

Taxonomic Studies of Australian *Senecio* (Asteraceae): 3. Radiate, arid region species allied to *S. magnificus* and the radiate, alpine species *S. pectinatus*

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Abstract

A morphological study of Australian radiate species of *Senecio* and *Othonna* have resulted in a number of taxonomic changes. From a group of species allied to *Senecio magnificus* F.Muell., predominantly from arid and semiarid regions, the following taxonomic changes are made: *Senecio pilosicristus* I.Thomps. and *S. conferruminatus* I.Thomps. are described as new, *S. tuberculatus* Ali is resurrected, *Othonna gypsicola* R.Bates is recombined as *Senecio gypsicola* (R.Bates) I.Thomps., and *Othonna gregorii* (F.Muell.) C.Jeffrey is returned to *Senecio*. Descriptions of the remaining species in this group are also presented. A radiate *Senecio* of alpine regions, *S. pectinatus* DC. var. *ochroleucus* F.Muell., is elevated to the rank of species as *S. albogilvus* I.Thomps. A key to all of Australia's radiate species of *Senecio* is presented.

Introduction

Certain radiate species of *Senecio* in Australia, predominantly of arid and semiarid regions, appear to form a natural group. They are characterised by glaucosity, relatively large capitula, calycular bracteoles lacking or few, achenes variously clothed in papillose hairs or papillae, and, for the most part, a persistent pappus. The taxonomy of this group, hereafter informally described as the Magnificus group, is the subject of first part of this paper.

One of the species treated here as a member of this group was first described as *Senecio gregorii* F.Muell. in 1859, but in 1986 it was transferred to the South African genus *Othonna* (Jeffrey 1986). Jeffrey cited a sharing of characteristic features with the yellow-flowered succulent species of this genus. However, the information given was scanty and which of the list of features Jeffrey gave for the othonnoid complex that *O. gregorii* (F.Muell.) C.Jeffrey shares was not specified except for 'ecalyculate involucre with tendency to united phyllaries'. Jeffrey conceded that *O. gregorii* was atypical of this *Othonna* group in possessing female fertile disc florets. The disc florets of *O. gregorii* also differ in having a divided style.

In 1993, Bates described a new species similar to *O. gregorii* in terms of the fusion of phyllaries, and named it *Othonna gypsicola* R.Bates following the lead of Jeffrey. However, Bates, like Jeffrey, was uncertain of this decision, and indicated that although *O. gregorii* and *O. gypsicola* are discordant in *Senecio*, both are also discordant in *Othonna*.

Othonna gypsicola appears to provide a morphological bridge between *O. gregorii* and other large-headed radiate species of arid and semiarid regions, most notably *Senecio magnificus* and *S. megaglossus*. The gametic chromosome number for *Othonna* is 10 (Nordenstam 1967). In contrast, the gametic chromosome numbers obtained for both *O. gregorii* (Ornduff *et al.*, 1963, Lawrence 1980) and *S. magnificus* (Lawrence 1980) is 20. The weight of evidence, I believe, does not favour the placement of *O. gregorii* and *O. gypsicola* in *Othonna*, and the necessary new combination is made for the latter below.

In the course of this study, two new species have come to light, one most closely allied to *S. gregorii* and the other to *S. magnificus*.

Senecio tuberculatus, described in 1965 (Ali, 1965), was synonymised under *S.*

murrayanus Wawra by Belcher (1986) upon discovery of the type of the latter. Although closely related, several differences readily distinguish *S. tuberculatus* from *S. murrayanus*.

In the second part of this paper, the taxonomy of the radiate alpine *Senecio*, *S. pectinatus* DC. is reassessed. *Senecio pectinatus* is one of a group of Australian scapiform, alpine or sub-alpine species. *Senecio pectinatus* var. *ochroleucus* F.Muell. is removed from *S. pectinatus* and is elevated to the rank of species. It is distinctive in having creamy-white ligules and its leaf morphology is closer to that of *S. leptocarpus* DC. rather than the two remaining varieties of *S. pectinatus*.

This paper concludes with a key to all radiate species of *Senecio* in Australia. Two of the terminal taxa in the key are complexes, the Australian lautusoid complex (including *S. pinnatifolius* A.Rich., *S. spathulatus* A.Rich. and *S. capillifolius* Hook.f.) and the *S. glossanthus* (Sond.) Belcher complex. Taxonomic studies have recently been carried out on these complexes (Thompson, two papers in press). Forms of the lautusoid complex are sympatric with and have occasionally been confused with the annual members of the Magnificus group.

Materials and Methods

Herbarium specimens from AD, BRI, CANB, DNA, HO, MEL, NE, NSW, and PERTH were examined. The circumscriptions of, and morphological variation within, previously recognised taxa was critically assessed and new taxonomic concepts developed and tested. Distribution maps were generated using ArcView computer program.

Terminology for descriptions and keys:

Unit inflorescence here refers to the cluster of capitula at the end of primary stems and branches where all the supporting inflorescence branches are leafless.

The diameter of the involucre is based on unpressed specimens measured approximately mid-involucre.

Divided, of leaves: Leaves with sinuses extending 50% or more towards the midrib are regarded here as divided and may be lobed (50–75%) or pinnatisect (> 75%).

Undivided leaves have sinuses extending < 50% towards midrib and their margins are described as entire, denticulate, dentate or coarse-dentate.

Lageniform (of achenes): bottle-shaped, i.e. with the distal third much narrower than the proximal third.

Bands and lines of papillose hairs on achenes: These bands run longitudinally.

Part 1: Taxonomy of the Magnificus Group

Annuals, perennial herbs or shrubs, nearly glabrous or with scattered long hairs, often glaucous. *Leaves* thin to fleshy, divided or not; margin dentate or entire. *Unit inflorescences* of 1–20, rarely to c. 60; peduncles sometimes dilating gradually towards capitulum, finally 10–100 mm long. *Capitula* radiate; calycular bracteoles absent or 1–6, narrow-ovate to lanceolate, 1–5(–6) mm long, 0.3–1.0 mm wide; involucre cylindrical or campanulate, 4–16 mm long, 3–10 mm diam.; phyllaries 12–22, free or sometimes fused; stereome flat, glabrous or rarely with scattered hairs, with 1–3 generally inconspicuous resin ducts; outer phyllaries: scarious margin slender. *Florets* c. 30–80; ligulate florets (4–)6–12(–16), 5–30 mm long; corolla-limb shorter than, c. equal to, or longer than tube. *Achenes* homomorphic or nearly so, or ray achenes sometimes infertile and small, narrow-obloid, oblong-ellipsoid, or narrowly lageniform, 2.0–9.0 mm long, with ribs variously prominent, sometimes convex, papillose-hairy, with hairs short or long, or sometimes with granular papillae; diam. of carpopodium 1/3–1/2 of diam. of body. *Pappus* persistent or rarely caducous; bristles nearly smooth, scabrid-barbellate or barbellate, sometimes subplumose apically.

1. *Senecio gregorii* F.Muell., *Enum. Pl. Coll. Gregory* 7 (1859)

Othonna gregorii (F.Muell.) C.Jeffrey, *Kew Bull.* 41: 876 (1986).

Type: [South Australia], Coopers River [Creek], A.C. Gregory; holotype: MEL.

Annuals to 0.3(–0.5) m high, glaucous, glabrous. *Mid-stem leaves* narrow-linear, to 10 cm long, with l:w ratio c. 15–20, undivided; margin entire; base narrow. *Upper-stem leaves* similar. *Unit inflorescences* of 1–5 capitula; peduncle dilating from c. 5 mm below base of capitulum. *Capitulum* ecalyculate; involucre 5–16 mm long, 3–9 mm diam. (size often highly variable on one plant); phyllaries c. 13, all ± seamlessly fused (except for apices) to adjacent phyllaries or a few with margins evident; involucre eventually splitting into 3 or 4 sections. *Florets* 30–55; ligulate florets 7–11; ligule 12–20 mm long, yellow, with 4–6 veins; disc florets: corolla 7–10 mm long; limb shorter than tube; balusterform base of corolla 3–5 mm long. *Achenes* dimorphic; disc achene narrow-obloid or slightly lageniform, 4–8.5 mm long, orange-brown or reddish, papillose hairs 0.6–1 mm long in bands, obscuring most of surface; ray achenes often not developing, pale, thin, with thin pappus bristles, otherwise similar to or slightly shorter and more densely hairy than disc achenes. *Pappus* persistent, 10–30 mm long; bristles smooth, robust proximally. (Figs 1 & 3)

Flowers most of year.

Distribution and Habitat: Occurs in western and south-western Western Australia from Carnarvon south-east to Kalgoorlie; in central Australia from Halls Crossing in southern Northern Territory south to the Whyalla area in southern South Australia and from Warburton in far eastern Western Australia east to Blackall in central Queensland. Also extends into south-eastern Australia as far as the Big Desert area in far north-western Victoria (Fig. 2a). Grows in various soils in river beds, plains, dunes and saline swamp margins, in herbfield, shrubland and woodland; commonly abundant following significant rains.

Notes: An unusual species with several apparently unique features, although it is similar to several other radiate Australian taxa of arid or semiarid regions. Also superficially similar to members of the southern African genus *Othonna*, in which it was placed in 1986. Closest affinity is with *S. conferruminatus* I.Thomps. based on involucre morphology. It possibly also has affinity to *S. gypsicola* based on fusion of phyllaries, and to *S. platylepis* based on achenial morphology. Readily recognised by the involucre of fused phyllaries, the absence of calycular bracteoles, the large achenes with an indumentum of long hairs, and the very long, basally-stout pappus bristles. Style-branches are long and their apex has a crown of rather long clear narrow-triangular papillae. Capitulum size varies considerably on individuals with later-developing capitula often much smaller. This feature also occurs in *S. conferruminatus*.

Another similarity between *S. gregorii* and *S. conferruminatus*, and which distinguishes them from the other members of the Magnificus group, is the morphology of the corolla of disc florets. The limb is markedly shorter than the tube and the balusterform (flared) base of the tube is elongate. In contrast, the balusterform base is not elongate in other species, the limb in *S. magnificus* and *S. megaglossus* is longer than the tube, and in most other species it is c. as long as the tube. *Senecio gypsicola* is a slight exception in that the limb in this species is commonly slightly shorter than the tube.

