confluence, 945 m, 6 May 1971, *D.R. Given 71212* (CHR 219846); Rollesby Ra., 1219 m, Jan 1969, *B. Molloy s.n.* (CHR 178921); S.E. spur of Torlesse Ra[nge], 1219 m, 24 Jan 1948, *W.R.B. Oliver s.n.* (WELT SP045861/A-B); slopes of Mt Torlesse above Porters Pass, 1020 m, 15 Feb 1949, *R.C. Cooper s.n.* (AK 24237); South branch Rutherford Stream, 1341 m, 7 Feb 1971, *H.D. Wilson s.n.* (CHR 254768); spur Mt Pember, Puketeraki Range, 1067 m, 18 Dec 1966, *L.B. Moore & J. Clarke s.n.* (CHR 174030); Torlesse Range, above Porters Pass, 21 Jan 1948, *W.R.B. Oliver s.n.* (WELT SP045862); Torlesse Range, Foggy Peak ridge, 1250 m, 12 Dec 1997, *E.K. Cameron 9028* (AK 234998); Torlesse Range, near source of Dry River, 1067 m, 16 Dec 1891, *L. Cockayne s.n.* (WELT SP045781); Twin Stream, Ohau Range, 1493 m, 20 Feb 1970, *A. Mark s.n.* (OTA 28287); Two Thumb Range, 1830 m, Apr 1920, *A. Wall s.n.* (AK 9706); Two Thumb Range, Fox Peak, 18 Feb 1967, *K. Jansen s.n.* (AK 360934); Two Thumb Range, Mt Richmond, 1371 m, 1 Jan 1969, *A. Mark & N. Adams s.n.* (OTA 25360); Two Thumbs [Thumb] Range, 1829 m, *A. Wall s.n.* (WELT SP046498); upper Rangitata, *J.F.A. Armstrong s.n.* (CHR 634818). **Otago.** Sine loco, 1200 m, *D. Petrie s.n.?* (AK 34931); Ben Lomond, 1067 m, 31 Mar 1921, *L. Cockayne s.n.* (WELT SP054454); Ben Lomond saddle, 20 Feb 1953, *W.R.B. Oliver s.n.* (WELT SP005785); Ben Lomond summit, 14 Feb 1953, *W.R.B. Oliver*

s.n. (WELT SP005865); Ben Lomond, below saddle, 14 Feb 1953, *W.R.B. Oliver s.n.* (WELT SP005784); Black Peak, *J. Buchanan s.n.* (WELT SP046909); Camp Creek, Lake Wanaka, 915 m, 1 Feb 1950, *P. Wardle s.n.* (OTA 2476); Carrick Range, 1585 m, 8 Jan 1964, *A. Mark s.n.* (OTA 9056); *ibid.*, 1615 m, 1925, *A. Wall s.n.* (CHR 290015); *ibid.*, 1645 m, 22 Nov 1970, *A. Mark s.n.* (OTA 31027); Coronet Peak, Queenstown, *G. Brownlie s.n.* (CHR 331429); crest of Old Woman Range, 10 Dec 1985, *C. Ogle s.n.* (WELT SP089224); Danseys Pass, 640 m, Oct 1969, *I. Ritchie s.n.* (CHR 200795); *ibid.*, 1676 m, 1 Jun 1967, *D.R. Given 67614* (CHR 175005); Danseys Pass, common alongside shingle slide immediately inland of pass, *J.B. Irwin s.n.* (CHR 353706); Dart River, below Cascade saddle, 1480 m, 12 Mar 1978, *P. Sommerville s.n.* (OTA 37028); Dart River, upper, 1400 m, 26 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 22146); Dunstan Mts., tops, 26 Feb 1968, *H.E. Connor s.n.* (CHR 190215); Forbes Mts., above Cattle Flat, Dart Valley, Nov 1923, *H.L. Darton s.n.* (WELT SP045771); Forbes Mts., above Paradise, west Otago, 1615 m, 2 Dec 1967, *A. Mark s.n.* (OTA 27408); Gem Lake, ridge leading above Gem Lake, 1370 m, 18 Dec 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 60403); Hawkdun Range, Danseys Pass, 1219 m, 20 Dec 1969, *A. Mark s.n.* (OTA 28858); Hector Mts., 1828 m, *J. Speden s.n.* (AK 9726); Hector Range, near Tennants Peak, 1500 m, 26 Mar 1993, *P. Wardle 96/14 & R.P. Buxton s.n.* (CHR 511316); Hills opposite Mt Aspiring, 1219 m, *D. Petrie s.n.* (WELT SP046591); *ibid.*, *collector unknown* (WELT SP046592, SP046593); Hyde Rock, Old Man Range, Gorge Creek, 1585 m, 14 Jan 1959, *A. Mark s.n.* (OTA 6287); Lake McKay, Pisa Range, 1830 m, 6 Feb 1966, *J. Wells s.n.* (OTA 15059); Leaning Rock, Dunstan Mts., 11 Jan 2005, *M. Thorsen s.n.* (CHR 582872); Mt Alta, 1767 m, 1 Feb 1973, *A. Mark s.n.* (OTA 33675); *ibid.*, 1219–1829 m, *J. Buchanan s.n.* (WELT SP046904/A-B); Mt Cardrona, 1780 m, 13 Feb 1979, *A. Mark s.n.* (OTA 38108); Mt Earnslaw, *E. Phillips s.n.* (AK 34934); Mt Ernest, 1524 m, 24 Mar 1921, *L. Cockayne 1979* (AK 34925); *ibid.*, 24 Mar 1921, *L. Cockayne s.n.* (CHR 18367); Mt Jumbo, Wilkin Valley Mt Aspiring, 1554 m, 11 Dec 1968, *A. Mark s.n.* (OTA 28711); Mt Kyeburn, 1066 m, Dec 1987, *B.C. Aston* (CHR 108935); *ibid.*, Jan 1898, *B.L. Aston & D. Petrie s.n.* (CHR 328702); Mt Pisa, 1370 m, 1 Feb 1951, *P. Wardle s.n.* (OTA 2475); *ibid.*, 1585 m, 9 Mar 1921, *L. Cockayne s.n.* (WELT SP045775); *ibid.*, 1830 m, 1 Feb 1963, *G.T.S. Baylis s.n.* (OTA 7202); *ibid.*, *D. Petrie s.n.* (WELT SP046497); Mt Pisa Plateau, 1560 m, 9 Mar 1921, *L. Cockayne 1978* (K 77064 [image]); *ibid.*, *W.R. Reid s.n.* (AK 34928); 1585 m, 9 Mar 1921, *L. Cockayne s.n.* (WELT SP045776); Mt Pisa, above cirque, 1829 m, 16 Jan 1970, *N. Adams s.n.* (WELT SP042876); Mt Pisa, north end, among [*Celmisia*] *viscosa* and [*Celmisia*] *sessiliflora*, 1524 m, 1 Jul 1967, *D.R. Given 67021* (CHR 175010); Mt Pisgah, Nov 1937, *W.A. Thomson s.n.* (CHR 19013); Mt Pisgah, Cultivated, 1737 m, *J.S. Thompson s.n.* (CHR 658200); Mt Turnes, 1980 m, Jan 1926, *A. Wall s.n.* (CHR 289211); near Lake Wakitipu, Ben Lomond, *J. Speden s.n.* (AK 9730); near Lake Wakitipu, Garvie Mts., Jan 1921, *J. Speden s.n.* (AK 9733); near summit of Rock and Pillar Range, 26 Mar 1920, *L. Cockayne s.n.* (AK 34926); Nr. Queenstown, Coronet Peak, 1463 m, 12 Jan 1979, *B. Sneddon s.n.* (WELT SP091100); Old Man Range, 1524 m, 19 Jan 1970, *N. Adams s.n.* (WELT SP043012); *ibid.*, 1525 m, 13 Mar 1964, *M.J. Merrilees s.n.* (OTA 13557); *ibid.*, 1615 m, 30 Dec 1963, *A. Mark s.n.* (OTA 9088); *ibid.*, 1630 m, 29 Oct 1985, *B.D. Rance & S. Halloy s.n.* (OTA 44101); *ibid.*, 1674 m, 15 Jan 2017, *P. Saldivia 2527* (OTA); *ibid.*, 1685 m, 12 Feb 1966, *J. Wells s.n.* (OTA 59716); Old Man range, 12 km east of Obelisk, summit ridge, 1700 m, 26 Nov 1988, *J.C. Smith-Dodsworth s.n.* (AK 187012); Old Man Range, near obelisk rock, 19 Dec 1969, *L.B. Moore s.n.* (CHR 199662); Old Man Range, Symes Road (near summit), 1620 m, 18 Jan 2008, *P.J. de Lange 7788 & M.J. Thorsen s.n.* (AK 304702); Pisa Range, 1740 m, *A.P. Druce 1376* (CHR 471968); *ibid.*, 1890 m, 27 Feb 1964, *A. Mark s.n.* (OTA 8933); Rees saddle, Mt Aspiring, 1450 m, 20 Jan 1986, *A. Mark s.n.* (OTA 44750); ridge leading to above Gem Lake, 1370 m, 18 Dec 1985, *K. Dickinson & B.D. Rance s.n.* (CHR 431409); Rock and Pillar, 1315 m, 28 Feb 2018, *P. Saldivia 2655–2656* (OTA); Rock and Pillar Range, 1290 m, 1 Feb 1979, *J. Talbot s.n.* (OTA 37796); *ibid.*, 1370 m, 20 Apr 1969, *Powell s.n.* (OTA 28124); *ibid.*, 24 Feb 1952, *G.T.S. Baylis s.n.* (OTA 2474); Snowy Creek, 1524 m, 25 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 60514); Snowy Creek, Mt Aspiring, 1525 m, 25 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21123); summit of Old Man Range, 1310 m, 27 Mar 1919, *collector unknown* (CHR 290105); The Remarkables, 1360 m, 14 Mar 2003, *D.R. Given & M. Ito 3-0314-24*

(CHR 570415); Treble Cone, 22 Dec 1973, *C.D. Meurk s.n.* (OTA 34320); Treble Cone, Lake Wanaka District, 1300 m, 5 Jan 1978, *A. Mark s.n.* (OTA 37110); upper Dart Valley, 1219 m, 26 Jan 1968, *A. Mark & M.L. Burke s.n.* (CHR 619786); upper Rastus Burn, Remarkables Range, 1540 m, 23 Jan 2009, *J. Lord s.n.* (OTA 61590); upper Shotover R[iver], 1219 m, 4 Jan 1949, *D. McQueen s.n.* (WELT SP046811); W[est] of Clutha Valley, Old Man Range, 1524 m, Jan 1920, *A. Wall s.n.* (WELT SP045773); Walter Peak, 1433 m, 28 Apr 1921, *L. Cockayne s.n.* (WELT SP054453); Wanaka district, collector unknown (WELT SP044580, SP046912); Wanaka District, Three Kings [an early name for Treble Cone], *J. Buchanan s.n.* (WELT SP046911); Young Valley, lower (south side), 1584 m, 2 Feb 1969, *A. Mark s.n.* (OTA 23440). **Southland.** Above Lake Scott, Garvie Mts., 1770 m, 14 Feb 1971, *A. Mark s.n.* (OTA 32280); Blue Lake, between Garvie Mts. and Waikaia River, Southland, 1219 m, 30 Dec 1975, *J.M. Chaffey s.n.* (CHR 307669); East Dome, 1371 m, *H.H. Allan s.n.* (CHR 6310); Eyre Creek, upper, 1158 m, 26 Dec 1970, *A. Mark s.n.* (OTA 30429); Eyre Mts., 1219 m, *J. Speden s.n.* (AK 9731, 9732); Eyre Mts., upper Eyre Creek, 1160 m, 26 Nov 1970, *A. Mark s.n.* (OTA 30427); Eyre Mts., upper Little Jungle Creek, 1300 m, 6 Jan 1987, *A. Mark & K. Dickinson s.n.* (OTA 44711); Eyre Mts., spur south side, 1320 m, 8 Jan 1987, *B.D. Rance s.n.* (CHR 455523); Eyre Peak, ridge leading from hut, Mataura Valley, 1219 m, 22 Nov 1972, *D.R. Given 72975* (CHR 233176); Garvie Mts., 1524 m, 11 Jan 1933, *E.M. Heine s.n.* (WELT SP046598); *ibid.*, 11 Jan 1939, *E.M. Heine s.n.* (WELT SP046998); *ibid.*, 1770 m, 7 Jan 1964, *A. Mark s.n.* (OTA 10371); Jane Peak, Eyre Mts., 1370 m, 30 Mar 1975, *A. Mark s.n.* (OTA 36301); Livingston Range, head of Windon, 24 Feb 1974, *C.D. Meurk s.n.* (OTA 34278); Livingstone Mtns., Mt Cerberna, 1500 m, 6 Dec 1986, *A. Mark & K. Dickinson s.n.* (OTA 44712); Livingstone Mts., West Burn, 1450 m, 28 Mar 1975, *A. Mark s.n.* (OTA 35223); Mid Dome, 1350 m, 10 Dec 1986, *K. Dickinson & A. Mark s.n.* (OTA 44187); Mt Dick, 24 Mar 1921, *L. Cockayne s.n.* (AK 34927); Mt Tennyson, west Garvies, slopes facing west, 17 Feb 1966, *D.R. Given 66204* (CHR 650490); rock bluff, summit Eyre Peak, *D.R. Given 72914* (CHR 233129); Takitimu Mts., 1828 m, Feb 1920, *A. Wall s.n.* (CHR 290017); Trig 0 southern Garvie Mts., to north of Steeple, 1230 m, 22 Feb 1987, *K. Dickinson & A. Mark s.n.* (OTA 44188); western catchment to Mt. Whitecomb, 1350 m, 22 Dec 1985, *B.D. Rance s.n.* (CHR 431410). **District unknown.** *Sine loco*, collector unknown (AK 34936); *ibid.*, *L. Cockayne s.n.* (WELT SP046499); *ibid.*, 27 Dec 1968, *D.J. Lyttle s.n.* (OTA 60404); Southern Alps, *J. von Haast s.n.* (WELT SP046564); *ibid.*, *T. Kirk s.n.* (AK 11732, WELT SP046566).

- 15. CELMISIA WALKERI** Kirk, Trans. & Proc. New Zealand Inst. 9: 549. 1877. **TYPE: NEW ZEALAND.** South Island, dividing range above Lake Harris, 3500 ft, Otago, *T. Kirk s.n.* (lectotype: WELT SP45260! designated by Saldivia 2023: 42).

Decumbent, sprawling, loosely branched **shrub**, forming loose cushions or extended patches, up to 30–35 cm tall. **Leaves** imbricated along the branches, new leaves straight upwards but soon becoming patent, sessile; lamina linear, coriaceous, (–10)15–40(–50) × (–2.5)3–5(–6) mm, apex angle acute or obtuse, apex shape straight, often mucronate, base truncate; adaxial surface viscid, glabrous, green, lustrous, midvein conspicuous, slightly raised, and two raised secondary veins running on each side of the midvein following the leaf margin (when dry, the secondary veins and some veins of third-order, are conspicuously raised and contrasting with the lamina); abaxial surface densely covered (blade not visible) with a thick, white indumentum layer of flagellate aseptate trichomes, midvein raised, conspicuous, secondary veins hidden beneath the tomentum, margin with 3–4 distant inconspicuous teeth along each side of the lamina, and a terminal one at the end of the midvein, flat; sheath parallel-sided, glabrous, mostly white-hyaline to green towards the top, abaxial surface often purple-dotted and purplish towards the base; venation parallel, multi-nerved. **Peduncle** 10–15 cm long, covered with biseriate stalked glandular trichomes, green, with few foliaceous bracts 7–13 mm long, linear-deltoid, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 9–12 × 5–7 mm. **Phyllaries** arranged in 5–6 series gradually longer from the outer to the inner ones, appressed at anthesis, or the outer ones slightly spread, covered with biseriate stalked glandular trichomes, linear-lanceolate, apex angle acute, straight to acuminate, green to purplish towards the base, outer ones 5–6 × 0.9–1.2 mm,

inner ones 8–10(–11) × 0.8–1.2 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 25–30, arranged in 1–2 rows, white. **Disc florets** 30–35, tube 4–5 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2 mm long; appendage 0.4–0.5 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 150–200 µm long; filament collar same width as the filament; style branches 1.5–1.8 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 30–40 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes. Fig. 29.

Distribution: South Island. West Coast, Canterbury, Otago, and Southland. Widespread along the mountains, especially in the high rainfall areas close to the main divide, from the Arthur's Pass area in the north to the southernmost peaks of Southland in the south (Fig. 28).

Habitat: Subalpine to Low Alpine (800–1700 m). Common in snow tussock-herbfield, and rocky outcrops and scree at higher altitudes.

Etymology: After Captain J. Campbell Walker, companion of T. Kirk when he collected the type specimens.

Other descriptions: Kirk (1899: 280–281), Cheeseman (1906: 300; 1925: 936), Allan (1961: 616).

Illustrations: Kirk (1877, loc. cit., pl. XXX), Mark & Adams (1995: plate 55).

Additional collections. SOUTH ISLAND. West Coast. Alex Knob, near summit, 19 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005783); Arthurs Pass National Park, Kellys Hill, track to Carroll Hut, 14 Jan 1979, *B. Sneddon s.n.* (WELT SP091102); Axis spur, Dec 1916, *J. Holloway s.n.* (WELT SP004521); Drake Range, Te nahi Valley Waitoto River, 1158 m, 24 Jan 1969, *A. Mark s.n.* (OTA 24230); Five Finger Range, Joe R[iver], 1066 m, 19 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 219153); *Ibid.*, Joe Valley, 1158 m, 19 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21803); Franz Josef Glacier, Alex Knob, 1290 m, 1 Jan 1954, *K.M. Wood s.n.* (AK 32573); Haast Pass, *D. Poppelwell s.n.* (WELT SP004524); Kelly's Hill, 1006 m, 22 Nov 1966, *W. Burke s.n.* (WELT SP096263); Mt Barron, 914 m, *L. Cockayne s.n.* (WELT SP004520); Mt Brewster Track, 1405 m, 19 Feb 2017, *P. Saldivia 2556* (OTA); Mt Molke [Moltke], 1067 m, 29 Dec 1931, *E.M. Heine s.n.* (WELT SP004517); Mt Warren, Warren spur, Turnbull Valley, 1005 m, 28 Jan 1969, *A. Mark s.n.* (OTA 23454); Ngatau River Br. Okuru Valley, 1097 m, 16 Jan 1969, *A. Mark s.n.* (OTA 23463); Otira Track, 1097 m, 14 Feb 2018, *P. Saldivia 2600* (OTA); Rampart ridge, lower, Waitoto Valley, 1341 m, 25 Jan 1969, *A. Mark s.n.* (OTA 23365); S Westland, between Paringa and Moeraki Rivers, 1050 m, 1 Jan 1985, *P.J. Waddell s.n.* (AK 275306); Te Naihi River, upper, Waitoto Valley, 1097 m, 23 Jan 1969, *A. Mark s.n.* (OTA 23420); Williamson Flat, east of Anawhata River, 1158 m, 16 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21866); Wills River, upper, Haast Range, 975 m, 5 Feb 1969, *A. Mark s.n.* (OTA 23460). **Canterbury.** Ahuriri River, upper, 920 m, 1 Apr 1972, *A. Mark s.n.* (OTA 60665); Arthur's Pass, 900 m, Jan 1880, *T.F. Cheeseman s.n.* (AK 9689); *ibid.*, *T. Cheeseman s.n.* (WELT SP004527/B); *ibid.*, 1 Jan 1956, *M.E. Sexton s.n.* (AK 248908); *ibid.*, Jan 1880, *T.F. Cheeseman s.n.* (AK 9688); *ibid.*, 914 m, *T. Cheeseman s.n.* (WELT SP004529); *ibid.*, 1200 m, 20 Jan 1956, *P. Hynes s.n.* (AK 43907, 43908); Blimit, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP005787); Cass River, upper south aspect, 1371 m, 27 May 1969, *C.L. Powell s.n.* (OTA 26257); Copland Pass, west side, Mt. Cook district, 1371 m, 22 Feb 1951, *G.T.S. Baylis s.n.* (OTA 2464); Craigieburn Mts. [Range], 10 Mar 1905, *L. Cockayne s.n.* (WELT SP004518); Hooker Valley, upper, 1066 m, 23 May 1966, *OUSA s.n.* (OTA 14348); Lake Ohau, *J. Buchanan s.n.* (WELT SP046906); *ibid.*, ridge between Nth [north branch] and Sth [South branch] Temple Creek, 1067 m, Jan 1969, *A. McEwen s.n.* (WELT SP096260); Mt Cook, *collector unknown* (WELT SP046537); *ibid.*, Sealy Lakes, 27 Dec 1955, *K.M. Wood s.n.* (AK 48822); Mt Cook

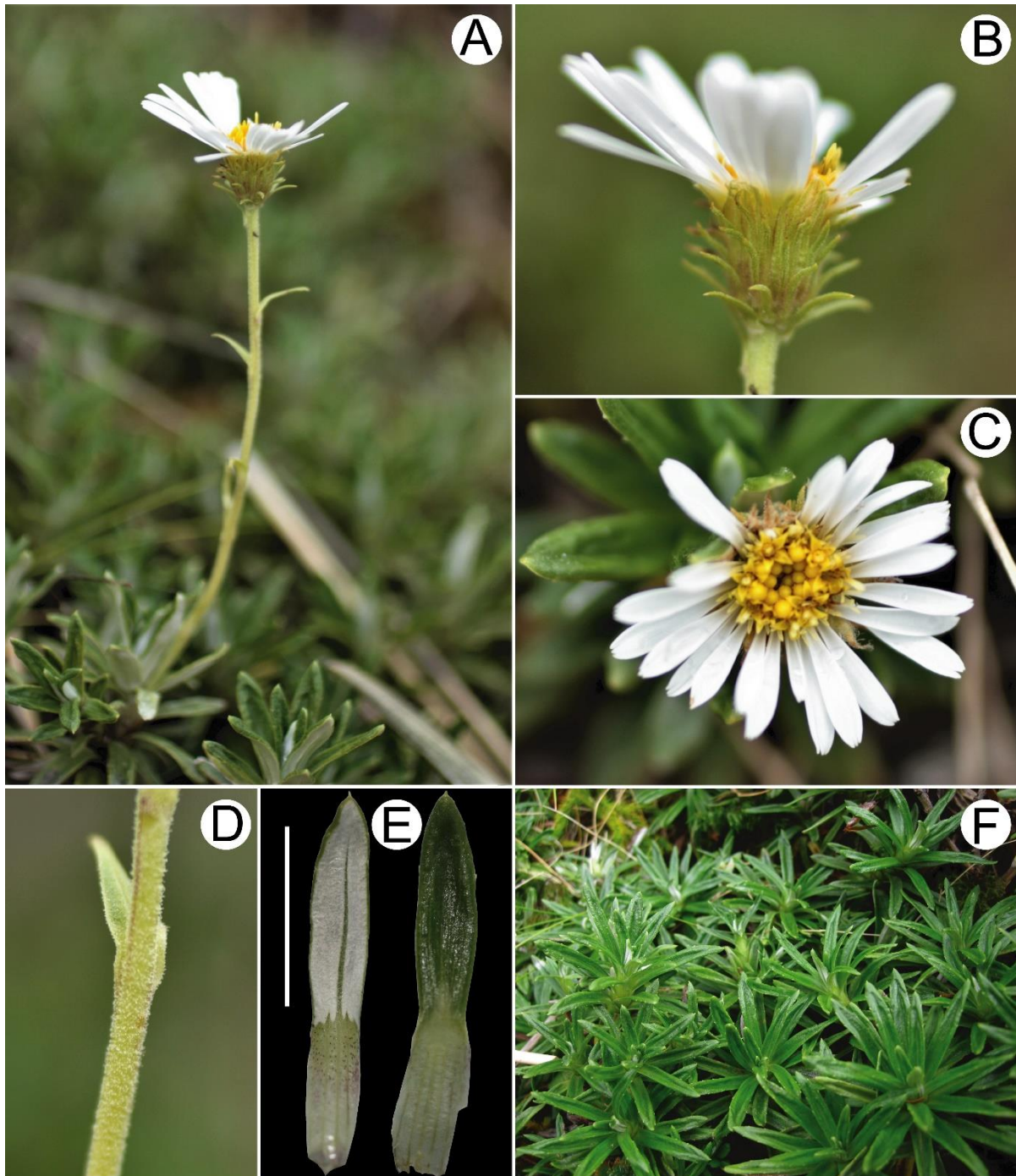


Figure 29. *C. walkeri*: A. Habit, floriferous branch; B. Capitulum (lateral view); C. Capitulum (top view); D. Peduncle densely covered by glandular trichomes; E. Abaxial (left) and adaxial (right) surfaces of a leaf; F. Foliage. A–E from OTA (*P. Saldivia* 2556, Mt Brewster, West Coast). F by Duncan Nicol at Otira Valley (Canterbury).

National Park, Stocking Stream, 900 m, 23 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122056); Mts. above Arthur's Pass, 1372 m, Jan 1880, *T. Cheeseman s.n.* (WELT SP004516); near Mt Cook, Sealy [Sealy] Range, 14 Feb 1911, *D. Petrie s.n.* (WELT SP096262); Sealy Range, *D. Petrie s.n.* (WELT SP046755); south of upper part of Ohau Ski Field, 1620 m, 4 Jan 2004, *E.K. Cameron 12110* (AK 354929); Twin Stream, Ben Ohau Range, 1493 m, 20 Feb 1970, *A. Mark s.n.* (OTA 28281); upper

Bealey, 9 Jan 1931, *L.B. Moore & L.M. Cranwell s.n.* (AK 34918). **Otago.** Aspinall Peak, east Matukituki, 1158 m, 16 Jan 1968, *C.L. Powell s.n.* (OTA 28100); Black Umbrella Range, ridge, Crown Rock to Stronach Hill, 1220 m, 24 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 43036); cultivated in Dunedin, Mr Matthews' garden, *H.B. Matthews s.n.* (AK 9683, 9684); Gem Lake, cirque, 1320 m, 14 Dec 1985, *K. Dickinson & A. Mark s.n.* (OTA 43035); hill opposite Mt Aspiring, 900 m, *D. Petrie s.n.* (AK 9687); Humbolt [Humboldt] Mts., above L. [Lake] McKenzie [Mackenzie], 1219 m, 26 Feb 1967, *B. Sneddon s.n.* (WELT SP091154); in neighborhood of Lake Harris saddle, *J. Thomson & G. Simpson s.n.* (WELT SP004519); Lake Harris, above, 1371 m, *T. Kirk s.n.* (OTA 16423); Margaret Burn, Barrier Range, 1280 m, 25 Jan 1968, *A. Mark & P.M.F. Smith s.n.* (OTA 20756); McKerrow Range, Makarora Valley, 1219 m, 4 Feb 1969, *collector unknown* (OTA 23568); Mt Alta Range, W part., close to Mt Aspiring, N.W. of Lake Wanaka, *D. Petrie s.n.* (WELT SP004528); Mt Whitecomb, eastern catchment, 1320 m, 21 Dec 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 43037); Mts. above Lake Harris, *T. Kirk s.n.* (WELT SP004530); *ibid.*, 11 Jan 1877, *T. Kirk* 722 (WELT SP003287); near Lake Harris, *T. Kirk s.n.* (WELT SP004548); Ocean Peak, Harris saddle, 1432 m, 1 May 1963, *A. Mark s.n.* (OTA 7264); Toward Lake Harris, 1219 m, 7 May 1921, *L. Cockayne s.n.* (WELT SP004522); upper Young River South branch, Makarora, 1280 m, 31 Jan 1969, *A. Mark s.n.* (OTA 23458); Young Range, Makarora Valley, 1280 m, 9 Feb 1969, *A. Mark s.n.* (OTA 23502); Young Valley, lower north side, 1188 m, 3 Feb 1969, *A. Mark s.n.* (OTA 23565). **Southland.** Bligh Sound, Turnback Comb, 944 m, 15 Jan 1970, *A. Mark s.n.* (OTA 28618); Caswell Sd [Sound], Stillwater to Leslie flat, 28 Mar 1949, *W.R.B. Oliver s.n.* (WELT SP005782); Chalky Inlet, *T. Kirk s.n.* (WELT SP004549); Eyre Creek, upper, 1158 m, 26 Nov 1970, *A. Mark s.n.* (OTA 30410); Eyre Mts., *J. Speden s.n.* (AK 9690, WELT SP004527/A); Eyre Mts., Cromel - Irthing ridge, 1067 m, 4 Feb 1969, *A. McEwen s.n.* (WELT SP096261); Fiordland, McKinnon [Mackinnon] Pass, 22 Feb 1967, *B. Sneddon s.n.* (WELT SP091155); Homer saddle, 26 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP045770); Homer to Gertrude saddle, Apr 1954, *O. Sansom s.n.* (WELT SP005781); Homer Tunnel, Fiordland, 929 m, 23 Jan 1962, *G.T.S. Baylis s.n.* (OTA 6961); Lake Thomson, Fiordland, 944 m, 22 May 1962, *A. Mark s.n.* (OTA 7048); Leslie tops, Caswell Sd [Sound], 29 Mar 1949, *W.R.B. Oliver s.n.* (WELT SP005780); Livingston Range, east slope, 1370 m, 29 Mar 1975, *A. Mark s.n.* (OTA 35143); lower Hollyford, Gertrude cirque, 1350 m, 15 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 126973); McKinnons Pass, *F.G. Gibbs* 532 (AK 9686); Milford Track, Arthur Valley side of McKinnon Pass, 1020 m, 6 Feb 1976, *J.H. Goulding* 824 (AK 139116); Mt Burns, 1219 m, 22 May 1967, *J. Rowley & J. Wells s.n.* (OTA 18910); *ibid.*, 1524 m, 2 Feb 1978, *collector unknown* (OTA 64533); Mt Hodges, Dusky Sound, 1158 m, 16 Feb 1969, *V.J. Lyttle s.n.* (OTA 34102); Mt Tutoko, saddle, 1066 m, 20 Feb 1967, *J. Rowley & J. Wells s.n.* (OTA 18234); Murchison Mts, Takahe Valley, Dec 1949, *R.A. Falla s.n.* (WELT SP045768); Murchison Mts., above Lake Eyles, 1070 m, 11 Feb 1973, *A. Mark s.n.* (OTA 33947); Murchison Range, Mystery Burn, Mar 1951, *F. Newcombe s.n.* (WELT SP064716); near Homer Tunnel, 21 Apr 1905, *O. Fletcher s.n.* (AK 263867); Old Man Range, south cirque above Campbell Creek, 1554 m, 23 Mar 1973, *C.D. Meurk s.n.* (OTA 34231); Park Pass, Rockburn Valley, 1249 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20601); S. of Lake Hauroto [Hauroko], The Hump, Mar 1910, *J. Crosby-Smith s.n.* (WELT SP004526/A); Simonin Pass, Red Mts., 1036 m, 23 Jan 1975, *W. Lee & A. Mark s.n.* (OTA 35520); Stillwater Valley, upper, 1066 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30508); Takahe Valley, 914 m, 1 Feb 1956, *G.T.S. Baylis s.n.* (OTA 3677, 60664); *ibid.*, 2 May 1905, *J. Sorensen s.n.* (WELT SP045769, SP046656, WELT SP046657); Takahe Valley, cirque, 18 Feb 1952, *W.R.B. Oliver s.n.* (WELT SP005786); Takitimu Mts., *J. Crosby-Smith s.n.* (WELT SP004526/B); *ibid.*, 1200 m, 1 Feb 1920, *A. Wall s.n.* (AK 9685); Takitimu Mts., Corner Peaks, 853 m, 16 Dec 1972, *C.D. Meurk s.n.* (OTA 34615).

- 16. CELMISIA PROREPENS** Petrie, *Trans. & Proc. New Zealand Inst.* 14: 326. 1886 (1887). **TYPE:** NEW ZEALAND. South Island, Old Man Range, Otago, 4500 ft, *D. Petrie s.n.* (lectotype: AK 9762! designated by Saldivia 2023: 41).

Decumbent, sometimes creeping, loosely branched **shrub**, forming patches or loose cushions up to 10 cm tall. **Leaves** clustered at the distal part of the branches, which are covered by decaying leaves and sheaths towards to base, sessile; lamina oblanceolate, subcoriaceous, 40–100 × 12–20 mm, apex angle acute, apex shape straight or less frequently rounded, base truncate, attenuate; adaxial surface strongly longitudinally furrowed and wrinkled, glabrous, green, midvein conspicuous, wider at the base, yellowish, contrasting with the lamina, slightly impressed, and two raised secondary veins running on each side of the midvein following the leaf margin; abaxial surface glabrous or sometimes covered with a thin (epidermis visible) white layer of arachnoid indumentum of flagellate aseptate trichomes, midvein and secondary veins raised, conspicuous; margin conspicuously serrate, with a deep rounded sinus, plicate and often shallowly undulate, slightly revolute; sheath parallel-sided, glabrous, mostly purple, sometimes green-yellowish towards the top; venation parallel, multi-nerved. **Peduncle** 15–20(–25) cm long, viscid, purple, with few broad foliaceous bracts 20–30(–35) × 2–2.3 mm, linear-deltoid, apex angle acute, apex shape straight, the upper 2–3 subtending the capitulum. **Involucre** short-cylindrical at anthesis, 12–16 × 9–15 mm. **Phyllaries** arranged in 6–7 series gradually longer from the outer to the inner ones, outer phyllaries spreading to slightly recurved from the midpoint, middle phyllaries slightly recurved and spread, and inner ones appressed at anthesis, viscid, linear-lanceolate, apex angle acute, straight to acuminate, green or less frequently green-purplish, outer ones 7–9 × 1.4–2 mm, inner ones 12–16 × 1–1.4 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 30–50, arranged in 2–3 rows, white. **Disc florets** 60–80, tube 5.5–6 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2.2 mm long, appendage 0.4 mm long, deltoid, apex rounded, bases tailed 200 µm long, filament collar same width or slightly wider than the filament; style branches 1.3 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.5 mm long, apical papillae 20–30 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–6 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes. Fig. 30.

Distribution: South Island. Restricted to south-central Otago and northern Southland west of Fiordland (Fig. 31).

Habitat: Subalpine to high alpine (600–1800 m). Occurring preferentially in the margin of snowbanks and wet areas in snow tussock grassland.

Etymology: Refers to the creeping habit.

Other descriptions: Kirk (1899: 283), Cheeseman (1906: 303; 1925: 941–942), Allan (1961: 629).

Illustrations: Mark & Adams (1995: plate 56).