Selected specimens examined: **WESTERN AUSTRALIA:** 35 miles [56 km] west of Docker River on road to Giles Weather Station, *K. Menkhorst s.n.*, 11.viii.1986 (MEL, PERTH). **NORTHERN TERRITORY:** 10 miles [16 km] WNW of Santa Teresa Mission, *M. Lazarides* 5732, 17.viii.1956 (CANB, DNA). **SOUTH AUSTRALIA:** Gairdner-Torrens district: 75 km N of Glendampo on Stuart Highway, E side of road, *J.R. Shelley 27 & R. McCullough*, 12.viii.1984 (AD, CBG, MEL, PERTH). **QUEENSLAND:** 5 km W of Betoota on Birdsville Road, *K.A. Williams* 78171 (AD, BRI). **NEW SOUTH WALES:** 8.5 km southeast of Fort Grey campsite turnoff en

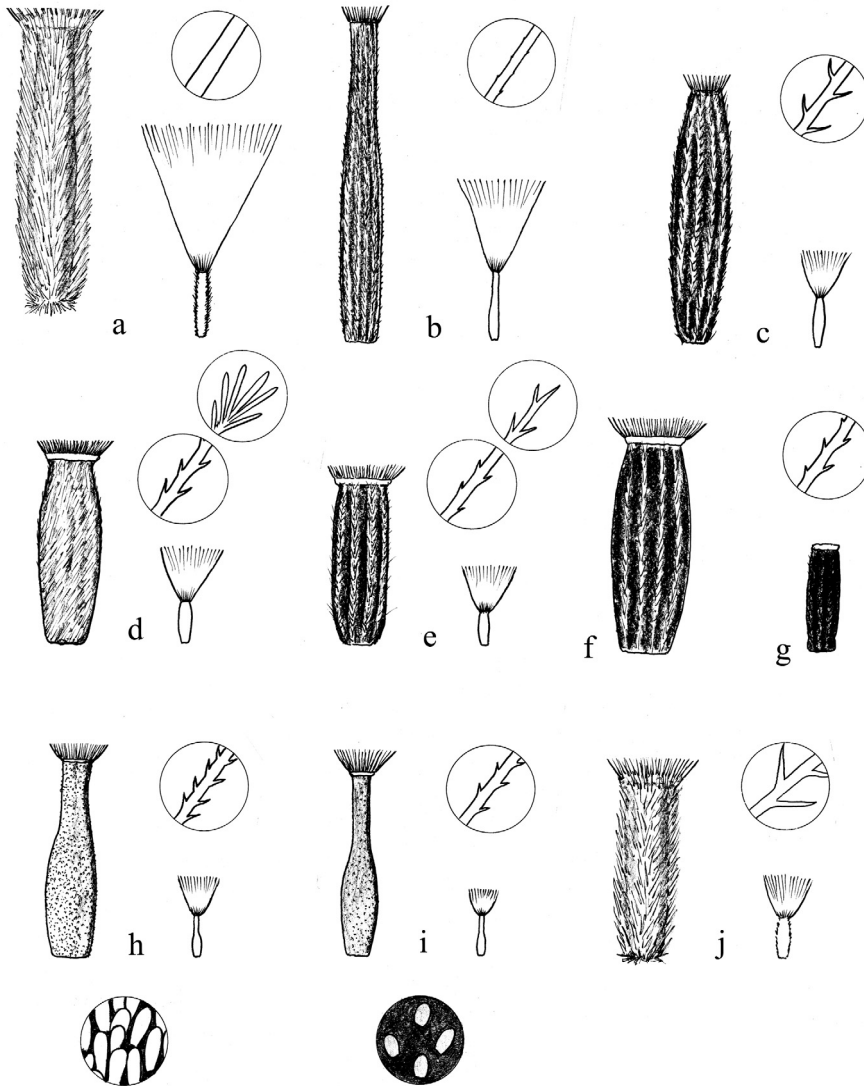


Figure 1. Achenes and pappus a. *S. gregorii* (D.E. Symon 2164 PERTH); b. *S. conferruminatus* (holotype); c. *S. gypsicola* (holotype); d. *S. magnificus* (B. Nordenstam & A. Anderberg 873 MEL), apex of pappus bristle also shown; e. *S. pilosicristus* (H.B. Williamson, Sept. 1921 CANB), apex of pappus bristle also shown; f. *S. megaglossus* (F.E. Davies 1377a & R.B. Hadlow MEL; achene $\times 5$ only); g. *S. velleioides* (R.M. King 9788 MEL); h. *S. murrayanus* (F. Mueller 1878 MEL), details of granular hairs ($\times 50$) also shown; i. *S. tuberculatus* (S.L. Everist 6235 BRI), details of granular hairs ($\times 50$) also shown; j. *S. platylepis* (J.H. Browne 164 MEL). Achene $\times 5$, achene with persistent pappus $\times 1$, pappus bristle $\times 50$ (viewed in proximal third; also at apex in e and f).

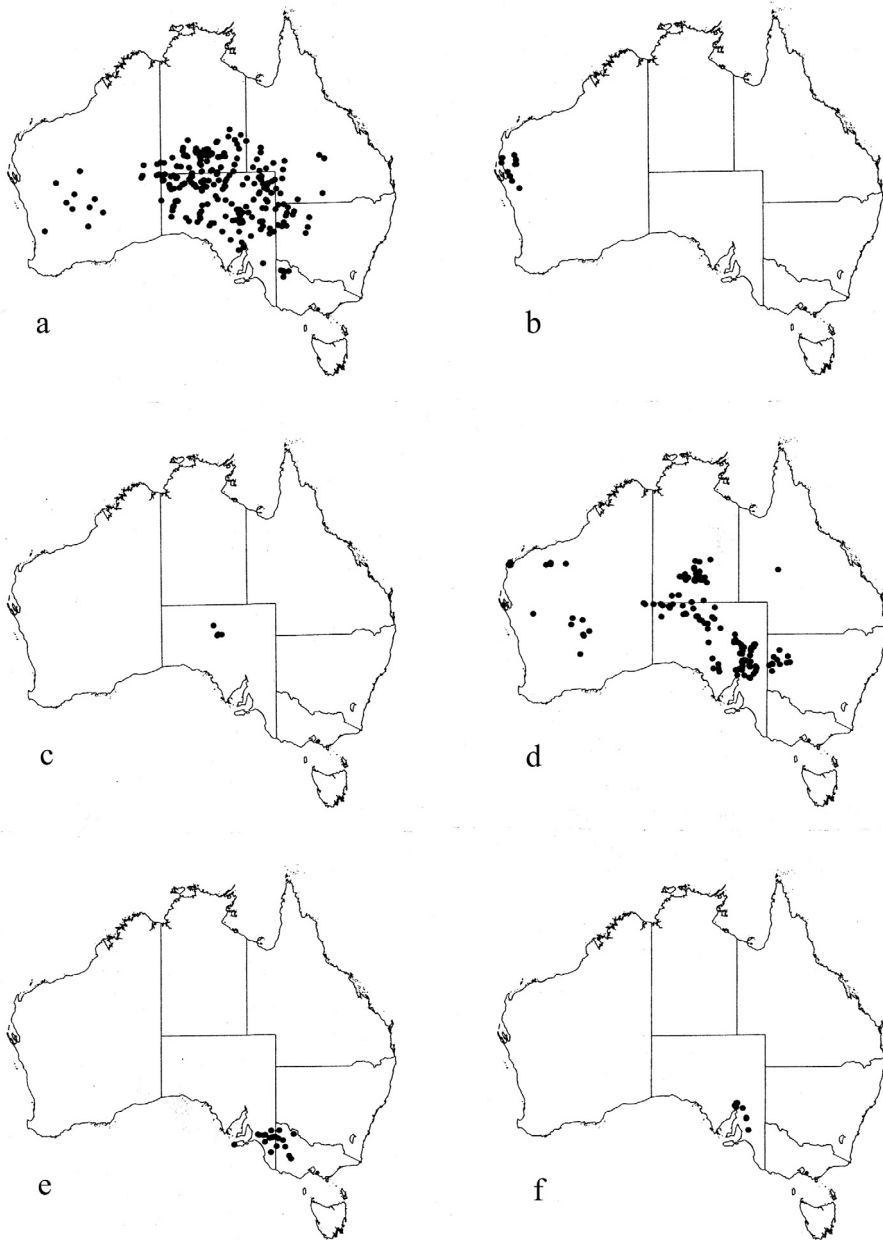


Figure 2. Distribution of a. *S. gregorii*; b. *S. conferruminatus*; c. *S. gypsicola*; d. *S. magnificus*; e. *S. pilosicristus*; f. *S. megaglossus*.

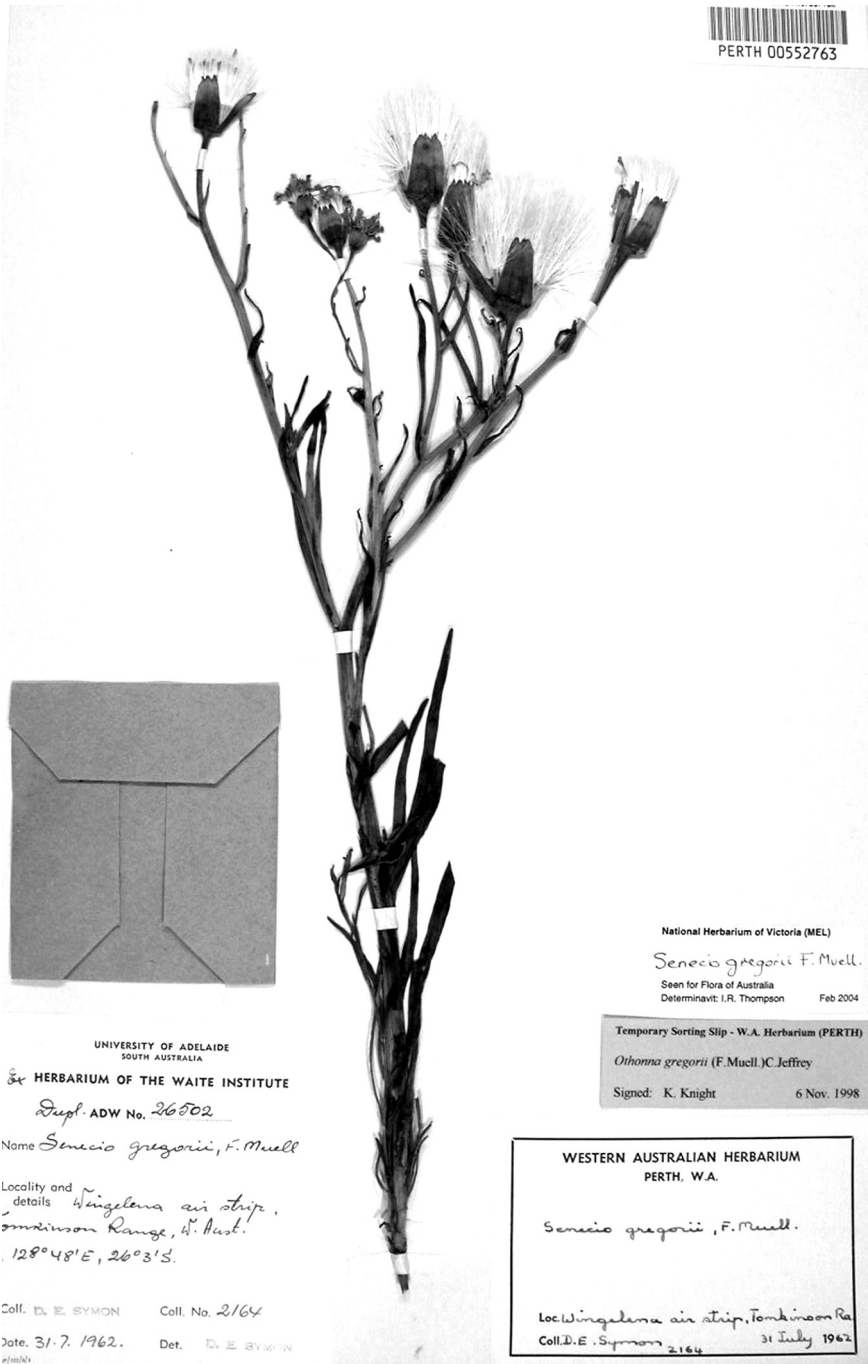


Figure 3. *S. gregorii* (D.E. Symon 2164 PERTH).

route to Tibooburra in Sturt National Park, *R.G. Coveny 13498, M. Savio & B. Wiecek*, 4.ix.1989 (AD, BRI, CANB, MEL, NSW). **VICTORIA**: Wyperfeld Nat. Park - 400 m south of Meridian Gate, *D.C. Cheal*, 24.viii.1983 (MEL).

2. *Senecio conferruminatus* I.Thomps., *sp. nov.*

A *S. gregorii* F.Muell. capitulis pluribus, flosculis paucioribus, ligulis paucioribus, acheniis longioribus pilis brevioribus, pappo breviori differt.

Type: Western Australia, 13 miles East of 550 mile peg, North West Highway, *T.E.H. Aplin 3220*, 3 July 1970; holotype: PERTH.

Annuals to c. 0.3m high, glaucous, glabrous. *Mid-stem leaves* narrow-linear, to 10 cm long, with l:w ratio c. 15–30, undivided; margin entire; base narrow. *Upper-stem leaves* similar. *Unit inflorescences* of 2–7 capitula; peduncle dilating from 1–5 mm below base of capitulum or hardly dilating. *Capitula* ecalyculate; involucre cylindrical, 4–15 mm long, 2–4 mm diam. (length commonly highly variable on one plant); phyllaries c. 13, all \pm seamlessly fused (except for apices) to adjacent phyllaries or a few with margins evident; involucre eventually splitting into 3 or 4 sections. *Florets* 20–32; ligulate florets 5–7, commonly 5; ligule 8–15 mm long, yellow, with 4–6 veins; disc florets: corolla 5–8 mm long; limb shorter than tube; balusterform base of corolla 1–3 mm long. *Achenes* narrowly lageniform, 6–10 mm long, brown or reddish, with papillose hairs c. 0.3 mm long in bands, obscuring c. 50% of surface; l:w ratio of hairs c. 6. *Pappus* persistent, 5–17 mm long; bristles nearly smooth. (Figs 1 & 4)

Flowers late winter–spring.

Distribution and Habitat: Occurs in far western Western Australia from the Gascoyne River near Carnarvon S to the Murchison River (Fig. 2b). Grows in various soils in river beds, plains, dunes and saline swamp margins, in herbfield, shrubland and woodland.

Notes: This species is very similar to *S. gregorii* in terms of the texture and nature of the fusion of phyllaries, but the capitula of *S. conferruminatus* are generally more numerous, smaller and with fewer florets. Furthermore, ligulate florets are fewer, achenes are longer particularly relative to the length of the involucre (c. 2/5–3/4 of length compared to c. 1/2 of length in *S. gregorii*), achenial hairs are much shorter, and the pappus bristles are generally shorter and less robust. The narrowly lageniform achenes are reminiscent of *S. tuberculatus* and *S. murrayanus* but those of the latter two species are clothed in papillae rather than hairs.

Etymology: The epithet alludes to the fused phyllaries of the involucre (*L. conferruminatus*, fused)

Selected specimens examined: **WESTERN AUSTRALIA**: Wooramel Roadhouse, *N.S. Lander 1340, B.A. Fuhrer, & P.S. Short*, 17.viii.1986 (MEL, PERTH); 16 km west of Gascoyne junction, *P.S. Short 2517, N.S. Lander & B.A. Fuhrer*, 20.viii.1986 (AD, MEL, PERTH); 150 mi [250 km] N of Mullewa, *B.L. Turner 5371*, 21.viii.1965 (MEL); Outside Carnarvon towards Geraldton, *D. Clyde 153* (NSW).

3. *Senecio gypsicola* (R.Bates) I.Thomps., *comb. nov.*

Othonna gypsicola R.Bates, *J. Adelaide. Bot. Gard.* 15: 149 (1993).

Type: South Australia, gypseous clay mounds between Copper Hills and Arckaringa, *R. Bates 19171*, 8 July 1989; holotype: AD; isotype: NSW, PERTH.

Annuals to c. 0.3 m high, glabrous, sometimes glaucous. *Mid-stem leaves* narrow-obovate to oblanceolate, to 4 cm long, with l:w ratio c. 3–4, undivided; margin entire; tapering to



Figure 4. *S. conferruminatus* (holotype: T.E.H. Aplin 3220 PERTH).

a moderately narrow base. *Upper-stem leaves* similar. *Unit inflorescences* of 1–4 capitula; peduncle sometimes dilating from c. 5 mm below base of capitulum. *Capitulum* ecalyculate; involucre cylindric, 6–9 mm long, 2–4 mm in diam.; phyllaries c. 12, but often fused as pairs resulting in 5–10 sections, these sections shortly fused basally. *Florets* c. 60; ligulate florets 8–10; ligule c. 10 mm long, yellow, with 4–6 veins; disc florets: corolla c. 4–6 mm long; limb shorter than or c. equal to tube; balusterform base of corolla c. 1 mm long. *Achenes* 5–8 mm long, brown, with papillose hairs c. 0.3 mm long in bands; obscuring c. 40% of surface. *Pappus* persistent, 5–6 mm long; bristles minutely scabrid, length of barbels c. equal to diam. of bristle. (Fig. 1)

Flowers winter.

Distribution and Habitat: Occurs in north-central South Australia in the Coober Pedy area and further north at Arckaringa (Fig. 2c). Grows on mounds of black gypseous clay in ephemeral herbfields.

Notes: Collected from only two areas, initially in 1989 about 2 months after heavy rains when it appeared in large numbers. Resembles *S. gregorii* in that there is some fusion of phyllaries, but is closer to *S. magnificus* and *S. megaglossus* in leaf, capitular and achenial morphology.

Selected specimens examined: **SOUTH AUSTRALIA:** Dam on Copper Hills and Arckaringa Station, *R. Bates 19816*, 7.vii.1989 (AD); 30 km NE of Coober Pedy on the road to Oodnadatta, *D.E. Symon 16196 & J. Symon*, 30.vi.2000 (AD, CANB, MEL); 16 km NE of Coober Pedy. Coober Pedy–Oodnadatta Road at the crossing of the Oogelima Creek on Moon Plain, *D.E. Symon 16161 & J. Symon*, 30.vi.2000 (AD, BRI, CANB, MEL); Giddi Giddina Creek, 46 km NE of Coober Pedy on road to Oodnadatta, *D.E. Symon 15664 & J. Symon*, 30.iv.1997 (AD, CANB).

4. *Senecio magnificus* F.Muell., *Linnaea* 25: 418 (1852)

Type: [South Australia], 'In glarea exsiccata rivi Cudnaka [Kanyaka River in Flinders Ras]', *F. Mueller*; lecto (**here selected**): MEL 304729; isolecto: MEL 82167.

Shrubs to c. 1.3 m high, glaucous, glabrous. *Mid-stem leaves* oblong, oblong-obovate, oblanceolate, or narrow-elliptic, to 11 cm long, with l:w ratio c. 2–4, undivided; margin entire, dentate, coarse-dentate or serrate, teeth several, more numerous distally; base ± attenuate to truncate, often decurrent. *Upper-stem leaves:* base often cordate and semiamplexicaul. *Unit inflorescences* of 3–10(–20) capitula; peduncles usually dilating from c. 10–20 mm below base of capitulum. *Capitula:* calycular bracteoles (0–)1–3, 1–6 mm long; involucre campanulate, 6–11 mm long, c. 4–7 mm diam.; phyllaries 12–18. *Florets* c. 30–55; ligulate florets 4–8; ligule 7–20 mm long, yellow, with 4–13 veins; disc florets: corolla 7–12 mm long; limb longer than tube; balusterform base of corolla 0.5–0.8 mm long. *Achenes* oblong-ellipsoid, 3.0–7.0 mm long, with papillose hairs c. 0.3 mm long in bands or ± evenly distributed, largely obscuring surface. *Pappus* persistent, 6–12 mm long; bristles barbellate to subplumose apically, length of barbels 2–3 times diam. of bristle, otherwise bristles minutely scabrid, length of barbels c. equal to diam. of bristle. (Figs 1 & 5)

Flowers mostly winter and spring.

Distribution and habitat: Occurs in western Western Australia from Exmouth in the far central-west south-east to the Kalgoorlie area, and in Central Australia from the Barrow Creek area south-east to Wilcannia in central-western New South Wales, south-south-east to Ucolta in central-eastern South Australia, and south-west to the Blackstone Range in far central-eastern Western Australia. Also occurs disjunctly in central Queensland (Fig. 2d). Grows in sand and sandy loam soils, on plains or sometimes in rocky sites, over limestone and dolerite, often associated with watercourses, in spinifex grassland, shrubland, and low open woodland.



Figure 5. *S. magnificus* (M.E. Lawrence 802 MEL).

Notes: The pappus bristles of *S. magnificus* are more densely and longer barbellate distally than in other Australian species of *Senecio*, although *S. megaglossus* is similar. Populations in north-western Western Australia tend to have more entire leaves with a higher length:width ratio and have relatively long bracteoles; they may warrant further investigation.

Selected specimens examined: **WESTERN AUSTRALIA:** About 40 km E of Hamersley Station Homestead, A.A. Mitchell PRP714, 7.ix.1995 (MEL, PERTH); 15 km E of Glenorn on Mt Remarkable Rd, A.A. Mitchell 2720, 28.viii.1992 (CANB, PERTH). **NORTHERN TERRITORY:** Between Red Bank Gorge and Glen Helen–Haasts Bluff Road, G.W. Carr 1672 & A.C. Beauglehole 45451, 12.vi.1974 (AD, CANB, DNA, MEL); 5 miles SSE of Undoolya Station, M. Lazarides 5716, 16.viii.1956 (BRI, CANB). **SOUTH AUSTRALIA:** On way from Wilpena Pound to Brachina Gorge, V. Jaegermann, 27.viii.1983 (AD, MEL). **QUEENSLAND:** Gregory North, Warlus VI, Site R5, 23 km W of 'Cork', R.W. Purdie 1022, 7.ix.1977 (BRI). **NEW SOUTH WALES:** c. 100 km by road from Broken Hill towards Mootwingee National Park, c. 10 km direct NE of The Bluff, A.M. Lyne 1858 & S. Donaldson, 11.xii.1995 (CBG, MEL, NSW).

5. *Senecio pilosicristus* I.Thomps., *sp. nov.*

A *S. magnifico* Desf. ex Poir. foliis superioribus valde lanceolatis, bracteolis calyculorum multioribus, acheniis valde costatis papillis ad limitatas costae differt; a *S. velleioides* A.Cunn. ex DC. bracteolis calyculorum multioribus, acheniis magnioribus differt.

Type: South Australia, 5 m [8 km] N of Wirra (19 m [33 km] N of Lameroo) by roadside, D.E. Symon 3878, 12 Oct. 1965; holo: AD; iso: AD (two sheets).