Additional collections. SOUTH ISLAND. Otago. [Cultivated] plant from Old Man Range, Nov 1892, *D. Petrie s.n.* (WELT SP047012); 48 km NNE of Lumsden, Hector Range, 1050 m, 24 Feb 1962, *R & E.F. Melville 6507 & H.E. Conner s.n.* (AK 156328); Ben Nevis, Hector Mts., 1828 m, 22 Feb 1965, *A. Mark & J. Wells s.n.* (OTA 12931); Gem Lake, cirque, 1350 m, 10 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 42784); ridge above Gem Lake, 1370 m, 18 Dec 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 43041); Lake Wakatipu, Walter Peak, 1911, *W. Willcox s.n.* (WELT SP047010); Lammerlaw Range, 1070 m, 3 Dec 1971, *A. Mark s.n.* (OTA 33968); *ibid.*, 1200 m, 5 Feb 1974, *D. Holdsworth s.n.* (OTA 38748); Lammerlaws, 1200 m, 5 Feb 1974, *D. Holdsworth s.n.* (OTA 38910); Mt Benger, Old Man Range, 1066 m, 2 Dec 1965, *A. Mark s.n.* (OTA 13656); Mt Maungatua, 3 Mar 1973, *A. Gordon s.n.* (OTA 36411); *ibid.*, 701 m, 13 Dec 1953, *A. Mark s.n.* (OTA 3252); Nardoo Stream, Lammerlaw Range, 700 m, 26 Nov 1984, *A. Mark s.n.* (OTA 41617); plants from Old Man Range grown in Dunedin, *D. Petrie s.n.* (WELT SP2151); Old Man Range, 1549 m, 15 Jan 2017, *P. Saldivia 2530* (OTA); *ibid.*, 1592 m, 15 Jan 2017, *P. Saldivia 2531* (OTA); *ibid.*, 1219–1524 m, *D.*

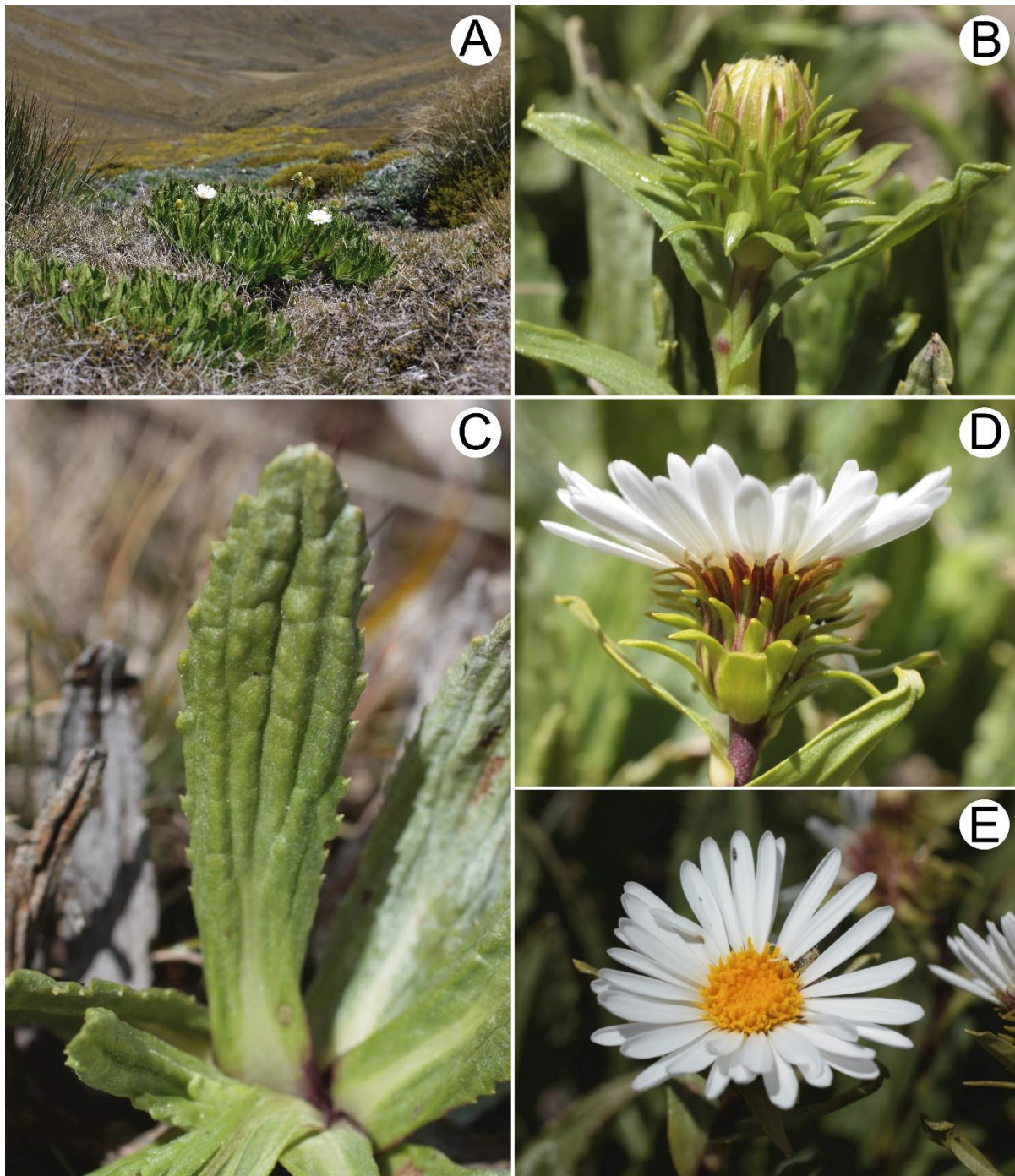


Figure 30. *C. prorepens*: A. Habit; B. Involucre; C. Leaf (adaxial surface); D. Capitulum (lateral view); E. Capitulum (top view). A, B, D, E from OTA (*P. Saldivia* 2531, The Old Man Range, Central Otago). C from OTA (*P. Saldivia* 2530, The Old Man Range).

Petrie s.n. (WELT SP002150); Rock and Pillar, 1158 m, *D. Petrie s.n.* (WELT SP046846); Rock and Pillar Range, 23 Mar 1947, *G.T.S. Baylis s.n.* (OTA 2488); *ibid.*, 1127 m, 20 Apr 1969, *C. Powell s.n.* (OTA 28127); *ibid.*, 1200 m, *A.J. Boise s.n.* (OTA 36446); *ibid.*, 1219 m, Nov 1892, *D. Petrie s.n.* (WELT SP002149, SP046845, WELT SP047009); *ibid.*, 1260 m, 1 Feb 1979, *J. Jallot s.n.* (OTA 37812); Shingle Creek, Old Man Range, 1310 m, 13 Jan 1959, *A. Mark s.n.* (OTA 6297); top of Rock and Pillar Range, 1341 m, Nov 1892, *D. Petrie s.n.* (AK 9761); Walter Peak, 28 Apr 1921, *L. Cockayne*

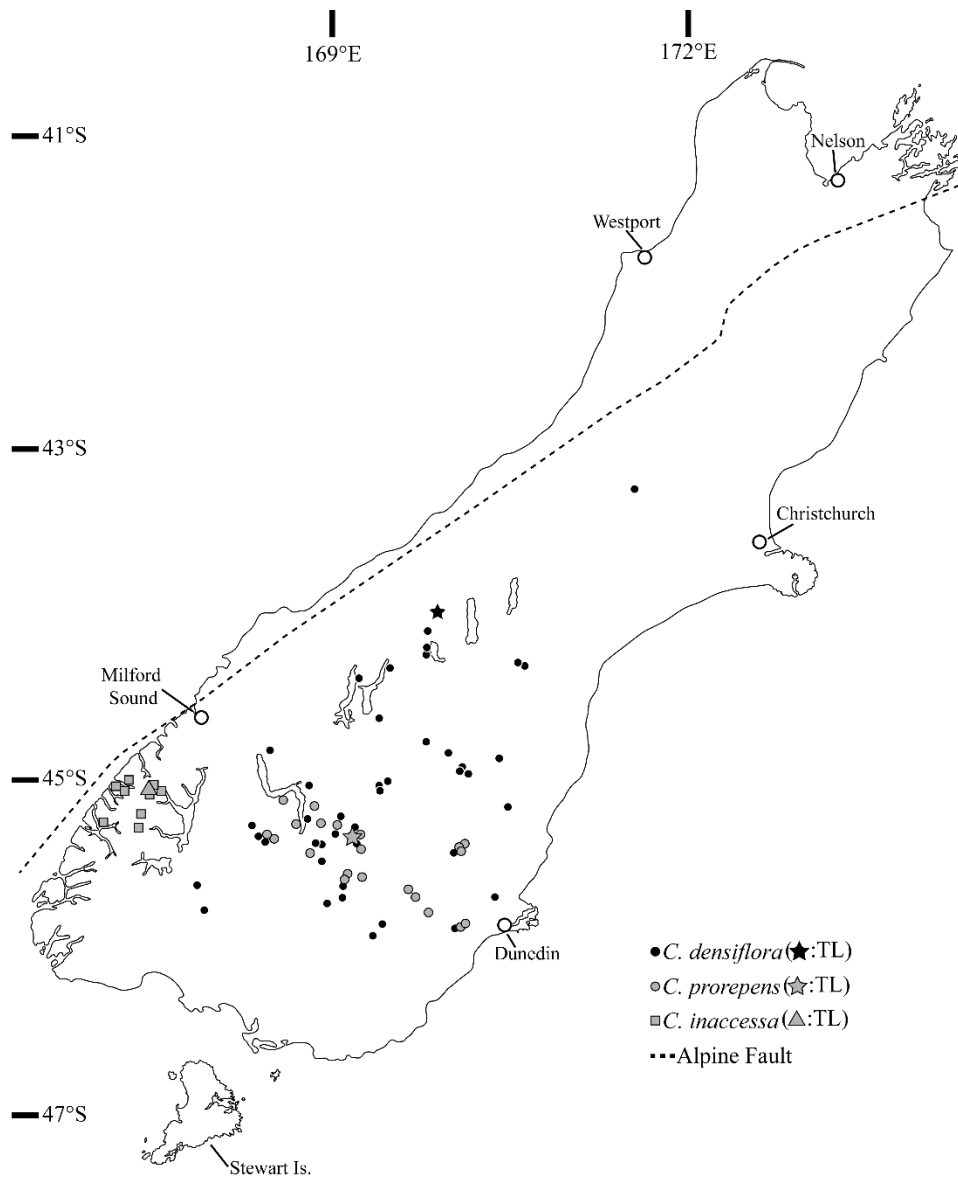


Figure 31. Distribution map of *C. prorepens*, *C. densiflora*, and *C. inaccessa* in the South Island of New Zealand. TL: Type locality.

s.n. (WELT SP047011). **Southland.** Eyre Mts., upper Matoua River, 800 m, 23 Nov 1972, *A. Mark s.n.* (OTA 33062); Eyre Peak, Main ridge to Eyre Peak, 620 m, 9 Jan 1987, *K. Dickinson & A. Mark s.n.* (OTA 44718); Garvie Mts., Jan 1921, *J. Speden s.n.* (AK 9763); Hummock Peak, Eyre Mts., 1158 m, *A. Mark s.n.* (OTA 27281); Mt Dick, 23 Apr 1921, *L. Cockayne s.n.* (AK 34957); *ibid.*, 3 Mar 1921, *L. Cockayne s.n.* (AK 34958); Mt Tennyson, Garvie Mts., 975 m, 9 Jan 1964, *A. Mark s.n.* (OTA 8799); Parasol Creek, east Umbrella Mts., 970 m, 24 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 43905); Umbrella Mts., 1310 m, 15 Dec 1971, *A. Mark s.n.* (OTA 32274). **District unknown.** Cultivated, Nov 1889, *D. Petrie s.n.* (WELT SP046844).

17. CELMISIA DENSIFLORA Hook.f., *Handb. N. Zealand Fl.*: 130. 1864. **TYPE: NEW ZEALAND.** Middle [South] Island, Valley of Hopkins, sides of mountains, 2200–5000 ft, 1863, *Haast 143* (first-step lectotype: K 882073 [image!] ex Herbarium Hookerianum designated by Allan 1961: 629; second-step lectotype: left-hand capitulum excluded, designated by Saldivia 2023: 36).

Decumbent loosely branched **shrub**, often developing stolons, forming patches or loose cushions up to 20 cm tall. **Leaves** clustered at the distal part of the branches, which are covered by decaying leaves and sheaths towards the base, sessile; lamina oblanceolate, coriaceous, thick, 60–120 × 15–25 mm, apex angle acute, apex shape straight or rarely rounded, base truncate, attenuate; adaxial surface often slightly longitudinally furrowed and wrinkled, glabrous, green, lustrous, rarely glaucous, midvein conspicuous, wider at the base, whitish to yellowish contrasting with the lamina, slightly impressed, and two raised secondary veins running on each side of the midvein following the leaf margin; abaxial surface densely covered (blade not visible) with a thick, white indumentum layer of flagellate aseptate trichomes, and sparse non-stalked glandular trichomes beneath, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin conspicuously serrate, with a deep rounded sinus, often plicate and undulate, or rarely flat; sheath parallel-sided, glabrous, mostly white-hyaline to green-yellowish, rarely purple towards the top, venation parallel, multi-nerved. **Peduncle** 12–25(–40) cm long, viscid, purple (rarely green-purplish), with few foliaceous bracts 15–35 mm long, linear-deltoid, apex angle acute, apex shape straight. **Involucre** short-cylindrical at anthesis, 13–18 × 12–17 mm. **Phyllaries** arranged in 9–10 series gradually longer from the outer to the inner ones, strongly recurved from the midpoint (especially the outer ones), rarely appressed at anthesis, viscid, linear-lanceolate, apex angle acute, straight to acuminate, green or less frequently green-purplish; outer ones 8–10 × 0.9–1 mm; inner ones 12–15 × 0.8–1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 40–50, arranged in 2–3 rows, white. **Disc florets** 80–100, tube 5.5–6 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2.5 mm long; appendage 0.4 mm long, deltoid, apex straight or rounded, bases tailed 200 µm long, filament collar same width or slightly wider than the filament; style branches ca. 1.3 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 20–30 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and diminutive outer setae; bristles irregular in length, 4.5–6 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes. Fig. 32.

Distribution: South Island. Central-west Canterbury, Otago, and east Southland, east of the main divide (Fig. 31).

Habitat: Subalpine to high alpine (500–1700 m). Mainly in well-drained drier areas, along rocky outcrops, tussock-grassland and herbfield, and uncommon in fellfield.

Etymology: Refers to the many florets per capitulum.

Other descriptions: Kirk (1899: 283), Cheeseman (1906: 303–304; 1925: 937–938), Allan (1961: 629).

Illustrations: Mark & Adams (1995: plate 56).

Additional collections. SOUTH ISLAND. Canterbury. Hakataramea Pass Road, Dalgety Stream, 860 m, 19 Mar 2004, *P.J. de Lange* 5955 & *D.A. Norton* s.n. (AK 286051); Ida Range, Mt Ida, Feb 1922, *W. Martin* s.n. (WELT SP046940); Kurow Hill (Mt Kurow), 1371 m, *H.B. Matthews* s.n. (AK 9705); Lake Ohau, 762 m, 20 May 1958, *D. Scott* s.n. (OTA 4633); *ibid.*, 838 m, 13 Mar 1960, *E.B. Fitzgerald* s.n. (OTA 6350); Lake Ohau District, *J. von Haast* s.n. (WELT SP046853); Lake Ohau, ridge between Nth [north branch] and Sth [South branch] Temple Creek, 1067 m, Jan 1969, *A. McEwen* s.n. (WELT SP095832); Mt Dalgety Range, 1066 m, 3 Jan 1969, *A. Mark* s.n. (OTA 26390); Mt Ida, 762 m, *D. Petrie* s.n. (AK 9700, 9701); *ibid.*, 610–914 m, *D. Petrie* s.n. (WELT SP046851); *ibid.*, near Arch, near fan, 4 Mar 1914, *L. Cockayne* s.n. (AK 34920); Mt Tennyson, 975 m, 9 Jan 1964, *A. Mark* s.n. (OTA 8798); Mts. above Lake Ohau, Jan 1949, *H. Talbot* s.n. (WELT SP005779); Ohau Range, 1158 m, 3 Jan 1969, *A. Mark* s.n. (OTA 25681). **Otago.** Sine loco, *J. Buchanan* s.n. (WELT

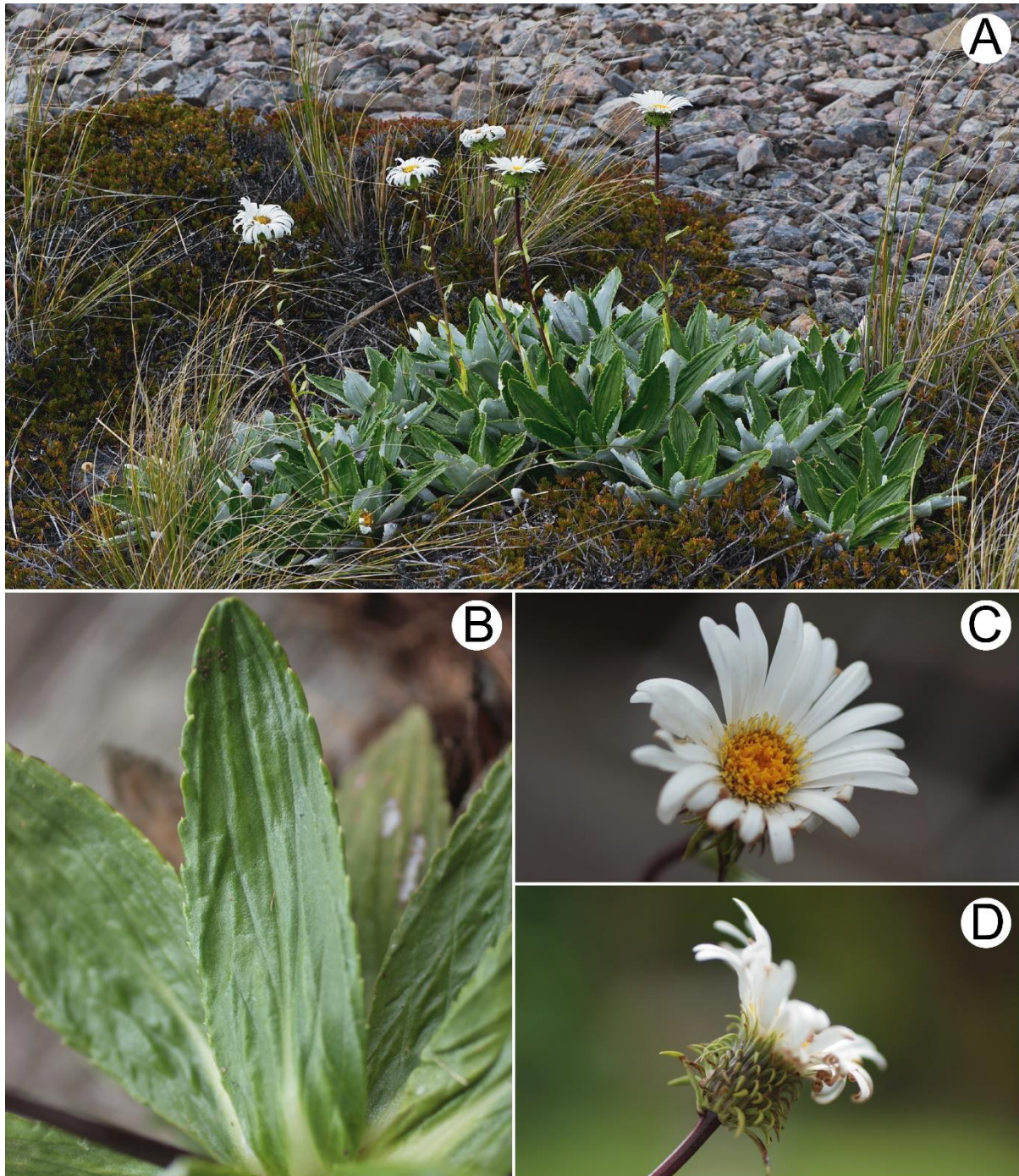


Figure 32. *C. densiflora*: A. Habit; B. Leaf (adaxial surface); C. Capitulum (top view); D. Capitulum (lateral view). B, D, E from OTA (*P. Saldivia* 2526, Maungatua, Otago). A by David Lyttle at Hawkdun Range, northern Otago.

SP046849); Black Peak, *J. Buchanan s.n.* (WELT SP044645); Blue Mts., *H.B. Matthews s.n.* (AK 9703, 9704); *ibid.*, 914 m, 31 Dec 1964, *A. Mark s.n.* (OTA 9905); *ibid.*, north end, 914 m, 31 Dec 1964, *A. Mark s.n.* (OTA 9904); Camp Creek, Lake Wanaka, 1066 m, 25 Mar 1951, *P. Wardle s.n.* (OTA 2460); Campbell Creek (Old Man Range), near S.U. rig, south slope, 1280 m, 2 Feb 1973, *C.D. Meurk s.n.* (OTA 34264); Carrick Range, 1615 m, 22 Nov 1970, *A. Mark s.n.* (OTA 31022); Dunstan Mts., near summit, *L. Cockayne s.n.* (AK 34922, 34923, 34924); Gem Lake, ridge leading to above

gem lake, 1280 m, 11 Dec 1985, *K. Dickinson s.n.* (OTA 43048); Grandview Range, Hawea, 1432 m, 20 Jan 1960, *G.T.S. Baylis s.n.* (OTA 6363); Hawkdun Range, 1000 m, 24 Dec 2015, *P. Saldivia 2502* (OTA); *ibid.*, 1097 m, 19 Jan 1960, *A. Mark s.n.* (OTA 6314); Interior of Otago, 610–1219 m, *W. Martin s.n.* (WELT SP046939); Kakanui Range, Mt Dasher, E. side, 1150 m, 27 Jan 1990, *S. Scobie s.n.* (WELT SP095831); Lamb Hill, Hindon, 731 m, 15 Mar 1952, *G.T.S. Baylis s.n.* (OTA 2459); Maungatua, 732 m, 8 Jan 2017, *P. Saldivia 2526* (OTA); Mt Maungatua, 701 m, 13 Dec 1953, *A. Mark s.n.* (OTA 3253); Old Man Range, *D. Petrie s.n.* (WELT SP046852); *ibid.*, c. 3.5 miles south of Obelisk, 1524 m, 11 Jan 1979, *B. Sneddon s.n.* (WELT SP091137); Remarkables, western face, 1371 m, 2 May 1971, *C.D. Meurk s.n.* (OTA 34684); Rock and Pillar Range, west, spur between heads of rock and pillar creek and Cambridge creek, 1310 m, 23 Feb 1973, *C.D. Meurk s.n.* (OTA 34362); Saint Bathans Range, 1676 m, 10 Jan 1972, *C.D. Meurk s.n.* (OTA 34727); Staircase Creek, Hector Mts., 609 m, 22 Feb 1965, *A. Mark & J. Wells s.n.* (OTA 12957); Stronach Hill, near trig, east Umbrella, 970 m, 9 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 42789); upper Hawea, Mt Arnould [Arnold], 1829 m, *D. Petrie s.n.* (WELT SP046679); west side of Fraser Basin, Fraser River, Old Man Range, 1600 m, 20 Jan 1959, *A. Mark s.n.* (OTA 6310). **Southland.** Awatere Station, Southwest Umbrella Ecological District, 660 m, 4 Mar 1986, *K. Dickinson & B.D. Rance s.n.* (OTA 43049); *ibid.*, 670 m, 22 Nov 1985, *K. Dickinson & B.D. Rance s.n.* (OTA 43934); Excelsior Peak, 1310 m, 2 Feb 1971, *A. Mark s.n.* (OTA 31438, 31439); Eyre Creek, upper, 762 m, 20 Nov 1969, *A. Mark s.n.* (OTA 26663); Eyre Mts., 623 m, 11 Feb 2017, *P. Saldivia 2547* (OTA); *ibid.*, upper Mataura Valley, 800 m, 23 Nov 1972, *A. Mark s.n.* (OTA 33042); Garvie Mts., 1372 m, Jan 1921, *J. Speden s.n.* (AK 9702); *ibid.*, 1524 m, 11 Jan 1934, *E.M. Heine s.n.* (WELT SP046850); *ibid.*, upper west Waikaia Valley, 1600 m, 7 Feb 1985, *A. Mark s.n.* (OTA 41619); Hummock Peak, Eyre Mts., 1158 m, 30 Dec 1969, *A. Mark s.n.* (OTA 27280); Parasol Creek, east Umbrella Mts., 970 m, 30 Jan 1986, *K. Dickinson & B.D. Rance s.n.* (OTA 43047); Takitimu foothills, 609 m, 7 Dec 1979, *J.F. West s.n.* (OTA 64519); Takitimu Mts., 975 m, 30 Dec 1912, *D. Petrie s.n.* (WELT SP046676). **District unknown.** Sine loco, *collector unknown* (AK 34921, OTA 17028); [Cultivated], Dunedin, Mr Matthews' garden, 15 Jan 1911, *D. Petrie s.n.* (WELT SP046678).

- 18. CELMISIA INACCESSA** Given, New Zealand J. Bot. 9(3): 526–529. 1971. **TYPE: NEW ZEALAND.** South Island, 'Waipiti Lake,' Barrier Peaks area between Doon and Stillwater Rivers, Fiordland, Jan 1970, *J. Anderson s.n.* (holotype: CHR 198268A!; isotypes: CHR 198268B!, CHR 198268C!).

Decumbent loosely branched **shrub**, forming loose cushions or patches (rarely mats) up to 20 cm tall. **Leaves** more or less clustered at the distal part of the branches, which are covered by decaying leaves and sheaths towards to base, sessile, straight upwards but soon becoming spreading; lamina oblanceolate to obovate, coriaceous, 20–60 × 10–20 mm, apex angle obtuse (rarely subacute), apex shape convex, mucronate, base truncate, attenuate; adaxial and abaxial surfaces glabrous except for a narrow and sometimes inconspicuous band of deciduous white hairs along the margin towards the apex, and isolated non-stalked glandular trichomes on the abaxial surface, green or glaucous, midvein and two parallel secondary veins on each side of the midvein, conspicuous, impressed in the adaxial surface, and raised in the abaxial surface; margin conspicuously serrate-crenate, with 9–16 distant teeth along the upper half of each side of the lamina, and a terminal one at the end of the midvein, flat; sheath parallel-sided, glabrous, mostly white-hyaline to green towards the top, venation parallel, multi-nerved. **Peduncle** 12–20 cm long, covered in biseriate stalked glandular trichomes, green, with several foliaceous bracts 20–35 × 6–11.5 mm, oblong to oblanceolate, apex angle obtuse or acute, apex shape convex or straight. **Involucre** cylindrical at anthesis, 14–16 × 9–11.5 mm. **Phyllaries** arranged in 4–5 series, subequal in length, appressed at anthesis (outer ones sometimes spread), densely covered in biseriate stalked glandular trichomes, linear-lanceolate, apex angle acute, subulate, acuminate, green, 10–15 × 1.5–1.9 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 35–40, arranged in 2–3 rows, white. **Disc florets** 50–60, tube 3.5–4.5 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae ca. 2 mm long; appendage 0.4

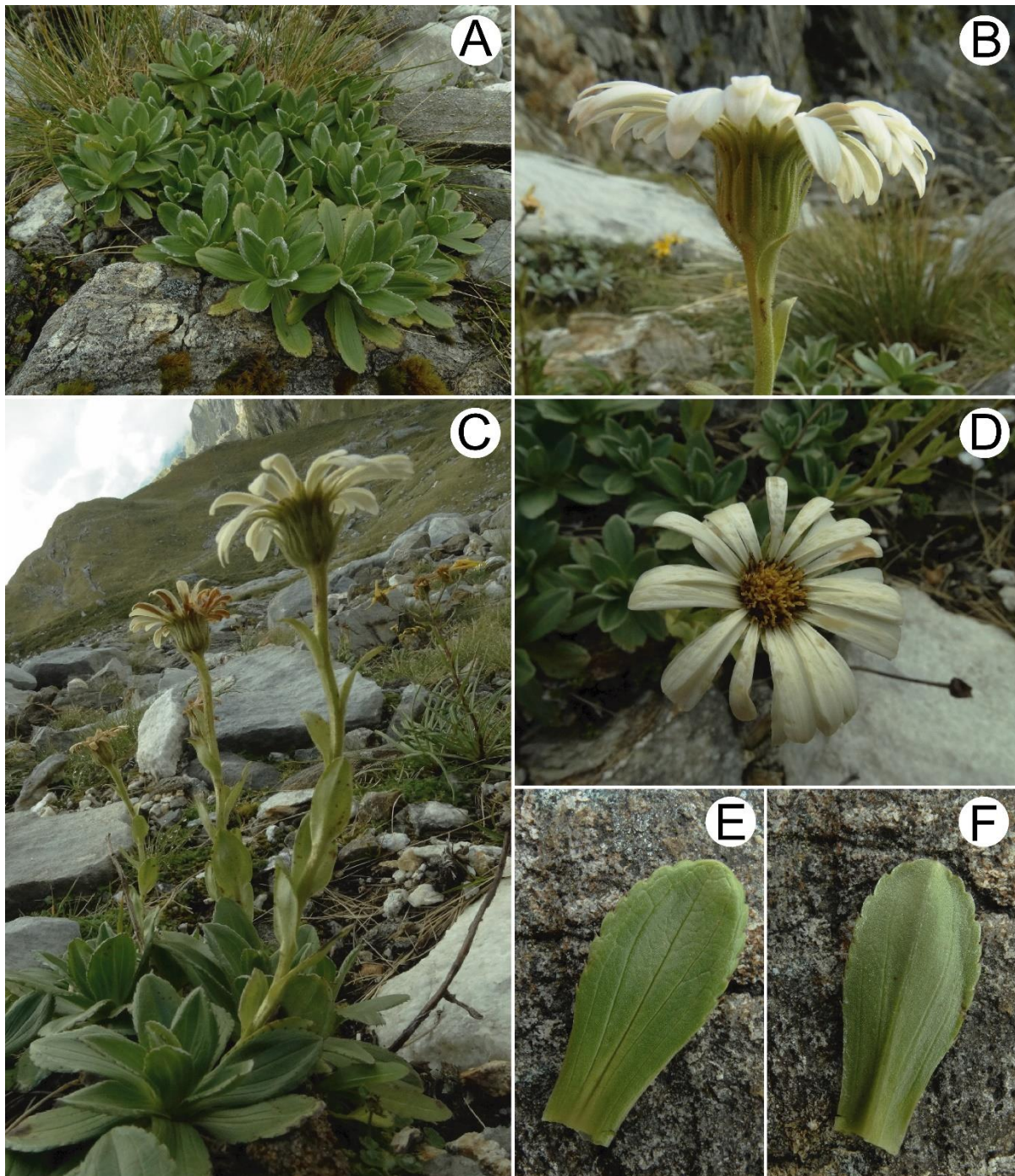


Figure 33. *C. inaccessa*: A. Habit; B. Capitulum (lateral view); C. Habit, floriferous branch; D. Capitulum (top view); E. Adaxial surface of a leaf; F. Abaxial surface of a leaf. A–F by Rowan Hindmarsh-Walls at mountains east of Lake Te Anau, Fiordland.

mm long, deltoid, apex straight; bases tailed 150–200 μm long, filament collar slightly wider than the filament; style branches 1.3–1.5 mm long, linear, stigmatic bands reaching $3/4$ of the branch length or more, sterile appendage deltoid, 0.3–0.4 mm long, apical papillae 40–50 μm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 5–7 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3.5 mm long, 5–ribbed, covered with twin trichomes. Fig. 33.

Distribution: South Island. Southland, confined to the mountains of central Fiordland National Park, west of Lake Te Anau (Fig. 31).

Habitat: Low alpine (700–1200 m) on steep, damp, shady rocky bluffs.

Etymology: Refers to the steep, inaccessible rock faces, where this species often occurs.

Other descriptions: Given (1971: 526–529).

Illustrations: Given (1971: fig. 1A, B, H; 3), Mark & Adams (1995: plate 56).

Additional collections. SOUTH ISLAND. Southland. Bottom end of Wapiti Lake, Fiordland, 1100 m, 1 Jan 1971, *J.C. Anderson s.n.* (CHR 207172); Juno Valley, 975 m, 1 Mar 1970, *J. Anderson s.n.* (OTA 28277); head of Lake Wapiti, south-facing slope beneath rock face, 950 m, 7 May 1995, *B.D. Rance s.n.* (CHR 526105); Lake Ione, Kepler, 914 m, 1 Feb 1981, *D.L. Bruce s.n.* (OTA 38418); Lake Wapiti, 1200 m, 12 Apr 1998, *D. Glenny 7480b* (CHR 631170); *ibid.*, upper Doon, Fiordland, 1036 m, 31 Dec 1970, *A. Mark s.n.* (OTA 30623, 60550); Mt Alexander, Fiordland, Apr 1976, *J. Anderson s.n.* (CHR 323413); Robin saddle, 1158 m, 1 Feb 1981, *D.L. Bruce s.n.* (OTA 38427); Wapiti Lake, mouth of T.R. Upper cirque, Fiordland, 1000 m, 8 Dec 1994, *K.H. Platt s.n.* (CHR 519275); Thompson Sound, Mts. above Lyall Bay, Fiordland, 1020 m, Jan 1958, *L.J. Metcalf s.n.* (CHR 272914).

19. CELMISIA HIERACIIFOLIA Hook.f., Bot. Antarct. Voy. II. (Fl. Nov.-Zel.). 1: 124, t. 34 B. 1853.

TYPE: NEW ZEALAND. Middle [South] Island, Nelson on the Mountains, *J.C. Bidwill 46* (holotype: K 882155 [image!] ex Herbarium Hookerianum).

Celmisia hieraciifolia Hook.f. var. *oblonga* Kirk, Trans. & Proc. New Zealand Inst. 27: 328. 1895.

TYPE: NEW ZEALAND. South Island, Mt Stokes, Jan 1894, *J. Macmahon s.n.* (holotype: WELT 3286!). Syn. nov.

Celmisia hieraciifolia Hook.f. var. *gracilis* Allan, Fl. New Zealand 1: 638, 967. 1961. **TYPE: NEW ZEALAND.** South Island, Mt Hope, ca. 6000 ft, Jan 1921, *A. Wall s.n.* (holotype CHR 76177!). Syn. nov.