Perennial herbs to c. 0.8 m high, with secondary roots fleshy, sometimes weakly glaucous, glabrous. *Leaves* in lower stem region somewhat larger and more crowded; narrow-obovate to oblanceolate, to 17 cm long, dentate to lobate in distal half. *Mid-stem leaves* narrow-elliptic to lanceolate to 12 cm long, 40 mm wide, with l:w ratio c. 2.5–8, undivided; margin coarsely dentate distally or almost entire; base cuneate to cordate, not or moderately amplexicaul. *Upper-stem leaves* becoming strongly triangular-lanceolate; margin entire; base moderately amplexicaul. *Unit inflorescences* of 2–8(–15) capitula; peduncle dilating from 1–8 mm below base of capitulum. *Capitula:* calycular bracteoles 3–6, 2–4 mm long; involucre campanulate, 6–10 mm long, c. 5–7 mm diam.; phyllaries 12–16. *Florets* 30–55; ligulate florets 6–10; ligule 10–20 mm long, yellow, with 4 or 5 veins; disc florets: corolla 5–8 mm long; limb equal to or slightly longer than tube; balusterform base of corolla 0.4–0.8 mm long. *Achenes* narrow-obloid, 4–5 mm long, brown, with pairs of ribs strongly raised to form several ridges, with papillose hairs c. 0.3 mm long restricted to lines within ridges. *Pappus* persistent, 5.5–7 mm long; bristles minutely scabrid or nearly smooth, length of barbels less than diam. of bristle. (Figs 1 & 6)

Flowers late winter–spring.

Distribution and Habitat: Occurs in south-eastern Australia from Kangaroo Island in south-eastern South Australia ESE to the Grampians in western Victoria and ENE to Manangatang in north-western Victoria (Fig. 2e). Grows on plains and sand hills, in woodland and low woodland, and recorded once from a swamp on Kangaroo Island.

Etymology: The epithet alludes to the papillose hairs arising from the prominent ridges of the achenes (*L. pilosus*, hairy; and *cristus*, ridge).

Notes: *Senecio pilosicristus* has previously been identified as *S. magnificus* or occasionally as *S. velleioides*, and morphologically it is somewhat intermediate between these two species. The three species are geographically isolated from one another. *Senecio pilosicristus* differs from *S. magnificus* by being non-shrubby, having broader and more numerous calycular bracteoles, peduncles that do not gradually dilate towards



Figure 6. *S. pilosicristus* (holotype: D.E. Symon 3878 AD).

the capitulum, pappus bristles that are less conspicuously barbellate, basal leaves that are narrow oblanceolate, upper-stem leaves that are triangular-lanceolate and with a more acute apex, inflorescences that are less congested and of fewer capitula, ligules that are consistently only 4- or 5-nerved, and achenes that have strongly raised ribs with longer hairs along ridges (in shallow grooves along ridge top) and glabrous between ribs. The fruit is similar to that of *S. velleioides* but is much larger and with longer hairs along the ridges. The habit and morphology of the upper-stem leaves are also reminiscent of *S. velleioides*. Further investigation of the underground parts of the plant is desirable, particularly to ascertain whether the plant is rhizomatous.

Selected specimens examined: **SOUTH AUSTRALIA:** Monarto South, School, *Herb. Ising*, Oct. 1929 (AD); Monarto South, *M. Kenny s.n.*, 26.ix.1963 (AD); Murray Bridge, *R. Bates 3763*, 24.vi.1984 (AD); Karoonda, *J.M. Black*, 6.x.1915 (AD); Pinnaroo, *J.M. Black*, 5.ix.1912 (AD); Hundred of Senior, ca. 20 km north-north-east of Bordertown, *D. Hunt 1124*, 8.ix.1962 (AD); Coonalpyn, *D. of A. 433*, 15.iv.1965 (AD); Alawoona, ca. 30 km south of Loxton, School, *Herb Ising*, Sept. 1936 (AD); Wilkawatt, *T.G.B. Osborn*, Oct. 1913 (AD); Wynarka, School, *Herb Ising*, Oct. 1932 (AD); Kangaroo Island. Breakneck River, *J.B. Cleland*, 19.xi.1924 (AD). **VICTORIA:** Mt Stapylton, northern Grampians, *P. Collier 2942*, 4.x.1987 (HO); Jeparit, St. *E. D'Alton*, Jan. 1902 (NSW); Parilla forest, *W. Gill*, Jan. 1911 (NSW); Coonalpyn, 90 mile desert, *B. Cleland*, May 1911 (NSW); Manangatang, *H.B. Williamson*, Sept 1921 (CANB); Sunset Country - central-west, near main east-west track, *P.D. Cheal*, 9.x.1978 (MEL); Big Desert, 12 km S of Murrayville on Nhill Road, *M.G. Corrick 6255 & B.A. Fuhrer*, 29.viii.1979 (MEL); Fyans Creek upstream from Stawell Pipeline, approx. 3/4 mile [1.2 km] up from bridge on Grampians Road, *A.C. Beaglehole 24907*, 29.ii.1968 (MEL); Dimboola, *F.M. Reader*, 29.ix.1882 (MEL); Big Desert, adjoining South Australian border fence, in Toonamool Parish \pm 12 miles [19 km] north of Serviceton, *J.H. Willis*, 17.ix.1948 (MEL).

6. *S. megaglossus* F.Muell., *Linnaea* 25: 419 (1852)

Type: [South Australia]. 'In collibus aridis pone fodinas Burra, inter rupes ad Broughton-flumen et inter rivos Hutt et Hill' [On arid hills at the Burra mine, also on rocks at the Broughton between the Hutt and Hill rivers], *F. Mueller*, Oct. 1851; lecto (**here selected**): MEL 304730; isolecto: MEL.

Shrubs to c. 0.8 m high, glaucous, glabrous. *Mid-stem leaves* narrow-obovate to oblanceolate or narrow-elliptic, to 10 cm long, with l:w ratio c. 2–4, undivided; margin entire or dentate; base tapering, hardly amplexicaul. *Upper-stem leaves* similar. *Unit inflorescences* of 1–4 capitula; peduncle dilating from c. 10–20 mm below base of capitulum. *Capitula:* calycular bracteoles (0–)1–3, 1–5 mm long; involucre campanulate, 8–15 mm long, c. 8–10 mm in diam.; phyllaries 16–20. *Florets* 60–80; ligulate *florets* 8; ligule 15–30 mm long, yellow, with c. 12–20 veins; disc florets: corolla 9–15 mm long; limb longer than tube; balusterform base of corolla c. 1 mm long. *Achenes* narrow-obloid, 5–7.5 mm long, brown, with ribs moderately raised especially basally, \pm glabrous or with scattered papillose hairs c. 0.3 mm long obscuring up to half of surface. *Pappus* persistent, 8–10 mm long; bristles conspicuously barbellate around summit, length of barbels 2–3 times diam. of bristle, more proximally, bristles minutely scabrid, length of barbels c. equal to diam. of bristle. (Fig. 1)

Flowers winter–spring.

Distribution and habitat: Occurs in south-eastern South Australia from the Flinders Ranges south-south-east to the Lofty Ranges (Fig. 2f). Grows in sandhills and in rocky gorges in or above creeks in loam and red clay.

Notes: Similar to *S. magnificus* but with fewer and larger capitula per inflorescence, ligules with more numerous veins, and achenes less densely indumented. Sympatric with and possibly occasionally hybridises with *S. magnificus* (Quorn area). *Senecio*

megaglossus and *S. magnificus* are also similar in that the peduncles of these species begin to dilate a greater distance below the base of the capitulum compared to those of related species.

Selected specimens examined: **SOUTH AUSTRALIA:** South Mount Lofty Ranges, Marne River Gorge, *F.E. Davies 1377a* & *R.B. Hadlow*, 21.xi.1989 (CBG, MEL); Warren Gorge, 21 km N of Quorn, Flinders Ranges, *A.J.A. Sikkes AS647* & *P. Ollerenshaw*, 21.ix.1973 (CBG).

7. *Senecio velleioides* A.Cunn. ex DC., *Prodr.* 6: 374 (1838)

Type: [New South Wales] 'in collibus rupestribus ad septentr. urbis Bathurst in Nova-Hollandia, *A. Cunningham*; holo: G, *n.v.*, microfiche seen MEL.

Perennial herbs to c. 2 m high, usually glaucous, glabrous. *Mid-stem leaves* narrow-elliptic to narrow-oblong, to 20 cm long, with l:w ratio c. 2–4, undivided; margin entire or dentate; base strongly cordate and amplexicaul. *Upper-stem leaves* lanceolate, strongly amplexicaul. *Unit inflorescences* of 5–80 capitula; peduncle dilating from c. 3–5 mm below base of capitulum. *Capitula:* calycular bracteoles 0–4, 1.0–3.0 mm long; involucre campanulate, 5.0–7.0 mm long, c. 3–5 mm diam.; phyllaries 12–16. *Florets* 35–50; ligulate florets 6–9; ligule 8–15 mm long, yellow, with 4 or 5 veins 4; disc florets: corolla 5–6 mm long; limb c. as long as tube; balusterform base of corolla c. 0.5 mm long. *Achenes* obloid to narrow-obloid, 2–4 mm long, brown, with pairs of ribs strongly raised to form several ridges, glabrous, or with papillose hairs c. 0.3 mm long in grooves of ridges. *Pappus* caducous, 3–5 mm long; bristles minutely scabrid, length of barbels less than diam. of bristle. (Fig. 1.)

Flowers spring–autumn

Distribution and habitat: Occurs in far south-eastern Australia from Wingen Maid near Taree in north-eastern New South Wales south-south-west to the Otway Ranges in south-western Victoria, and widely distributed in Tasmania (Fig. 7a). Grows in loamy soils in woodland and forest.

Notes: Distinguishable from sympatric species of *Senecio* by the strongly amplexicaul, glaucous leaves, the paucity of calycular bracteoles, and the relatively small deeply-ribbed achenes with hairs in grooves along the summit of prominent ribs. Tasmanian forms appear to be more robust, are less glaucous, have inflorescences with a greater number of heads, and calycular bracteoles that are a little longer and slightly more numerous. *Senecio velleioides* is similar vegetatively and in achenial morphology to *S. pilosicristus* but reproductive structures are more numerous and smaller, calycular bracteoles are fewer, and the achenes are much smaller and have caducous pappus bristles.

Selected specimens examined: **NEW SOUTH WALES:** 5.1 km NE along Galah Mtn Rd, then 1.6 km ± SE along trail to Rocky Ck, near Newnes, *P.D. Hind 5971* & *W. Cherry*, 31.i.1990 (AD, HO, MEL, NSW); Carters Creek, Currowan State Forest, NW of Bateman's Bay, South Coast, *R. Pullen 8730* & *J. Story* 6.xii.1973 (CANB, BRI); Summit of Mt Imlay, *D.E. Albrecht 194* & *B.J. Conn*, 21.ii.1983 (AD, MEL, NSW, PERTH). **VICTORIA:** 19 km SW of Colac PO, *A.C. Beaglehole 67298*, 13.xii.1979 (MEL). **TASMANIA:** Pine Cove Creek, *A. Moscal 5393* (AD, HO); Taranna, *W. Ashby* & *D.P.I.*, 24.ii.1995 (AD, HO, MEL, NSW).

8. *Senecio murrayanus* Wawra, in H. Wawra von Fernsee & G.R. von M. Beck, *Itin. Princ. S-Coburgi* 2: 48 (1888)

Type: [Victoria], 'Austral. Victoria/Murray Fl., [Murray River], *Dr Wawra 427*; holo: W *n.v.*, *fide* R.O. Belcher, *Muelleria* 6: 176 (1986); probable iso: MEL.