Stout, decumbent, branched **shrub**, forming small cushions or patches up to 20 cm tall. **Leaves** clustered at the distal part of the branches forming apical rosettes, pseudopetiolate; lamina oblanceolate to oblanceolate-elliptic, coriaceous, (–1.2)40–70(–100) × (–0.2)0.6–2.2 cm, apex angle acute or obtuse, apex shape straight or convex, sometimes mucronate, base more or less decurrent; adaxial surface glabrous, green or glaucous, rarely with a sparse farinaceous indumentum, midvein impressed, conspicuous, and 3–4 secondary veins running on each side of the midvein following the leaf margin, impressed; abaxial surface densely covered (blade not visible) with a pale yellow, pale orange, or buff (often turning white after one season) layer of dense, thick, resinous, felty indumentum of flagellate aseptate trichomes, midvein and secondary veins raised, conspicuous thorough the indumentum (no epidermis visible); margin distantly serrate or crenate, and usually a terminal tooth at the end of the midvein, flat; sheath parallel-sided, glabrous, white-greenish, yellowish or purplish, venation parallel, multi-nerved. **Peduncle** (–2.5)8–16(–20) cm long, densely covered with biseriate stalked glandular trichomes, green to purplish, with few distant, often semiclasping, foliaceous, glandular bracts, 12–25 mm long, linear-lanceolate to wide deltoid, apex angle acute, straight. **Involucre** short-cylindrical, (–9)12–18(–20) × 9–24(–27) mm. **Phyllaries** arranged in 7–8 series, densely covered with biseriate stalked glandular trichomes, green to purplish; the 2 outer series subtending the capitulum are most of the times conspicuously wider than the rest, linear-oblong, (–7)9–11 × (–1)1.5–3.5 mm; remaining series gradually longer from the outer to the inner ones, deltoid to linear-lanceolate, appressed to spread at anthesis, apices often slightly recurved, outer ones 7–10 × 1.2–1.3 mm; inner ones (–11)13–17 ×

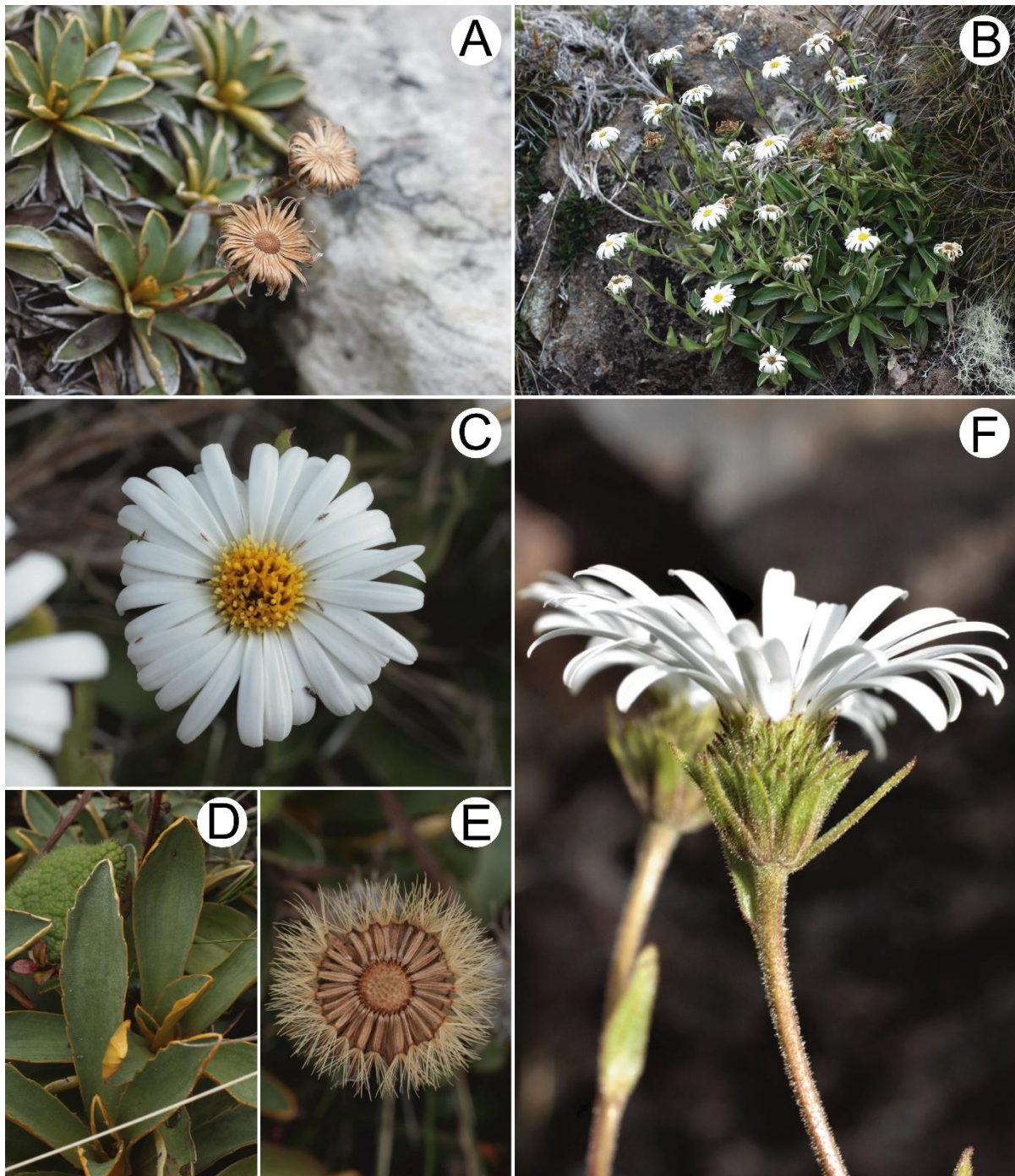


Figure 34. *C. hieraciifolia*: A and B. Habit; C. Capitulum (top view); D. Leaves; E. Receptacle and lateral cypselae in dispersion; F. Capitulum (lateral view). A, D, E from OTA (*P. Saldivia* 2546, Mt Stokes, Marlborough Sounds). B, C, F from (*P. Saldivia* 2579, south of Mt Peel, Tasman).

0.9–1.2 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 25–45, arranged in 3 rows, white. **Disc florets** ca. 80, tube 6–6.5 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2.5 mm long, appendage 0.5–0.6 mm long, linear-lanceolate to deltoid, apex shape straight or rounded, bases tailed 200–300 μ m long; filament collar slightly wider than the filament; style branches 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.5 mm long, apical papillae 50–60 μ m long. **Pappus** of numerous barbellate

bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 4–5 mm long, 4–6 ribbed, covered with twin trichomes. Fig. 34.

Notes: Varieties *oblonga* and *gracilis* were described based on subtle characteristics of leaf morphology. Kirk (1895) stated about var. *oblonga*: “A smaller and less robust plant than the typical form, with much narrower leaves, and sometimes densely tufted. In the type the leaves are often broadly-ovate”. Even though the plants from Mt Stokes are quite homogeneous, plants matching var. *oblonga* are not uncommon across the distribution range of the species. Allan (1961) described var. *gracilis* as follows: “Lamina \pm 1.5–2.5 cm. \times 2–4 mm.; linear to very narrow-obovate, subacute to obtuse on the same plant; margins entire or nearly so. Scape slender, glandular-pubescent, up to c. 12 cm. long; capitula 2–3 cm. diam.”. From this description, the only highlight is the size and shape of the leaves. However, I have studied the type (CHR 76177), and the leaves are not narrower than 4–4.5 mm. and several exceed 3 cm long. Besides, plants of the size described above or even smaller also occur in the North Island (e.g., Alpha, Quoin Ridge, Tararua Range).

Furthermore, although Allan (1961) recognized these two varieties, he commented “A rather polymorphic species needing cultural and genetic treatment. The vars accepted here [*oblonga* and *gracilis*] are linked with the large form described above [variety *typica*] by intermediate, probably mostly hybrid forms [...]” Concurring with Allan’s interpretation of *C. hieraciifolia* as a polymorphic species, I am treating these two varieties as synonyms of the typical *C. hieraciifolia*.

Distribution: North and South Islands. Wellington, Marlborough, Tasman, Nelson, and a few records from northern West Coast. From the Tararua Range in the north to Brunner Range in the South (Figs. 35, 36).

Habitat: Low alpine (750–1700 m). Mostly in snow tussock-herbfield and rocky sites.

Etymology: Leaves like *Hieracium* (Asteraceae, Hawkweeds).

Other descriptions: Hooker (1864: 131), Kirk (1899: 283), Cheeseman (1906: 303; 1925: 942), Allan (1961: 637–638).

Illustrations: Mark & Adams (1995: plate 57).

Additional collections. NORTH ISLAND. Wellington. Field Peak, Tararua Range, 1371 m, 25 Nov 1968, A. Mark s.n. (OTA 25895); Mt Alpha, E. Phillips s.n. (AK 34960); *ibid.*, 1907, J.A. Morris & B.C. Aston s.n. (WELT SP046665, SP046666); *ibid.*, 1280 m, Dec 1965, J. Knox s.n. (WELT SP096205); *ibid.*, 1360 m, Jan 1966, R. Steele s.n. (WELT SP096207); *ibid.*, 1371 m, 1 Dec 1907, B.C. Aston s.n. (AK 9771); *ibid.*, 1402 m, Dec 1907, B.C. Aston s.n. (WELT SP046620, SP046754); Mt Alpha, boggy ground, Dec 1907, B.C. Aston s.n. (CHR 290448); Mt Hector, 27 Feb 1932, W.R.B. Oliver s.n. (WELT SP046639); *ibid.*, 28 Feb 1931, E.M. Heine s.n. (WELT SP046622); *ibid.*, 1 Dec 1932, J.E. Attwood s.n. (AK 32172, AK 32175); *ibid.*, 1 Jan 1907, D. Petrie s.n. (AK 9770); *ibid.*, 1067 m, Jan 1907, B.C. Aston s.n. (WELT SP046642); *ibid.*, 1219 m, 1 Jan 1908, B.C. Aston s.n. (AK 9769); *ibid.*, 1280 m, Jan 1907, B.C. Aston s.n. (WELT SP046646); *ibid.*, 1158–1463 m, 29 Jan 1907, D. Petrie & B.C. Aston s.n. (WELT SP046668, SP046672); *ibid.*, 1219–1524 m, B.C. Aston s.n. (WELT SP046643, SP046756); Mt Hector, western slopes, 1219 m, 17 Jan 1930, E. Atkinson s.n. (WELT SP046641); Mt. Hector, exposed rocky face, 1494 m, 25 Jan 1947, A.P. Druce s.n. (CHR 51921); Mt. Hector, south-facing slope, 1371 m, 25 Jan 1947, A.P. Druce s.n. (CHR 51931); Mt Holdsworth, L. Cockayne s.n. (WELT SP046611); *ibid.*, W.L. Townson s.n. (AK 247461); *ibid.*, 1 Feb 1948, R. Mason s.n. (CHR 62090); *ibid.*, 1 Jan 1907, W.L. Townson s.n. (AK 9768); *ibid.*, 19 Jan 1949, W.R.B. Oliver s.n. (WELT SP005866); *ibid.*, 25 Jan 1908, D. Petrie s.n. (WELT SP046669); *ibid.*, 28 Jan 1948, A.P. Druce s.n. (CHR 82172); *ibid.*, 6 Jan 1973, B.L. Enting s.n. (WELT SP062720); *ibid.*, Dec 1961, R.

Maybill & A.P. Druce s.n. (CHR 133016); *ibid.*, 1219-1463 m, 16 Feb 1931, *E.M. Heine s.n.* (WELT SP046640); *ibid.*, 1219 m, 30 Dec 1964, *B. Sneddon s.n.* (WELT SP091124); *ibid.*, 1250 m, 26 Jan 1990, *A.P. Druce 500* (CHR 465834); Mt Reeves, Tararua, Oct 1940, *R. Mason s.n.* (CHR 28484); Tararua, Dec 1959, *P. Wardle s.n.* (CHR 519514); Tararua Mt [Tararua Range], *J. Buchanan s.n.* (WELT SP046673); Tararua Range, Grassland, 18 Dec 1974, *N. Fine s.n.* (CHR 519513); Tararua Ranges, 1 Jan 1933, *J.E. Attwood s.n.* (AK 32181); Tararuas, Kime Hut, 1530 m, 19 Mar 1947, *D. McQueen s.n.* (WELT SP064802). **SOUTH ISLAND. Tasman.** [Mt?] Owen, *W. Thomson s.n.* (WELT SP046607); above Cobb Dam, Mt Sylvester, 1350 m, 9 Jan 1961, *P. Hynes s.n.* (AK 70334); Ben Nevis, *F. Gibbs s.n.* (WELT SP046605); Ben Nevis and Rintoul Range, *F. Gibbs s.n.* (WELT SP046638); Ben Nevis, Nelson, Apr 1961, *J. Stanton s.n.* (CHR 219863); *ibid.*, Aug 1965, *D.H. Leigh s.n.* (CHR 169686); Boulder Lake, 7 Jan 1962, *P. Hynes s.n.* (AK 71478); *ibid.*, 1 Jan 1957, *A.E. Esler s.n.* (AK 215585, 215602); *ibid.*, 967 m, 6 Jan 1962, *P. Hynes s.n.* (AK 71479); Boulder Lake, Lead Hill, 1200 m, 3 Feb 1955, *T.C. Chambers & J.A. Rattenbury s.n.* (AK 242352); *ibid.*, 1220 m, 3 Feb 1955, *T.C. Chambers & J.A. Rattenbury s.n.* (AK 303926); Brown Cow Peak, near Boulder Lake, 6 Feb 1951, *J.A. Hay s.n.* (CHR 108375, 108381); Buller Valley, Hope Mts., 1219 m, Jan 1892, *T.F. Cheeseman s.n.* (AK 9776); Cobb area, 10 Jan 1961, *M.E. Sexton s.n.* (AK 251522); Cobb River, 1280 m, 1 Jan 1943, *R. Mason s.n.* (CHR 36109); Cobb Valley, *F.G. Gibbs 359* (CHR 141050); *ibid.*, 1470 m, *D. Given & M. Ito 3-0317-05* (CHR 570422); Collingwood, Nov 1910, *H.H. Travers s.n.* (WELT SP046606); Golden Bay, Cobb River, Burgoo Stream, 1320 m, 28 Jan 2015, *K. Ladley s.n.* (CHR 645829); Iron Hill, near cobb valley, herbfield, 1341 m, 14 Feb 1953, *J.A. Petterson s.n.* (CHR 77943); Lake Sylvester, Jan 1965, *G. Rickards s.n.* (WELT SP096313); *ibid.*, 1 Jan 1956, *M.E. Sexton s.n.* (AK 252234); *ibid.*, 20 Jan 1954, *G. Cone s.n.* (WELT SP096206); *ibid.*, 1463 m, 18 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 21637); Lake Sylvester to Iron Hill, 1350 m, 13 Jan 1962, *R. & E.F. Melville 5941* (AK 226714); Lake Sylvester, Cobb Valley, 20 Jan 1954, *G.B. Cone s.n.* (CHR 108380); *ibid.*, 914 m, 20 Jan 1954, *G.B. Cone s.n.* (CHR 87013); Lead Hill, 1219 m, *F.G. Gibbs s.n.* (CHR 125063); *ibid.*, 914-1067 m, 24 Dec 1946, *W.R.B. Oliver s.n.* (WELT SP054428, SP054429); Lookout Range, 22 Feb 1969, *C.J.E. Bell s.n.* (CHR 193083); Lookout Range, near summit, 1615 m, 22 Feb 1969, *C. Bell s.n.* (WELT SP096208); Mt Arthur, *D. Petrie s.n.* (WELT SP046667); *ibid.*, collector unknown (WELT SP046663); Mt Hope, Feb 1921, *A. Wall s.n.* (CHR 290453); *ibid.*, 1219 m, Feb 1921, *A. Wall s.n.* (CHR 290452); *ibid.*, 1829 m, Jan 1921, *A. Wall s.n.* (WELT SP046650); Mt Murchison, *W. Thomson s.n.* (WELT SP046884); *ibid.*, *W. Townson s.n.* (CHR 290445); *ibid.*, *W.L. Townson s.n.* (AK 247544); *ibid.*, 914 m, *W.L. Townson 562* (AK 9775); Mts. nr Lake Rotoiti, *E. Kidson s.n.* (WELT SP046886); near Boulder Lake, Lead Hills, 945 m, 19 Mar 1961, *C. McCann s.n.* (WELT SP051905); near Cobb Valley, Jan 1905, *F. Gibbs s.n.* (WELT SP046608); near outlet to Boulder Lake, roche moutonnée, 1036 m, 11 Apr 1966, *G. Park s.n.* (WELT SP096209); Owen Range to Lookout Range, Apr 1976, *C.J. & T.H. Webb s.n.* (CHR 283743); ridge leading to Mt Arthur, 1370 m, 23 Feb 1953, *G.W. Mason s.n.* (AK 263805); rocky plateau between Balloon Hut and Lake Peel, 1440 m, 11 Jan 2019, *P. Saldivia 2679* (OTA); south of Lookout Peak, above Nydia Bay, 840 m, Apr 1990, *A.P. Druce 1313* (CHR 471905); Sylvester Lakes area, above Cobb Dam, 29 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122050); *ibid.*, 30 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122046); Travers [Valley, Range...?], 1870, *H.H. Travers s.n.* (WELT SP046684). **Nelson.** Dun Mtn., *F.G. Gibbs s.n.* (CHR 10234); *ibid.*, *H.H. Travers s.n.* (WELT SP046644); *ibid.*, *J. Buchanan s.n.* (WELT SP045568); *ibid.*, collector unknown (WELT SP046651); *ibid.*, *W. Martin s.n.* (WELT SP046956/A); *ibid.*, Jan 1921, *A. Wall s.n.* (CHR 288016); *ibid.*, 774 m, 17 Apr 1975, *W. Lee & D. Caldwell s.n.* (OTA 35350); *ibid.*, 914 m, 27 Aug 1967, *J. Wells & A. Mark s.n.* (OTA 19470); *ibid.*, 1219 m, Jan 1878, *T.F. Cheeseman s.n.* (AK 9766); Dun Mtn. Range, *F.G. Gibbs 359* (AK 9765); *ibid.*, *F.G. Gibbs s.n.* (AK 9764); Maungatapu, *F.G. Gibbs s.n.* (CHR 125054); Mt Duppa, Bryant Range, Mar 1982, *A.P. Druce s.n.* (CHR 387181, 387182); Mt Duppa, Tapamutu, 1904, *J. McMahan s.n.* (WELT SP077129/B); *ibid.*, 1219 m, 1902, *J. McMahan s.n.* (WELT SP077129/A); Mt Dupper [Duppa], east Nelson, Feb 1931, *G. Simpson s.n.* (CHR 201342); near Old Maungatapu, *F.G. Gibbs s.n.* (CHR 335252); Old Maungatapu, *F. Gibbs s.n.* (WELT SP046660, SP046661, SP046662, SP046664); *ibid.*, *F.G. Gibbs s.n.* (CHR 141003).

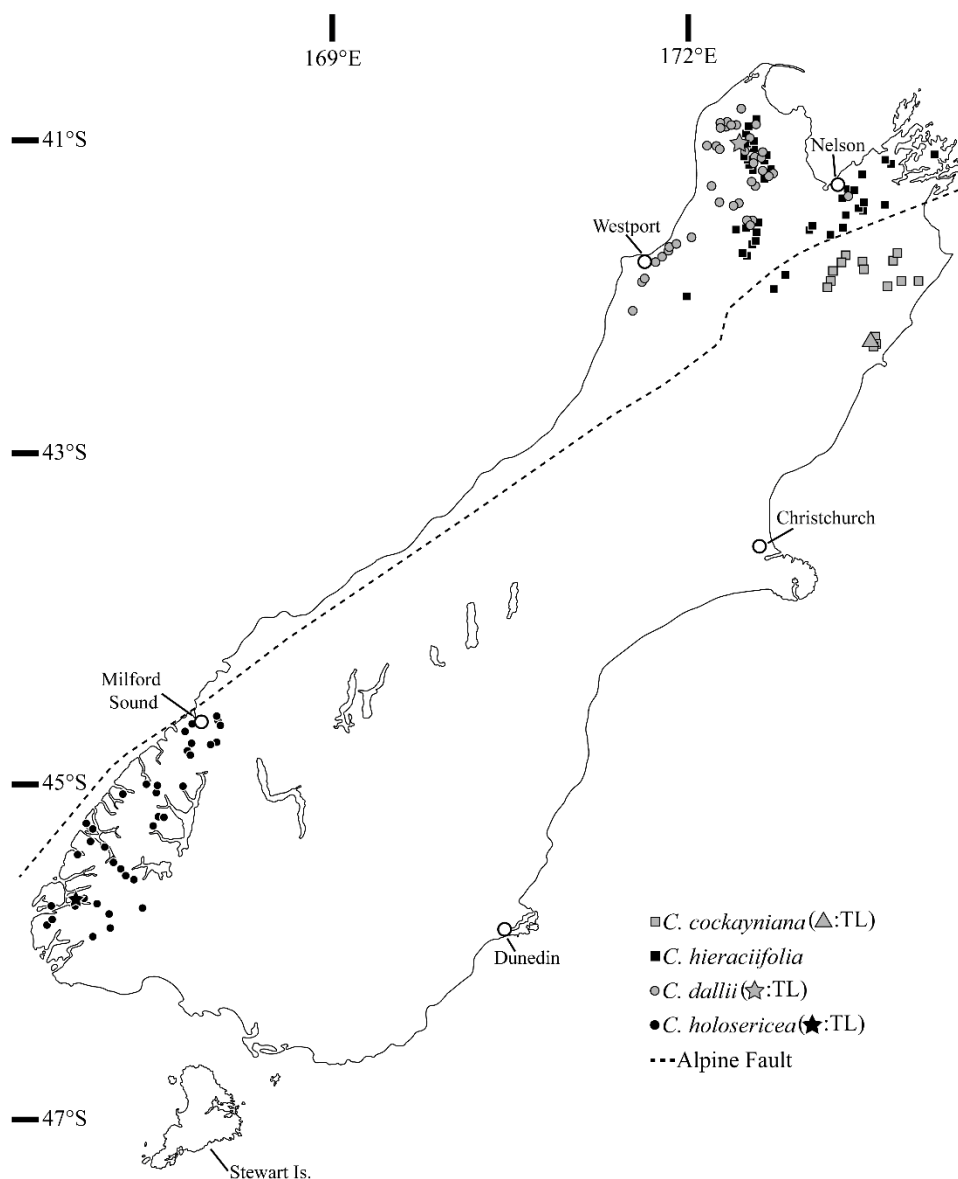


Figure 35. Distribution map of *C. hieraciifolia*, *C. cockayniana*, *C. dallii* and *C. holosericea* in the South Island of New Zealand. TL: Type locality

Marlborough. Bryant Ecological District, Nelson, *T. Kirk s.n.* (AK 11734); Editor Hill, Feb 1975, *Diana & G.C. Kelly s.n.* (CHR 274487); Fishtail, Richmond Range, 1066 m, 1979, *Molloy s.n.* (CHR 386662); Mt Fishtail, 1524 m, Nov 1932, *J. Hadfield s.n.* (WELT SP046938); Mt Fishtail, rocky outcrops, Mar 1979, *J. Hayward s.n.* (CHR 355611); Mt Patriarch ridge, Staircase saddle, 1100 m, 3 Feb 1986, *D.R. Given 14149 & M. Gray* (CHR 420457); Mt Riley, 15 Nov 1942, *A.J. Haley s.n.* (CHR 108463); Mt Riley, Marlborough, summit area, 1615 m, 8 Jan 1966, *D. Given 66021* (CHR 190303); Mt Stokes, *E. Phillips s.n.* (AK 34961); *ibid.*, *J. McMahon s.n.* (WELT SP046613, SP046647, SP046649, SP077137, SP077183); *ibid.*, *J.H. MacMahon s.n.* (AK 9767); *ibid.*, *T. Kirk s.n.* (AK 9772, WELT SP046609, SP046610, SP046612); *ibid.*, Feb 1920, *J. McMahon s.n.* (WELT SP077143); *ibid.*, Feb 1921, *J. McMahon s.n.* (WELT SP077177, SP077182); *ibid.*, 10 Jan 1895, *J. McMahon s.n.* (WELT SP043147); *ibid.*, 15 Feb 1892, *J. McMahon s.n.* (WELT SP043148); *ibid.*, 1902, *J. McMahon s.n.* (WELT SP077145/B); *ibid.*, 6 Nov 1891, *J. McMahon s.n.* (WELT SP077145/A); *ibid.*, Jan 1939, *A.J. Healy s.n.* (CHR 33348); *ibid.*, Nov 1971, *Given 71472* (CHR 200949); *ibid.*, 1183 m, 25 Feb 2018, *P.*

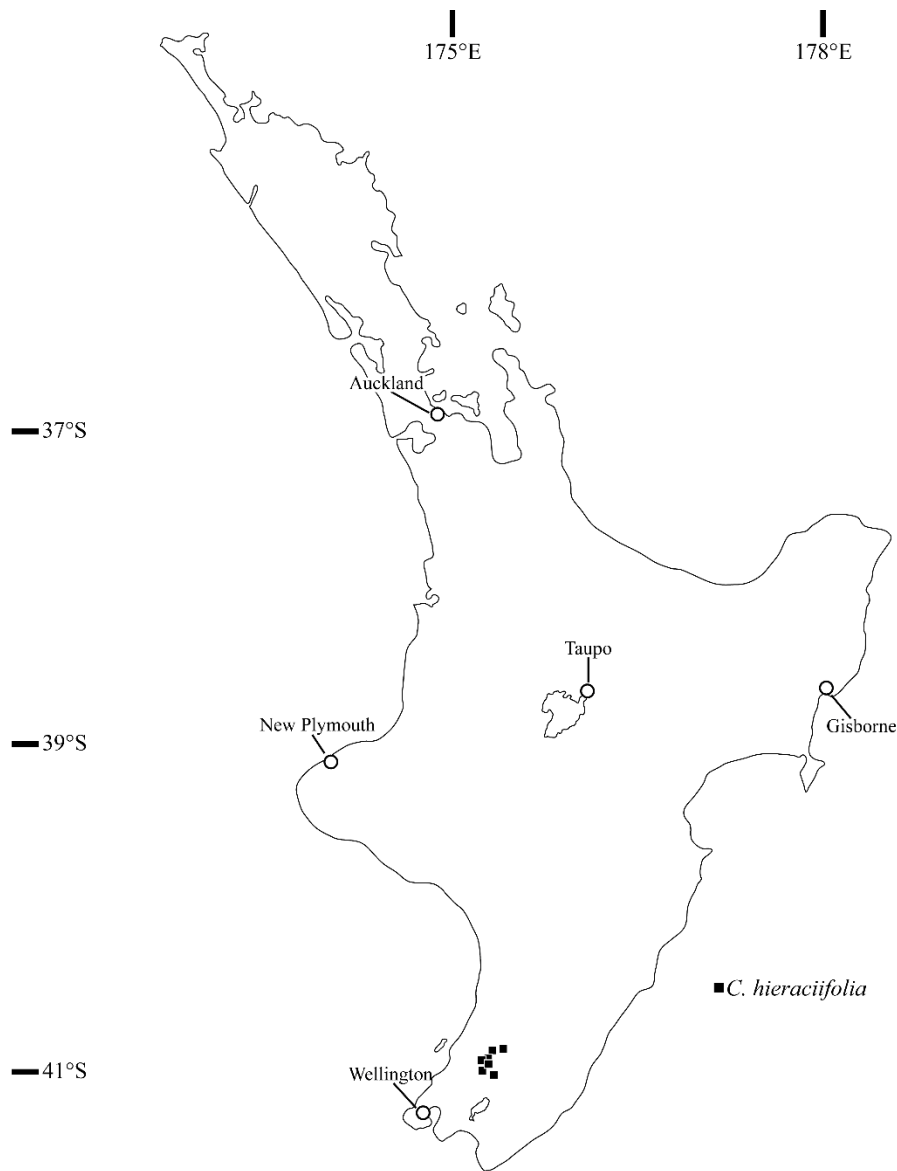


Figure 36. Distribution map of *C. hieraciifolia* in the North Island of New Zealand.

Saldivia 2646 (OTA); *ibid.*, 1203 m, 21 Jan 1995, *P.J. de Lange & G.M. Crowcroft s.n.* (AK 229035); *ibid.*, 1219 m, Jan 1923, *J.H. MacMahon s.n.* (CHR 290451); Mt Stokes, fellfield at summit, 26 Feb 1950, *J.A. Hay s.n.* (CHR 108384); *ibid.*, 19 Nov 1950, *J.A. Hay s.n.* (CHR 108386); *ibid.*, 26 Feb 1950, *J.A. Hay s.n.* (CHR 108383); *ibid.*, 1203 m, 19 Nov 1950, *J.A. Hay s.n.* (CHR 108385); *ibid.*, 1310 m, 26 Feb 1950, *J.A. Hay s.n.* (CHR 108387); Peak west of Mt. Richmond, cliff in Forest, Feb 1980, *A.P. Druce s.n.* (CHR 365721); SE of Editor Hill., 1005 m, 12 Aug 1981, *G.Y. Walls s.n.* (CHR 416880); summit of Mt Stokes, 1 Feb 1927, *J.H. MacMahon s.n.* (AK 263804); *ibid.*, 487 m, Feb 1924, *Macmahon s.n.* (CHR 290447); unnamed peak at head of Johnson creek and between Wakamarua and Palorus Valleys, Richmond Range, Dec 1984, *J. Hayward s.n.* (CHR 401669); Wairau Mts., Mt Patriarch, 1524 m, Feb 1934, *W. Martin s.n.* (WELT SP046933/B); Wairau Valley, *T. Kirk s.n.* (CHR 288019); Wairau, Nelson, *collector unknown* (OTA 16422); west of Mt. Richmond Range, 1380 m, Dec 1985, *A.P. Druce s.n.* (CHR 401556). **West Coast.** Bald Knob ridge, NW Nelson, Mt Baigent, 1350 m, Feb 1989, *A.P. Druce s.n.* (CHR 395631); Douglas Range, 23 Feb 1946, *R. Mason s.n.* (CHR

34933); Headwaters Cool/Coal Creek Brunner Range, 29 May 1905, *I. Payton s.n.* (CHR 519516); Mt Peel, *J.A. Rattenbury s.n.* (AK 263806); *ibid.*, 1 Jan 1957, *A.E. Esler s.n.* (AK 215586); *ibid.*, 19 Feb 1946, *W.R.B. Oliver s.n.* (WELT SP046645); *ibid.*, 28 Jan 1956, *P. Hynes s.n.* (AK 51045); *ibid.*, 1219 m, Jan 1886, *T.F. Cheeseman s.n.* (AK 9774); ridge between Anatoki and Douglas Ranges, 22 Feb 1946, *R. Mason s.n.* (CHR 34934). **District unknown.** Sine loco, *J. Adams s.n.* (AK 34929); Nelson, 2 Jul 1895, *F. Gibbs s.n.* (WELT SP067902); Nelson Mts., *F.G. Gibbs 234* (AK 9773); *ibid.*, Jan 1905, *F. Gibbs s.n.* (WELT SP046648); Rocky Peak, *E. Phillips s.n.* (AK 34959).

20. CELMISIA COCKAYNIANA Petrie, Trans. & Proc. New Zealand Inst. 44: 182. 1911 (1912). **TYPE:** **NEW ZEALAND.** South Island, Mt Fyffe, Seaward Kaikoura Range, 4000 ft, 10 Feb 1892, *L. Cockayne s.n.* (first-step lectotype: WELT SP2142 designated by Allan 1961: 626; second-step lectotype: WELT SP2142A! designated by Saldivia 2023: 36; isolectotypes: WELT SP2142B!).

Stout, decumbent, shortly branched **shrub**, forming single rosettes to small cushions or patches. **Leaves** clustered at the distal part of the branches forming apical loose rosettes, pseudopetiolate; lamina oblanceolate, coriaceous, 4–8(–10) × 0.9–1.8 cm, apex angle acute, apex shape straight or convex, mucronate, base decurrent; adaxial surface glabrous or with a deciduous farinaceous indumentum, green, midvein impressed, conspicuous, and 3–4 secondary veins running on each side of the midvein following the leaf margin, impressed; abaxial surface densely covered (blade not visible) with a white, loose, arachnoid indumentum layer of flagellate aseptate trichomes, and non-stalked glandular trichomes beneath, midvein raised, conspicuous, secondary veins hidden beneath the indumentum; margin distantly serrate with a terminal tooth at the end of the midvein, flat; sheath parallel-sided, glabrous, white-greenish to purplish, venation parallel, multi-nerved. **Peduncle** 15–20 (–25) cm long, densely covered with biseriate stalked glandular trichomes, green to purplish, with few distant foliaceous, glandular bracts, 18–25 mm long, linear-oblong, apex angle acute, apex shape straight; rarely the peduncles produce 1–2 lateral smaller capitula (see note below). **Involucre** short-cylindrical, 18–22 × 18–27 mm. **Phyllaries** arranged in 6–7 series, densely covered with biseriate stalked glandular trichomes, green to purplish; the two outer series subtending the capitulum are conspicuously wider than the rest, linear-oblong, 10.5–11 × 2–4 mm; remaining series gradually longer from the outer to the inner ones, deltoid to linear-lanceolate, appressed to spread at anthesis, apices often slightly recurved, outer ones 9–13 × 1.2–1.3 mm; inner ones 15–20 × 0.9–1.2 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 50–60, arranged in 3 rows, white. **Disc florets** ca. 100, tube 6–7 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 3.5 mm long; appendage 0.6 mm long, linear-lanceolate to deltoid, apex shape straight or rounded; bases tailed 200–300 μm long, filament collar slightly wider than the filament; style branches 2–2.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.5 mm long, apical papillae 50–60 μm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching or slightly exceeding the corolla lobes. **Cypselae** 4–5 mm long, 4–5 ribbed, covered twin trichomes. Fig. 37.

Note: Two specimens collected in 1892 (WELT SP2142B [isolectotype] and WELT SP4450) show scapes with smaller, probably undeveloped lateral capitula (1–2). These specimens are the only examples of multi-headed scapes in subgenus *Lignosae* s. lato

Distribution: South Island. Marlborough and North Canterbury near Kaikoura. Scarcely collected (Fig. 35).

Habitat: Subalpine to high alpine (900–1900 m). Rocky sites, crevices, and outcrops.

Etymology: After Dr L. Cockayne, one of the leading figures of New Zealand botany.

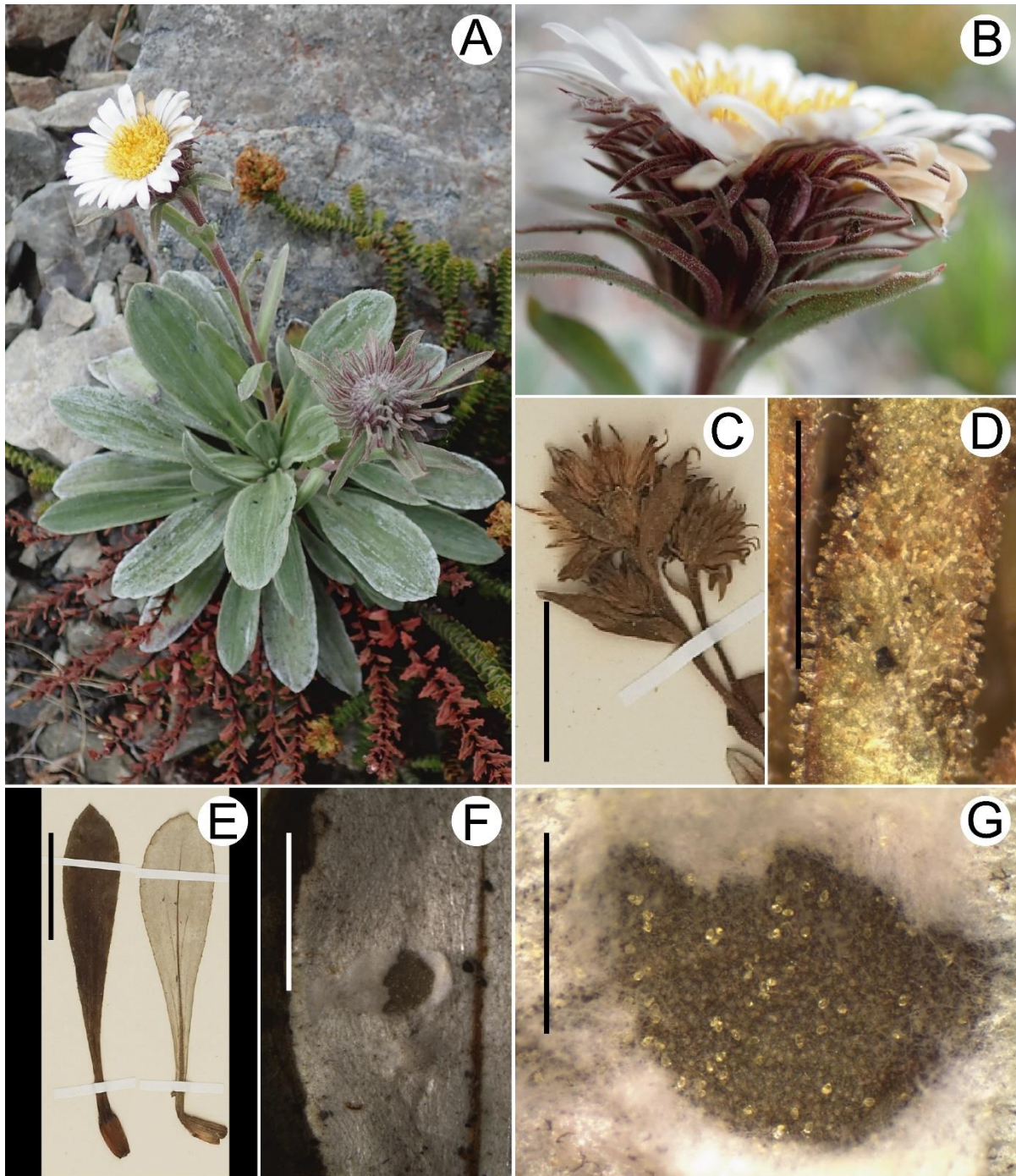


Figure 37. *C. cockayniana*. A. Habit, floriferous branch; B. Capitulum (lateral view); C. Peduncle showing two lateral smaller capitula; D. Glandularity of a phyllary; E. Adaxial (left) and abaxial (right) surfaces of the leaves; F. Cottony indumentum of the abaxial surface of a leaf; G. Detail of the glands found beneath the cottony indumentum. A–B by Duncan Nicol at Mt Fyffe, Canterbury; C from WELT (SP4450); E WELT (SP84326); D, F, G from CHR (218427B). Scale bars: A: 5 cm. B, E: 3 cm. C: 2 cm. D: 2 mm. F: 5 mm. G: 1 mm.

Other descriptions: Cheeseman (1925: 942), Allan (1961: 626).

Additional collections. SOUTH ISLAND. Marlborough. Avon Valley, on rock, 1371 m, *W. Martin s.n.* (CHR 112131); Ben More, Isolation Creek, 244 m, 6 Dec 1975, *C. Ogle s.n.* (WELT SP088418); Blairich, 10 Jan 1971, *Canterbury Botanical Soc. s.n.* (CHR 215824); Bounds, 1600 m, 8

Dec 1931, *W. Martin s.n.* (WELT SP046935); Gordon's Hut, Lethan Wairau, 2500 m, Jan 1960, *P.W. s.n.* (CHR 519515); Mixed: Mt Schiza & Waihopai saddle, 1372 m, 5 Jan 1934, *W. Martin s.n.* (WELT SP046931); Mt Altimarloch, Black Birch Range, 1066 m, Mar 1967, *F. Bodley s.n.* (CHR 174940); Mt B.J. [Jacks Brother], 1219 m, Feb 1931, *W. Martin s.n.* (WELT SP046976); Mt Malvern, 1219 m, *W. Martin s.n.* (WELT SP046934); Mt Philips, Waihopai valley, stony bank, 1525 m, Jan 1982, *P.A. Williams s.n.* (CHR 344586); Ure [Waima] Valley, Jan 1938, *J.S. Thompson s.n.* (CHR 19288); Wairau Mts., *J.B. Armstrong s.n.* (CHR 634672). **Canterbury.** Camden Range, Inland Kaikoura Range, 1188 m, Feb 1930, *R. Wall s.n.* (CHR 288031); coastal ridge, Hapuku, Kaikoura, 1219 m, 10 Jan 1967, *I.M. Ritchie s.n.* (CHR 175150); Kowhai River, Seaward Kaikoura Range, Rocky bluff in gorge, Dec 1980, *P.A. Williams s.n.* (CHR 309600); main ridge at head of E. Hapuka River Seaward Kaikoura Mts., on rocky outcrops, 10 Jan 1967, *I.M. Ritchie s.n.* (CHR 176065); Mt Fyffe, 914-1524 m, Jan 1932, *W. Martin s.n.* (WELT SP046972); *ibid.*, 1219 m, Jan 1892, *L. Cockayne 1950* (K 882077 [image]); *ibid.*, south ridge just above Forestry Hut, 1200 m, Mar 1971, *D. Given 71100* (CHR 218427A-B); ridge to Manukau, east Hapuka, Kaikoura Range, Mar 1967, *I.M. Ritchie s.n.* (CHR 174913); spur of Mt Fyffe, facing the sea, Seaward Kaikoura Mts., 1219 m, Nov 1892, *L. Cockayne s.n.* (WELT SP004450).

21. CELMISIA DALLII Buchanan, Trans. & Proc. New Zealand Inst. 14: 355. Pl. XXXV. 1882. t. 35.

TYPE: NEW ZEALAND. South Island. Nelson, on the Goulard [originally as Golden] Downs near head of the Aorere River — [icon] Buchanan (1882: Plate XXXV) (lectotype designated by Allan 1961: 639).

Decumbent, shortly branched **shrub**, forming single rosettes to small patches up to 0.2–0.3 m tall. **Leaves** clustered at the distal part of the branches forming apical large rosettes, spread; lamina oblanceolate to oblanceolate-elliptic, coriaceous, 8–20(–25) × (–2)3–4 cm, apex angle acute (rarely obtuse), apex shape straight, convex, or slightly acuminate, mucronate, base attenuate; adaxial surface glabrous, green, lustrous, rarely glaucous or with a sparse farinaceous indumentum, midvein slightly impressed, conspicuously wider at the base, whitish to yellowish, and 4–5 secondary veins running on each side of the midvein following the leaf margin, conspicuous, faintly impressed; abaxial surface densely covered (blade not visible) with a thick, white to pale yellowish layer of satiny, shiny indumentum of flagellate aseptate trichomes, midvein and secondary veins raised, conspicuous through the indumentum (no epidermis visible); margin with a thick rim of the indumentum (coming from the abaxial surface), conspicuously bordering the adaxial surface, distantly serrate, and a terminal tooth at the end of the midvein, flat or slightly upturned; sheath parallel-sided, glabrous, white (rarely purplish), venation parallel, multi-nerved. **Peduncle** (–15) 20–40(–50) cm long, viscid, green, with few distant semiclasping foliaceous bracts 20–40(–50) mm long, deltoid to oblong-lanceolate, apex angle acute, apex shape straight. **Involucre** short-cylindrical, 17–25 × 14–23 mm. **Phyllaries** arranged in 7–8 series, viscid, glabrous or slightly pubescent in the abaxial surface, especially the outer ones, deltoid to linear-lanceolate; the 2–3 outer series subtending the capitulum are conspicuously wider and longer than the rest, 15–22 × 2.5–5 mm; remaining series gradually longer from the outer to the inner ones, often strongly recurved; outer ones 8–11 × 1–1.5 mm; inner ones 14–18(–20) × 0.9–1.2 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 60–70, arranged in 3 rows, white. **Disc florets** ca. 200, tube 5–5.5 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2.5 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight or rounded, bases tailed 200 µm long, filament collar slightly wider than the filament; style branches ca. 2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 30–40 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest slightly shorter than the tube. **Cypselae** 4–5 mm long, 5–6 ribbed, covered with twin trichomes. Fig. 38.

Distribution: South Island. Northern West Coast and western Tasman. It has been recorded once at the east of its main distribution in 1910 at the Dun Mts (*H.H. Travers s.n.*, WELT SP45605) (Fig. 35).



Figure 38. *C. dallii*: A Habit; B. Involucre before flowering; C. Capitulum (lateral view); D. Capitulum (top view); E. Capitulum, cypselae before dispersion. A, C, D from OTA (*P. Saldivia* 2684, south of Mt Peel, Tasman); E from OTA (*P. Saldivia* 2628, Sylvester Hut, Tasman); B by Duncan Nicol at south of Mt Peel.

Habitat: Subalpine to Low Alpine (600–1700 m). Commonly in snow tussock-herbfield, but also found on rocky outcrops.

Etymology: After Mr J. Dall, who collected the type specimen(s) (that have not been located).

Other descriptions: Kirk (1899: 282–283), Cheeseman (1906: 302; 1925: 943), Allan (1961: 638–9).

Illustrations: Mark & Adams (1995: plate 57).

Additional collections. SOUTH ISLAND. Tasman. Above Cobb Dam, Cobb ridge, 1050 m, 14 Jan 1961, *P. Hynes s.n.* (AK 70348); Balloon hut, 1947 m, *H. Talbot s.n.* (CHR 396367); Cobb area, above Lake Sylvester, 1380 m, 10 Jan 1961, *P. Hynes s.n.* (AK 70377); Cobb ridge, 1066 m, 1 Jan 1964, *J. Wells s.n.* (OTA 10044); Cobb Valley, 1 Jan 1957, *A.E. Esler s.n.* (AK 215601); *ibid.*, 1097 m, 15 Feb 1969, *A. Mark s.n.* (OTA 25877); *ibid.*, 1340 m, 17 Mar 2003, *D. Given & M. Ito 3-0317-11* (CHR 570418); *ibid.*, ridge, Trilobite Hut, 29 Dec 1983, *G.D. Sylvester s.n.* (OTA 60509); Goulund Downs, 10 Jan 1962, *P. Hynes s.n.* (AK 71378); *ibid.*, Dec 1962, *H.T. s.n.* (CHR 255341); Haypaddock, Mt. Owen, Nelson, in *Chionochloa* grassland on ridge, 1432 m, 22 Jan 1972, *M.J.A. Simpson 6703* (CHR 226514); Head of Baton River, 23 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005869); Heaphy Track through Goulund Downs, 10 Jan 1962, *P. Hynes s.n.* (AK 71401); Heaphy Track, Mt Perry tussock saddle, 1 Feb 1964, *P. Hynes s.n.* (AK 242289); Heaphy Track, West Goulund Downs, Jan 1969, *E. Paynter s.n.* (CHR 169656); Lake Aorere, rocks near lake, Jan 1977, *A.P. Druce s.n.* (CHR 310400); Lake Sylvester Hut, 1323 m, 19 Feb 2018, *P. Saldivia 2628* (OTA); Lake Sylvester, Cobb Valley, Jan 1968, *H. Talbot s.n.* (CHR 269070); Mt Arthur, 1870, *J. Buchanan s.n.* (WELT SP046699/A-B); *ibid.*, *F. Spencer s.n.* (WELT SP046887); *ibid.*, Jan 1962, *G. Rickards s.n.* (WELT SP096307); *ibid.*, 14 Jan 1941, *R. Mason s.n.* (CHR 28593); *ibid.*, Jan 1941, *R. Mason s.n.* (CHR 28594); *ibid.*, Jan 1963, *R. Ward & J. Milne s.n.* (CHR 312413); *ibid.*, Nov 1969, *I. Townsend s.n.* (CHR 197984); *ibid.*, 1066-1371 m, 27 Dec 1950, *H.A. Hay s.n.* (CHR 75728); *ibid.*, 609 m, 12-15 April 1963, *B.H. Macmillan s.n.* (CHR 323431); *ibid.*, 1280 m, 24 Apr 1905, *R. Mason s.n.* (CHR 28582); *ibid.*, 1524 m, 30 Dec 1933, *E.M. Heine s.n.* (WELT SP046630, SP046889); Mt Arthur Plateau, *J. Buchanan & J. Dall s.n.* (WELT SP045608); *ibid.*, Jan 1881, *T.F. Cheeseman s.n.* (AK 9781, 9782); *ibid.*, Jan 1886, *T.F. Cheeseman s.n.* (AK 9777, 9778, 9779, 9780); *ibid.*, 1066 m, Jan 1921, *A. Wall s.n.* (CHR 288041); *ibid.*, 1219 m, *T. Cheeseman s.n.* (WELT SP046888); Mt Arthur, Tableland, 914 m, 17 Apr 1964, *W.M. Fleming s.n.* (WELT SP096210); *ibid.*, 1219 m, 6 Feb 1967, *J. Wells s.n.* (OTA 18276); Mt Cobb, 865 m, *F.G. Gibbs 286* (CHR 141032); Mt Lockett, Mar 1903, *F.G. Gibbs 286* (AK 9783); Mt Perry, Jan 1973, *A.P. Druce s.n.* (CHR 222994); Mt Stevens, 1160 m, 7 Jan 2019, *P. Saldivia 2666* (OTA); *ibid.*, 1280 m, Feb 1976, *A.P. Druce s.n.* (CHR 283134); northwest Nelson, Goulund Downs, near Saxon Hut, 1 Jan 1996, *C.D. Meurk s.n.* (CHR 610263); Owen Ra. [Range], Haypaddock [Hay Paddock] moraines, 1280-1402 m, 11 Feb 1968, *C. Bell s.n.* (WELT SP095829); Owen Range, *A.P. Druce 1972* (CHR 249517); Perry saddle, on Heaphy track 14 miles from Bainham, Jan 1966, *J. McCallum s.n.* (CHR 169574); ridge leading to Mt Arthur, 1370 m, 23 Feb 1953, *G.W. Mason s.n.* (AK 303925); Ridge S. [South] Baton River, 24 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005870); shore of Boulder Lake, 1006 m, 28 Jan 1963, *W. Burke s.n.* (WELT SP095830); Sylvester Lakes area, above Cobb Dam, 30 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122054); tussock-field between Balloon Hut and Lake Peel, 1400 m, 11 Jan 2019, *P. Saldivia 2684* (OTA). **Nelson.** Dun Mtn., 1910, *H.H. Travers s.n.* (WELT SP045605). **West Coast.** Allen Range, Mt Zetland, 1311 m, 18 Jan 1981, *B. Sneddon s.n.* (WELT SP091083); Buckland Peaks, 1097 m, 18 Feb 1913, *D. Petrie s.n.* (WELT SP045604/A, C); Buckland Peaks, Paparoa Range, 1097 m, 18 Feb 1913, *D. Petrie s.n.* (WELT SP046752); Denniston Plateau, 27 Nov 1948, *A.R. Thompson s.n.* (WELT SP005872); *ibid.*, sandstone plateau, 2 Mar 1993, *A.M. Buchanan 13239* (CHR 552343); Denniston, among low plateau scrub in position sheltered from west, 1127 m, 10 Jan 1968, *G. Brownlie s.n.* (CHR 345218); Drunken Sailors north aspect Douglas Range, 1523 m, *S. Raaijen s.n.* (CHR 415626); Gunner Downs, beside stream in tussock land, Nov 1979, *A.P. Druce s.n.* (CHR 358587); Heaphy River, 1 Feb 1898, *J. Dall s.n.* (WELT SP046879, SP046880, SP046881); Karamea, Mt Stormy, ridge top, 1051 m, 17 Jan 1985, *F. Maxwell s.n.* (CHR 419258A-B); Mt Buckland [Buckland Peaks], 1067 m, 18 Feb 1913, *P. Morgan s.n.* (WELT SP046885); Mt Dewar, Lochnager Range, Paparoa Range, Dec 1969, *I. Townsend s.n.* (CHR 198254); Mt Frederic, 4 Mar 1912, *P. Morgan & W. Townson s.n.* (WELT SP045606/A-B); Mt Glasgow, collector unknown (CHR 7776); Mt Luna, rock face with layer of soil, 1 Jan 1957, *A.E. Esler s.n.* (AK

215603); Mt Peel, 19 Feb 1946, *W.R.B. Oliver s.n.* (WELT SP005871); *ibid.*, 28 Jan 1956, *P. Hynes s.n.* (AK 242290, 50985); *ibid.*, 1347 m, 26 Dec 1946, *R. Mason s.n.* (CHR 58232); *ibid.*, 1440 m, 12 Jan 1961, *M.E. Sexton s.n.* (AK 251523); *ibid.*, 1463 m, 23 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23047); *ibid.*, 1493 m, 16 Feb 1969, *A. Mark s.n.* (OTA 26223); Mt. Augustus, 6 Feb 2000, *R. Bartlett s.n.* (AK 254469); Mts. near Westport, *P.G. Morgan s.n.* (AK 9784); north of Westport, Stockton Plateau, top of exposed knoll, 850 m, 6 Aug 1989, *G.A. Taylor s.n.* (AK 278139); Stockton Plateau, 1100 m, 8 Jan 1985, *M.J.A. Simpson 8529* (CHR 440090); *ibid.*, Feb 1952, *A.R. Thompson s.n.* (WELT SP005868); Trig. pt., east of Wangapeka saddle, 27 Dec 1947, *R. Mason s.n.* (CHR 58616).

22. CELMISIA HOLOSERICEA (G. Forst.) Hook.f., Bot. Antarct. Voy. I. (Fl. Antarct.). 1: 36. 1844. *Aster holosericeus* G. Forst., Fl. Ins. Austr. 56, n. 296. 1786. **TYPE: NEW ZEALAND.** In Nova Zelandia, ad rupes muscosas in Dusky Bay (lectotype: P 711339 [image!] designated by Saldivia 2023: 39).

Stout, decumbent, shortly branched **shrub**, forming single rosettes to small patches up to 20–30 cm tall. **Leaves** clustered at the distal part of the branches forming large apical rosettes, spread; lamina oblanceolate to oblanceolate-elliptic, coriaceous, (–12)14–20(–30) × (–2)3–4.5(–5) cm, apex angle acute, apex shape straight to slightly acuminate, often mucronate, base attenuate; adaxial surface glabrous, green, lustrous, midvein impressed, conspicuously wider at the base, whitish to yellowish, and 4–5 secondary veins running on each side of the midvein following the leaf margin, conspicuous, impressed; abaxial surface densely covered (blade not visible) with a thick, white layer of satiny, shiny indumentum of flagellate aseptate trichomes, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin distantly serrate, and a terminal tooth at the end of the midvein, flat; sheath parallel-sided, glabrous, sometimes with margins slightly lanose towards the top, white (rarely purplish), venation parallel, multi-nerved. **Peduncle** 20–40(–60) cm long, viscid, green, sometimes with a purplish tinge or rarely purple, with few distant foliaceous bracts 20–40(–50) mm long, linear, apex angle acute, apex shape straight. **Involucre** short-cylindrical, 15–25 × 20–30 mm. **Phyllaries** arranged in 9–10 series, viscid, glabrous or slightly pubescent in the abaxial surface, especially the outer ones, deltoid to linear-lanceolate; the 2–3 outer series subtending the capitulum are conspicuously wider and longer than the rest, 13–21 × 2.5–5 mm; remaining series gradually longer from the outer to the inner ones; outer ones 8–12 × 1.5–2 mm; inner ones 14–20 × 1.1–1.5 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 70–90, arranged in 3–4 rows, white. **Disc florets** ca. 250, tube 5–6 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2.5 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 200 µm long; filament collar slightly wider than the filament; style branches ca. 2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4 mm long, apical papillae 30–40 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest slightly shorter than the tube. **Cypselae** 4–5 mm long, 5-ribbed, covered with twin trichomes. Fig. 39.

Distribution: South Island. Southland, restricted to Fiordland National Park (Fig. 35).

Habitat: Coastal to low alpine (up to 1300 m). Rocky areas in open subalpine scrub below the tree line. In the alpine zone, commonly in snow tussock-herbfield.

Etymology: Refers to the silky indumentum of the abaxial surface of the leaves.

Other descriptions: Hooker (1864: 130), Kirk (1899: 282), Cheeseman (1906: 302; 1925: 943), Allan (1961: 639).

Illustrations: Hooker (1853: pl. XXXI), Mark & Adams (1995: plate 57).

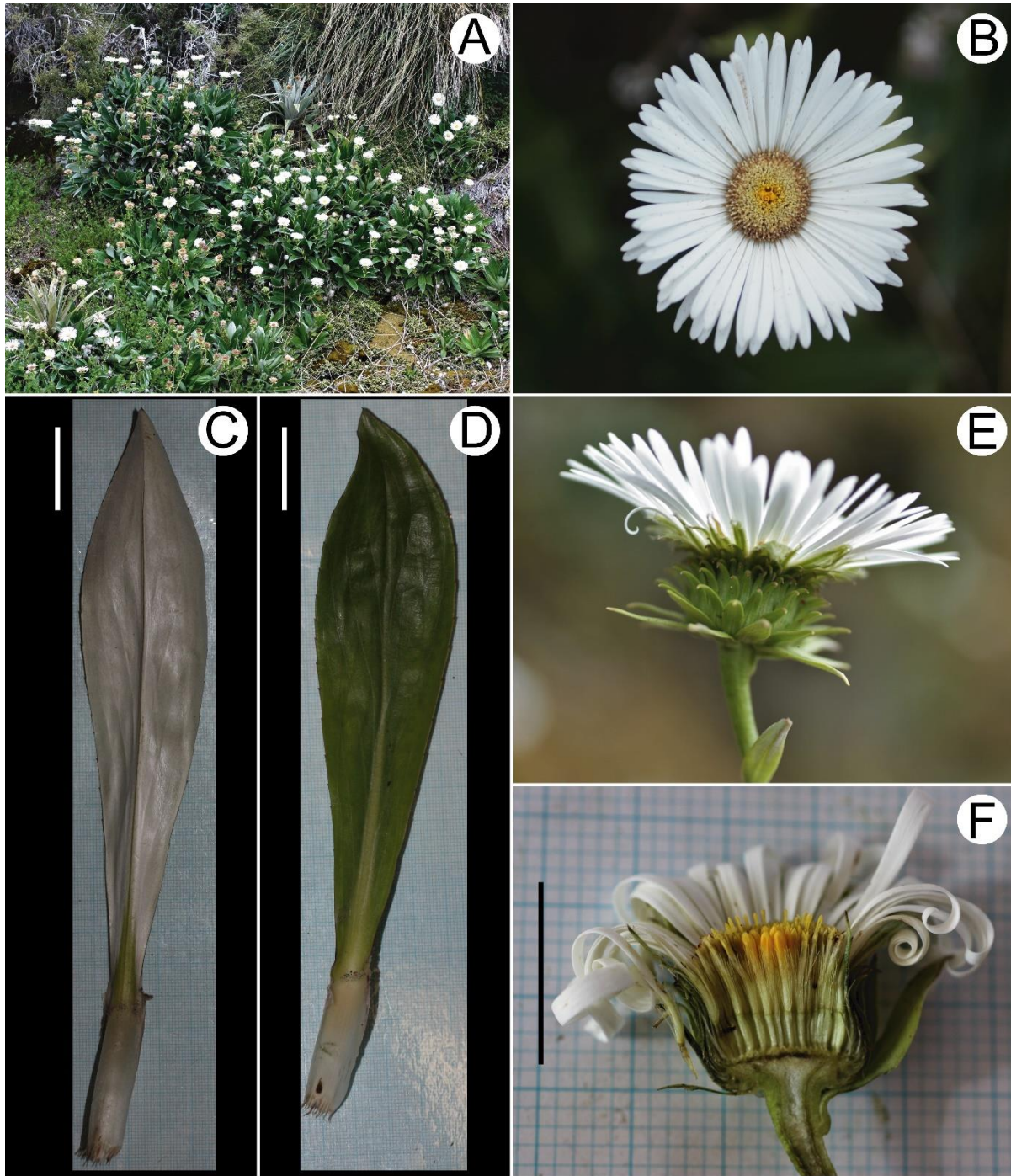


Figure 39. *C. holosericea*: A Habit; B. Capitulum (top view); C. Abaxial surface of a leaf; D. Adaxial surface of a leaf; E. Capitulum (lateral view); F. Receptacle. A–F from OTA (*P. Saldivia* 2569, Borland Saddle, Fiordland). Scale bars: C–D: 5 cm. F: 2 cm.

Additional collections. SOUTH ISLAND. Southland. [Cultivated] plant from Dusky Bay, Nov 1890, *T. Kirk s.n.* (WELT SP045591); below Juno saddle, Juno River, Fiordland, facing Caswell Sound, 30 Oct 1969, *D.R. Given 69692* (CHR 197961); Borland saddle, 960 m, 5 Mar 2017, *P. Saldivia* 2569 (OTA); *ibid.*, 970 m, 18 Jan 1986, *B.D. Rance & S. Halloy s.n.* (OTA 44077); *ibid.*, 1066 m, 26 May 1967, *A. Mark J. Wells s.n.* (OTA 18978); Cape Farewell [wrong locality?], 22 Dec 1946, *W.R.B. Oliver s.n.* (WELT SP056785); Cascade Cove, Dusky Bay?, *Forster s.n.* (K 882152 [image]); *ibid.*,

Forster s.n. (BM 810613 [image], 810614 [image]); *ibid.*, *J.R. Forster & J.G.A. Forster s.n.?* (B W 15843 -01 0 [image]); *ibid.*, *J.G.A. Forster s.n.* (GOET 12702 [image]); *ibid.*, *G. Forster s.n.* (UPS-THUNB 19728 [image]); *ibid.*, *Forster 139* (M 29760 [image]); Dusky Sound, near Indian Island, 914 m, 12 Feb 1969, *D.J. Lyttle s.n.* (OTA 34132); Cleddau River Portal (Homer Tunnel), 91 m, Jan 1967, *L.B. Moore s.n.* (CHR 141612); Cleft Creek, Hollyford River, Fiordland, 1190 m, 12 Feb 2004, *C. Morse s.n.* (CHR 596884); Clinton Valley, Jan 1892, *D. Petrie s.n.* (WELT SP045592); Dagg Sound, Jan-Feb 1954, *G.F. Findlay s.n.* (CHR 87866); Doubtful Sound, lower slopes of Mt Troup, above Doubtful Sound Hostel, 480 m, 7 Jan 1956, *T.C. Chambers s.n.* (AK 242354); Dusky Bay, *G.B. Armstrong s.n.* (CHR 634668, 634669); *ibid.*, *J.R. Wilkinson s.n.* (CHR 634667); Fiordland, Doubtful Sd., between 1st Arm and Crooked Arm, New Year saddle, 870 m, 3 Jan 1956, *T.C. Chambers s.n.* (AK 242353); Fiordland, Dusky Sound, Cooper Island, entrance to Sportsman Cove, east of cliffs on north side, 16 Feb 1972, *D.R. Given 72506* (CHR 512423); Fiordland, McKinnon [Mackinnon] Pass, 914 m, 22 Feb 1967, *B. Sneddon s.n.* (WELT SP091099); *ibid.*, 1036 m, 22 Feb 1967, *B. Sneddon s.n.* (WELT SP091101); Fiordland, near Lake Manapouri, road from South Arm to below Percy Saddle, *B. Sykes s.n.* (CHR 512583); George Sound, southside tops, 853 m, 4 Feb 1970, *C. Powell s.n.* (OTA 28588); Gertrude Valley, 853 m, 9 Jan 1979, *B. Sneddon s.n.* (WELT SP091125); Gully - Borland Rd., 914 m, 31 Jan 1978, *J.F. West s.n.* (OTA 64531); Head of Doubtful Sound, 4 Mar 1927, *W.R.B. Oliver s.n.* (WELT SP045594); Jacksons Bay [wrong locality?], 1869, *J.B. Armstrong s.n.* (WELT SP045588); Lake Eyles, above, 1070 m, 12 Feb 1973, *A. Mark s.n.* (OTA 33874); Lake Te Anau, Clinton Valley, *D. Petrie s.n.* (AK 9786); Mackinnon Pass, Jan 1926, *A. Wall s.n.* (CHR 289010); Marrington Pks to Mt Soaker, Fiordland, 1158 m, 10 Jan 1957, *M.J.A. Simpson s.n.* (CHR 94201); McKinnons Pass, *F.G. Gibbs s.n.* (AK 9785); Milford Sound, *Armstrong s.n.* (CHR 634665); Milford sound, Sinbad Gully, 27 Feb 1975, *P.N. Johnson s.n.* (CHR 261651); Milford Track, 17 Jan 1959, *M.E. Sexton s.n.* (AK 248858); Mt Barber, 3 Mar 1927, *W.R.B. Oliver s.n.* (WELT SP045595); Mt Barber, above Wilmot saddle, 3 Mar 1927, *W.R.B. Oliver s.n.* (WELT SP056783); Mt Gray, Fiordland, herbfield, 14 Feb 1959, *M.J.A. Simpson 1127* (CHR 111902); Mt Pender, Dusky Sound, Fiordland, 850 m, 12 Mar 2005, *B. Hazel s.n.* (CHR 504545); Mt Tutoko, saddle, 22 Feb 1967, *A. Mark & J. Wells s.n.* (OTA 18098); *ibid.*, 1066 m, 21 Feb 1967, *A. Mark J. & Wells s.n.* (OTA 18267); near Lake Te Anau, Clinton saddle, Jan 1892, *D. Petrie s.n.* (WELT SP096211); near Shark Cove, Dusky Sound, Fiordland, 950 m, 17 Apr 2002, *A. Miller s.n.* (CHR 596896); Otago Alps, 1280 m, *J. Buchanan s.n.* (CHR 289015); peak east of Cascade Basin, Preservation Inlet, 28 Jan 1946, *H.H. Allan s.n.* (CHR 55248); Plant from Milford Sound, [later] grown in Christchurch Botanical Gardens, *D. Petrie s.n.* (WELT SP045590); Plant from Princess Range [Mts.], end Peak, Lake Hauroto [Hauroko], cultivated in Invercargill, 1372 m, Feb 1910, *J. Crosby-Smith s.n.* (WELT SP045589); Princess Range [Mts.], End Peak, nr [near] Lake Hauroko, *J. Crosby-Smith s.n.* (WELT SP045587); saddle Hill, upper Stillwater, Caswell Sound, alpine herbfield, 14 Mar 1949, *A.P. Poole s.n.* (CHR 67437); Secretary Island, 31 Jan 1967, *P.W. Wardle s.n.* (CHR 200950); *ibid.*, 975 m, 18 Feb 1959, *G.T.S. Baylis s.n.* (OTA 60549); *ibid.*, 990 m, 18 Feb 1959, *G.T.S. Baylis s.n.* (OTA 60548, 60551); Secretary Island, near lake, 548 m, 16 Feb 1959, *G.T.S. Baylis s.n.* (OTA 4979); Secretary Island, summit ridge, 990 m, 18 Feb 1959, *G.T.S. Baylis s.n.* (OTA 4993); Sound of West Coast, 0-3 m, *J. Buchanan s.n.* (WELT SP045593); South Caroline burn, expedition peak, Lake Hauroko, 24 Nov 1975, *C. Sutcliffe s.n.* (CHR 307660); Stillwater Valley, upper, 1066 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30436); The Sounds, *R.M. Laing s.n.* (CHR 289013); Transit Valley, 680 m, 16 Jan 1977, *R.S. Gray s.n.* (CHR 313614); True left of Rugged Burn, Wapiti River, Fiordland, SE of Mt Elwood, 950 m, 14 Feb 1975, *I. Payton s.n.* (CHR 519520); upper Snag Burn, Murchison Mts., Fiordland, true left branch, 1040 m, 10 Jul 1975, *I. Payton s.n.* (CHR 519521); W[est] C[oast] Sounds, *B.C. Aston s.n.* (WELT SP046771); Wilmot Pass, 822 m, 9 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 22119); Wilmot Pass, saddle, 853 m, 9 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 218903); Woodrow Burn, South of Murchison Mts., 1130 m, 13 Feb 1973, *A. Mark s.n.* (OTA 33909); sine loco, *Armstrong s.n.* (WELT SP045627); *ibid.*, *collector unknown* (WELT SP045099).

23. CELMISIA DISCOLOR Hook.f., Bot. Antarct. Voy. II. (Fl. Nov.-Zel.). 1: 124, t. 34 B. 1853. **TYPE: NEW ZEALAND.** Middle [South] Island, Nelson on the Mountains, *J.C. Bidwill* 37 (holotype: K 882087 [image!] ex Herbarium Hookerianum; isotype: CHR 288144! [fragment of the type]).

Celmisia incana Hook.f., Bot. Antarct. Voy. II. (Fl. Nov.-Zel.). 1: 123, t. 34. 1853. **TYPE: NEW ZEALAND.** Northern Island, Ruahine Range, 1847, *W. Colenso* 55 (lectotype: K 882084 [image!] ex Herbarium Hookerianum designated by Allan 1961: 622). Syn.nov.

Celmisia incana Hook.f. var. *petiolata* Kirk, Stud. Fl. N.Z.: 284. 1899. **TYPE: NEW ZEALAND.** South Island, Kelly's Hill, Westland, Jan 1893, *D. Petrie s.n.* (lectotype: WELT SP46519! [top branch excluded] designated by Saldivia 2023: 39). Syn. nov.

Celmisia intermedia Petrie, Trans. & Proc. New Zealand Inst. 45: 267. 1913. **TYPE: NEW ZEALAND.** South Island, Canterbury Alps, Arthur's Pass, 3000 ft, Jan 1893, *D. Petrie s.n.* (lectotype: WELT SP2146! designated by Allan 1961: 621). *Celmisia discolor* Hook.f. var. *intermedia* (Petrie) Allan, Fl. New Zealand I: 621. 1961. Syn. nov.

Celmisia discolor Hook.f. var. *ampla* Allan, Fl. New Zealand I: 621, 967. 1961. **TYPE: NEW ZEALAND.** South Island, head of Clarence River, 19 Feb 1947, *R. Mason s.n.* (holotype: CHR 58285!). Syn. nov.

Stout, decumbent, loosely branched **shrub**, forming loose cushions or small patches or mats, up to 20 cm tall. **Leaves** clustered at the distal part of the branches forming apical loose rosettes, pseudopetiolate, new ones straight upwards but soon becoming spreading or patent; lamina obovate to oblanceolate, coriaceous, $(-1)1.5-4.5(-7) \times (-0.4)0.8-1.4(-1.5)$ cm, apex angle acute or rarely obtuse, apex shape convex to straight, often mucronate, base decurrent; adaxial surface longitudinally grooved (5–9 more or less equally spaced grooves not coincident with the veins), glandular, from almost glabrous, pale-green, to densely covered with a pale-gray indumentum of flagellate aseptate trichomes, midvein conspicuous, impressed, and 2–3 thin secondary veins running on each side of the midvein following the leaf margin, impressed; abaxial surface densely covered (blade not visible) with a thick, white, often satiny indumentum layer of flagellate aseptate trichomes, and sparse non-stalked glandular trichomes beneath, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin conspicuously serrate, with 3–7 distant teeth along each side of the lamina, and a terminal one at the end of the midvein, flat; sheath parallel-sided, surfaces glabrous, margin glabrous or lanose towards the top, pale green to purple; venation parallel, multi-nerved. **Peduncle** 5–20 cm long, covered with biseriate stalked glandular trichomes and often lanose, green, with few distant foliaceous bracts 8–20 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical to slightly campanulate at anthesis, 8–11 × 5–8 mm. **Phyllaries** arranged in 5–6 series, gradually longer from the outer to the inner ones, mostly erect, appressed to slightly spread or recurved at anthesis, covered with biseriate stalked glandular trichomes, linear-lanceolate, apex angle acute, straight to acuminate, pale green; outer ones 5–7 × 0.8–1 mm; inner ones 7–10 × 0.8–1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 35–50, arranged in 2–4 rows, white. **Disc florets** 40–70, tube 4.5–6 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2–2.8 mm long, appendage 0.5 mm long, linear-lanceolate to deltoid, apex straight or rounded, bases tailed 200 μm long, filament collar slightly wider than the filament; style branches ca. 1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.3–0.4 mm long, apical papillae 40–50 μm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 row and diminutive outer setae; bristles irregular in length, 4–6 mm long, with the longest ones reaching the corolla lobes. **Cypselae** 2–3.5 mm long, 5–ribbed, covered with twin trichomes. Fig. 40.

Notes: Hooker (1853) described *Celmisia incana* and *C. discolor* next to each other, and about the latter he commented “A very similar plant to *C. incana*, and perhaps only a variety.” Later he (Hooker 1864) wrote about *C. discolor*, “Some stages approach *C. incana* in the softness and laxity of the wool,”



Figure 40. *C. discolor*: A Habit; B. Habit, growing next to *C. sinclairii* var. *allanii* (right side plant with grey whitish leaves); C. Capitulum (top view); D. Capitulum (lateral view); E. Involucre; F and G: Adaxial surface of the leaves showing different coloration and density of indumentum. A, D, E, F from OTA (*P. Saldivia* 2678, Lake Peel, Tasman). B from OTA (*P. Saldivia* 2650, Mt Technical, Lewis Pass). C, G from OTA (*P. Saldivia* 2665, Mt Stevens, Tasman).

and regarding *C. incana*, “[...] but I fear it may pass into *C. discolor*.” Cheeseman (1925: 939) listed *C. intermedia* as a synonym for *Celmisia incana* var. *petiolata*, which I agree with. Both lectotypes are identical, were collected by D. Petrie in January 1893, and come from the same geographic area (Otira River). Allan (1961) did not provide a contrasting diagnosis for *C. discolor* var. *ampla*, and the given

description does not indicate any diagnostic character. Additionally, Allan (1961: 621) wrote “Connected with other vars [var. *discolor* and var. *intermedia*] by intermediate forms [...]”