Annuals to c. 0.5 m high, not glaucous, ± glabrous. *Mid-stem leaves* very narrow-elliptic to linear, to 10 cm long, with l:w ratio c. 7–12, lobate; lobes up to 3 per side; margins

entire; base narrow, not amplexicaul. *Upper-stem leaves* similar. *Unit inflorescences* of 3–10(–20) capitula; peduncle dilating from c. 2–5 mm below base of capitulum. *Capitula*: calycular bracteoles 2–4, 2.0–5.0 mm long; involucre campanulate, 4.0–7.0 mm long, c. 6–10 mm diam.; phyllaries 14–22. *Florets* 50–70; ligulate florets c. 8; ligule 5–10 mm long, yellow, with 4 veins; disc florets: corolla 4–7 mm long; limb c. as long as tube; balusterform base of corolla c. 0.5 mm long. *Achenes* narrowly lageniform, 5–7 mm long, ellipsoid granule-like, usually opaque papillae crowded over entire surface. *Pappus* persistent, 4–7 mm long; bristles minutely scabrid, length of barbels c. equal to diam. of bristle. (Fig. 1.)

Flowers mostly winter–spring.

Distribution and Habitat: Occurs in south-eastern Australia from Trangie in central New South Wales south-south-west to Pine Plains in north-western Victoria (Fig. 7b). Ecological preferences unknown, probably growing on clay or loam soils.

Notes: A rare species for which there are no recent records and which, although described in 1888, was not recognised in Australia until 1986. Previous collections were left undetermined or identified as *S. lautus* Forst.f. ex Willd. or *S. platylepis*. Belcher matched achenes from type material of *S. murrayanus* with those of type material of the allied species *S. tuberculatus* which itself had only been described in 1965. He considered that the achenes were identical and hence *S. tuberculatus* was sunk under the earlier name *S. murrayanus*. The achenes are not in fact identical and further differences between the two species are outlined under *S. tuberculatus*.



Figure 7. Distribution of a. *S. velleioides*; b. *S. murrayanus*; c. *S. tuberculatus*; d. *S. platylepis*.

The unusual ellipsoid to obovoid granular papillae covering the surface of the achenes of *S. murrayanus* have a longitudinal furrow. When water is applied, hair-like structures are released and the water is absorbed to produce large amounts of mucus. This phenomenon is discussed in more detail by Belcher (1986) and the similar, or identical, mechanism that occurs in the more typical papillose hairs is described by Lawrence (1985).

Selected specimens examined: **NEW SOUTH WALES:** Lachlan R., *F. Mueller*, Sept. 1878 (MEL); Trangie, *L.R. Clark*, 27.x.1942 (CANB); 30 miles NW of Balranald, *J.H. Leigh W311* (NSW). **VICTORIA:** Kerang, *J. Minchin*, Oct 1887 (MEL).

9. *Senecio tuberculatus* Ali, *Kew Bull.* 19: 423 (1965)

Type: Queensland, South of Tara, Bullock Head Creek Road, *R.W. Johnson 538*, 28 Aug. 1958; holo: BRI; iso: NSW.

Annuals to c. 0.5 m high, not glaucous, with hairs sparse. *Mid-stem leaves* elliptic in outline, to 15 cm long, with l:w ratio c. 1.5–3, pinnatisect or bipinnatisect; segments 2–5 per side; margins entire, dentate, or divided; base narrow. *Upper-stem leaves* similar. *Unit inflorescences* of 3–30 capitula; peduncle dilating from c. 2–5 mm below base of capitulum. *Capitula:* calycular bracteoles 2–6, 1–3 mm long; involucre (3–)4–6 mm long, c. 6–10 mm diam., sparsely hairy; phyllaries 14–22. *Florets* 60–90; ligulate florets 8–12; ligule 5–10 mm long, yellow, with mostly 4 or 5 veins; disc florets: corolla 4–6 mm long; limb c. as long as tube; balusterform base of corolla c. 0.5 mm long. *Achenes* narrowly lageniform, 4–7 mm long, orange-brown, with ± translucent granule-like papillae scattered to moderately dense over surface, sparser on neck. *Pappus* persistent, 4–5 mm long; bristles minutely scabrid, length of barbels less than diam. of bristle (Figs 1 & 8) *Flowers* winter–spring.

Distribution and Habitat: Occurs in central-eastern Australia from Charleville in south-central Queensland S to Nevertire in north-central New South Wales, and east-south-east to Inglewood in far south-eastern Queensland (Fig. 7c). Grows in sandy-loam, loam and heavy grey clays in grassland, herbfield and Brigalow or Casuarina woodland.

Notes: Similar to the more southerly distributed *S. murrayanus* but differing by having leaves more deeply dissected, phyllaries shorter, and bearing scattered coarse hairs at anthesis, and achenes more sparsely covered, especially on neck, by smaller, differently shaped, translucent granular papillae.

Selected specimens examined: **QUEENSLAND:** 7 km north of Barrington along main road to Cunnamulla, *P.S. Short 3569*, 15.viii.1989 (BRI, MEL); 10 km W of Condamine River on Moonie Highway, 16 km SW of Dalby, *J. Gillieatt 192*, 21.ix.1964 (BRI); Near Donga Creek, 45 miles N of St George, on Surat Road, *S.L. Everest 6235*, 4.ix.1960 (BRI). **NEW SOUTH WALES:** “Mt Mulyah” - about 80 km north-west of Louth, *C.W.E. Moore 7879*, 18.ix.1978 (CANB).

10. *Senecio platylepis* DC., *Prodr.* 6: 371 (1838)

Type: [New South Wales], ‘in demissis ad basin montium Peels range [base of Cocoparra Range], *A. Cunningham*, [1817]; holo: G n.v., microfiche seen MEL; iso: K n.v., photo seen MEL.

Annuals to c. 0.3 m high, not glaucous, with hairs sparse or scattered. *Mid-stem leaves* very narrow-elliptic to very narrow-oblong in outline, to 12 cm long, with l:w ratio c. 2–4, lobate to pinnatisect; segments 2–4 per side; margin often dentate to lobate; base often somewhat dilated, semi-amplexicaul. *Upper-stem leaves* similar. *Unit inflorescences* of 1–4 capitula; peduncle dilating from c. 2–5 mm below base of capitulum. *Capitula:* calycular bracteoles 3–6, 2.0–5.0 mm long; involucre campanulate, c. 6–10 mm long, c. 7–10 mm diam., receptacle and peduncle sparsely to moderately hairy, glabrescent; phyllaries 12–20. *Florets* 40–70; ligulate florets 8–16; ligule 6–15 mm long, yellow, with

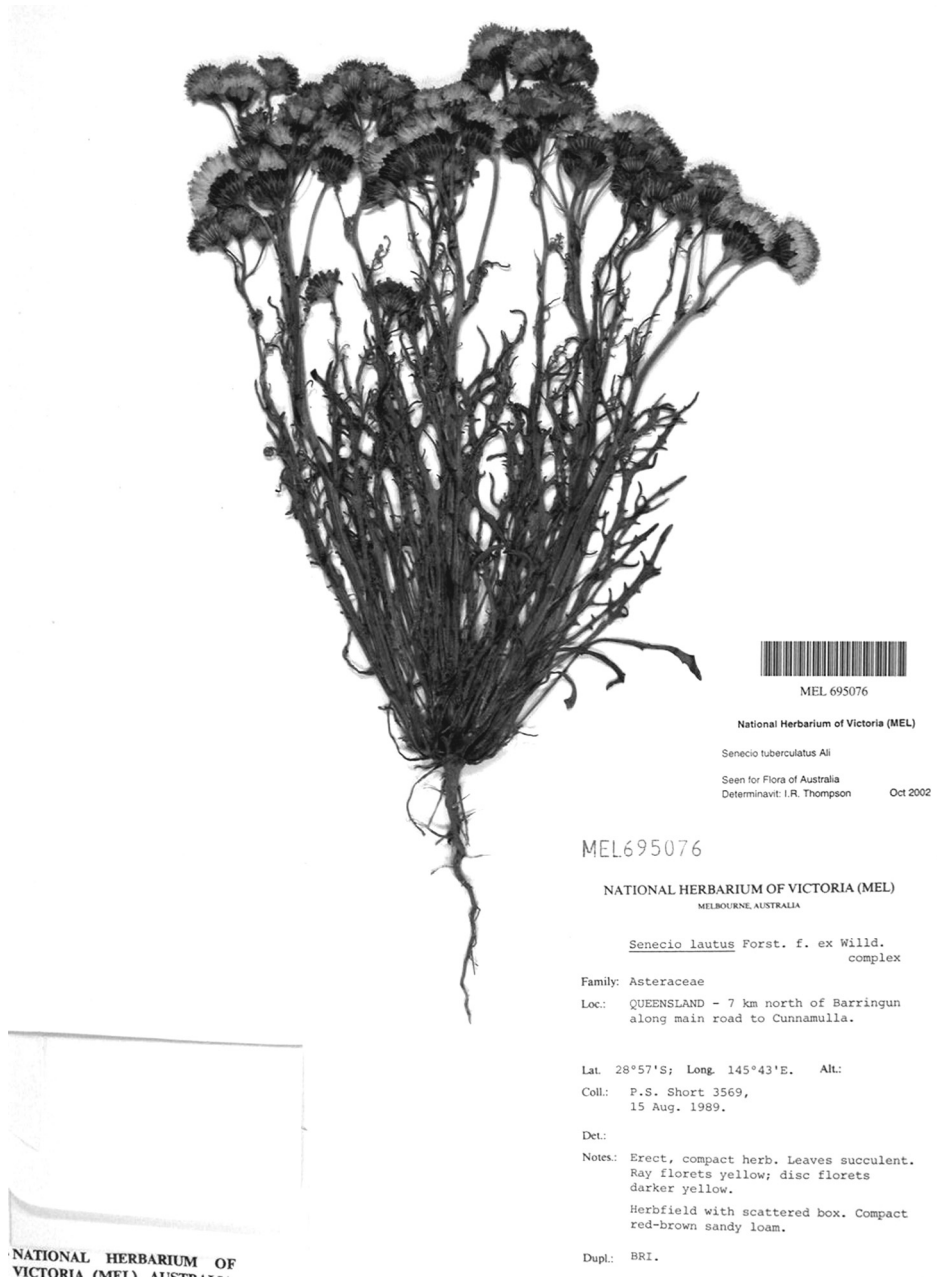


Figure 8. *S. tuberculatus* (P.S. Short 3569 MEL).

4 or sometimes up to 8 veins; disc florets: corolla 5–7 mm long; limb c. as long as tube; balusterform base of corolla 0.5–0.8 mm long. *Achenes* of disc florets narrow-obloid, 4–6 mm long, with reddish exudate on surface, prominently ribbed, with papillose hairs c. 0.6–0.8 mm long, largely or totally obscuring surface; achenes of ray florets infertile, undeveloped, glabrous. *Pappus* persistent 5–8 mm long; bristles barbellate, length of barbels c. 2–3 times diam. of bristle. (Fig. 1)

Flowers mostly winter–spring.

Distribution and habitat: Occurs in western New South Wales and far north-western Victoria from the Bourke district south to Pink Lakes in Victoria (Fig. 7d). Grows in red sandy-loam or in clay in interdune flats or adjacent to ephemeral water in saltbush shrubland.

Notes: A species that occurs only in favourable years when it can form extensive colonies. Phyllaries are relatively broad and flat and achenes are unusual in having reddish glandular material covering the surface. This glandular material is overtopped and largely obscured by a dense indumentum of relatively long, white hairs.

Selected specimens examined: **NEW SOUTH WALES**: Yara via Condobolin, Yara Reserve, SW corner just outside fence, *K. Horne ANU4242*, 13.viii.1966 (CANB). **VICTORIA**: Birthday Tank ca. 4 miles (6 km) NW of Mt Crozier (ca. 90 km NW of Ouyen), *J.H. Willis*, 2.viii.1968 (MEL).

Part 2. Taxonomy of *Senecio pectinatus* DC. and the elevation of var. *ochroleucus* to the status of species.

Senecio pectinatus is one of a group of radiate species of alpine and subalpine regions that are rhizomatous, scapiform, with large, herbaceous calycular bracteoles, and glabrous achenes with a well-developed carpopodium. The group was recently revised by Belcher (1996). Other members of this group are *S. leptocarpus* DC., *S. papillosus* F.Muell. and *S. primulifolius* F.Muell. All taxa in the group are endemic to Tasmania except for *Senecio pectinatus* var. *major* (although there is an uncertain record of *S. pectinatus* var. *pectinatus* for Victoria). This group appear to be most closely allied to four mainland species based on similarities in capitulum size, calycular bracteole morphology and the size and glabrous nature of the achenes. These species are: *S. vagus* F.Muell., *S. macranthus* A.Rich., *S. amygdalifolius* F.Muell., and *S. daltonii* F.Muell. These species occur in forested hills and mountains of south-eastern Australia with the exception of *S. daltonii* which occurs in drier, lowland habitats.

11. *Senecio pectinatus* DC., *Prodr.* 6: 372 (1838).

Type: Tasmania, *R. Gunn 107*, 1832; holo: G n.v., *fide* R.O. Belcher, *Muelleria* 9: 116 (1996), microfiche seen MEL.

Scapiform, rhizomatous perennials to 0.3 (–0.5) m high, ±glabrous except for upper scape and capitulum; roots fleshy. *Leaves* rosette-forming, narrow-spathulate, to 12 cm long, with l:w ratio c. 2–6, with expanded portion coarsely dentate to pinnatisect; major segments 3–5 per side, with shape various; commonly petiole-like in proximal third to two thirds. Stem leaves 5–12, usually similar to rosette leaves basally, becoming entire upwards, grading into bracteoles. *Inflorescence* of a solitary capitulum or rarely 2. *Capitulum*: calycular bracteoles 6–10, 6–10 mm long; involucre campanulate, 6–11 mm long, 5–17 mm diam. (10–30 mm wide when pressed), ±glabrous; peduncle, base of capitulum and bracteoles hairy; phyllaries 12–30. *Florets* 60–120; ligulate florets 13–20; ligule 10–20 mm long, yellow, with 4(–6) veins; disc florets: corolla 4–9 mm long; limb longer than tube; balusterform base of corolla c. 0.5 mm long. *Achenes* very narrow-obloid or narrow-obconical, 4–8 mm long, orange-brown, glabrous; carpopodium well-developed. *Pappus* ?persistent, 4–7.5 mm long.

Flowers summer to early autumn

Distribution and Habitat: Occurs in south-eastern Australia including Tasmania. Grows in alpine or sub-alpine herbfields, heathland and shrubland, commonly near streams or seepage areas.

Notes: There are two varieties of this species differing only in their dimensions, and they are not always easy to distinguish, particularly if stunted plants are encountered. The key produced by Belcher (1996) when he described var. *major* does not adequately distinguish them. Although the variation appears almost continuous, I consider that the two varieties should be maintained. A modified key is presented below. The high chromosome number of $2n = 80$ for var. *major* (Lawrence 1980) is suggestive of polyploidy. A chromosome count for the typical variety is lacking, however. The typical variety almost exclusively occurs in Tasmania, whereas var. *major* is largely confined to the mainland. In Tasmania, var. *major* appears to occur only in the north, e.g. in Ben Lomond National Park, where it is sympatric with the typical variety.

- 1 Scape < 1.5 mm diam.; rosette leaves 1–5(–8) cm long; involucre 6–8 mm long, usually < 15 mm wide when pressed; corolla of disc florets < 6 mm long
**11a. var. *pectinatus***
- 1: Scape > 1.5 mm diam.; rosette leaves 4–15 cm long; involucre 8–12 mm long, usually > 15 mm wide when pressed; corolla of disc florets > 6 mm long**11b. var. *major***

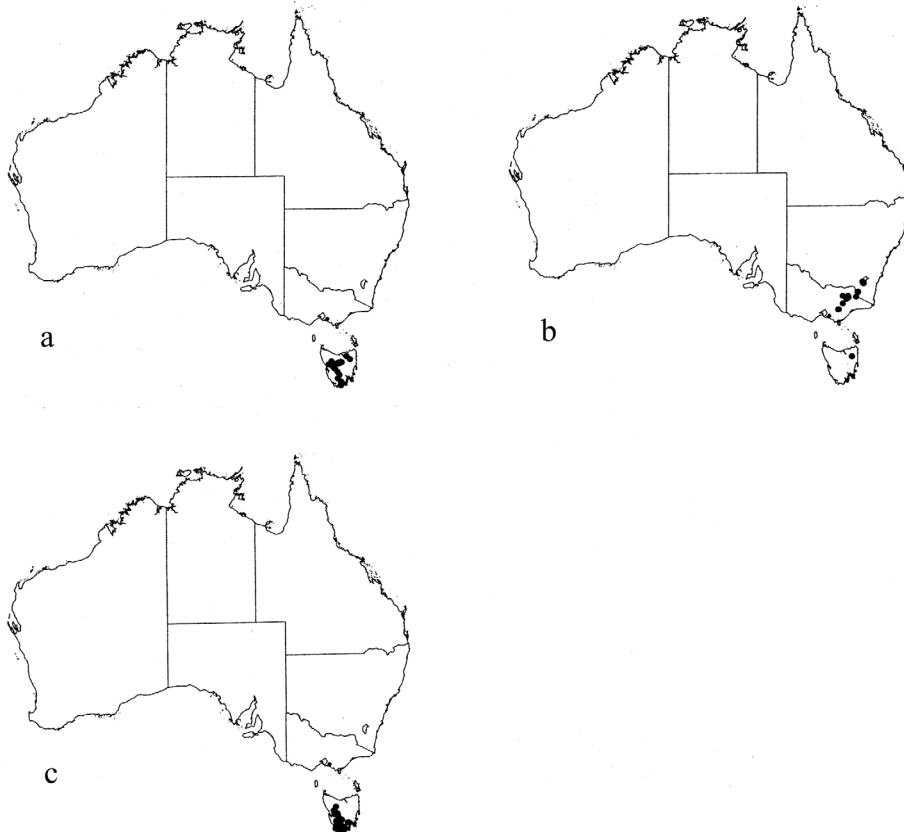


Figure 9. Distribution of a. *S. pectinatus* var. *pectinatus*; b. *S. pectinatus* var. *major*; c. *S. albogilvus*.

11a. *Senecio pectinatus* DC. var. *pectinatus*

Distribution and Habitat: Occurs in Tasmania from Mt Arthur in the far north to Mt La Perouse in the far south. A specimen from Mt Buffalo in Victoria, *H.C.E. Stewart* (MEL) is doubtfully included as this variety. Further collections from this locality are desirable (Fig. 9a).

Selected specimens examined: **VICTORIA:** Mt Buffalo, *H.C.E. Stewart*, 27.i.1940 (MEL). **TASMANIA:** Hartz mountains National Park. Between Ladies Tarn and Hartz Peak, *P.S. Short* 1892, 1.ii.1983 (MEL); Ben Lomond National Park, Hamilton Crags, 1.5 km E of Legges Tor, *F.E. Davies* 1167, 23.i.1989 (AD, CBG, HO, MEL).

11b. *Senecio pectinatus* var. *major* F.Muell. ex Belcher, *Muelleria* 9: 120 (1996)

Type: [Victoria], Cobboras [Cobberas] Mountains, *F. Mueller*, [1854]; holo: MEL; syn: MEL.

Distribution and Habitat: Occurs in south-eastern Australia; on the mainland from Mt Kelly in southern parts of the Australian Capital Territory south-west to Mt Baw Baw in southern Victoria, and in north-eastern Tasmania at Hamilton Crags (Fig. 9b).

Selected specimens examined: **NEW SOUTH WALES:** Approx. 1 km along summit Rd from parking area, Mt Stillwell, Charlottes Pass, Koscius[z]ko, Koscius[z]ko National Park, *P. Hind* 5520 & *G. D'Aubert*, 1.iii.1988 (MEL, NSW). **VICTORIA:** Bogong High Plains near Mt McKay, beside road from "Ruined Castle", At head of ?McKay Creek, *M.G. Corrick* 11500, 30.i.1997 (CANB, MEL); Hotham Heights, Wall of Death, *D.E. Albrecht* 4949, 9.iv.1992 (MEL); Baw-Baws, *C.L. Gumm*, 31.i.1970 (CANB); Baw Baw National Park – Mt St Gwinear, *P.D. Cheal*, 11.i.1980 (MEL). **TASMANIA:** Ben Lomond National Park, Hamilton Crags, *M.G. Noble* 28274, 1.ii.1979 (HO).

12. *Senecio albogilvus* (F.Muell.) I.Thomps., *nom. nov.*

Senecio pectinatus var. *ochroleucus* F.Muell., *Papers & Proc. Roy. Soc. Tasmania for 1870*: 16 (1871), as var. *ochroleuca*; L.Rodway, *Tasm. Fl.* 93 (1903).

Type: [Tasmania], Mt Wellington, 4600 ft [1420 m], *F. Mueller*, Jan. 1869; lecto: MEL; syn: MEL.

Scapiform, rhizomatous perennials to 0.15(–0.25) m high, ±glabrous except for upper scape and capitulum; roots fleshy. *Leaves* rosetted, numerous, very narrow-oblongate to linear, to 4 cm long, with l:w ratio c. 8–15, entire except for 1 or 2 small serrations or lobes per side in distal half, sometimes ± entire; upper surface somewhat glossy, dark-green; lower surface much paler. Stem leaves 10–15, becoming entire, grading into bracteoles. *Inflorescence* of a solitary capitulum. *Capitulum:* calycular bracteoles 6–10, 4–9 mm long; involucre campanulate, 5–11 mm long, c. 3–7 mm diam., glabrous; peduncle and base of capitulum hairy; phyllaries 12–22. *Florets* 35–55; ligulate florets 10–15; ligule 8–12 mm long, cream-white, with 4(–6) veins; disc florets: corolla 4–6 mm long; limb longer than tube; balusterform base of corolla c. 0.5 mm long. *Achenes* narrow-obloid, 2–3 mm long, orange-brown, glabrous; carpopodium well-developed. *Pappus* ?persistent, 4.5–6 mm long.

Flowers summer to early autumn

Distribution and Habitat: Occurs in central-western and southern Tasmania from Cradle Mountain south to Pindar's Peak (Fig. 9c). Grows in rocky sites in herbfield, heathland and shrubland in montane to alpine regions.