The interpretation here is that *Celmisia discolor*, *C. incana*, and the varieties listed above constitute a single species highly variable regarding general leaf shape (although always within the limits of obovate-oblong shape) and adaxial surface indumentum. For example, plants from the Raukamara Range (North Island) are not always pale gray above, and in plants from the Volcanic Plateau (e.g., Mt Ruapehu, North Island), the leaves tend to lose the adaxial surface indumentum after one or two seasons. However, the glandularity of the peduncles and involucre (always densely covered with biserial glandular stalked trichomes), and conspicuously grooved leaves, are diagnostic characters of *C. discolor*, as conceived here. These characters allow its discrimination from species like *C. sinclairii* and *C. angustifolia*, with which it has historically been confused.

Distribution: North and South Islands. Mainly Waikato, Gisborne, Manawatu-Wanganui, Tasman, Marlborough, West Coast, and Canterbury. From Coromandel, Raukumara Range, Volcanic Plateau, Kaweka, and Ruahine Ranges in the North Island (absent in the Tararua Range), to West Coast and central Canterbury in the South Island, and a few specimens from southwest Otago. (Figs. 41, 42).

Habitat: Subalpine to high alpine (750–1750 m). In open areas of subalpine scrub and forest, and common in snow tussock-herbfield, fellfield, and rocky outcrops.

Etymology: Refers to the often-different color between the adaxial and abaxial surfaces of the leaves. This character, however, is not constant in this species.

Other descriptions: Kirk (1899: 283–284), Cheeseman (1906: 304–305; 1925: 938, 940–941), Allan (1961: 620–622).

Illustrations: Mark & Adams (1995: plate 53).

Additional collections. NORTH ISLAND. Waikato. Base of Mt. Ngauruhoe, *H.B. Matthews s.n.* (AK 9750); Cape Colville, Te Moehau, *J. Adams s.n.* (WELT SP046518); Cape Colville, upper 30' of Little Moehau, 880 m, 1 May 1950, *T.C. Chambers s.n.* (AK 263810); Moehau Range, Little Moehau, 889 m, 2 Dec 2000, *P.J. de Lange 4748* (AK 252571); Moehau, Coromandel, 9 Nov 1929, *L.B. Moore s.n.* (CHR 40645); Moehau, Coromandel, southern Peak, Jan 1937, *R. Mason s.n.* (CHR 22186); Moehau, rocky outcrop S E of trig, 860 m, 14 Nov 1981, *E.K. Cameron 775* (AK 270590); Moehau, summit rock, *L.B. Moore s.n.* (CHR 40954); Mt Moehau, eastern pinnacle, 840 m, 22 Aug 1974, *A.E. Wright 725* (AK 135266); Ngaruhoe [Mt Ngauruhoe], *A. Hamilton s.n.* (WELT SP045886); summit of [Mt] Moehau, Coromandel Peninsula, Jan 1899, *D. Petrie s.n.* (WELT SP046494); Te Moehau, *J. Adams s.n.* (AK 15608); *ibid.*, 870 m, 10 Nov 1973, *A.J. Dakin s.n.* (AK 213911); Te Moehau, below summit, 800 m, 10 Nov 1973, *M. Taylor s.n.* (AK 261568). **Gisborne.** East Cape, Mt Hikurangi, Jan 1987, *J. Adams s.n.* (AK 15603); *ibid.*, 1524 m, Jan 1987, *J. Adams s.n.* (AK 9749); Mt Hikurangi, Ruakumara Range, 1432 m, 1962, *A.P. Druce s.n.* (CHR 131868); Mt Honokawa, Raukumara, 1432 m, Dec 1962, *A.P. Druce s.n.* (CHR 159820); Mt Maungawa[...] / Maungawaru? plateau, Raukumara Range, Jan 1953, *A.P. Druce s.n.* (CHR 82428); Raukumara Range, Mt. Honokawa (Whanokao) (eastern peak), 1524 m, 20 Jan 1967, *B. Sneddon s.n.* (WELT SP091098); Waiapu Co.[unty] W from Waipiro Bay, Mt Hikurangi, 1631 m, Jan 1897, *D. Petrie s.n.* (WELT SP046495). **Manawatu-Wanganui.** 2 km S of Takapari south Ruahine, 1966, *collector unknown* (CHR 159250); *ibid.*, Jan 1966, *A.P. Druce s.n.* (CHR 159248); 3 km S of Takapari south Ruahine, 1432 m, Jan 1967, *A.P. Druce s.n.* (CHR 159247); Chateau Tongariro, 1 Jan 1954, *D.V.G. Woods s.n.* (AK 119756); Hauhungatahi, 2 Jan 1921, *H.B. Matthews & H. Carse s.n.* (AK 34942); Hikurangi, near summit, 28 Mar 1932, *L.B. Moore & L.M. Cranwell s.n.* (AK 34946); Mangahua ridge, Whanahua Range, Ruahines, 21 Jan 1952, *J.A. Hay s.n.* (CHR 76850); Mt Hauhungatahi, Volcanic Plateau, *H. Carse s.n.* (CHR 289172); Mt Hikurangi, *W. Colenso 201* (K 882083 [image]); *ibid.*, 17 Nov 1926, *W.R.B. Oliver*

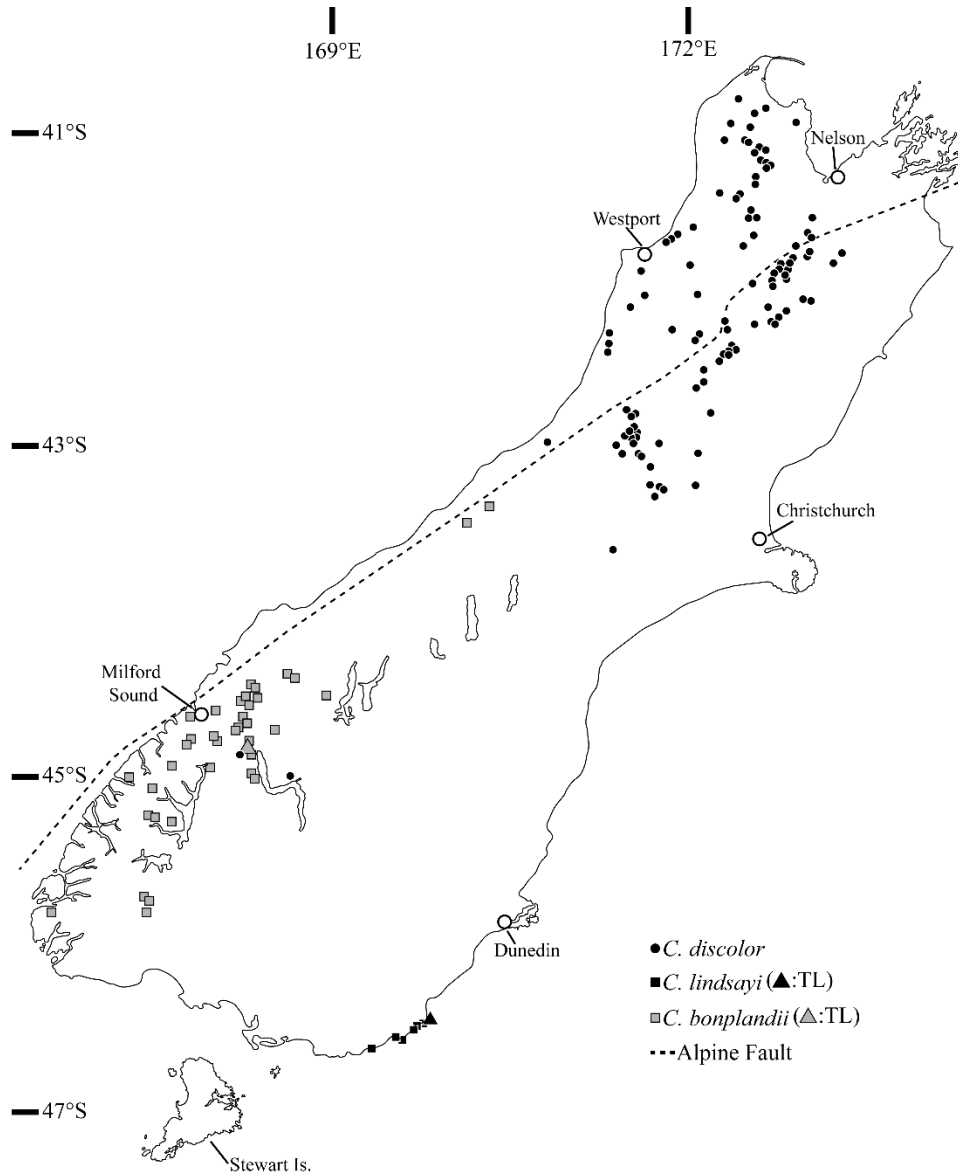


Figure 41. Distribution map of *C. discolor*, *C. lindsayi*, and *C. bonplandii* in the South Island of New Zealand. TL: Type locality.

s.n. (WELT SP046490); *ibid.*, 1380 m, 30 Mar 1932, *L.B. Moore & L.M. Cranwell s.n.* (AK 34945); *ibid.*, 1524 m, Jan 1897, *D. Petrie s.n.* (WELT SP046634); Mt Mangahuaia, Ruahines, 1371 m, 11 Jan 1950, *J.A. Hay s.n.* (CHR 108438); Mt Ruapehu, *W.L. Townson s.n.* (AK 245741); *ibid.*, 13 Apr 1963, *R.J. Lowrie s.n.* (AK 261294); *ibid.*, 1219 m, Oct 1947, *P. Searell s.n.* (WELT SP078642); Mt Ruapehu, above Blythe Hut, 22 Jan 1968, *P. Hynes s.n.* (AK 117895); Mt Ruapehu, above the Top of the Bruce, 4 May 1969, *M.C. Doyle s.n.* (AK 247817); Mt Ruapehu, Blythe Hut, 14 Jan 1961, *H.J.L. Clegg s.n.* (AK 134913); Mt Ruapehu, Bruce Road, 1219 m, 23 Nov 1968, *A. Mark s.n.* (OTA 26185); Mt Ruapehu, Ohakune Mt Road, 1370 m, 2 Jan 1972, *M.D. Hampton s.n.* (AK 247815); Mt Tongariro, north slope, 2 Mar 1956, *W.R.B. Oliver s.n.* (WELT SP005767); NW Mt Ruapehu, Whakapapaiti Stream, 23 Jan 1954, *W.R.B. Oliver s.n.* (WELT SP005769); Okakune track, Ruapehu, 1371 m, 27 Oct 1947, *R. Mason s.n.* (CHR 58198); Rangiwahia, Ruahines, 7 Jan 1950, *T. Ward s.n.* (CHR 68859); *ibid.*, Jan 1962, *A.P. Druce s.n.* (CHR 116810); Ruahine Corner, Ruahine Range, 1973, *A.P. Druce s.n.*

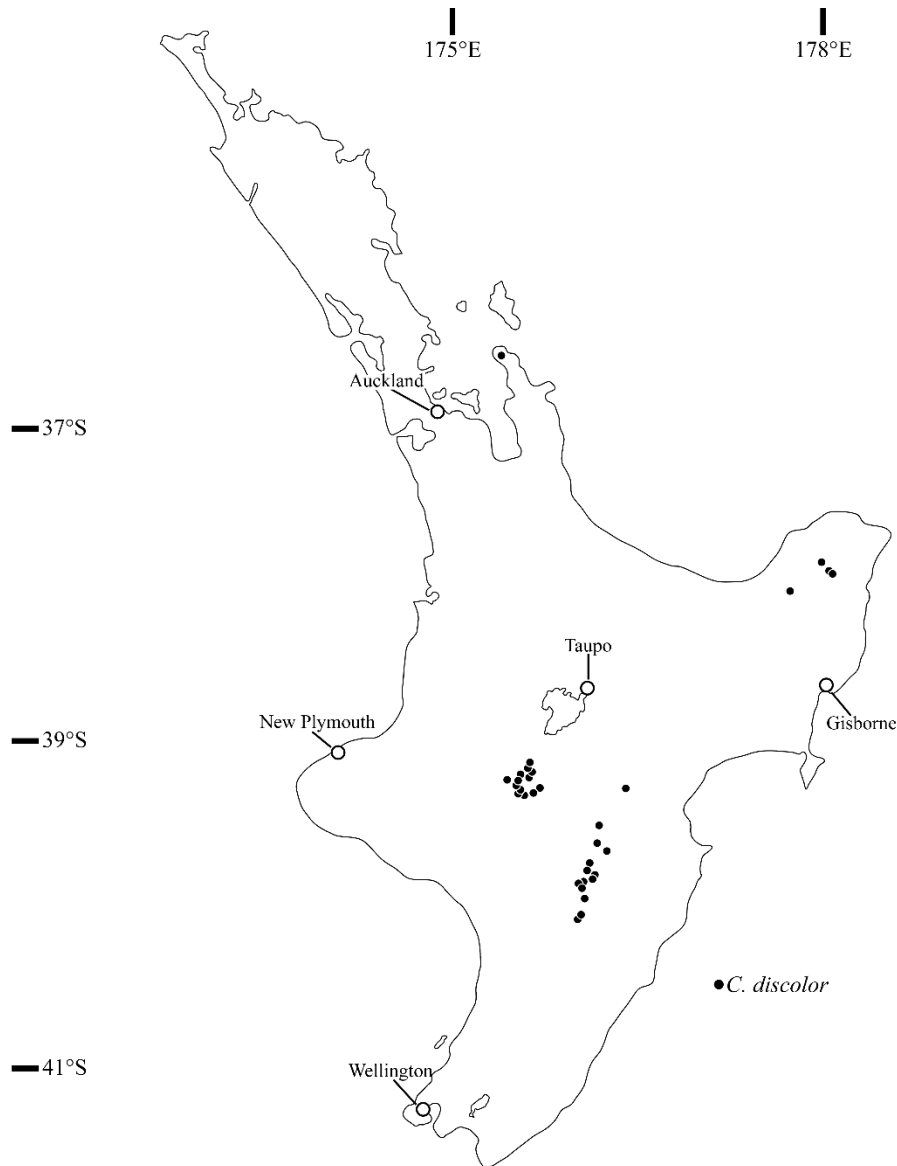


Figure 42. Distribution map of *C. discolor* in the North Island of New Zealand.

(CHR 260351); Ruahine Mts. (west), 1494 m, 24 Jan 1966, *R. Chinnock s.n.* (WELT SP096198); Ruahine Mts. [Range], *A. Hamilton s.n.* (WELT SP046520); *ibid.*, 1214-1524 m, Jan 1889, *D. Petrie s.n.* (WELT SP046629); Ruahine Range, 1845, *W. Colenso s.n.* (WELT SP024121); Ruahines, Whana Huia, Jan 1942, *N.L. Elder s.n.* (CHR 65167); Ruapehu, *W.L. Townson s.n.* (AK 9751); *ibid.*, 1524 m, 28 Aug 1973, *B. Enting s.n.* (WELT SP062728); Takapari, S. Ruahine, 1127 m, Jan 1966, *A.P. Druce s.n.* (CHR 159246); *ibid.*, 1524 m, Jan 1966, *A.P. Druce s.n.* (CHR 159249); Tama saddle, Tongariro, 1371 m, Dec 1966, *J. Knox s.n.* (CHR 625205); Tongariro National Park, 1220 m, 17 May 1949, *T.C. Chambers s.n.* (AK 263808); Tongariro National Park, Mt Ruapehu, 14 Apr 1905, *J.E. Attwood s.n.* (AK 34949); Tongariro National Park, near the Chateau, 1130 m, 1 May 1949, *G.W. Mason 204* (AK 263809); Tongariro National Park, Ohakune Mtn. Road, Waitonga Falls track, Blyth Hut Track, 0.4km NNE of Blyth Hut, 1440 m, 14 Feb 1993, *J. Fox & M. Huaki s.n.* (WELT SP101168/A); Tongariro National Park, Ruapehu, 15 Apr 1905, *J.E. Attwood s.n.* (AK 34944); *ibid.*, 14 Apr 1905, *J.E. Attwood s.n.* (AK 32162, 34948, 34950, 34951, 34952, 34953); Tongariro National Park, Ruapehu, Whakapapa River, Chateau, 1220 m, 22 Feb 1962, *C. Ogle s.n.* (WELT SP088422); Tongariro National Park, Silica

Springs, 27 Aug 1932, *E.M. Heine s.n.* (WELT SP046491); Waimarino Co., Hauhungatahi, 2 Jan 21, *H. Matthews s.n.* (WELT SP046496); west side of Ruapehu, 30 Jan 1939, *J.E. Attwood s.n.* (AK 32167, 32168); Whanahuia Range, Ruahines, 20 Jan 1952, *J.A. Hay s.n.* (CHR 76838); *ibid.*, Feb 1967, *A.P. Druce s.n.* (CHR 165816); *ibid.*, 1219 m, 21 Jan 1952, *J.A. Hay s.n.* (CHR 76879); *ibid.*, 1524 m, Feb 1967, *A.P. Druce s.n.* (CHR 165782); Whanahuia Range, Ruahines, waterfall, 1524 m, 1952, *J.A. Hay s.n.* (CHR 73752). **Hawke's Bay.** Makahu saddle Kaweka Range, 1371 m, Dec 1966, *B. Arnott s.n.* (CHR 178829); NW Ruahine, Otupae, 1402 m, Jan 1948, *A.P. Druce s.n.* (CHR 65168); Ruahines, near Parks Peak, 1067 m, 30 Jan 1933, *A. Barker s.n.* (WELT SP046621). **SOUTH ISLAND. Tasman.** above Boulder Lake, Brown Cow Mt., 7 Jan 1962, *P. Hynes s.n.* (AK 71440, 71441); Beebys Knob, Jan 1952, *Talbot Herbarium s.n.* (CHR 269068); *ibid.*, 1341 m, 14 Jan 1971, *A. Mark s.n.* (OTA 31613); Ben Nevis, 1219 m, *F.G. Gibbs s.n.* (AK 9718); Central Owen Ra. [Range], Haypaddock [Hay Paddock], 1433 m, 11 Feb 1968, *C. Bell s.n.* (WELT SP096153); Cobb ridge, 1066 m, 29 Dec 1966, *J. Wells s.n.* (OTA 18314); Cobb saddle, 6 May 1905, *I.W. Davey s.n.* (CHR 81960); Cobb Valley, 1 Jan 1957, *A.E. Esler s.n.* (AK 215584); *ibid.*, 1470 m, 17 Mar 2003, *D. Given & M. Ito 3-0317-07* (CHR 570373); *ibid.*, *D. Given & M. Ito 3-0317-08* (CHR 570374); Cupola Hut, Nelson Lakes, Grassy slope below Wind Charger, 18 Jan 1964, *J.R. Fryer s.n.* (CHR 150029); Fifth basin, Travers Range, Nelson Lakes, 13 Feb 1971, *M.J.A. Simpson 6052* (CHR 220396); Glenroy Valley, 1285 m, 18 Jan 1985, *W.D. Burke 348* (CHR 421121); Goulard Downs area, below Mt Goulard, 1200 m, 31 Jan 1964, *P. Hynes s.n.* (AK 100581); Iron Hill, 914 m, 14 Feb 1953, *J.A. Peterson s.n.* (CHR 77938); Lake Aorere, 792 m, Jan 1977, *A.P. Druce s.n.* (CHR 311612); Lake Rotoiti, 29 Dec 1952, *T.W. Mellor s.n.* (WELT SP005750); Lake Sylvester, *G.B. Cone s.n.* (CHR 87014); *ibid.*, 20 Jan 1954, *G. Cone s.n.* (WELT SP096197); *ibid.*, 1364 m, 18 Feb 2018, *P. Salsdivia 2626* (OTA); *ibid.*, 1432 m, 17 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 21643); Lake Sylvester, Mt. Cobb., 883 m, 1962, *R. Melville s.n.* (CHR 142807); Lookout Range, Jan 1972, *A.P. Druce s.n.* (CHR 249635); Moa Park, 9 Jan 1964, *H. Talbot s.n.* (CHR 269059); *ibid.*, Jan 1969, *A.P. Druce s.n.* (CHR 189152); Mole Tops above Mole Stream, 29 Apr 1967, *D.R. Given s.n.* (CHR 492248); Mole Tops above Mole stream south nelson, ridge top, 29 Apr 1967, *D.R. Given 67470* (CHR 178845); Moor Park [Moa Park], Abel Tasman National Park, 1066 m, 23 Dec 1957, *A.E. Esler s.n.* (WELT SP085166); Mt Arthur, *F.G. Gibbs s.n.* (AK 9748); *ibid.*, 28 Dec 1933, *E.M. Heine s.n.* (WELT SP056782); *ibid.*, 30 Dec 1933, *E.M. Heine s.n.* (WELT SP046618); *ibid.*, 1870, *J. Buchanan s.n.* (WELT SP046703); *ibid.*, Feb 1962, *G. Rickards s.n.* (WELT SP096306); *ibid.*, 16 Jan 1975, *M.J.A. Simpson s.n.* (CHR 278357); *ibid.*, 21 Feb 1905, *A. McKay s.n.* (WELT SP046701); *ibid.*, 25 Apr 1939, *E. Pickmere s.n.* (WELT SP078125); *ibid.*, 1219 m, 6 Feb 1967, *J. Wells s.n.* (OTA 18597); *ibid.*, 1371 m, 26 Dec 1950, *J.A. Hay s.n.* (CHR 108436); *ibid.*, 1524 m, 1952, *J.A. Hay s.n.* (CHR 75596); Mt Arthur Plateau, Jan 1881, *T.F. Cheeseman s.n.* (AK 9719); *ibid.*, Jan 1886, *T.F. Cheeseman s.n.* (AK 9747); *ibid.*, Dec 1907, *H.H. Travers s.n.* (WELT SP046480); *ibid.*, 1219 m, *T. Cheeseman s.n.* (WELT SP046493); Mt Arthur, Balloons Hut, 23 Nov 1984, *G. Sylvester s.n.* (OTA 61560); Mt Arthur, Tableland, 1158 m, 28 Dec 1933, *E.M. Heine s.n.* (WELT SP046619); *ibid.*, 1219 m, 6 Feb 1967, *J. Wells s.n.* (OTA 18265); Mt Goulard, Goulard Downs, 1973, *J.A. Simpson s.n.* (CHR 278276); Mt Murchison, *W.L. Townson s.n.* (AK 247547); Mt Robert, 1402 m, 19 Apr 1975, *W. Lee & A. Mark s.n.* (OTA 35946); *ibid.*, 1440 m, 18 Feb 1969, *P. Hynes s.n.* (AK 120688); Mt Robert, above Kia Hut, 9 May 1905, *L. Moore s.n.* (CHR 108435); Mt Roberts, ridged above first basin, 1005 m, 26 Dec 1965, *D.R. Given 65236* (CHR 178871); Mt St Arnaud [= St Arnaud Range], 1372 m, Mar 1934, *W. Martin s.n.* (WELT SP046961, SP046962); Mt St. Arnaud, 1372 m, Mar 1933, *W. Martin s.n.* (WELT SP046994); Mt Star, 9 Mar 1966, *D.H. Leigh s.n.* (CHR 150274); Mt Stevens, Jan 1979, *A.P. Druce s.n.* (CHR 358529); *ibid.*, 1524 m, Feb 1976, *A.P. Druce s.n.* (CHR 283129); *ibid.*, 1180 m, 7 Jan 2019, *P. Salsdivia 2665* (OTA); *ibid.*, 1200 m, 7 Jan 2019, *P. Salsdivia 2668* (OTA); Reverse Basin, Owen Range, 29 May 1905, *P.J. Garnock-Jones s.n.* (CHR 280455); Ridge S. [South] Baton River, 24 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005751); S. Hope Range, 1140 m, Feb 1993, *A.P. Druce 1894* (CHR 476158); saddle between Lake Peel and Cobb Valley, 1489 m, 10 Jan 2019, *P. Salsdivia 2678* (OTA); Saint Arnaud Range, 1524 m, 22 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23041); Salisbury hut, 1436 m, Dec 1964, *Talbot Herbarium s.n.* (CHR 269067); Spenser Ecological

Region, Rotoroa Ecological District, Buller Valley, Mt Mantell, *W.L. Townson* 622 (AK 9745 [mixed collection, together with *C. sinclairii* var. *allanii*]); St A Ra [St Arnaud Range], 11 Dec 1950, *W.R.B. Oliver s.n.* (WELT SP005757); St Arnaud Mts., 1 Jan 1950, *T.W. Mellor s.n.* (AK 26022); St Arnaud Range, 1 Jan 2007, *W.R. Sykes 3/07* (CHR 605952); St Arnauds [Saint Arnaud Range], 15 Apr 1905, *W. Martin s.n.* (WELT SP005756); St. Arnaud Ra [Range], 11 Dec 1950, *W.R.B. Oliver s.n.* (WELT SP005754); Sylvester Lakes area, above Cobb Dam, 29 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 121983); *ibid.*, 30 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 121982); track to Mt Arthur, 1370 m, 13 Dec 1952, *J.A. Rattenbury 415* (AK 263776); Travers [Valley, Range...?], 1870, *H.H. Travers s.n.* (WELT SP046687); Travers Range, 2nd Basin., 22 Mar 1961, *M.J.A. Simpson 3104* (CHR 120784); tussock-field between Balloon Hut and Lake Peel, 1426 m, 9 Jan 2019, *P. Saldivia 2669* (OTA); Walker ridge, Haupiri Range, Takaka, 1341 m, 27 Dec 1951, *J.A. Hay s.n.* (CHR 73673). **Marlborough.** Island saddle just north of road summit, 1380 m, 4 Jan 2002, *E.K. Cameron 10676* (AK 255628); Mt Schiza, 1524 m, Jan 1932, *W. Martin s.n.* (WELT SP046963); Raglan Mts. [Range], 1524 m, *W. Martin s.n.* (WELT SP046993); Raglan Range 4km S of Blowhard, end of 4WD road, 1480 m, 4 Feb 1986, *D.R. Given 14165 & M. Gray* (CHR 420473); Raglan ridge, 7 Feb 1980, *B.P.J. Molloy s.n.* (CHR 643847); St Arnaud Range, Wairau Valley, 1200 m, 18 Apr 1965, *P. Hynes s.n.* (AK 104902); valley south of Mt Weld by tributary (unnamed) of Wairau River, flat area above river, 1140 m, 5 Jan 2002, *E.K. Cameron 10751* (AK 289391); Wairau Valley, Red Hills, *J. McMahon s.n.* (WELT SP077157); *ibid.*, *T.F. Cheeseman s.n.* (AK 9717). **West Coast.** Bald Range, Rangī Taipo, 1300 m, Mar 1996, *D. Glenny 6472* (CHR 509997); Big River, Pakihi, 720 m, 16 Jan 1986, *S.P. Courtney s.n.* (CHR 468446); Buller District, Boundary Peak, 1158 m, 18 Feb 1968, *B. Sneddon s.n.* (WELT SP091079); Glasgow Range, Mokihinui River, Buller, 1300 m, Dec 1978, *G. Loh s.n.* (CHR 359073); Gordons Pyramid, 13 Apr 1952, *J.A. Hay s.n.* (CHR 76984); *ibid.*, 1951, *J.A. Hay s.n.* (CHR 108437); Kelly Range, north Otira Westland, near Carroll Hut, Jan 1966, *N.C. Lambechtsen s.n.* (CHR 170599); Kelly's Hill, 1066 m, Jan 1893, *D. Petrie s.n.* (AK 9723); Kelly's Hill, Otira River, 1219 m, Jan 1893, *D. Petrie s.n.* (WELT SP045863/A-B); Lewis Pass, *J. McMahon s.n.* (WELT SP077156); *ibid.*, 10 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005758); *ibid.*, 18 Jan 1962, *R. Melville & E.F. Melville 6127* (CHR 144530); *ibid.*, 9 Jan 1969, *B. Sneddon s.n.* (WELT SP091080); *ibid.*, 853 m, 16 Dec 1963, *A. Mark s.n.* (OTA 8929); Lewis Tops Track, 1372 m, 27 Feb 2018, *P. Saldivia 2650* (OTA); Little Whanganui saddle, Jan 1981, *A.P. Druce s.n.* (CHR 387164); Mt Augustis, summit area, south of summit, 1976, *D.R. Given s.n.* (CHR 261281); Mt Augustus, summit rocks, 10 Jan 1976, *Y. Elder s.n.* (CHR 280332); *ibid.*, 29 May 1905, *L.B. Moore s.n.* (CHR 280331); Mt Frederic, 914-1036 m, 4 Mar 1912, *P. Morgan s.n.* (WELT SP045788); Mt Greenland, Jan 1921, *R.M. Laing s.n.* (CHR 10213); Mt Haast, Feb 1966, *BB. & BV. Given s.n.* (CHR 190287); Mt Peel, 1460 m, 1 Feb 1953, *G.W. Mason s.n.* (AK 263775); Mt Peel, Tasman, 1432 m, 16 Feb 1969, *A. Mark s.n.* (OTA 25891); Mt Rajah?[Ryall], Paparoa Range, Jan 1967, *L.B. Moore & J. Clarke s.n.* (CHR 178819); Mt Watson, Paparoa Range, Jan 1967, *L.B. Moore & J. Clarke s.n.* (CHR 174706); Mts. S.W. coast of Nelson, near Westport, *W. Thomson s.n.* (WELT SP096152); near Westport, Mt Frederic, *W.L. Townson s.n.* (AK 9720); north branch of Wangapeka river, 22 Jan 1971, *B.H. Macmillan s.n.* (CHR 219264); north branch of Wangapeka river, below Mt Luna, 23 Jan 1971, *B.H. Macmillan s.n.* (CHR 219915); north of Rahu saddle, Victoria Range, *BB. & BV. Given s.n.* (CHR 169573); north of Westport, Mt Frederic, *P.G. Morgan s.n.* (AK 9721); Otira Track, 936 m, 14 Feb 2018, *P. Saldivia 2610* (OTA); *ibid.*, 966 m, 14 Feb 2018, *P. Saldivia 2609* (OTA); *ibid.*, 1009 m, 14 Feb 2018, *P. Saldivia 2605* (OTA); Paparoa Range, 920 m, 25 Mar 1978, *A. Mark s.n.* (OTA 37364); Paparoa Range, Mt Davy, 7 Jan 1952, *W.R.B. Oliver s.n.* (WELT SP005755); Phipps Peak, Arthur's Pass, 1310 m, Dec 1965, *D.R. Given s.n.* (CHR 200810); Phipps peak, west ridge, 22 Dec 1965, *D.R. Given 65177* (CHR 178903); Reefton, Rahu [saddle?], *O. Croker s.n.* (WELT SP096154); Stockton Plateau, Feb 1952, *A.R. Thompson s.n.* (WELT SP005749); SW of Lewis Pass, on main divide, 1371 m, 28 Jan 1962, *D.R. Given s.n.* (CHR 141737); *ibid.*, 28 Dec 1962, *D.R. Given s.n.* (CHR 141748); *ibid.*, 28 Jan 1962, *D.R. Given s.n.* (CHR 141747); Upper Otira Valley, 1448 m, 29 Jan 1994, *W.R. Sykes 92/94* (CHR 497109A-B); Vicinity of Westport, *W.L. Townson s.n.* (AK 9722); Victoria Range, summit ridge, 1280 m, 27 Jan 1972, *B.H. Macmillan 72/383* (CHR 226153); Waiheke

River, 1195 m, 19 Dec 2012, *J. Gosden s.n.* (CHR 645814). **Canterbury.** Above Arthur's Pass, Blimit peak, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046489); *ibid.*, 29 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046481); Allans Basin, Broken River Craigieburn Range, *J. Vickers s.n.* (CHR 592960); Arthur's Pass, Temple Basin Track., 22 Dec 2001, *M. Ito s.n.* (CHR 551701); Arthur's Pass, Avalanche Creek, 1927, *R.M. Laing s.n.* (CHR 334464); Arthur's Pass, 24 Jan 1876, *T. Kirk s.n.* (WELT SP046521); *ibid.*, Jan 1880, *T.F. Cheeseman s.n.* (AK 9724, 9725); *ibid.*, *M. Sutherland s.n.* (WELT SP064657); *ibid.*, Feb 1927, *W.R.B. Oliver s.n.* (WELT SP046574); *ibid.*, 1 Aug 1970, *collector unknown* (OTA 16425); *ibid.*, 1 Jan 1950, *U.V. Dellow s.n.* (AK 263800); *ibid.*, 1 Jan 1954, *P. Hynes s.n.* (AK 32465, 32650); *ibid.*, 1 Jan 1956, *M.E. Sexton s.n.* (AK 248861, 248864); *ibid.*, 12 Jun 1953, *G. Brownlie s.n.* (CHR 331412); *ibid.*, 12 Mar 1937, *A.L. Poole s.n.* (CHR 22279); *ibid.*, 13 Jan 1931, *L.B. Moore & L.M. Cranwell s.n.* (AK 34947); *ibid.*, 15 Jan 1898, *collector unknown* (WELT SP044647); *ibid.*, 1927, *A. Wall s.n.* (CHR 290162); *ibid.*, 24 Jan 1876, *T. Kirk s.n.* (WELT SP046565); *ibid.*, 30 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046578, SP046579); *ibid.*, 7 May 1948, *W.R.B. Oliver s.n.* (WELT SP005753, SP065023); *ibid.*, 840 m, 1 Jan 1954, *P. Hynes s.n.* (AK 150997); *ibid.*, 850 m, 19 Dec 1962, *B.F. Slade s.n.* (OTA 7189); *ibid.*, 853 m, Jan 1893, *D. Petrie s.n.* (CHR 10211); *ibid.*, 914 m, *R.M. Laing s.n.* (CHR 334421); Arthur's Pass National Park, Bealey Valley, 1371 m, 5 Jan 2008, *T. Witt s.n.* (CHR 646779); *ibid.*, 5 Jan 2008, *T. Witt T82* (CHR 646769); Arthur's Pass National Park, Bealey Valley, Margaret's Tarn, 5 Jan 2008, *T. Witt s.n.* (CHR 646774); Arthur's Pass National Park, Cons Track, 1 Mar 1998, *M. Korver & G. Korver s.n.* (CHR 516634); Arthur's Pass, Bealey River, 930 m, 16 Jan 1951, *H. St. John s.n.* (AK 120886); Arthur's Pass, roadside, 900 m, 20 Feb 1949, *R.C. Cooper s.n.* (AK 24329); Bealey Valley, 14 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP005764, SP046573); *ibid.*, 30 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046577); Bealey Valley, Avalanche Gully, Mtn. above, 17 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046575, SP046636); Bealey spur, Cass, Arthur's Pass, Jan 1985, *J. Vickers s.n.* (CHR 293195); Black Range, Bealey, Feb 1890, *Ball s.n.* (AK 268771); Blimit, 1219-1524 m, 29 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP005763); Blimit cirque, 29 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046635); Blimit, col, 1767 m, 27 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 28045); Castle Hill, Feb 1896, *Ball s.n.* (AK 263812); Christopher River, Spenser Mts., 1371-1524 m, 22 Feb 1947, *R. Mason s.n.* (CHR 58255); Craigieburn Mts., Apr 1926, *A. Wall s.n.* (CHR 290169); Easy saddle, at head of Anticraw River, Black Range, 1493 m, Feb 1967, *D.R. Given s.n.* (CHR 175076); Hope valley, west Amuri, 914 m, 13 Feb 1937, *W.B. Brockie s.n.* (CHR 22207); in closed herbfield grassland at Waimakariri Falls Arthur's Pass, 30 Jan 1971, *D.R. Given 71025* (CHR 205561); Lake Tennyson, Jan 1976, *L.R. Stemmer s.n.* (CHR 279754A-B); Lake Tennyson area, 5 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 122055); Lake Tennyson, end moraine, 1371 m, 15 Dec 1971, *M.J.A. Simpson 6334* (CHR 225779); Lake Tennyson, lake outlet swamp area, 29 May 1905, *L.R. Stemmer s.n.* (CHR 279753); Mt Oxford, Oct 1926, *A. Wall s.n.* (CHR 289158); Mt Rolleston, *J.B. Armstrong s.n.* (WELT SP045864); Mt Somers, *W. Martin s.n.* (WELT SP046973); Mt Torlesse, *N.T. Carrington s.n.* (WELT SP046515); Mt Trovatore, 7 Feb 1928, *collector unknown* (CHR 10214); Mt Una, Jan 1927, *R. Wall s.n.* (CHR 289157); Mtn. at back of Bealey Hotel (Bealey spur), 1066 m, Jan 1890, *L. Cockayne s.n.* (AK 34935); Phipps Peak, ridge leading from Arthur's Pass, 22 Dec 1965, *D.R. Given s.n.* (CHR 175194); Porters Pass, 1000 m, 11 Mar 2003, *D. Given & M. Ito 30304* (CHR 570408); Puketeraki range, Lees Valley, 24 Feb 1967, *J. Le Comte s.n.* (CHR 177580); Rd to Lake Tennyson, 1010 m, 23 Feb 2018, *P. Saldivia 2636-2637* (OTA); Temple Basin, 1066 m, 27 Dec 1967, *A. Mark s.n.* (OTA 27903); Temple Basin Track, 9 Aug 1998, *R.E. Beever 970 65* (AK 369951); upper Bealey Valley, 16 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046576); upper Hope Valley, Top Hope Hut vicinity, Mar 1978, *D.R. Given 11215 & P. Douglass s.n.* (CHR 479926); upper Waimak [Waimakariri], 1219 m, 1867, *J.B. Armstrong s.n.* (CHR 634840); White River, 1220 m, 1867, *J.B. Armstrong s.n.* (CHR 634841); Woolshed Ridge, Lake Sumner, 853 m, 19 Feb 1979, *A.D. Campbell & B.P.J. Molloy s.n.* (CHR 354393). **Otago.** Mt Bonpland, *collector unknown* (WELT SP046596); *ibid.*, *H.B. Matthews s.n.* (AK 9727); Queenstown, Ben Lomond, Aug 1946, *R. Dell s.n.* (WELT SP078126). **District unknown.** Sine loco, *H.B. Matthews s.n.* (AK 34943); sine loco, *W. Colenso s.n.* (WELT SP024120, SP024124); Southern Alps, *N.T. Carrington s.n.* (WELT SP045885).