Etymology: The epithet alludes to the colour of the ligules (*L.albus*, white and *gilvus*, pale yellow).

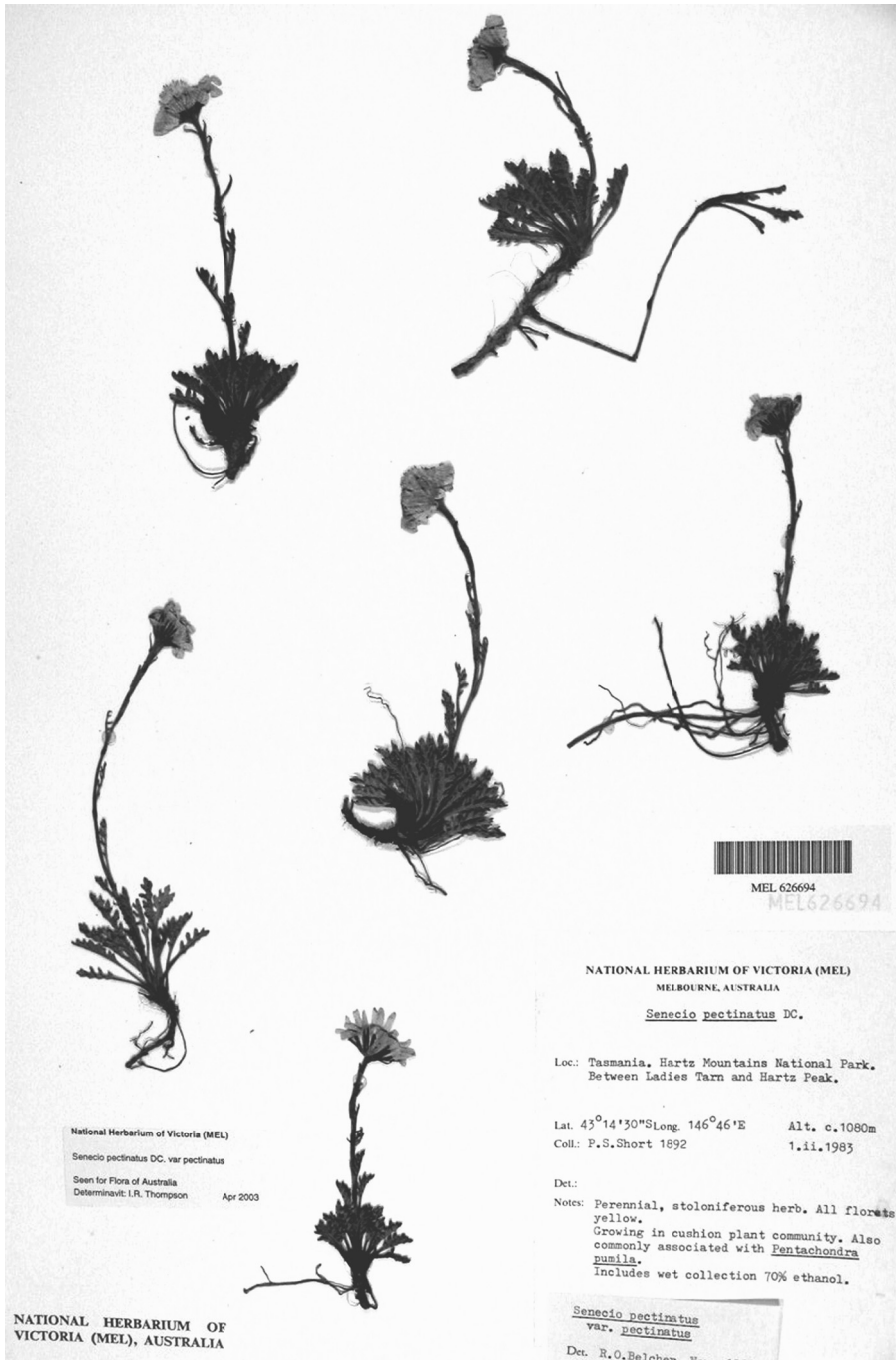


Figure 10. *S. pectinatus* var. *pectinatus* (P.S. Short 1892 MEL).

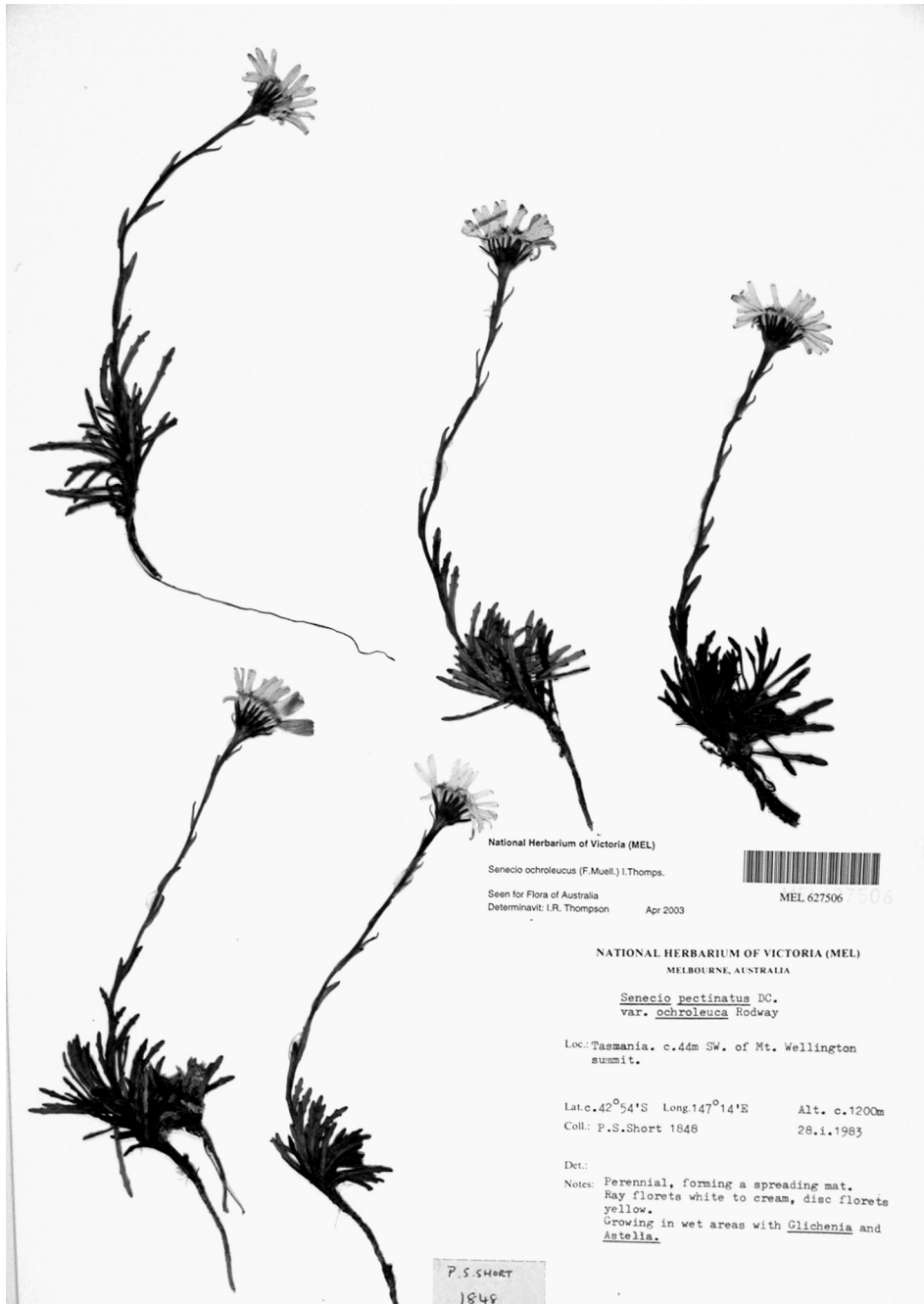


Figure 11. *S. albogilvus* (P.S. Short 1848 MEL).

Notes: Previously included in *S. pectinatus* but distinct from this species in leaf morphology. The undivided, discolorous leaves are more reminiscent of those of *S. leptocarpus*, although considerably smaller. A further distinctive feature of this species is the white-cream colour of the ligules.

Selected specimens examined: **TASMANIA:** Cradle Mountain National Park, Eastern edge of Cradle Mountain c. 100 m below summit, *P.S. Short 1786*, 19.i.1983 (HO, MEL); c. 44 m SW of Mt Wellington summit, *P.S. Short 1848*, 28.i.1983 (MEL); Hartz Mountains National Park, Hartz Mountain track, 500 m from base of track, *F.E. Davies 878 & P. Ollerenshaw*, 15.i.1989 (AD, CBG, HO, MEL).

Key to radiate and quasiradiate *Senecio* and *Arrhenechthites* in Australia

Capitula in species in the following key are heterogamous with the majority of florets tubular and perfect and forming the disc except in *A. mixta*. In most cases the marginal pistillate florets are prominently ligulate, but there are a few species in which the pistillate florets have very small or undeveloped ligules. The latter can be distinguished from discoid species, e.g. *S. odoratus* Hornem., by the sex of and lack of regular corolla-lobes on the marginal florets, and in some cases by the dimorphic achenes (achenes of female florets larger, more densely hairy and with a larger carpodium than achenes of bisexual florets). They can be distinguished from disciform species of *Senecio*, e.g. *S. quadridentatus* Labill., by the last two features and also by the lower proportion of pistillate florets. Prominent tubercles around the margin of the receptacle to receive the carpodium of achenes of female florets is a feature correlated with dimorphism of the achenes in Australian *Senecio*.

The key includes introduced radiate species; they are designated with an asterisk.