24. CELMISIA LINDSAYI Hook.f., Handb. N. Zealand Fl.: 132. 1864. **TYPE: NEW ZEALAND.** Middle [South] Island, Otago, Trap Cliffs at Shaw's Bay, the Nuggets, mouth of the Clutha River, 6 Dec 1861, *L. Lindsay s.n.* (holotype: K 340033 [image!] ex Herbarium Hookerianum).

Stout, decumbent, loosely branched **shrub**, forming loose cushions or small patches up to 20 cm tall. **Leaves** clustered at the distal part of the branches forming apical loose rosettes, sessile to obscurely pseudopetiolate, new leaves straight upwards but becoming spreading or patent; lamina oblanceolate-oblong to oblanceolate-elliptic, coriaceous, 6–10(–15) × (–1.5)2–2.5 cm, apex angle obtuse or acute, apex shape obtuse or straight, sometimes slightly mucronate, base attenuate to less frequently decurrent; adaxial surface viscid, glabrous, green, lustrous, rarely glaucous, midvein slightly impressed, conspicuously wider at the base, whitish to yellowish, and 2 secondary veins running on each side of the midvein following the leaf margin, conspicuous, faintly impressed; abaxial surface densely covered (blade not visible) with a thick, white indumentum layer of flagellate aseptate trichomes, and sparse non-stalked glandular trichomes beneath, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin obscurely distantly serrate, with 4–6 distant teeth along each side of the lamina, and a terminal one at the end of the midvein, flat to slightly undulate; sheath parallel-sided, glabrous, white-hyaline to pale green, venation parallel, multi-nerved. **Peduncle** 6–20 cm long, viscid, green, with few distant foliaceous bracts 10–25 mm long, linear, apex angle acute, apex shape straight. **Involucre** short-cylindrical at anthesis, 10–14 × 10–12 mm. **Phyllaries** arranged in 7–8 series gradually longer from the outer to the inner ones, appressed at anthesis, viscid, linear-lanceolate, apex angle acute, straight to acuminate, green, outer ones 4–5 × 0.8–1 mm, inner ones 9–12 × 1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 30–50, arranged in 3–4 rows, white. **Disc florets** 60–80, tube 5–6 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, glabrous; anther thecae 2.5 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 200 µm long, filament collar slightly wider than the filament; style branches 1.2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.3 mm long, apical papillae 40–50 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in one row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 3–4 mm long, 5-ribbed, covered with twin trichomes. Fig. 43.

Note: Hooker (1890) erroneously mentioned that in *C. lindsayi* the base of the anthers is tailless (see Fig. 5K). See also note under *C. bonplandii*.

Distribution: South Island. Southern Otago, restricted to coastal areas of The Catlins, from Nugget Point in the north to Wallace Head in the south. Originally also described from the mouth of the Clutha River, 13 km north Nugget Point, but I have not seen specimens from that locality (Fig. 41).

Habitat: Coastal rocks, cliffs, crevices, and less frequently on coastal slopes among scrub or herbfield.

Etymology: After Dr. William Lauder Lindsay (1829–1880), Scottish physician and botanist, who collected the type specimen.

Other descriptions: Hooker (1890: Tab. 7134), Kirk (1899: 284–285), Cheeseman (1906: 305–306; 1925: 940), Allan (1961: 624).

Illustrations: Hooker (1890: Tab. 7134).

Additional collections. **SOUTH ISLAND. Otago.** [Cultivated], Dunedin, HJ Matthews' garden, from Lake Harris, Routeburn [wrong locality], Dec 1892, *H.J. Matthews s.n.* (WELT SP004435); [Cultivated] Dunedin, HJ Matthews' garden, from n[ea]r Lake Harris [wrong locality], 7



Figure 43. *C. lindsayi*: A. Habit; B. Capitulum (top view); C. Capitulum (lateral view); D. Adaxial (left) and abaxial (right) surfaces of a leaf. B, C, D from OTA (*P. Saldivia* 2516, Nugget Point, Coastal Otago). A from the same locality but without collection. Scale bar: 2 cm.

Mar 1905, *H.J. Matthews s.n.* (WELT SP004436); Cannibal Bay, 2 m, 28 Jan 2017, *P. Saldivia* 2538 (OTA); *ibid.*, 9 Dec 2016, *P. Saldivia* 2517 (OTA); Catlins Region, Pillans Head, *E. Phillips s.n.* (AK 34937); Catlins River, South Head, *T. Kirk s.n.* (AK 242364); *ibid.*, 4 Feb 1885, *T. Kirk s.n.* (WELT SP004438, SP004439); Cliffs S[outh] of Catlin's River, *D. Petrie s.n.* (WELT SP004440); Clutha Co[unty], sea cliffs south of Catlins River, *D. Petrie s.n.* (WELT SP004432, SP004433); Cultivated, sine loco, *collector unknown* (WELT SP004441); Cult.[ivated]? ex Mt Bonpland? [wrong locality], *J.*

Buchanan s.n. (WELT SP004446); Cultivated, [probably from H.J. Matthews Garden in Dunedin, the original collection location is unknown], *H.J. Matthews s.n.* (WELT SP004442); E[ast] coast of Otago, Nuggels [Nugget Point], 3 Oct 2002, *L. Cockayne s.n.* (WELT SP004443); Long Point, Catlins, 10 m, 10 Feb 2002, *collector unknown* (OTA 61493); Mt Franklyn [wrong locality], 30 Dec 1912, *J. Crosby-Smith s.n.* (WELT SP004431); near Nuggels [Nugget Point], *collector unknown* (WELT SP004445); Nugget Point, *D. Petrie s.n.* (AK 9740); *ibid.*, *W. Martin s.n.* (WELT SP046945); *ibid.*, 13 Feb 2003, *L. Cockayne s.n.* (WELT SP004444); *ibid.*, 25 Nov 1956, *collector unknown* (OTA 3880); *ibid.*, Dec 1942, *G. Simpson Herbarium s.n.* (CHR 201348); *ibid.*, Nov 1964, *G.I. Collet s.n.* (CHR 150485, 150488); *ibid.*, 6 m, 30 Sep 1967, *collector unknown* (OTA 19500, 19591); *ibid.*, 6 Mar 2006, *collector unknown* (OTA 60728); Nugget Point, near lighthouse, 1 May 1994, *W.R. Sykes s.n.* (CHR 497029); Nugget point, near the nuggets, 30 m, 10 May 1986, *collector unknown* (OTA 44715); Nuggets Point, 22 m, 9 Dec 2016, *P. Saldivia 2515* (OTA); *ibid.*, 69 m, 9 Dec 2016, *P. Saldivia 2516* (OTA); on sea-cliffs, *H.B. Matthews s.n.* (AK 9738, 9739); south head of Catlins River, *collector unknown* (WELT SP004437); south head of Catlins River, margins of forest facing the sea, *T. Kirk s.n.* (WELT SP029655); south of Nugget Point, on coast by Jacks Blow Hole, just south of Jacks Beach, 28 Dec 1983, *D. Smith & S. Smith s.n.* (AK 273302); Tahakopa Bay, 9 m, 18 Jan 1963, *J. Short s.n.* (WELT SP096193); False Inlet [Islet], 4 m, 29 Apr 1978, *collector unknown* (OTA 37404); Wallace Head, 30 m, 2 Jan 1978, *collector unknown* (OTA 36679).

- 25. CELMISIA BONPLANDII** (Buchanan) Allan, Fl. New Zealand I: 624. 1961. *Erigeron bonplandii* Buchanan, Trans. & Proc. New Zealand Inst. 19: 213. 1887. **TYPE: NEW ZEALAND.** South Island, Bold Peak, 4500 ft, 25 Dec 1927, *H.H. Allan s.n.* (neotype: CHR 6301! designated by Allan 1961: 625). Originally described from “Mount Bonpland” in the Humboldt Mts, the same mountain range as the neotype’s provenance.

Celmisia discolor Hook.f. var. β , Bot. Antarct. Voy. II. (Fl. Nov.-Zel.) 1: 123. 1853.

Stout, decumbent, loosely branched **shrub**, forming loose cushions or small patches up to 20 cm tall. **Leaves** clustered at the distal part of the branches forming apical loose rosettes, pseudo-petiolate, new ones straight upwards but soon becoming spreading or patent, and finally revolute when old; lamina obovate to oblanceolate, coriaceous, 5–10 × (–1.8)2–2.5(–3) cm, apex angle acute or obtuse, apex shape straight to convex, often mucronate, base decurrent; adaxial surface viscid, glabrous, green, lustrous, midvein and two secondary veins running on each side of the midvein following the leaf margin, conspicuous, impressed; abaxial surface densely covered (blade not visible) with a thick, white indumentum layer of flagellate aseptate trichomes, and sparse non-stalked glandular trichomes beneath, midvein raised, conspicuous, secondary veins hidden beneath the tomentum; margin conspicuously serrate, with ca 10 distant teeth along each side of the lamina, and a terminal one at the end of the midvein, flat; sheath parallel-sided, glabrous, lustrous, purple, enclosing the stem, venation parallel, multi-nerved, conspicuously raised (grooved) on the abaxial surface. **Peduncle** 15–25(–30) cm long, viscid, green, often with a purplish tinge, with few distant foliaceous bracts 20–25 mm long, linear, apex angle acute, apex shape straight. **Involucre** short-cylindrical at anthesis, 12–16 × 9–12 mm. **Phyllaries** arranged in 6–7 series gradually longer and recurved from the outer to the inner ones, viscid, linear-lanceolate, apex angle acute, straight to acuminate, green to purplish towards the base; outer ones 4–5 × 0.9–1 mm; inner ones 12–15 × 1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 30–50, arranged in 3–4 rows, white. **Disc florets** 60–100, tube 6–7 mm long, lobes 1–1.5 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae 2.5–2.8 mm long; appendage 0.5 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 200 μ m long, filament collar wider than the filament; style branches ca. 2 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.5 mm long, apical papillae 40–60 μ m long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 2–3 row and diminutive outer setae; bristles irregular in length, 4–5 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5-ribbed, covered with twin trichomes. Fig. 44.

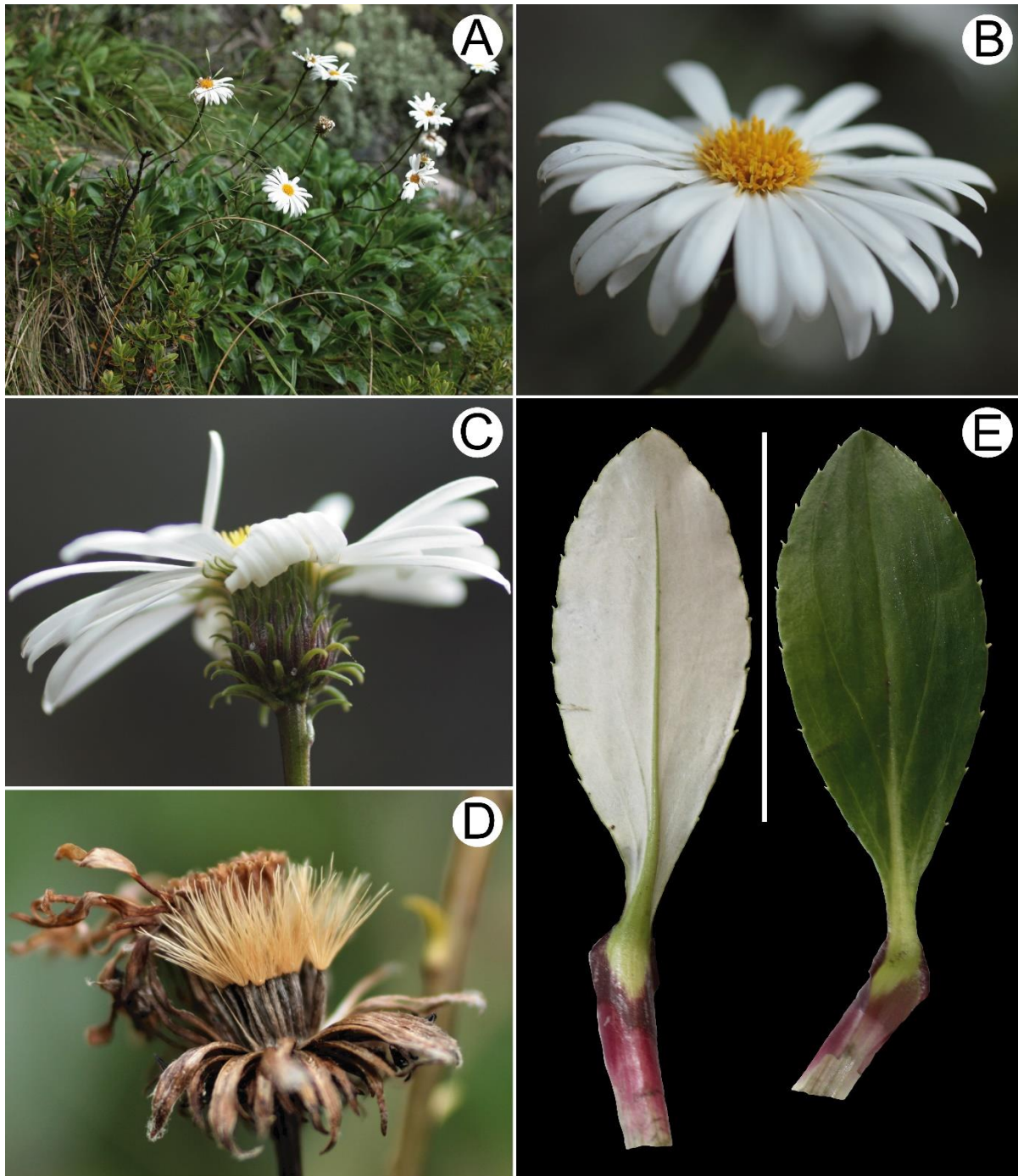


Figure 44. *C. bonplandii*: A Habit; B. Capitulum (top view); C. Capitulum (lateral view); D. Cypselae in dispersion; E. Adaxial (left) and abaxial (right) surfaces of a leaf. A–D from OTA (*P. Saldivia 2540*, Humboldt Mts, western Otago). Scale bar: 5 cm.

Notes: Hooker (1853) described *Celmisia discolor* var. β from a collection made by D. Lyall in Milford Sound. Two original materials at Kew (Herbarium Hookerianum, K 882085 [image!] and K 882086 [image!]) are probably duplicates. Hooker (1853), however, expressed some doubts concerning the inclusion of var. β as part of *Celmisia discolor*. He wrote: “Of the var. β I have no flowers, and it may belong to a different species: the leaves are pale green, larger, 1 1/2–2 inches long, not so coriaceous, plane on the surface (not furrowed), elliptical, acute and apiculate, with a distinct petiole

and smooth furrowed sheaths; bractea broader, silvery below and green above.” Both specimens match the general size and leaf morphology of *C. bonplandii*. Besides, *C. bonplandii* is a common plant in subalpine and alpine areas of the Milford Sound area.

Kirk (1899) placed *Erigeron bonplandii* (\equiv *Celmisia bonplandii*) as a synonym of the coastal endemic *C. lindsayi* (although with a confusing statement; see details in Cockayne 1906). This proposal was followed by Cheeseman (1906, 1925) but not by Allan (1961), who considered them different taxa and made the combination in *Celmisia* for *E. bonplandii*. Allan (1961), however, erroneously mentioned that in *C. bonplandii*, the base of the anthers is tailless, probably, I assume, confused by the same mistake carried on by Hooker (1890) regarding *C. lindsayi*. Despite the above, there are clear morphological differences between the two species. For example, the leaves are obovate to oblanceolate with the base decurrent forming a pseudopetiole, and at least the outer rows of phyllaries are strongly recurved at anthesis in *C. bonplandii*, while in *C. lindsayi*, the leaves are oblanceolate-oblong to oblanceolate-elliptic with the base attenuate (not decurrent), and the phyllaries are appressed at anthesis.

Distribution: South Island. South of West Coast, West of Otago, and Southland. Widespread along the mountains, especially in the high rainfall areas, concentrated from the south of Mt Aspiring National Park (Waipara Range) southwards (Fiordland National Park). Further north, it has been scarcely recorded from west of Franz Josef Glacier (Fig. 41).

Habitat: Subalpine to high alpine (750–1700 m). Common on rocky outcrops in snow tussock-herbfield, and rocky, shady areas at higher altitudes.

Etymology: Refers to Mt Bonpland, from where it was originally described.

Other descriptions: Allan (1961: 624–625).

Illustrations: Mark & Adams (1995: plate 55).

Additional collections. SOUTH ISLAND. West Coast. Mt Moltke, 22 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005880); Waipara River, upper, Waipara Range, 1310 m, 18 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20816, 60510); Waitangi Taona, Darnley Creek, 1500 m, 25 Jan 2013, *J. Mace s.n.* (CHR 645794). **Otago.** Barrier Range, Red Hills, northwest Otago, 883 m, 9 Dec 1969, *A. Mark s.n.* (OTA 27248); *ibid.*, 1158 m, 9 Dec 1969, *A. Mark s.n.* (OTA 27257); Bold Peak, Humbolt Mts., 1524 m, 12 Jan 1974, *C.D. Meurk s.n.* (OTA 34457); Cosmos Creak, Col, Brightburn, Mt. Aspiring, 1691 m, 15 Feb 1968, *A. Mark s.n.* (OTA 21141); Glacier Burn Track, 1101 m, 5 Feb 2017, *P. Saldivia 2544* (OTA); *ibid.*, 1116 m, 5 Feb 2017, *P. Saldivia 2540* (OTA); Lake Harris, *W. Thomson s.n.* (WELT SP046597); Lake Wakatipu, Tooth Peak, 7 Apr 1921, *W.D. Reid s.n.* (AK 34939); *ibid.*, 1200 m, 7 Apr 1921, *W.D. Reid s.n.* (AK 242288); *ibid.*, 1350 m, 7 Apr 1921, *W.D. Reid s.n.* (AK 34940); Margaret Burn, Barrier Range, 1280 m, 27 Jan 1968, *A. Mark & P.M.F. Smith s.n.* (OTA 20758); Mt Alta, *D. Petrie s.n.* (WELT SP044646, SP046729); Mt Bonpland, 1219 m, *D. Petrie s.n.* (WELT SP004454); Mt Savage, Humbolt Mts., 1219 m, 22 Feb 1968, *A. Mark s.n.* (OTA 20527); Mts. above Lake Harris, 11 Jan 1877, *T. Kirk s.n.* (WELT SP004457); N.W. fr. [northwest from] Lake Wakatipu, Lake Harris, Feb 1911, *D. Petrie s.n.* (WELT SP046725); Nr [near] Lake Wakatipu, Mt Bonpland, *D. Petrie s.n.* (WELT SP046730); Rock Burn Valley, Mt. Aspiring, 1158 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20544); Route Burn, north branch, 1066 m, 11 Dec 1967, *A. Mark & M.L. Burke s.n.* (OTA 21089); Routeburn, *H.J. Matthews s.n.* (WELT SP046588); southwest, *J. Speden s.n.* (WELT SP046589); Sugarloaf Pass, Rock Burn Valley, 1371 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20564). **Southland.** Aparima River, south branch, 16 Feb 1974, *collector unknown* (OTA 34411); Cascade Cove, Dusky Sound, near Indian Island, 914 m, 11 Feb 1969, *collector unknown* (OTA 34107); Cleughearn Peak, lake Monowai, 1219 m, 25 May 1953, *A. Mark s.n.* (OTA 6051); Clinton saddle, 762 m, Jan 1892, *D. Petrie s.n.* (WELT SP046724); Darran Mts., crest of ridge dividing Sinbad Cirque from Transit River, 1200 m, 10 Jan

1963, D.E. Cooper s.n. (AK 101075); Excelsior Peak, 1524 m, 2 Feb 1971, A. Mark s.n. (OTA 34016); Fiery Col, 1737 m, 28 Jan 1974, W. Lee & A. Mark s.n. (OTA 35658); Fohn Peak, Brightburn, 1524 m, 16 Dec 1968, A. Mark s.n. (OTA 21144); Gertrude saddle, 1150 m, 29 Dec 1985, A. Mark & K. Dickinson s.n. (OTA 44504); Homer Cirque, Dec 1943, J.T. Salmon s.n. (WELT SP004458); *ibid.*, 30 Dec 1944, W.R.B. Oliver s.n. (WELT SP005882); Homer Forks, Dec 1944, W.R.B. Oliver s.n. (WELT SP004460); *ibid.*, 12 Dec 1944, W.R.B. Oliver s.n. (WELT SP005881); Homer Tunnel, 930 m, 17 Jan 1970, B.S. Parris & J. Croxall s.n. (AK 122048); *ibid.*, 20 Jan 1967, B.S. Parris s.n. (AK 129400); Homer Tunnel, Fiordland, A. Mark s.n. (OTA 60511); *ibid.*, 1158 m, 11 Jan 1968, A. Mark & N. Adams s.n. (OTA 218922); *ibid.*, 1066 m, 10 Jan 1968, A. Mark & N. Adams s.n. (OTA 218921); Lake Eyles, above, 1280 m, 11 Feb 1973, A. Mark s.n. (OTA 33942); Lake Monowai, Mt Cleughearn, 1372 m, W. Thomson s.n. (WELT SP046599); Lake Te Anau, Clinton saddle, D. Petrie s.n. (AK 9735); Lake Wapiti, upper Dome Valley Fiordland, 1219 m, 30 Dec 1970, A. Mark s.n. (OTA 30558); McKenzie Burn, upper, Murchison Mt, Fiordland, 1280 m, 12 Feb 1973, A. Mark s.n. (OTA 33737); Milford Sound, D. Lyall s.n. (K 882085 [image!], 882086 [image!]); *ibid.*, Arthur River, 19 Dec 1944, W.R.B. Oliver s.n. (WELT SP005745); Mt Alexander, Caswell Sound, Above timber line, 1524 m, 29 Mar 1949, V.D. Zotov s.n. (CHR 71111); Mt Burns, 1066 m, 22 May 1967, A. Mark J. Wells s.n. (OTA 18941); *ibid.*, 1580 m, 24 Jan 2006, A. Mark s.n. (OTA 60375); Mt Tutoko, saddle, 1219 m, 21 Feb 1967, J. Wells & A. Mark s.n. (OTA 18231); ridge above Borland saddle, 1160 m, 31 Jan 1978, J.F. West s.n. (OTA 64516); Rim of Takahe Valley cirque, 1219 m, 20 Feb 1952, W.R.B. Oliver s.n. (WELT SP005878); Takahe Valley, 19 Feb 1952, W.R.B. Oliver s.n. (WELT SP005877); *ibid.*, 1460 m, 12 Dec 1972, A. Mark s.n. (OTA 32949); Takahe Valley, cirque, 18 Feb 1952, W.R.B. Oliver s.n. (WELT SP005873, SP005876); upper Hollyford Valley, 2 Jan 1945, W.R.B. Oliver s.n. (WELT SP004461, SP005883); upper Hollyford Valley, at Homer Forks, Dec 1944, W.R.B. Oliver s.n. (WELT SP004459).

26. CELMISIA SINCLAIRII Hook.f.

Decumbent, loosely branched **shrub**, forming loose cushions or mats up to 15–20 cm tall. **Leaves** clustered at the distal part of the branches forming apical loose rosettes, pseudopetiolate, new ones straight upwards but soon becoming spreading; lamina oblanceolate (rarely elliptic), slightly coriaceous, 3–7.5 × 0.8–1.6 cm, apex angle obtuse or acute, apex shape convex, often mucronate, base decurrent; adaxial surface glandular or viscid, green, or loose to densely arachnoid-tomentose, glaucous to pale-grey depending of the density of the indumentum, midvein and two impressed secondary veins running on each side of the midvein following the leaf margin, conspicuous, impressed; abaxial surface glandular, green, or densely covered (blade not visible) with a white layer of arachnoid to satiny indumentum of flagellate aseptate trichomes, and sparse to abundant non-stalked glandular trichomes, midvein and secondary veins raised, conspicuous, but hidden beneath the tomentum in varieties *durietzii* and *allanii*; margin conspicuously serrate, with (–)6–10 distant teeth emerging on the edge of the adaxial surface along each side of the lamina, and a terminal one at the end of the midvein, flat (rarely undulate); sheath parallel-sided, surfaces glabrous, margin lanose towards the top, mostly white-hyaline to green or purplish, multi-nerved, raised on the abaxial surface. **Peduncle** 12–20 cm long, viscid, glandular, purple, rarely green with a purple tinge, often lanose in var. *allanii*, with few distant foliaceous bracts 10–30 mm long, linear, apex angle acute, apex shape straight. **Involucre** cylindrical at anthesis, 11–14 × 5–8 mm. **Phyllaries** arranged in 5–7 series gradually longer from the outer to the inner ones, often conspicuously recurved from the midpoint, especially the outer rows, viscid, sometimes with non-stalked glandular trichomes especially along the margins and/or lanose, linear-lanceolate, apex angle acute, straight to acuminate, green to purplish towards the base; outer ones 5–7 × 0.6–0.8 mm; inner ones 10–11 × 0.8–1 mm, apex fimbriate with long lanose white trichomes. **Ray florets** 35–50, arranged in 3–4 rows, white. **Disc florets** 50–70, tube 4.5–6 mm long, lobes 1 mm long, deltoid, reflexed at anthesis, with sparse biseriate non-glandular trichomes; anther thecae 2–2.5 mm long; appendage 0.5–0.7 mm long, linear-lanceolate to deltoid, apex shape straight, bases tailed 200 µm long, filament collar slightly wider than the filament; style branches 1.3–1.5 mm long, linear, stigmatic bands reaching 3/4 of the branch length or more, sterile appendage deltoid, 0.4–0.5 mm long,

apical papillae 30–60 µm long. **Pappus** of numerous barbellate bristles with spaced teeth arranged in 1–2 rows and diminutive outer setae; bristles irregular in length, 4–6 mm long with the longest ones reaching the corolla lobes. **Cypselae** 2.5–3 mm long, 5–ribbed, covered with twin trichomes.

C. sinclairii is an extremely plastic species. Three varieties are recognized based mainly on the leaf indumentum, glandularity, and general distribution patterns. Individuals with intermediate characters between varieties are not uncommon in overlapping distributional areas, especially between varieties *allanii* and *durietzii*. Nicol et al. (2024) recovered the three varieties as a clade.

Key to varieties of *C. SINCLAIRII*

1. Leaves densely amber glandular in both surfaces, green, arachnoid indumentum only present (not always) on the abaxial surface in the transition area between the lamina and the sheath

..... 26.1. ***C. sinclairii* var. *sinclairii***

1. Leaves glandular or viscid, green-glaucous to pale gray in the adaxial surface, and white, covered by a dense layer of lanose, felted, or satiny indumentum in the abaxial surface.

2. Adaxial leaf surface pale gray, densely covered by a thick layer of arachnoid-tomentose to floccose indumentum..... 26.2. ***C. sinclairii* var. *allanii***

2. Adaxial leaf surface green to green-glaucous, sometimes with a thin layer of loose arachnoid white tomentum..... 26.3. ***C. sinclairii* var. *durietzii***

26.1. CELMISIA SINCLAIRII [var. **SINCLAIRII**], Handb. N. Zealand Fl.: 132. 1864. *emend.* W. Martin, Trans. & Proc. New Zealand Inst. 66: 73. 1936. **TYPE: NEW ZEALAND.** South Island, Tarndale, Jan 1861, *Sinclair s.n.* (lectotype: K 882075 [image!] ex Herbarium Hookerianum designated by W. Martin 1936: 73; isolectotype: CHR 288143!). (Fig. 45).

Note: Hooker's original description of *Celmisia sinclairii* referred to two of the varieties here recognized, *C. sinclairii* var. *sinclairii* from Tarndale (*Sinclair*, leaves glabrous on both surfaces) and *C. sinclairii* var. *durietzii* from the Dun Mts (*Sinclair*, leaves white below). Martin (1936: 73–74) emended the description restricting *C. sinclairii* to the glabrous plant from Tarndale, excluding the other pubescent plant originally from Dun Mts as *C. allanii* var. *canescens* (here considered a synonym of *C. sinclairii* var. *durietzii*, see comments on var. *durietzii*).

Distribution: South Island. Eastern Tasman and Western Marlborough. Mountains on both sides of the Wairau Valley and Travers Range, from Mt Fishtail in the north to Tarndale in the south (Fig. 46).

Habitat: Subalpine to Low Alpine (900–1700 m). Tussock grassland, herbfield, and fellfield.

Etymology: After Dr A. Sinclair, who collected the type specimens.

Other descriptions: Allan (1961: 628–629).