- 1 Involucre 12–20 mm long, with l:w ratio 5–7, phyllaries commonly bearing coarse purplish multicellular hairs; bisexual disc florets 2–5; achenes narrow-obloid, 6–8 mm long, \pm glabrous.....*Arrhenechthites mixta*[†]
- 1: Involucre not entirely as above; bisexual disc florets > 5, or if less then not otherwise as above
 - 2 Annuals; ligules to 2 mm long, sometimes vestigial....*S. glossanthus complex*^{††}
 - 2: Annuals or perennials, sometimes shrubby or climbing; ligules > 2 mm long
 - 3 Scrambling or climbing plants producing stems 2 m long or more, leaves petiolate, with the l:w ratio of lamina 1–2
 - 4 Leaves mostly to 6 cm long, with lamina c. triangular, basal lobes large, acute, entire distal to basal lobes; unit inflorescences of 1–3 capitula on short branches; involucre 8–12 mm long; bracteoles c. 10 mm long*S. macroglossus*^{*}
 - 4: Leaves mostly to 12 cm long, with lamina not triangular or if nearly so, major lobes obtuse to rounded, often toothed distal to basal lobes; unit inflorescences mostly of 10 or more capitula; involucre 5–8 mm long; bracteoles 1–3 mm long
 - 5 Basal third of lamina of leaves not or only slightly wider than middle third; involucre 7–8 mm long; corollas of disc florets 9–12 mm long, overtopping involucre by c. 5 mm; achenes glabrous*S. tamoides*^{*}
 - 5: Basal third of lamina of leaves frequently markedly wider than middle third; involucre 5–6 mm long; corollas of disc florets 5–6 mm long, overtopping involucre by c. 3 mm; achenes with scattered hairs in lines*S. angulatus*^{*}
- 3: Plant habit not as above; leaves not petiolate or if so then the l:w ratio of lamina > 2
 - 6 Ligules pink or purple, or rarely white but then capitulum not solitary
 - 7 Capitula small (c. 1.5 mm diam.); ligules 1–3.....*S. leucoglossus*

- 7: Capitula large (c. 5–8 mm diam.); ligules 13 or more
- 8 Leaves acutely lobate or dentate; calycular bracteoles linear-lanceolate; phyllaries 20–22*S. glastifolius**
- 8: Leaves pinnatipartite; calycular bracteoles narrow-ovate; phyllaries 12–16*S. elegans**
- 6: Ligules mostly yellow, if whitish then capitula solitary
- 9 Plant scapiform (leaves in upper 2/3 of stems much smaller than the more crowded basal and sub-basal leaves), to 0.5 m tall; receptacle and usually peduncles moderately hairy; calycular bracteoles > 4 mm long (montane to alpine)
- 10 Leaves ±glabrous; cauline leaves/bracts 5–15 (excluding distalmost centimetre of scape)
- 11 Leaves ± concolorous, leaves deeply lobate to pinnatisect, 3–6 commonly ± quadrate segments per side; inflorescence of 1(–2) capitulum; ligules yellow**11. *S. pectinatus***
- 11: Leaves markedly discolorous, somewhat whitish on abaxial surface, 1–several serrations or ± triangular lobes per side; inflorescence of 1 or more capitula; ligules yellow or cream
- 12 Leaves 4–10 mm wide, serrations/lobes 3 or more per side; inflorescences mostly of 3 or more capitula; ligules yellow*S. leptocarpus*
- 12: Leaves 1–4 mm wide, serrations 1 or 2 per side; inflorescence of a solitary capitulum; ligules white or cream**12. *S. albogilvus***
- 10: Leaves hairy; cauline leaves/bracts up to 5 (excluding distalmost centimetre of scape)
- 13 Basal leaves ± sharply demarcated into petiole and blade, usually at least some 15–40 mm wide, upper surface lacking coarse septate hairs to c. 1.5 mm long (or stout residual tubercles), lower surface with secondary venation raised, conspicuous; capitula 1–4.....*S. primulifolius*
- 13: Basal leaves spatulate, less than 15 mm wide, upper surface with numerous coarse septate hairs to c. 1.5 mm long (or stout residual tubercles), lower surface with secondary venation inconspicuous; capitulum solitary*S. papillosus*
- 9: Plant not scapiform or if so calycular bracteoles < 4 mm long; height various; receptacle and peduncles hairy or glabrous (lowland to montane)
- 14 Plants glaucous; leaves entire; calycular bracteoles absent; involucre all ± seamlessly fused for most of length or fused in pairs or triplets of phyllaries to produce involucre sections up to 5 mm wide; arid or semiarid regions
- 15 Leaves obovate–oblanceolate; involucre comprising 7–10 sections including some 3–5 mm wide (comprising 2 or 3 fused phyllaries); pappus usually to 10 mm long, minutely barbellate (visible under low magnification)**3. *S. gypsicola***
- 15: Leaves linear; involucre comprising a cylinder of fused phyllaries (splitting finally into 3 or 4 sections); pappus to 30 mm long
- 16 Ligulate florets 5–7, commonly 5; achenes 2/3–3/4 of length of phyllaries; hairs of achenes c. 0.3 mm long; pappus 5–16 mm long at maturity (far central-western Western Australia)**2. *S. conferruminatus***
- 16: Ligulate florets 7–11; achenes c. 1/2 of length of phyllaries; hairs of achenes c. 1.0 mm long; pappus 10–30 mm long at maturity (further east than above)**1. *S. gregorii***
- 14: Plants glaucous or not; leaves entire or not; calycular bracteoles (0–)1–many; involucre of 12 or more unfused phyllaries (stereome boundaries clearly demarcated); habitat various

- 17 Involucre < 5.5 mm long, < 3 mm diam.; calycular bracteoles 4–8; ligules 4–8
- 18 Plants extensively rhizomatous, aerial stems to 50 cm high; inflorescences of 1–5 capitula; involucre appressed-woolly
.....*S. behrianus*
- 18: Plants not extensively rhizomatous, aerial stems to 200 cm high; inflorescences of several to 100s of capitula; involucre glabrous
- 19 Leaves with l:w ratio 1.5–4, the lower surface densely white-tomentose *S. garlandii*
- 19: Leaves with l:w ratio > 4, or if less the lower surface ±glabrous....
.....*S. linearifolius*
- 17: Plants not with all the above features
- 20 Plants ± grey throughout; involucre grey, 10–15 mm long x c. 10 mm diam.....
.....*S. crassiflorus**
- 20: Plants not grey throughout; involucre not entirely as above; habitat various
- 21 Plants biennial, rosetted in first season; leaves 2 or 3-pinnatisect, division of primary segments irregular; achenes dimorphic in terms of indumentum of ray florets glabrous, those of disc florets papillose.....**S. jacobaea*
- 21: Plants of various longevity, not forming a rosette as above; leaves simple or variously pinnatisect, division of primary segments ± regular; achenes not dimorphic as above
- 22 Lower surface of leaves whitish or grey, indumentum closely appressed; calycular bracteoles 14–20**S. pterophorus*
- 22: Lower surface of leaves glabrous or nearly so; calycular bracteoles mostly <14
- 23 Annuals to 45 cm high; achenes 4–7 mm long, narrowly lageniform with granule-like papillae or densely long-hairy, hairs obscuring the red excrescences on the surface (semiarid regions of eastern Australia)
- 24 Leaf-segments lobate, lobes moderately crowded, upperstem leaves often moderately hairy with long multicellular hairs; achenes of disc florets ± obloid, ribbed, densely pilose; achenes of ray florets not fertile.....**10. *S. platylepis***
- 24: Leaf-segments, if present, with lobes well spaced, leaves usually ±glabrous; achenes of all florets lageniform (i.e. long-attenuate apically), not ribbed, granular structures scattered to dense on unribbed surface; all achenes fertile
- 25 Leaves dentate to deeply lobate, axis of segments to 15 mm long, segments entire; phyllaries glabrous; achenes ± densely covered throughout by commonly whitish granules; central to southern N.S.W. northern Vic**8. *S. murrayanus***
- 25: Leaves lobate to pinnatisect, axis of segments to 40 mm long, segments sometimes again divided; phyllaries bearing a few coarse hairs; achenes with sparse to moderately dense often translucent granules, often sparser on neck; central to northern N.S.W. and southern Qld**9. *S. tuberculatus***
- 23: Plants commonly perennial, sometimes annual; achenes not narrowly lageniform with granule-like papillae or densely long-hairy (distribution various)
- 26 Leaves with a clear demarcation between petiole and lamina portions, lamina not divided, margins crowded-serrulate
.....*S. amygdalifolius*
- 26: Leaves not divided into petiole and lamina portions or if so, lamina divided and margins not crowded-serrulate

- 27 Mid-branch/stem leaves ovate in outline, short-petiolate, pinnatisect proximally reducing progressively to dentate distally; calycular bracteoles > 5 mm long; phyllaries sometimes bearing conspicuous pigmented hairs; ligules c. 7 nerved
.....*S. vagus*
- 27: Mid-branch/stem leaves not as above; calycular bracteoles < 5 mm long; phyllaries glabrous; ligules not or not consistently 7 nerved
- 28 Leaves thin, ± linear, 1–3 mm wide; involucre > 8 mm long, > 7 mm diam; achenes glabrous
- 29 Plant extensively rhizomatous; leaves lacking strap-like basal segments; pappus 12–20 mm long; lowland
.....*S. daltoni*
- 29: Plant not extensively rhizomatous; leaves with strap-like basal segments; pappus < 12 mm long*S. macranthus*
- 28: Either leaves not linear or involucre shorter or narrower than above;
- 30 Plants often glaucous; leaves not divided; calycular bracteoles 0–6; phyllaries with stereomes ± flat on drying
- 31 Unit inflorescences of 1–5 capitula; phyllaries 10–15 mm long; ligules 12–20-nerved; achenes 5–7.5 mm long, nearly glabrous, papillose hairs not in distinct lines*6. S. megaglossus*
- 31: Unit inflorescence of 3–30 capitula; phyllaries 5–11 mm long; ligules 4–13-nerved; achenes 2–6 mm long, densely papillose or papillose hairs in grooves along prominent ridges
- 32 Calycular bracteoles 3–6; achenes 4–5 mm long, papillose hairs ± confined to grooves at summits of ridges.*5. S. pilosicristus*
- 32: Calycular bracteoles 0–4; achenes either less than 4 mm long or papillose ± all over
- 33 Leaves hardly stem clasping (but sometimes lamina decurrent); unit inflorescences commonly with less than 20 capitula; achenes 3–7 mm long, hairs covering most of surface, lacking strongly raised ridges; pappus persistent (semiarid to arid regions)
.....*4. S. magnificus*
- 33: Leaves strongly amplexicaul; unit inflorescences commonly with more than 20 capitula; achenes 2.0–3.0 mm long, hairs restricted to grooves along summit of prominent ribs; pappus not persistent (mesic regions)*7. S. velleioides*
- 30: Plants not usually glaucous; leaves segmented or not; calycular bracteoles usually > 6; phyllaries with stereomes becoming 2-ridged in proximal half on drying unless plant a coastal succulent
- 34 Leaves thin, undivided or occasionally developing a few segments per side; unit inflorescences of up to 8 capitula; involucre of c. 18–22 phyllaries, achenes 1.3–2.2 mm long, < 0.5 mm diam., papillose hairs

extremely small, closely appressed (far eastern Australia mostly on and east of Great Dividing Range)*S. madagascariensis**

34: Leaves thin to fleshy or succulent, undivided or variously pinnatisect; unit inflorescences of up to 30 capitula; involucre of c. 12–22 phyllaries, achenes 1.6–7 mm long, > 0.5 mm diam., glabrous or papillose, papillose hairs larger than above.....

Lautusoid complex (including *S. pinnatifolius* A.Rich., *S. spathulatus* A.Rich., and *S. capillifolius* Hook.f.)^{††}

[†] The validity of placing this species in *Arrhenechthites*, a genus otherwise endemic to New Guinea, is currently under investigation.

^{††} The Australian lautusoid complex and the *S. glossanthus* complex are currently being revised and several new taxa will be described (Thompson, two papers in press).

Acknowledgements

I am grateful for the assistance given by the School of Botany, The University of Melbourne and the Royal Botanic Gardens, Melbourne for the use of their facilities, Neville Walsh for his assistance with field work and many other aspects of my research, Dr Niels Klazenga and Dr Teresa Lebel for their assistance with mapping and imaging, and the technical staff at MEL for their assistance with loans. I would also like to thank the directors of AD, BRI, CANB, DNA, HO, NE and NSW for the loan of specimens. This study was funded by a three year ABRs grant (Grant no: 2000/3192).

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Index of Scientific Names

Epithets of accepted names are in roman (with bold type for new names) and synonyms are in italics. The numbers refer to the number of the taxon as given in the taxonomy section. Key indicates that the species is only mentioned in the key and/or in introductory remarks.

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