Additional collections. SOUTH ISLAND. Tasman. Beebys Knob, 1341 m, 14 Jan 1971, *A. Mark s.n.* (OTA 30430); St Arnaud Mts. [= St Arnaud Range], 1372 m, Jan 1932, *W. Martin s.n.* (WELT SP046799); *ibid.*, 1524 m, Mar 1934, *W. Martin s.n.* (WELT SP046800); Travers Range, 1371 m, Apr 1962, *L. Moore s.n.* (CHR 200857); Travers Range, 2nd Basin, 1433 m, 22 Mar 1961, *M.J.A. Simpson s.n.* (CHR 521177); Travers Range, 2nd Basin, rock ledge at bushline, half-shade, 24 Apr 1962, *L.B. Moore s.n.* (CHR 129055). **Marlborough.** Bounds Range, [Mt] Schiza Valley, 1372 m, 5 Jan 1934, *W. Martin s.n.* (WELT SP046797); Bounds Range, Mt Schiza, 1372 m, 5 Jan 1934, *W. Martin s.n.* (WELT SP005748); Bounds Range, South of Wairau River, Mt Schiza, Jan 1933, *W. Martin s.n.* (CHR 9379); Mt Fishtail, Jan 1931, *W. Martin s.n.* (WELT SP046793); *ibid.*, 1372 m, Nov 1929, *W. Martin s.n.* (WELT SP046798/B); *ibid.*, 1524 m, *W. Martin s.n.* (WELT SP046798/A); Mt Fishtail, alpine

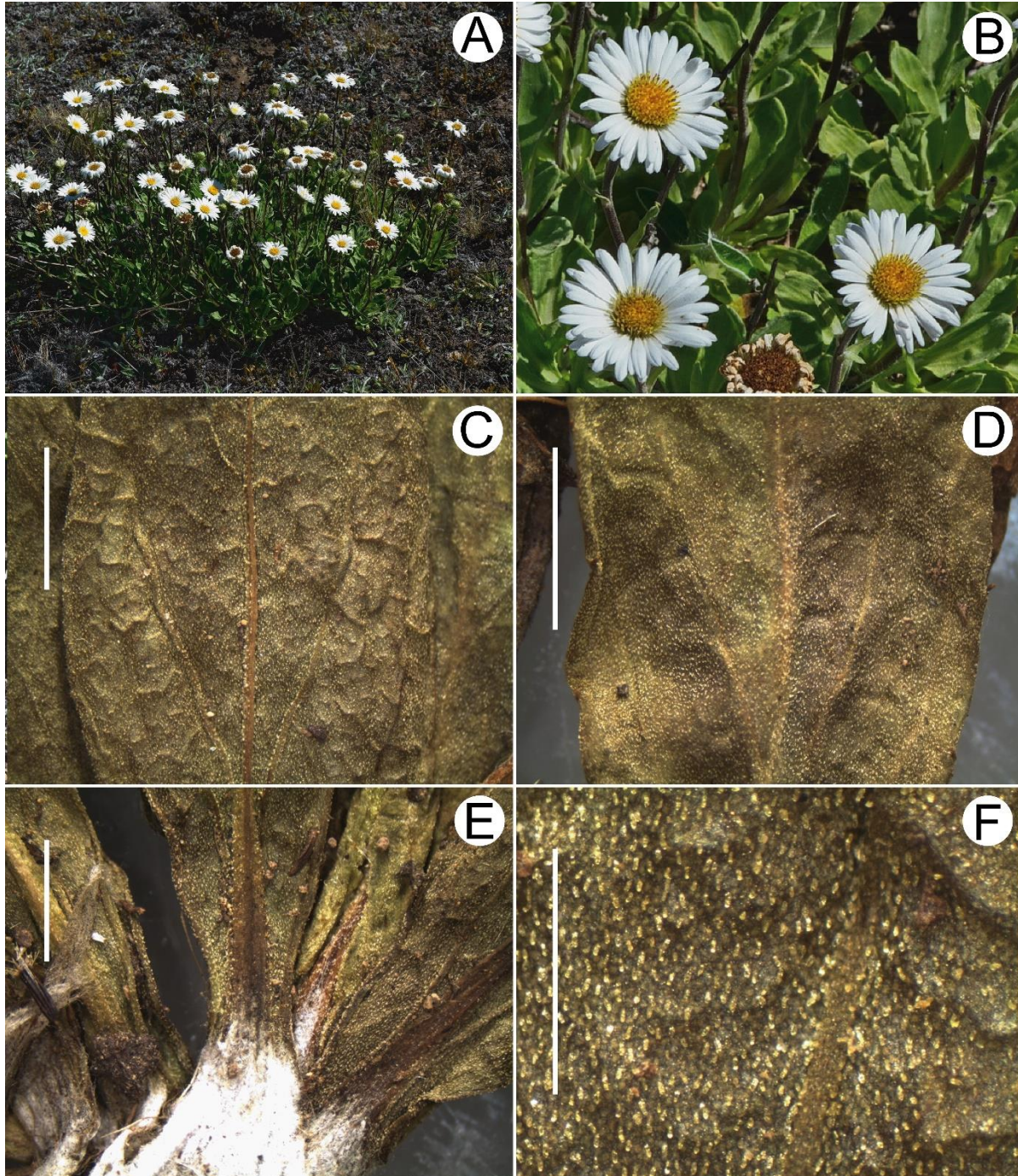


Figure 45. *C. sinclairii* var. *sinclairii*: A Habit; B. Capitula (top view); C. Abaxial surface of a leaf; D. Adaxial surface of a leaf; E. Base of a leaf showing white indumentum (abaxial surface); F. Detail to glands covering the abaxial surface of a leaf. C-F from OTA (*P. Saldivia* 2644, Tardale, Marlborough). A-B by David Lyttle at upper Wairau Valley (Marlborough). Scale bars: C-E: 5 cm. F: 1 mm.

herbfield, 21 Dec 1979, *B. Molloy s.n.* (CHR 386657); Mt Richmond, 1463 m, Feb 1980, *A.P. Druce s.n.* (CHR 365730); *ibid.*, 1585 m, 15 Apr 1905, *W. Martin s.n.* (WELT SP046801); Mt Richmond, north Peak, 1250 m, 19 Jan 1968, *B. Sneddon s.n.* (WELT SP091146); Mt Schiza, 5 Jan 1934, *W. Martin s.n.* (WELT SP046794, SP046796); *ibid.*, 1372 m, Jan 1933, *W. Martin s.n.* (WELT SP046792, SP046795, SP046802/A-B); Tardale, 1039 m, 23 Feb 2018, *P. Saldivia* 2644 (OTA); Wairau-Hammer

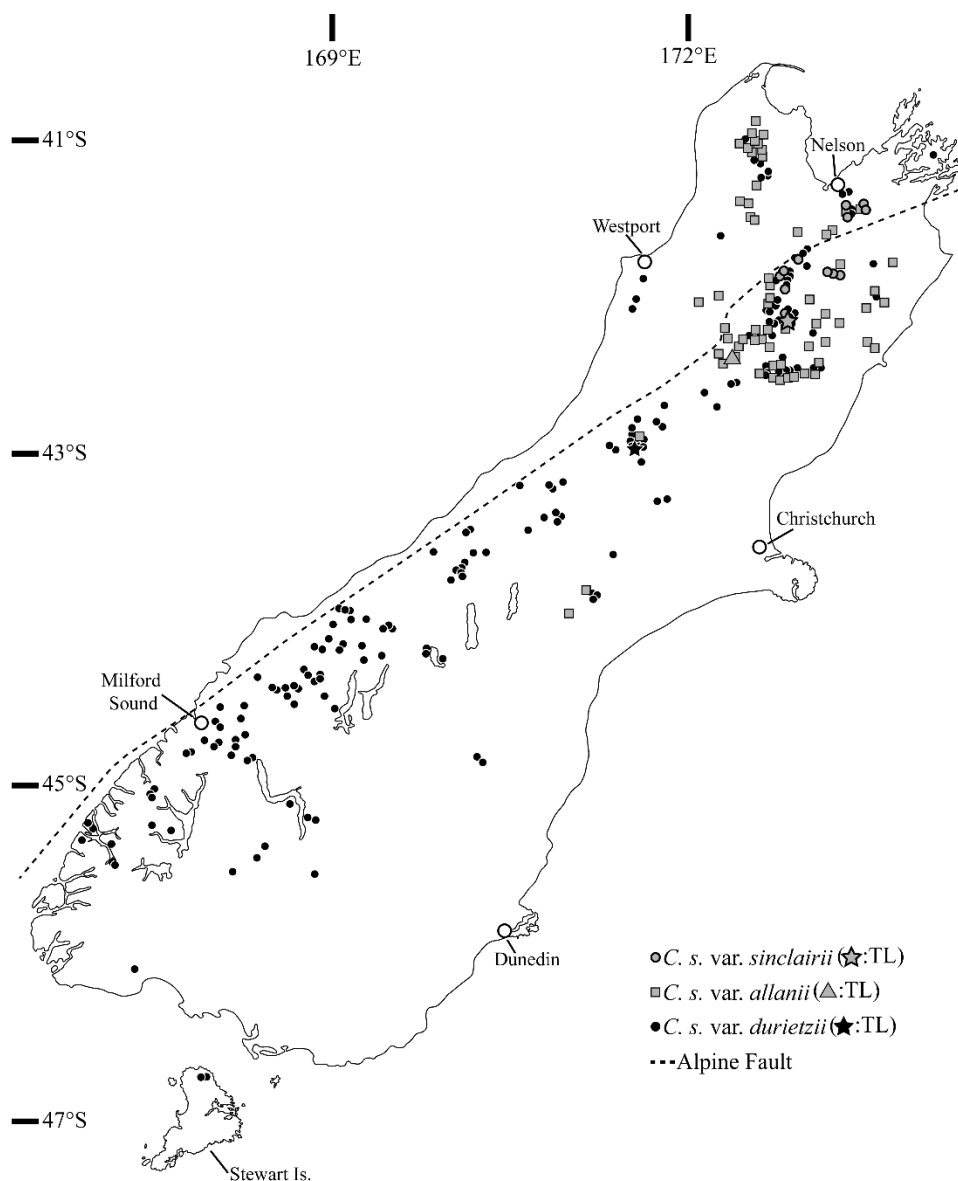


Figure 46. Distribution map of *C. sinclairii* in the South and Stewart Islands of New Zealand. TL: Type Locality.

Springs Hydro Rd, head of valley immediately south of Mt Weld, 1350 m, 2 Mar 2002, A.E. Wright 12900 (AK 281501).

26.2. CELMISIA SINCLAIRII var. **ALLANII** (W. Martin) Saldivia, **comb. et stat. nov.** *Celmisia allanii* W. Martin, Trans. & Proc. Roy. Soc. N. Z. Inst. 65: 181. 1935. **TYPE: NEW ZEALAND.** South Island, Mt Trovatore, 7 Feb 1928, H.H. Allan s.n. (holotype: CHR 75726!). (Fig. 48).

Celmisia incana Hook.f. var. *nivalis* Martin, Trans. & Proc. Roy. Soc. N. Zealand Inst. 65: 183. 1935. **TYPE: NEW ZEALAND.** South Island, Mt Schiza, Subalpine fellfield (meadow?), 5500 ft, Jan 1933, W. Martin s.n. (neotype: WELT SP045890! designated here).

Note: The holotype of *Celmisia incana* var. *nivalis* at the Herbarium of Plant Research Station, Palmerston North, which today corresponds to CHR (Wright 1984), has not been found. However, Martin (1935: 175) mentioned that “[...] may readily be distinguished from the typical *C. incana* by its dense, lax, lanate tomentum clothing both leaf-surfaces, the absence of obvious leaf-corrugations

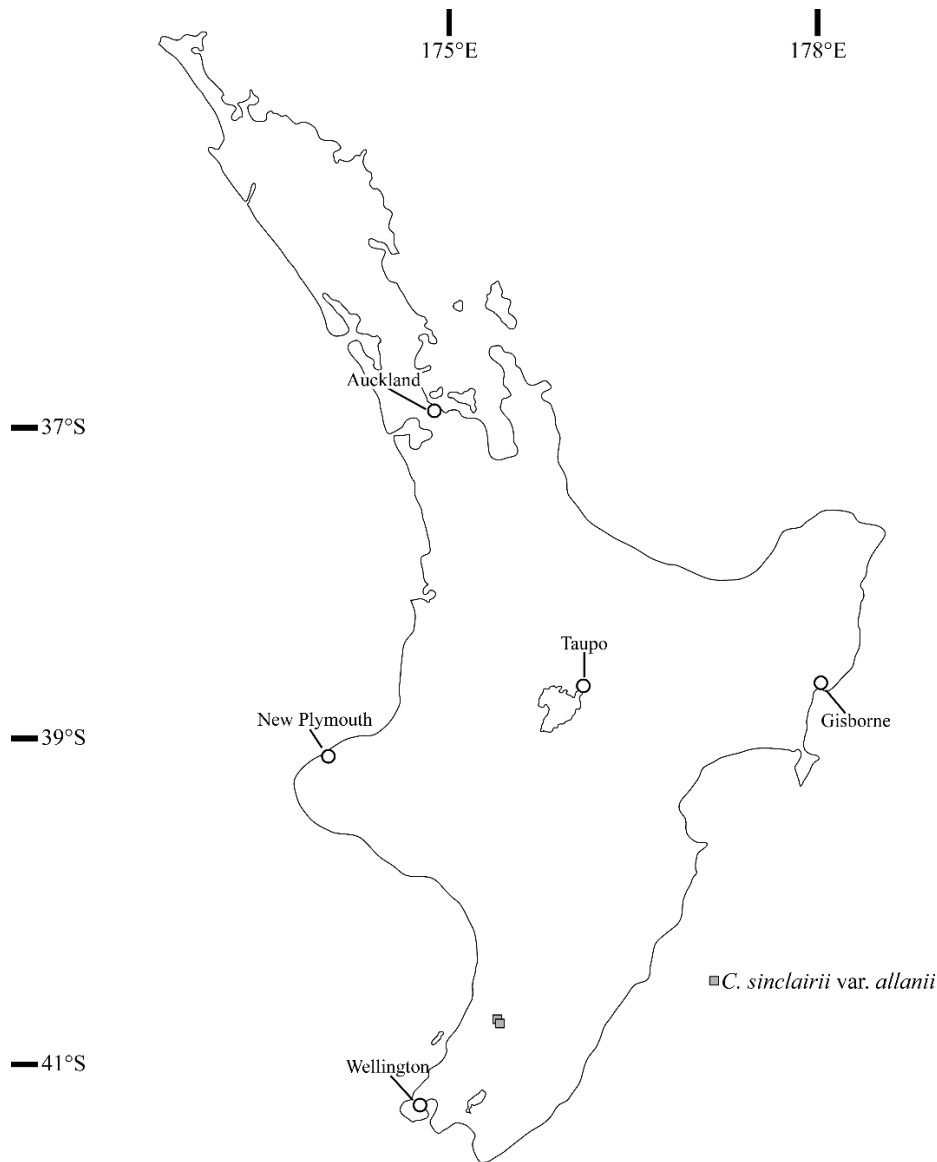


Figure 47. Distribution map of *C. sinclairii* in the North Island of New Zealand.

[furrowed leaves], and its conspicuously reflexed involucre bracts.” This description is clear enough to establish that it corresponds to the concept *C. sinclairii* var. *allanii* proposed here. There are two specimens at WELT (SP45890 and SP45891) from W. Martin’s herbarium labeled as “*C. allanii* var. *nivalis*” (tag name never published) from Mt Schiza, which is the type locality of *C. incana* var. *nivalis*. These two names likely refer to the same taxon, with the latter probably being a labeling mistake by W. Martin. Considering the above, I have selected WELT SP45890 as the neotype. This specimen includes three branches with abundant leaves, one peduncle each, and one complete involucre, which are morphological features that allow an unequivocal identification of the specimen.

Distribution: North and South Islands. Wellington, Tasman, northern West Coast, Marlborough, and Canterbury. It has been scarcely collected in the Tararua Range (Park Valley), and the adaxial indumentum of the leaves in plants from this area varies considerably, being intermediate with or approaching var. *durietzii*. Common in the north of the South Island, more or less continuously distributed from the Boulder Lake area, Mt Fishtail, and Black Birch Range in the north to Lewis Pass

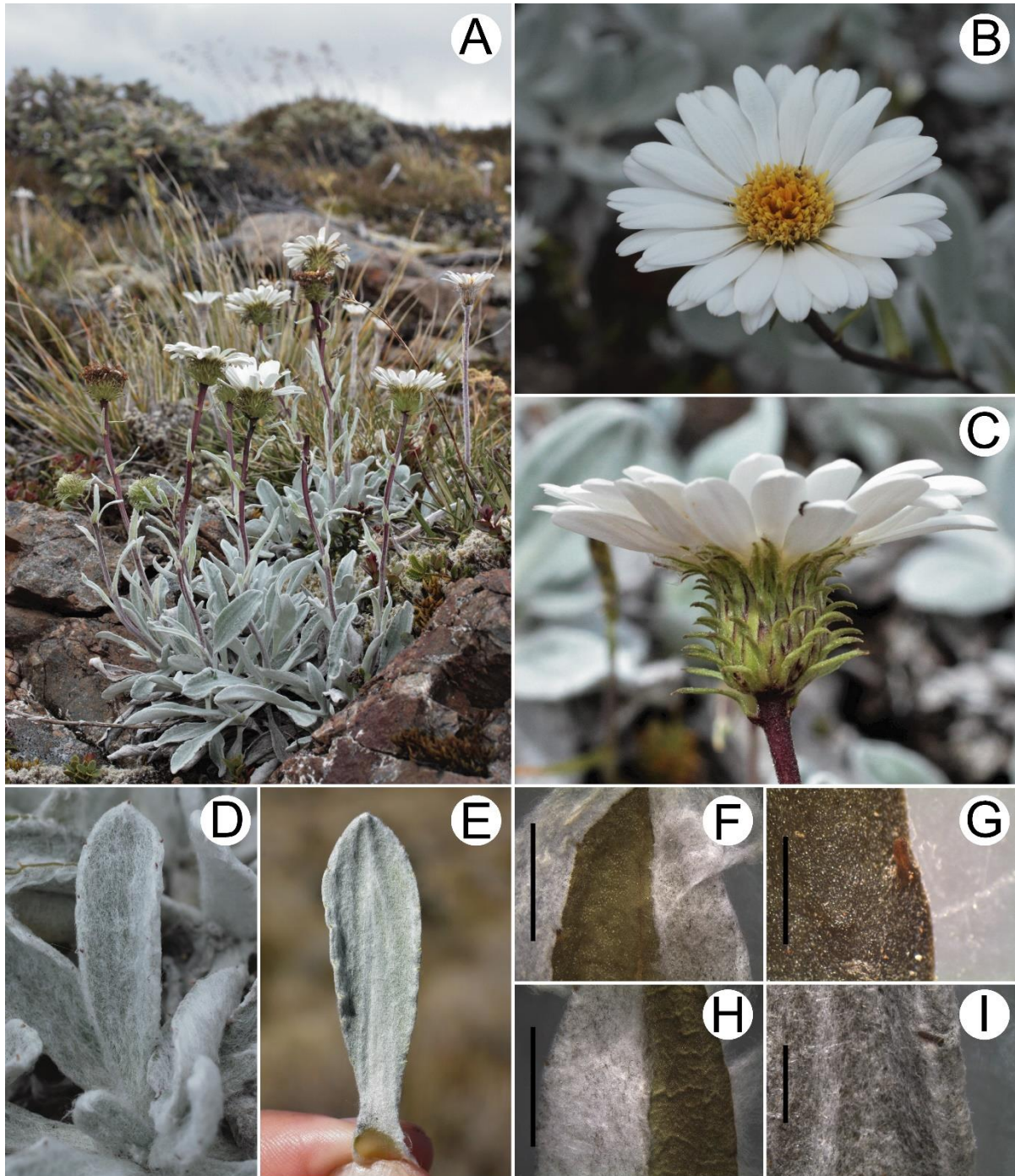


Figure 48. *C. sinclairii* var. *allanii*: A. Habit; B. Capitula (top view); C. Capitula (lateral view); D and E. Adaxial surfaces of the leaves; F. Adaxial surface of a leaf (indumentum partially removed); H. Abaxial surface of a leaf (indumentum partially removed); G and I. Teeth arising from the adaxial surface of the leaves (indumentum removed in G). A–C, F, H, I from OTA (*P. Saldivia* 2676, Lake Peel, Tasman); D, G from OTA (*P. Saldivia* 2652, Mt Technical, Lewis Pass); E from OTA (*P. Saldivia* 2638, Lake Tennyson, Marlborough). Scale bars: F–H: 1 cm. G–I: 1 mm.

and Hanmer Range in the south. A few collections have been made in the mountains of southeast Canterbury (Tara Haoa Range and Four Peaks Range) (Figs. 46, 47).

Habitat: Low to high alpine (800–1800 m). Snow tussock-herbfield and rocky outcrops.

Etymology: After H.H. Allan, one of the main figures of New Zealand botany.

Other descriptions: Allan (1961: 627).

Illustrations: Mark & Adams (1995: plate 53).

Additional collections. NORTH ISLAND. Wellington. Dundas Range, Tararua, Feb 1956, *A.P. Druce s.n.* (CHR 112745); Tararua Range, Park Valley Cirque, Jan 1989, *A.P. Druce* 38 (CHR 472200); Tararua Range, Park Valley, cult Taita, 1493 m, *A.P. Druce s.n.* (CHR 165307). **SOUTH ISLAND. Tasman.** [Cultivated], mts. of Nelson, from [H. H. Travers] Garden [Wellington], *H.H. Travers s.n.* (WELT SP086509); Boulder Lake, *collector unknown* (CHR 200787); *ibid.*, 840 m, 6 Jan 1962, *P. Hynes s.n.* (AK 150742); Boulder Lake, Lead Hill [Hills], 1524 m, 28 Jan 1963, *W. Burke s.n.* (WELT SP095799); Central Owen Range, Haypaddock [Hay Paddock], 1615 m, 14 Feb 1968, *C. Bell s.n.* (WELT SP095803); Cobb area, 10 Jan 1961, *M.E. Sexton s.n.* (AK 251520); Cobb Dam area, Mt Sylvester, 1050 m, 9 Jan 1961, *P. Hynes s.n.* (AK 70407); Cobb Valley, 29 May 1905, *D. Given & B. Given s.n.* (CHR 323435); *ibid.*, 1470 m, 17 Mar 2003, *D. Given & M. Ito* 3-0317-04 (CHR 570416); Culliford Hill, Owen Ra, Tussock-land, 1615 m, Jan 1972, *A.P. Druce s.n.* (CHR 249537); Devil Range, NW Nelson, tussock land on rocky ridge, 1700 m, Feb 1984, *A.P. Druce s.n.* (CHR 401033); Glenroy Valley, tall tussock grassland, 1435 m, 18 Jan 1985, *W.D. Burke* 348 (CHR 421120); Gordon's Knob, saddle above lookout, 16 Feb 1975, *M.J.A. Simpson* 7595 (CHR 285280); Iron Hill, 30 Dec 1942, *R. Mason s.n.* (CHR 36076); L. Sylvester, N.W. Nelson, 1524 m, 18 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 62775); Lake Peel, 1 Jan 1957, *A.E. Esler s.n.* (AK 215583); Lake Sylvester, Jan 1965, *G. Rickards s.n.* (WELT SP096310); *ibid.*, 1524 m, 18 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23050); *ibid.*, 1584 m, 18 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 21680); Mt Arthur, Tableland, 1067 m, 17 Apr 1965, *W.M. Fleming s.n.* (WELT SP096199); Mt Cobb, *F.G. Gibbs* 265 (CHR 141047); Mt Lockett, Mar 1903, *F.G. Gibbs s.n.* (AK 9746); Mt Mantell, *W. Townsend s.n.* (CHR 289179); *ibid.*, *W.L. Townson* 622 (AK 9745 [mixed collection, together with *C. discolor*]); *ibid.*, *W.L. Townson s.n.* (AK 243679); *ibid.*, Jan 1927, *A. Wall s.n.* (WELT SP043187); *ibid.*, 1524 m, 18 Jan 1922, *H.H. Allan s.n.* (AK 9744); *ibid.*, 1829 m, Jan 1927, *A. Wall s.n.* (WELT SP043185); Mt Peel, upper Cobb Valley, 1524 m, 12 Jan 1971, *A. Mark s.n.* (OTA 60406); Mt Roberts ridge, 1219 m, 28 Feb 1957, *R. Mason & M.T. Moore* 5067 (CHR 95935); Owen Range, Cullifords [Culliford] Hill, 1676 m, 13 Jan 1969, *C. Bell s.n.* (WELT SP095802); ridge above Lake Lillie, 1596 m, 18 Feb 2018, *P. Saldivia* 2623 (OTA); ridge S. [South] Baton River, 24 Jan 1956, *W.R.B. Oliver s.n.* (WELT SP005768); saddle between Lake Peel and Cobb Valley, 1489 m, 10 Jan 2019, *P. Saldivia* 2676 (OTA); shingle slopes of Mt Lockett, Cobb Valley, *F.G. Gibbs* 467 (CHR 6289); slopes of Iron Hill, 1463 m, 22 Jan 1962, *W. Burke s.n.* (WELT SP095804); Snowdon Range, 1524 m, April 1985, *A.P. Druce s.n.* (CHR 387844); Sylvester Lake, Jan 1962, *H. Talbot s.n.* (CHR 269033); Sylvester Lakes area, above Cobb Dam, 30 Jan 1970, *B.S. Parris & J. Croxall s.n.* (AK 242228); Travers [Valley, Range?], 1870, *H.H. Travers s.n.* (WELT SP046682, SP046683); Travers saddle, fell-field, 27 Jan 1962, *M.J.A. Simpson* 3588 (CHR 127660); Travers Valley, Spenser Mts., on rocks by stream, beech forest, 6 Feb 1947, *R. Mason s.n.* (CHR 58293). **Marlborough.** Acheron Valley, Molesworth Station, 28 Feb 1970, *L. Moore s.n.* (CHR 200778); Awatere Valley, Rachel Range, Mt Barefell, 1928 m, 21 Dec 1994, *P.J. de Lange* 3466 & *G.M. Crowcroft s.n.* (AK 235640); Clarence Ecological Region, Dillon Ecological District, Molesworth Station, Mt Chisholm, 26 Mar 1981, *J. Ulrich s.n.* (AK 160033); Dillon Cone, Dec 1926, *A. Wall s.n.* (CHR 289175); east side of Bounds, 1676 m, Dec 1931, *W. Martin s.n.* (WELT SP0045892); Hodder River valley, ridge down to Hodder Hut from pinnacle, 1030 m, 18 Feb 1981, *D.R. Given* 12560 (CHR 507805); Mt Balaclava, upper Wairau Valley, 1676 m, 16 Jan 1971, *A. Mark s.n.* (OTA 31614); Mt Chisholm, bare ground and tussock, 1524 m, 26 Mar 1981, *J. Ulrich s.n.* (CHR 369069); Mt Fishtail, Jan 1904, *J. McMahon s.n.* (WELT SP077133); Mt Patriarch, 1524 m, Feb 1934, *W. Martin s.n.* (WELT SP005762, SP045867, SP045868, SP045870); Mt Richmond, open herbfield, 29 Feb 1974, *C.J. & T.H.*

Webb 74110 (CHR 283720); Mt Schiza, S. side. In soil or rock, 1524 m, Jan 1932, *W. Martin s.n.* (WELT SP45891); NE of Mt. Patriarch, Jan 1974, *A.P. Druce s.n.* (CHR 273701); near summit Mt Patriarch, 1524 m, Feb 1934, *W. Martin s.n.* (WELT SP045871); northeast of Mt. Patriarch, scree margin, 1463 m, Jan 1974, *A.P. Druce s.n.* (CHR 273700); South of Altimarloch Trig, Black Birch Range, rock crevice, 1 Sep 1971, *E.M. Rivers & D.R. Given s.n.* (CHR 215817); summit, Mt Patriarch, 1524 m, Feb 1934, *W. Martin s.n.* (WELT SP045869); Tarndale Mts., 1921, *A. Wall s.n.* (CHR 289167); upper Leatham, open tussock grassland, 975 m, Feb 1971, *J.D. Hayward s.n.* (CHR 519587); upper Tone, 1300 m, Jan 1984, *P.A. Williams 74* (CHR 405266); Waihopai saddle, epiphytic on *Haastia pulvinaris*, 1524 m, 4 Jan 1934, *A. Brockett s.n.* (WELT SP45893); West of Mt Symons, Inland Kaikoura, Feb 1983, *A.P. Druce s.n.* (CHR 394173). **West Coast.** Ada saddle, 1371 m, 28 Apr 1905, *H. Talbot s.n.* (CHR 269079); Aorere Peak, 1585 m, 17 Jan 1970, *B. Sneddon s.n.* (WELT SP091092); *ibid.*, 1676 m, 17 Jan 1970, *W. Burke s.n.* (WELT SP095798); Douglas Range, 1219 m, 23 Feb 1946, *R. Mason s.n.* (CHR 34944); Drunken Sailors north aspect Douglas Range, 1523 m, *S. Raaijen s.n.* (CHR 415629); Lewis Pass, Deer Valley, Mt. Lucretia, 21 Jan 1978, *A.P. Druce & L.R. Stevenson s.n.* (CHR 312752); Lewis Pass, Freyberg Range, Mt Mueller, 1500 m, 22 Dec 1992, *R.P. Buxton s.n.* (CHR 479174); Lewis Pass, Mt Trovatore, 1524-1676 m, Feb 1927, *A. Wall s.n.* (WELT SP043186); Lewis Tops Track, 1372 m, 27 Feb 2018, *P. Saldivia 2649* (OTA); *ibid.*, 1512 m, 27 Feb 2018, *P. Saldivia 2652* (OTA); *ibid.*, 1516 m, 27 Feb 2018, *P. Saldivia 2653* (OTA); *ibid.*, 1568 m, 27 Feb 2018, *P. Saldivia 2654* (OTA); Lucretia ridge, near Lewis Pass, 21 Jan 1978, *C. Ogle s.n.* (WELT SP089381); Mt Luna, tussock land, 1645 m, Feb 1982, *A.P. Druce s.n.* (CHR 389025); Mt Peel, *J.A. Rattenbury s.n.* (AK 263811); *ibid.*, Jan 1965, *G. Rickards s.n.* (WELT SP096311); *ibid.*, 762 m, *H. Talbot s.n.* (CHR 326764); north branch of Wangapeka river, below Mt Luna, 23 Jan 1971, *B.H. McMillan 71/104* (CHR 219914); south-west of Lewis Pass on main divide, on rocks, 1219 m, 28 Dec 1962, *D.R. Given s.n.* (CHR 141738); Trovatore, Lewis Pass, 26 Mar 1967, *D.R. Given s.n.* (CHR 200780A-B); Victoria Range, Jan 1967, *J.S. Dugdale s.n.* (CHR 202013). **Canterbury.** Amuri, 1005 m, *T. Kirk s.n.* (OTA 16426); *ibid.*, 1200 m, *collector unknown* (AK 30917); Amuri Co [County], Mt Percival, 1524 m, 8 Feb 1914, *W. Morrison s.n.* (WELT SP086510); Amuri Co. [County], Mt. Miro Miro [Miromiro], 1219 m, 8 Feb 1914, *D. Petrie s.n.* (WELT SP086498, SP086507, SP086512); Amuri, Nelson, 1067 m, Jan 1875, *T. Kirk s.n.* (WELT SP046483/B); Amuri, St. James [Station], *T. Kirk s.n.* (WELT SP045884); *ibid.*, Jan 1895, *T. Kirk s.n.* (WELT SP045887); *ibid.*, 1067 m, *T. Kirk s.n.* (WELT SP046517); Christopher Range, Spenser Mts., 22 Feb 1947, *R. Mason s.n.* (CHR 58262, 58286); Clarence Valley, St. James [Station], 1067 m, Jan 1895, *T. Kirk s.n.* (WELT SP046483); Cultivated ex Mt Peel, 1676 m, *H.H. Allan s.n.* (AK 9741); Devils Peak, May 1979, *B. Molloy s.n.* (CHR 387964); Devils Peak, Fou Peaks Range, 1584 m, Apr 1979, *B. Molloy s.n.* (CHR 386741); Forster [Fowlers?] Pass, James Range, 1 Jan 1976, *M.J.A. Simpson 7783* (CHR 243981); Hanmer, *collector unknown* (WELT SP045563); Jacks Pass, Jan 1968, *G. Brownlie s.n.* (CHR 331424); *ibid.*, 2 Apr 1912, *L. Cockayne s.n.* (WELT SP046484); Jollies Pass, Feb 1921, *W. Martin s.n.* (WELT SP045875, SP045877); *ibid.*, 2 Oct 1938, *V.D. Zotov s.n.* (CHR 21128); Lake Tennyson, 1107 m, 23 Feb 2018, *P. Saldivia 2638* (OTA); Lake Tennyson, edge of tarn, Jan 1976, *L.R. Stemmer s.n.* (CHR 279757); Matakitaiki R. [River], Faerie Queene Basin, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP091091); Mt Charon, Hanmer, 1828 m, Jan 1927, *A. Wall s.n.* (CHR 289170); Mt Fyffe, forming sheets up to 2m across on south slopes, 1300-1500 m, 3 Jul 1971, *D.R. Given 71080* (CHR 205529); Mt Isobel, Jacks Pass, 29 Oct 1967, *M.J.A. Simpson s.n.* (CHR 200779); Mt Percival, 1828 m, Feb 1914, *W. Morrison s.n.* (CHR 289165); Mt St. Patrick, upper Clarence, Jan 1972, *D.R. Given s.n.* (CHR 228619); Mt Terako, scree, 1828 m, 4 Dec 1962, *M.J.A. Simpson s.n.* (CHR 122141); Mt Terako, scree slope facing SW, 30 Dec 1976, *M.J.A. Simpson s.n.* (CHR 207140); Mt. St. Patrick, 20 Jan 1976, *J. Petterson s.n.* (WELT SP095800); Mt Percival, Feb 1888, *J.B. Armstrong s.n.* (WELT SP086511); Phipps Peak, ridge leading from Arthur's Pass, 22 Dec 1965, *D.R. Given 65210* (CHR 175193); Spenser Mts., above Matakitaiki River (West branch), Faerie Queene, 1700 m, 12 Feb 1985, *B. Sneddon s.n.* (WELT SP083144); summit of Mt Charon, 13 Jan 1919, *T.L. Wright s.n.* (WELT SP086514); *ibid.*, 1 Mar 1912, *collector unknown* (WELT SP046486); *ibid.*, 1540 m, 1 Apr 1912, *collector unknown* (WELT SP046485); Tapuaenuku

[Tapuae-o-Uenuku], 1524 m, Dec 1915, *B.C. Aston s.n.* (WELT SP046765); Top of Jollies Pass, Feb 1921, *W. Martin s.n.* (WELT SP045876, SP045878); Uda [Una?] Valley, 1524 m, *R.M. Laing s.n.* (CHR 10226); W James Range, 21 Jan 1976, *M.J.A. Simpson 7787* (CHR 243989); Waiau, Amuri Co[unty], Waiauua [Waiau Valley], Glacier Gully, Feb 1865, *H.H. Travers s.n.* (WELT SP046516); Waimangarara stream, Kaikoura, sub-alpine scrub in clearings, 10 Dec 1985, *A. Huber s.n.* (CHR 569171); Western region of Amuri Co. [County], *W. Morrison s.n.* (WELT SP046733).

26.3. CELMISIA SINCLAIRII var. **DURIETZII** (Cockayne & Allan ex W. Martin) Saldivia, **comb. et stat. nov.** *Celmisia durietzii* Cockayne & Allan ex W. Martin, Trans. & Proc. Roy. Soc. N. Zealand Inst. 16: 75. 1936. **TYPE: NEW ZEALAND.** South Island, Arthur's Pass, Mar 1921, *W. Martin s.n.* (holotype: CHR 9376!). (Fig. 49).

Celmisia allanii W. Martin var. *canescens* W. Martin, Trans. & Proc. Roy. Soc. N. Zealand Inst. 65: 182. 1935. **TYPE: NEW ZEALAND.** South Island, St. Arnaud Mts., herbfield, 4500 ft, Jan 1932, *W. Martin s.n.* (neotype: WELT SP045874! designated here).

Notes: The holotype of *Celmisia allanii* var. *canescens* at the Herbarium of Plant Research Station, Palmerston North, which today corresponds to CHR (Wright 1984), has not been found. Additionally, the type locality, Mt. Arnaud, does not exist; still, it is most likely that Martin was referring to the St. Arnaud Range, east of Lake Rotoiti. Martin (1935: 182) described *Celmisia allanii* var. *canescens* as: “[...] *supra tomento cinereo in vita, in siccitate evidenter glabrata.*” This description is somehow confusing but otherwise fits the concept of *C. sinclairii* var. *durietzii* proposed here, in which some plants (across the whole distribution range of the variety) have a more or less deciduous thin arachnoid indumentum covering the adaxial surface of the leaves, which is less evident when dried; nonetheless, they are never cinereous, which is the feature that could link the description above with *C. sinclairii* var. *allanii*. However, all the materials I have studied from St Arnaud Range belong to *C. sinclairii* var. *durietzii* or the typical *C. sinclairii*, which agrees with Martin (1935, 1936), who only recorded *C. sinclairii* var. *sinclairii* and *C. sinclairii* var. *durietzii* (as *C. allanii* var. *canescens*) from St Arnaud Range, not *C. sinclairii* var. *allanii* (or *C. allanii* s. *stricto* under Martin's concept). Accordingly, I regard *C. allanii* var. *canescens* as a synonym of *C. sinclairii* var. *durietzii*.

Besides, Martin (1936: 74) added: “The subsequent discovery by me in the Dominion Museum herbarium [WELT] of a plant from Dun Mt. itself which closely matches Dr. Allan's tracing of the Kew specimen from the same locality, forces me to refer this latter plant to *Celmisia Allanii* var. *canescens* rather than to *C. Allanii* itself. All forms of *Celmisia Allanii* are tomentose on both surfaces, but on being dried the leaves in the case of var. *canescens* acquire a marked glabrous appearance on the upper surface.” There is one specimen from the Dun Mt at WELT (SP046720!, probably the one mentioned by Martin), which I also, without hesitation, place under *C. sinclairii* var. *durietzii*.

There are two specimens of *C. sinclairii* var. *durietzii* collected by W. Martin from St. Arnaud Range (as Mt St. Arnaud or St. Arnaud Mts.) that have a thin layer of arachnoid indumentum covering the adaxial surface of the leaves matching the description of *Celmisia allanii* var. *canescens*. Both specimens have labels with tag names that Martin never published, WELT SP045874 collected in Jan 1932 as “*Celmisia durietzii* var. *elegans*” (which was erased and changed to “*C. allanii* var. *congesta*”), and WELT SP095805 collected in 1934 as “*C. allanii* var. *congesta*”, indicating that Martin was still sorting out the identity of plants from St Arnaud Range a year before he formally described *Celmisia allanii* var. *canescens*. I have selected the former as a neotype because it has a floral branch with abundant leaves, a peduncle, and a capitulum.

Habitat: Subalpine to high alpine (700–1900 m). Common in snow tussock-herbfield and rocky outcrops. In Stewart Island grows in wet peaty grassland and herb moor (Mark & Adams 1995).

Etymology: After Dr. G. Einar Du-Rietz. Eminent Swedish botanist and ecologist.

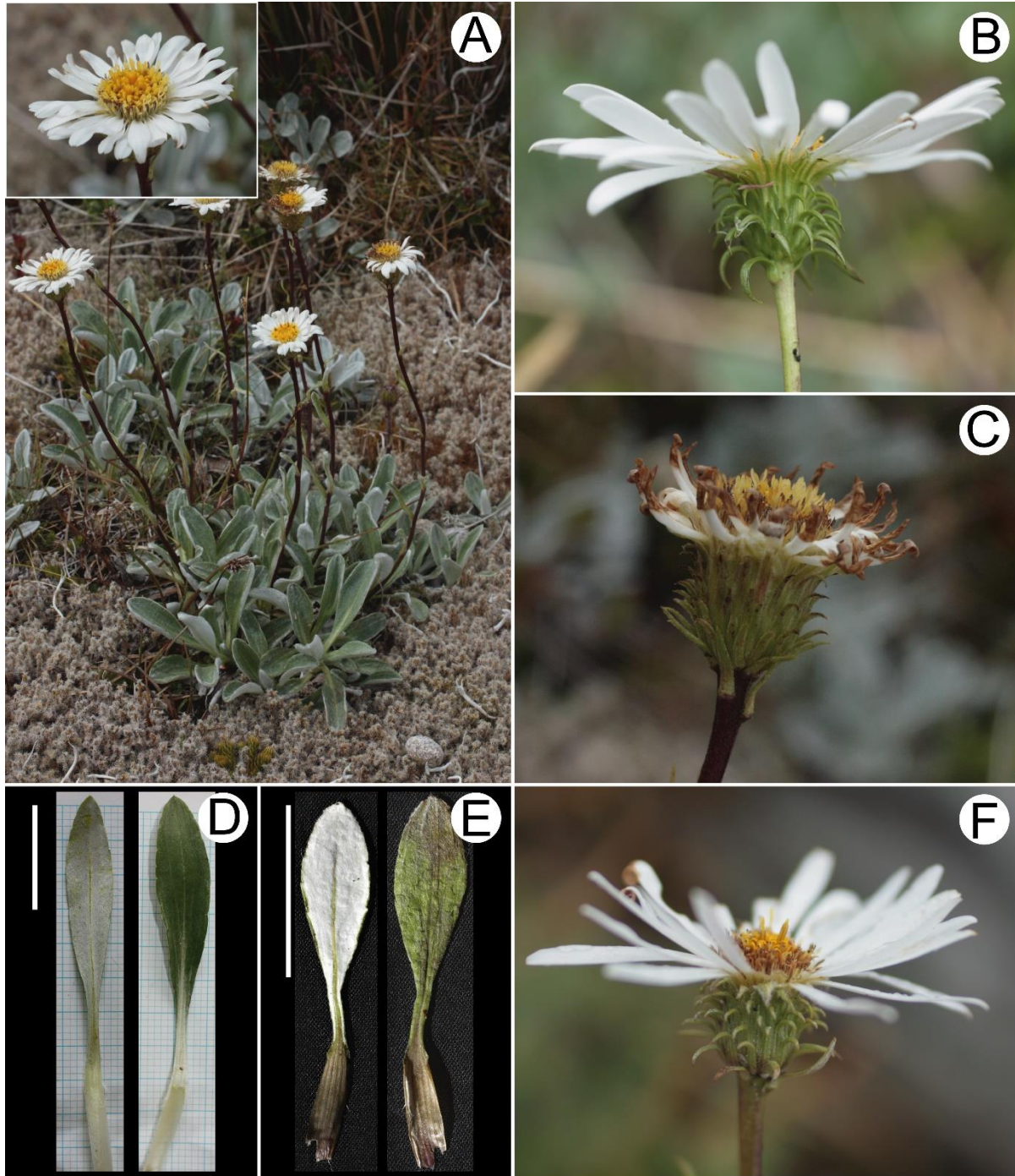


Figure 49. *C. sinclairii* var. *durietzii*: A. Habit (inset of capitulum, top view); B, C and F. Capitula (lateral view); D and E. Abaxial (left) and adaxial (right) surfaces of the leaves. A, C, E, F from OTA (*P. Saldivia* 2677, Lake Peel, Tasman); B from OTA (*P. Saldivia* 2541, Humboldt Mts, West Otago); F from OTA (*P. Saldivia* 2553, Mt Brewster, West Coast). Scale bar: 3 cm.

Other descriptions: Allan (1961: 623–624).

Illustrations: Mark & Adams (1995: plate 55), Eagle (2006: 765).

Distribution: South and Stewart Islands. Widespread, especially along the main divide. In the north of the South Island, it can be found growing together with variety *allanii*, and more rarely with var. *sinclairii*. In Stewart Island, it is confined to Hananui (Mt Anglem, the northern tip of the island). Plants from this locality have oblanceolate-elliptic and thicker leaves, with the base of the midvein conspicuously wide and yellowish in the adaxial surface (Fig. 46).

Additional collections. SOUTH ISLAND. Tasman. Above Lake Rotoiti, Mt Robert, 1395 m, 31 Jan 1965, *P. Hynes s.n.* (AK 104706); Beebys Knob, Beeby tops, Nelson, 1341 m, 14 Jan 1971, *A. Mark s.n.* (OTA 31487); east Sabine Valley, Spensers Mtn., 17 Feb 1947, *R. Mason s.n.* (CHR 58289); *ibid.*, 19 Feb 1947, *R. Mason s.n.* (CHR 58283); Fifth basin, Travers Range, Nelson Lakes, 14 Feb 1967, *M.J.A. Simpson 5088* (CHR 180035); Gordon's Knob, *collector unknown* (WELT SP046584); Lake Peel, 1 Jan 1957, *A.E. Esler s.n.* (AK 215600); *ibid.*, 1280 m, 21 Jan 1965, *B. Sneddon s.n.* (WELT SP091090); Lake Peel east of Mt track, Mt. Peel, 2 Jan 1964, *H. Talbot s.n.* (CHR 269058); Mt Arthur, *F.G. Gibbs 575* (AK 9711); Mt Arthur Range, *collector unknown* (WELT SP004456); Mt Arthur, north side, *collector unknown* (CHR 6292); Mt Robert, 1 Jan 1956, *G. Brownlie s.n.* (CHR 331416); *ibid.*, 120[0] m, 30 Dec 1959, *K.M. Wood s.n.* (AK 65410); *ibid.*, 1371 m, 23 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 23044); *ibid.*, 1413 m, 16 Feb 2018, *P. Salsdivia 2613* (OTA); Mt Roberts, Nelson Lakes, south slopes, 19 Mar 1961, *M.J.A. Simpson 2986* (CHR 120678); Mt St. Arnaud, 1524 m, 17 Apr 1905, *W. Martin s.n.* (WELT SP095805); Mt. Robert., 1280 m, 25 Jan 1963, *W. Burke s.n.* (WELT SP095801); ridge leading to Mt Arthur, 1370 m, 23 Nov 1952, *G.W. Mason s.n.* (AK 263769); saddle between Lake Peel and Cobb Valley, 1489 m, 10 Jan 2019, *P. Salsdivia 2677* (OTA); south end St. Arnaud Range, 1676 m, 1 Jun 1959, *M.J.A. Simpson 540* (CHR 110523); *ibid.*, rocks, 1371 m, Dec 1938, *M.J.A. Simpson s.n.* (CHR 110970); Spenser Mts, on rocks, *R.M. Laing s.n.* (CHR 10222); St A Ra [St Arnaud Range], 14 Dec 1950, *W.R.B. Oliver s.n.* (WELT SP005766); St Arnaud Mts., 1 Jan 1950, *T.W. Mellor s.n.* (AK 26157); St Arnaud Mts. [= St Arnaud Range], 1524 m, Jan 1932, *W. Martin s.n.* (WELT SP046964); St Arnaud Range, 1650 m, 27 Jan 1991, *K. Dickinson s.n.* (OTA 61275); St Arnaud Range, cirques north of Peanter Peak, 1750 m, 25 Jan 1991, *K. Dickinson & A. Butler s.n.* (WELT SP096140); St Arnaud Track from Lake Rotoiti, *P. Hynes s.n.* (AK 242229, 242230); *ibid.*, 24 Feb 1969, *P. Hynes s.n.* (AK 129464); *ibid.*, 1440 m, 2 Feb 1965, *P. Hynes s.n.* (AK 104742); *ibid.*, 1350 m, 24 Feb 1969, *M. Barr s.n.* (AK 120689); St. Arnaud Ra [Range], 11 Dec 1950, *W.R.B. Oliver s.n.* (WELT SP005761, SP006584); Travers Range, 2nd Basin., 22 Mar 1961, *M.J.A. Simpson 3105* (CHR 120795). **Nelson.** Dun Mtn., *T. Kirk s.n.* (WELT SP046720); Dun Mts. Range? No Catchews Hills, *F.G. Gibbs 626* (AK 9742). **Marlborough.** Awatere Valley, Rachel Range, 1513 m, 21 Dec 1994, *P.J. de Lange 3469 & G.M. Crowcroft s.n.* (AK 235643); Bert's Creek, 1090 m, 7 Jan 2002, *A.E. Wright 12786* (AK 281363); Bryant Ecological District, Nelson, *T. Kirk s.n.* (AK 11733); Mt Richmond, 5 Feb 1898, *F. Gibbs s.n.* (WELT SP044651); Mt Richmond, north Peak, 1219 m, 19 Jan 1967, *B. Sneddon s.n.* (WELT SP091093); Mt Richmond, steep rocky slope, Feb 1980, *A.P. Druce s.n.* (CHR 365732); Mt Stokes, Jan 1896, *T. Kirk s.n.* (WELT SP046721); Mts. above the Wairau Gorge, 1524 m, Jan 1878, *T.F. Cheeseman s.n.* (AK 9734); on rolling hills near Sedgemere Tarndale, 1127 m, Feb 1971, *D. Given 71047* (CHR 218415); Raglan Mts. [Range], 1372 m, *W. Martin s.n.* (WELT SP046992); Red Hills, Wairau Valley, Jan 1878, *T.F. Cheeseman s.n.* (CHR 10227); St Arnaud Range above Wairau Valley, 1440 m, 18 Apr 1965, *P. Hynes s.n.* (AK 104934); St Arnaud Range, Powder Lakes cirques (NE of Rainbow Ski field), 1540 m, 27 Jan 1991, *A. Butler s.n.* (WELT SP096143); St Arnaud Range, Rainbow Skifield, 1500 m, 22 Jan 1991, *A. Butler s.n.* (WELT SP096141); Stafford ridge, 18 Feb 1980, *D.R. Given 12283* (CHR 494230); summit of Malings Pass, upper, Wairau Valley, Easter 1967, *D. Given 67413* (CHR 178943A); upper Wairau Valley, Jan 1989, *J. Petterson s.n.* (WELT SP096145); upper Wairau, large river rising in Spenser Mts., it flows north between St. Arnaud and Raglan Ranges and then N.E. to the coast at Cloudy Bay, 14 Feb 1970, *H. Talbot s.n.* (CHR 269062); Wairau River, upper valley, 1066 m, 25 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 22435, 22437); Wairau Valley, Red Hills, Jan 1878, *T.F. Cheeseman s.n.* (AK 9712, 9743). **West Coast.** 1000 Acre Plateau, Matiri Range, 1432 m, Mar 1979, *A.P. Druce s.n.* (CHR 355095); Browning Pass, *collector*

unknown (AK 32177); Cave Camp, *J. Buchanan s.n.* (WELT SP046913); Copland Valley, 1066 m, 31 Jan 1947, *G.T.S. Baylis s.n.* (OTA 2462); Drake Range, Te Naihi Valley, 1371 m, 24 Jan 1969, *A. Mark s.n.* (OTA 23404); Five Finger Range, Joe Valley, 1158 m, 19 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21140); Grandeur ridge, Mt. Aspiring, 1524 m, 20 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21770); Haast Pass, Westland Side, 1219 m, 19 Feb 1962, *G.T.S. Baylis s.n.* (OTA 6969); Hills Peak, 1300 m, 12 Jan 1898, *L. Cockayne s.n.* (AK 9993, WELT SP046567); Kelly's Hill, 1158 m, Jan 1893, *D. Petrie s.n.* (WELT SP046736/A); *ibid.*, 1219 m, Jan 1893, *L. Cockayne s.n.* (WELT SP046582, SP046587, SP046717); Kellys Hill, Otira, 30 Dec 1933, *W. Mackay s.n.* (CHR 108721); Kelly's Hill, Otira River, 1219 m, Jan 1893, *D. Petrie s.n.* (WELT SP046740); Lindsay Creek, Okuru Valley, 1341 m, 17 Jan 1969, *A. Mark s.n.* (OTA 23399); lower Okuru Valley, north side, 1005 m, 26 Jan 1969, *A. Mark s.n.* (OTA 23530); Marks Range, Lr Haast V, Mt Aspiring National Park, 1158 m, 15 Jan 1969, *A. Mark s.n.* (OTA 23361); *ibid.*, 1160 m, *A. Mark s.n.* (OTA 62771); Mt Barron, 1219 m, Jan 1890, *L. Cockayne s.n.* (WELT SP046580); Mt Barron, Otira, Tew banks of Goat Creek, 1219 m, 3 Jan 1956, *C.G. Brownlie s.n.* (CHR 331406); Mt Brewster, 1524 m, 29 Jan 1967, *A. Mark J. & Wells s.n.* (OTA 17896); Mt Brewster Track, 1117 m, 5 Feb 2017, *P. Saldivia 2554* (OTA); *ibid.*, 1528 m, 19 Feb 2017, *P. Saldivia 2553* (OTA); Mt Buckland near Westport, 1219 m, *W.L. Townson 339* (AK 9713); Mt Moltke, 22 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005760, SP005879); Mt Peel, Jan 1965, *G. Rickards s.n.* (WELT SP096312); Mt Peel, damp ground by stream, 650 m, *collector unknown* (CHR 10221); Mt Peel, on rocks, 1 Jan 1951, *J.A. Hay s.n.* (CHR 108443); Mt Warren, spur, Turnbull Range, 1005 m, 28 Jan 1969, *A. Mark s.n.* (OTA 23562); Mts. near Greymouth, 8 Apr 1905, *A. Wall s.n.* (CHR 289182); on shingle slip under Otira Glacier, 25 Jan 1898, *L. Cockayne s.n.* (WELT SP046571); Otira Gorge, head of, 22 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046813); Otira Track, 1098 m, 14 Feb 2018, *P. Saldivia 2603* (OTA); Paparoa Ranges, *W.L. Townson s.n.* (AK 247546); Rampart ridge, 1463 m, 25 Jan 1969, *A. Mark s.n.* (OTA 25861); Seddon Creek, 1220 m, 29 Jan 2013, *J. Mace s.n.* (CHR 645801); The Twirligig, Burke Valley, 1310 m, 8 Feb 1969, *A. Mark s.n.* (OTA 23442); Waitototo River, 1066 m, 20 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21145); Williamson Flat, Arawhata R. Mt Aspiring N.P., 1158 m, 16 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 21892); Wills River, upper, Haast, 1341 m, 5 Feb 1969, *A. Mark s.n.* (OTA 23567); Wills V. Haast R., Mt Aspiring N.P., 1128 m, 5 Feb 1969, *A. Mark s.n.* (OTA 62773); Wills Valley, upper, Haast River, 1127 m, 5 Feb 1969, *A. Mark s.n.* (OTA 23518). **Canterbury.** Above Arthur's Pass, Blimit peak, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046817, SP046814); *ibid.*, 1829 m, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046815); *ibid.*, 1219-1524 m, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046816); above Hanmer, Jacks Pass, 848 m, 28 Jan 1965, *P. Hynes s.n.* (AK 104768); Amuri, *T. Kirk s.n.* (WELT SP004452); Amuri Co [County], Mt Percival, 1922, *W. Morrison s.n.* (WELT SP046680); Amuri, Hanmer Range, Mt. Captain, 1676 m, *collector unknown* (OTA 16424); Amuri, Jack's Pass, 3 Feb 1914, *D. Petrie s.n.* (WELT SP046715); Amuri, Mt Captain Range, *T. Kirk s.n.* (WELT SP086571); Arthur's Pass, *collector unknown* (WELT SP046572); *ibid.*, *T. Cheeseman s.n.* (WELT SP046569); *ibid.*, 1 Jan 1940, *J.E. Attwood s.n.* (AK 34919); *ibid.*, 6 Jan 1898, *L. Cockayne s.n.* (WELT SP046570); *ibid.*, Jan 1883, *T.F. Cheeseman s.n.* (AK 9715); *ibid.*, 914-1219 m, *J.B. Armstrong s.n.* (WELT SP046714); *ibid.*, 940 m, 6 Jan 1898, *L. Cockayne s.n.* (WELT SP046713); Arthur's Pass, Blimit, below summit ridge, 20 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP006583); Ashburton Mts., *T.H. Potts s.n.* (WELT SP046719); Avalanche Peak, Arthurs Pass, 1676 m, 29 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 28040); Bealey Valley, Avalanche Gully, Mtn. above, 17 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046803, SP046806, SP046808, SP046809); Black Range, Bealey, Feb 1890, *Ball s.n.* (AK 263799); Clarence River, upper valley, 1219 m, 25 Dec 1967, *A. Mark & N. Adams s.n.* (OTA 22305, 22307); Clarence Valley, 1219 m, *T. Kirk s.n.* (OTA 16420); Clyde River, 1584 m, Mar 1937, *T. Barker s.n.* (CHR 108426); east face of Mt Torlesse, 900 m, 30 Dec 1901, *L. Cockayne s.n.* (AK 34932); Eric Stream, Two Thumb Range, 1005 m, Feb 1991, *A.P. Druce 1533* (CHR 472125); Far west region of Amuri Co.[County], *W. Morrison s.n.* (WELT SP046709/B); Hanmer Plains District, Mar 1899, *L. Cockayne s.n.* (WELT SP046585); Hermitage, track to Sealy Lakes, 27 Dec 1955, *K.M. Wood s.n.* (AK 48821); Hill to Peak, Arthur's Pass, 914 m, Feb 1927, *A. Wall s.n.* (CHR 290163); Hooker Glacier, Mt. Cook, 26 May 1966,

OUSA s.n. (OTA 14396); *ibid.*, 1066 m, 22 May 1966, *OUSA s.n.* (OTA 14381); Jollies Pass, Feb 1921, *W. Martin s.n.* (WELT SP046966); Lake Ohau, L.[Left] branch., *J. Buchanan s.n.* (WELT SP046896, SP046898/A-B); Lake Tennyson, 1107 m, 23 Feb 2018, *P. Saldivia 2639* (OTA); Low Plains Ecological District, Rangiora, *Keir s.n.* (AK 9714); lower Ranges Hanmer Springs, *D. Petrie s.n.* (WELT SP046742/A, SP046743); main divide, Lake Sumner Forest Park, 1676 m, Jan 1976, *D. Banks s.n.* (WELT SP096147); Mingha Valley, 15 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046807); Mons Sex Millia, Amuri Co.[County], *W. Morrison s.n.* (WELT SP046709/A); Mt Cook, *collector unknown* (WELT SP046538/A-B); *ibid.*, 1768 m, Mar 1911, *P. Graham s.n.* (WELT SP046745); Mt Dispute, Muller Valley, 1402 m, 18 Jan 1969, *A. Mark s.n.* (OTA 24411); Mt Ida Range, head of Otomatea R. [Otematata River], *D. Petrie s.n.* (WELT SP046590); Mt Isabel [Isobel], 14 Feb 1903, *A.P.W. Thomas s.n.* (AK 263843); Mt Isobel, summit ridge, 11 Jan 1919, *T.L. Wright s.n.* (WELT SP044654); *ibid.*, 9 Jan 1951, *W.R.B. Oliver s.n.* (WELT SP005875); Mt Ollivier, Sealy [Sealy] Range, 1219 m, 17 Feb 1919, *L. Cockayne s.n.* (WELT SP046586); Mt Peel, Oct 1919, *H.H. Allan s.n.* (WELT SP046675); Mt Percival, 914 m, 10 Feb 1914, *D. Petrie s.n.* (WELT SP046712); *ibid.*, 1158 m, 10 Feb 1914, *D. Petrie s.n.* (WELT SP046742/B); Mt Rolleston, 2134 m, 17 Jan 1928, *H. Anderson s.n.* (WELT SP046810); Mt Somers, *W. Martin s.n.* (WELT SP046965); Mt Terako, 16 miles NNE of Waiau, 1402 m, 26 Jan 1969, *B.H. Macmillan 69/35* (CHR 193833); Mt Terako, semi-stable scree to tussock grassland, 1000 m, 17 Feb 1985, *K.H. Platt s.n.* (CHR 519538); Mt Williams, 1524 m, 11 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046804); Mueller moraine, Mt. Cook, 1280 m, 1 Nov 1958, *Moar 1498* (CHR 97764); Mulate Brun Hut, Jan 1967, *P.A. Williams 535* (CHR 254796); near Mt Cook, Sealy [Sealy] Range, 1311 m, 14 Feb 1911, *D. Petrie s.n.* (WELT SP046708); *ibid.*, 1372 m, 14 Feb 1911, *D. Petrie s.n.* (WELT SP046744); near the Waimakariri River, fellfield below Mt Davie, 1676 m, 26 Dec 1946, *D. McQueen s.n.* (WELT SP078638); on spur between Eugenie and Hayter Glacier, Hooker Valley, rocky herbfield, 16 Feb 1970, *D.R. Given 70033* (CHR 202821); Otematata River, 914 m, Dec 1889, *D. Petrie s.n.* (WELT SP046594); Scarface, Tawera County, 29 Dec 1943, *R. Mason s.n.* (CHR 96077); Sealy Range, 914 m, 6 Feb 1948, *G.T.S. Baylis s.n.* (OTA 2463); *ibid.*, 1432 m, 2 Mar 1968, *A. Mark s.n.* (OTA 21671); Sefton Bivouac, 1680 m, 13 Jan 1956, *T.C. Chambers s.n.* (AK 263774); spur between eugene and Haytor Glacier, Mt. Cook, 16 Feb 1970, *D.R. Given 70042* (CHR 202827); St James Range, slopes of Mt Saint Patrick, Amuri Ski Field, 1600 m, 14 Feb 1998, *M. Rixon et al. s.n.* (AK 366077); Stop 6-7, Deer spur Walk, Peel Forest Park, 610 m, 9 Dec 1979, *B.P.J. Molloy s.n.* (CHR 212812); summit of Mt Charon, 1540 m, 1 Mar 1912, *collector unknown* (WELT SP046995); Top of Jollies Pass, Feb 1921, *W. Martin s.n.* (WELT SP046968); upper Bealey Valley, 16 Jan 1928, *W.R.B. Oliver s.n.* (WELT SP046805); upper Hope Valley, Top Hope Hut vicinity., Mar 1978, *D.R. Given 11213 & P. Douglass s.n.* (CHR 479924). **Otago.** [Cultivated], Mr Matthew's garden, Dunedin, plant from Mt Earnslaw, Dec 1892, *H.J. Matthews s.n.* (WELT SP046726); Aspinall Peak, east branch Matukituki Valley, 1341 m, 16 Jan 1968, *C.L. Powell s.n.* (OTA 28121); Aspinall Peak, east Matukituki Valley, 1066 m, 14 Dec 1968, *A. Mark s.n.* (OTA 23588); Cascade saddle, Mt. Aspiring National Park, 1432 m, 27 Jan 1968, *A. Mark & M.L. Burke s.n.* (OTA 20941); Cecil Peaks [Peak], 1524 m, Jan 1927, *A. Wall s.n.* (WELT SP077179); Cultivated, Mr Matthews garden [Dunedin], Plant from Mt Bonpland, *collector unknown* (WELT SP078123); French ridge, 1524 m, 12 Feb 1954, *G.T.S. Baylis s.n.* (OTA 1867); French ridge, Matukituki, Aspiring, 1219 m, 18 Dec 1968, *A. Mark s.n.* (OTA 23587); Gillespie Pass, 1615 m, 30 Jan 1969, *A. Mark s.n.* (OTA 25829); Glacier Burn Track, 1117 m, 5 Feb 2017, *P. Saldivia 2541-2542* (OTA); Grown in Dunedin [possibly Mr Matthews garden] - Plant from Mt Bonpland, Dec 1892, *H.J. Matthews s.n.* (WELT SP046734/A-B); *ibid.*, Dec 1892, *H.J. Matthews s.n.* (WELT SP046735/A-B); Humbolt [Humboldt] Mts., above L. [Lake] McKenzie [Mackenzie], 1219 m, 26 Feb 1967, *B. Sneddon s.n.* (WELT SP091116); Humbolts [Humboldt Mts.], *L. Cockayne s.n.* (WELT SP054471); Humbolts [Humboldt Mts.], near lagoon [Sleepy Hollow?], 1620 m, 21 Feb 1897, *L. Cockayne s.n.* (WELT SP054436); Lake Harris, Routeburn, nr.[near] Lake Wakatipu, 1219 m, 27 Feb 1911, *D. Petrie s.n.* (WELT SP046727); Matukituki River, West branch, 1300 m, 27 Dec 1964, *E.M.F. Smith s.n.* (OTA 13940); McKerrow Range, Makarora V., Mt Aspiring National Park, 1249 m, 4 Feb 1969, *A. Mark s.n.* (OTA 23526); Mt Alta Range, W part., near Mt Aspiring, 1219 m, *D. Petrie s.n.* (WELT SP046732);

Mt Barff, 1219 m, 19 Dec 1968, *A. Mark s.n.* (OTA 25659); Mt Barff, west Matukituki Range, 1036 m, 19 Dec 1968, *A. Mark s.n.* (OTA 25920); Mt Bonpland, head of L [Lake] Wakatipu, 1372 m, *H.J. Matthews s.n.* (WELT SP046731); Mt Sisyphus, 1463 m, 16 Dec 1968, *A. Mark s.n.* (OTA 23578); Mt Tole, Wills Valley, Haast River, 1828 m, 6 Feb 1969, *A. Mark s.n.* (OTA 23410); Mts. above Lake Harris, 11 Jan 1877, *T. Kirk s.n.* (WELT SP046716); near Lake Harris, 6 Mar 1905, *H.J. Matthews s.n.* (WELT SP046710); Siberia Valley, Wilkin Valley, 640 m, 12 Dec 1968, *collector unknown* (OTA 23577); Sugarloaf Pass, 1371 m, 19 Feb 1968, *A. Mark s.n.* (OTA 20166); Wakatipu, Bold Peak, *W. Thomson s.n.* (WELT SP046738/B); Western, *H.B. Matthews s.n.* (AK 9737); Western Mts., *W. Thomson s.n.* (WELT SP046601); Young Range, Makaroroa, 1310 m, 9 Feb 1969, *A. Mark s.n.* (OTA 23503). **Southland.** All Round Peak, Secretary Island, 1127 m, 5 Feb 1967, *A. Mark s.n.* (OTA 19035); Cleddau River source, 17 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP005746); Doubtful Sound, Mts., Feb 1925, *W. Thomson s.n.* (WELT SP046623); Eyre Mts., *J. Speden s.n.* (WELT SP046812); Eyre Mts., Cromel - Irthing ridge, 1067 m, 4 Feb 1969, *A. McEwen s.n.* (WELT SP096144); Fiordland, Doon River, Wapiti Lake, 9 Jan 1970, *A. McEwen s.n.* (WELT SP096229); Fiordland, Doubtful Sd., Mt Troup, 1070 m, 8 Feb 1956, *T.C. Chambers s.n.* (AK 263772, 263771); Fiordland, Doubtful Sound, peak above head of 1st Arm, 1220 m, 31 Dec 1955, *T.C. Chambers s.n.* (AK 263773); Fohn Hill, upper Beans Burn, 1219 m, 16 Feb 1968, *A. Mark s.n.* (OTA 20587); Garvie Mts., Jan 1921, *J. Speden s.n.*? (AK 9736); Gertrude Valley, 1066 m, 12 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 218907, 60513); Homer, 1 Apr 1959, *M.E. Sexton s.n.* (AK 248845); Homer Tunnel, 11 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 218993); *ibid.*, 20 Jan 1967, *B.S. Parris s.n.* (AK 129396); *ibid.*, 929 m, 23 Jan 1962, *G.T.S. Baylis s.n.* (OTA 6955); *ibid.*, 944 m, 10 Jan 1968, *A. Mark & N. Adams s.n.* (OTA 218919, 218981); Homer Valley, 823-914 m, Dec 1943, *J.T. Salmon s.n.* (WELT SP005742); Key summit, Livingstone Range, 22 Dec 1944, *W.R.B. Oliver s.n.* (WELT SP005747); Keys summit, 914-1219 m, 17 Jan 1948, *D. Crawford s.n.* (WELT SP096146); Lake Eyles, above, 1220 m, 11 Feb 1973, *A. Mark s.n.* (OTA 33955); Lake Te Anau, Clinton saddle, Jan 1892, *D. Petrie s.n.* (WELT SP046738/A); Lake Wapiti, upper Doon, Fiordland, 1219 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30510); McKinnon Pass, near summit, 1020 m, 6 Feb 1976, *J.H. Goulding 812* (AK 139123); McKinnons Pass, 1 Jan 1951, *K.M. Wood s.n.* (AK 26613); *ibid.*, 17 Jan 1959, *M.E. Sexton s.n.* (AK 248850); Mt Burns, 1369 m, 4 Mar 2017, *P. Saldivia 2566* (OTA); Mt Tutoko, saddle, 1066 m, 21 Feb 1967, *A. Mark & Rowls s.n.* (OTA 18202); *ibid.*, 1371 m, 22 Feb 1967, *A. Mark & Rowls s.n.* (OTA 18133); Park Pass, 1249 m, *A. Mark s.n.* (OTA 20535); Secretary Island, 914 m, 1 Jan 1959, *J. Murray s.n.* (OTA 6869); Simonin Pass, Mt Limbo, 1402 m, 25 Jan 1975, *W. Lee & A. Mark s.n.* (OTA 35948); Stewart Island, summit area Little Mt Anglem, 700 m, 28 Feb 1980, *H.D. Wilson 798-418 & C.D. Meurk s.n.* (CHR 368739); Stillwater River, upper, 1066 m, 30 Dec 1970, *A. Mark s.n.* (OTA 30509); Takahe Valley, cirque, 20 Feb 1952, *W.R.B. Oliver s.n.* (WELT SP005744); tarns, ridge above Borland saddle, 1158 m, 31 Jan 1978, *J.F. West s.n.* (OTA 64514); The Hump, S[outh] of Lake Hauroto [Hauroko], 23 Feb 1910, *J. Crosby-Smith s.n.* (WELT SP046728); upper Hollyford Valley, 7 Jan 1956, *K.M. Wood s.n.* (AK 48827). **District unknown.** Sine loco, *collector unknown* (OTA 17020); Nelson, *collector unknown* (WELT SP046737); Nelson Mts., *J. Adams s.n.* (WELT SP046711). **STEWART ISLAND. Southland.** Cultivated at sea level, Stewart Island, [originally] plant from highest peak of Mt Anglem, Jan 1887, *T. Kirk s.n.* (WELT SP046718); Highest peak of Mt Anglem, 27 Dec 1883, *T. Kirk s.n.* (WELT SP046722); Mixed Stewart Island, 1. Mt Anglem, 2. Ulva [Island], 3 Feb 1890, *T. Kirk s.n.* (WELT SP029656); Mt Anglem, *F. Gibbs s.n.* (WELT SP046595); *ibid.*, *L. Cockayne s.n.* (WELT SP046604/A-C); *ibid.*, 1 Jan 1965, *D. Carstensen s.n.* (WELT SP064115); *ibid.*, 15 Feb 1967, *W. Burke s.n.* (WELT SP095833); *ibid.*, 21 May 1964, *A. Mark s.n.* (OTA 7877); *ibid.*, 609 m, 17 Feb 1952, *D. Holdsworth s.n.* (OTA 60515); *ibid.*, 762 m, 12 Apr 1950, *B.F. Slade s.n.* (OTA 2458); *ibid.*, 960 m, 15 Jan 1973, *A. Mark s.n.* (OTA 33051); *ibid.*, 975 m, 17 Jan 1951, *D. Holdsworth s.n.* (OTA 2457); *ibid.*, 980 m, 6 Jan 2000, *P.J. de Lange 4105* (AK 251913); Stewart Island, 3 Jul 1894, *collector unknown* (WELT SP004451).

Unresolved names

CELMISIA NOVAE-ZELANDIAE (Buchanan) Cheeseman, Man. New Zealand Fl., ed. 2. 939. 1925.
Erigeron novae-zealandiae Buchanan, Trans. & Proc. New Zealand Inst. 17: 287. Pl. XV.
 1885. **TYPE LOCALITY: NEW ZEALAND.** South Island, Collingwood. **TYPE:** [icon]
 Buchanan (1885: Plate XV) (lectotype designated by Saldivia 2023: 41). (Fig. 50).



Figure 50. Lectotype of *Erigeron novae-zealandiae* Buchanan.

Notes: *Erigeron novae-zealandiae* is a confusing name. The original description, although brief, clearly indicates that it is a member of *Celmisia* subgenus *Lignosae* s. lato (e.g., semi-shrubby, whole plant viscid). However, it was described from Collingwood (a small town in the northwest tip of the South Island), where plants matching the illustration (lectotype, Fig. 50) do not occur. Besides, Collingwood is a coastal town, and *Celmisia* subg. *Lignosae* species are always alpine in this part of the South Island.

The illustration (lectotype, Fig. 50) approaches *C. angustifolia*. However, this species is distributed about 300 km south of Collingwood, from Arthur's Pass southwards. Therefore, the decision by Cheeseman (1925) to validate this name by priority and to include *C. angustifolia* as a synonym (*Erigeron novae-zealandiae* was described in 1889, and *C. angustifolia* in 1914) seems to have been premature and likely wrong. Instead, I am following Allan (1961), who kept *C. angustifolia* as a species endemic to the southern half of the South Island and stated: "Until more is known of the *Celmisia* of the Collingwood district, *C. novae-zealandiae* remains of uncertain status." The study of herbarium specimens from the alpine areas closest to Collingwood (Mt. Stevens-Wakamarama Range and Boulder Lake) has been unsuccessful in finding specimens attributable to *E. novae-zealandiae*.

CELMISIA ROBUSTA (Buchanan) Cheeseman, Trans. & Proc. New Zealand Inst. 19: 215. Pl. XVIII. 1886 (1887). **TYPE:** [icon] Buchanan (1886: Plate XVIII) (lectotype designated here). (Fig. 51).

Notes: Kirk (1899) and Cheeseman (1906) listed it as a synonym of *C. discolor* (as *C. incana*), and Allan (1961) list it after *C. spectabilis* (subgenus *Pelliculatae*). Some resemblance to *C. bonplandii* should also be considered. However, the original description and illustration are not complete enough to draw any reliable conclusion, not even if it should be considered part of subgenus *Lignosae* s. lato

No type specimens or locality were mentioned in the protologue, and herbarium specimens that could be interpreted as types have not been found. Therefore, the illustration accompanying the original description is selected as lectotype.

Interspecific hybrids

Specimens with intermediate morphological attributes between two of the species treated here that could be interpreted as hybrids have been occasionally collected in areas of distributional overlap (e.g., *C. hectorii* × *C. ramulosa* [OTA 44720, 44721]; *C. angustifolia* × *C. densiflora* [WELT SP046602]; *C. densiflora* × *C. sinclairii* var. *durietzii* [AK 229046]; *C. discolor* × *C. sinclairii* var. *durietzii* [AK 34917]). However, as commented before (see section Hybridization), at this state of knowledge, these should be considered speculative. Nonetheless, special attention is drawn to *Celmisia poppelwellii* Petrie since it is a validly published name.

CELMISIA POPPELWELLII Petrie, Trans. & Proc. New Zealand Inst. 47: 50. 1915. **TYPE: NEW ZEALAND.** Subalpine meadow, on the Eyre Mts, Central Otago, *D.L. Poppelwell s.n.* (not found).

Notes: Allan (1961: 653) commented as follows: "Petrie compares his sp. with *C. haastii*, but Cheeseman [1925: 941] considered that 'the branching stems and much smaller and narrower leaves do not show any close affinity with that plant'. Cockayne & Allan [1934: 47] considered that the plants concerned were probably of hybrid origin, namely *C. haastii* × *C. hectorii*." From the original description it seems to be clear that this taxon belongs to subgenus *Lignosae* s. lato (e.g., "involucral bracts [...] somewhat viscid"). I agree that this taxon probably corresponds to an isolated collection of hybrid origin. The mention of 'Achenes glabrous' in the description would also indicate that one of the putative parents is *C. haastii* since this species is the only one with glabrous cypselae within *Lignosae* s. lato. However, the lack of a more comprehensive description, type specimens, and illustration makes it impossible to assess this taxon accurately. There is one specimen held at Auckland Museum (AK 9994) labeled as: '*Celmisia poppelwellii* Petrie?, Cultivated at Gore, Otago, J. Speden'. The specimen is a vegetative branched shoot with leaves similar to *C. hectorii*.



Figure 51. Lectotype of *Celmisia robusta* Buchanan.

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