

Taxonomic studies of Australian *Senecio* (Asteraceae): 1. The disciform species

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Abstract

Morphological studies of Australian disciform *Senecio* (central florets of the capitulum bisexual and tubular, and marginal florets female and tubular) have resulted in the recognition of 18 new species, two new subspecies, and the resurrection of six names. The new species are: *S. brevityubulus* I.Thomps., *S. distalilobatus* I.Thomps., *S. dolichocephalus* I.Thomps., *S. extensus* I.Thomps., *S. hispidissimus* I.Thomps., *S. interpositus* I.Thomps., *S. lageniformis* I.Thomps., *S. longicollaris* I.Thomps., *S. longipilus* I.Thomps., *S. microbasis* I.Thomps., *S. nigrapicus* I.Thomps., *S. niveoplanus* I.Thomps., *S. oldfieldii* F.Muell. ex I.Thomps., *S. phelleus* I.Thomps., *S. psilophyllus* I.Thomps., *S. queenslandicus* I.Thomps., *S. scabrellus* I.Thomps., and *S. tasmanicus* I.Thomps. The new subspecies are: *S. multicaulis* A.Rich. subsp. *stirlingensis* I.Thomps., and *S. glomeratus* Desf. ex Poir. subsp. *longifructus* I.Thomps.

Senecio bathurstianus (DC.) Sch.Bip., *S. multicaulis* A.Rich., *S. prenanthoides* A.Rich., *S. glandulosus* (DC.) Sch.Bip., and *S. glabrescens* (DC.) Sch.Bip. are resurrected. *Senecio georgianus* DC. and *S. helichrysoides* F.Muell., the latter here resurrected, although discoid, are allied to the disciform group and are described here. A key to species is presented.

Introduction

Senecio L. is a large, cosmopolitan genus comprising over a thousand species, and species are predominantly radiate or discoid. However, in Australia about a third of the approximately 50, mostly endemic species are disciform, i.e. with central florets bisexual and tubular and marginal florets female, tubular, and with corollas significantly smaller than those of the central florets. Belcher (1956) coined the term *erechthitoid* for this group because of the resemblance in floret composition to *Erechtites*.

Although most disciform species are endemic to Australia, several occur in both Australia and New Zealand, and four are endemic to New Zealand. *Senecio diaschides* D.G.Drury and *S. bipinnatisectus* Belcher are considered naturalised in New Zealand (Drury 1974; Webb 1988). The paper by Drury presents excellent illustrations of several of the species that occur in Australia. Single disciform species of *Senecio* are endemic to New Guinea and Indonesia (Belcher 1956).

The first *Senecio* described for Australia was the disciform *S. quadridentatus* Labill. in 1807. Since that time, disciform species have been either placed in *Senecio* or *Erechtites*, the latter described to accommodate senecioid species with disciform capitula. The most active period for publication of names was in the 1830s when Richard (1834) placed new species in *Senecio*, while de Candolle (1838) placed new disciform species in *Erechtites* as well as transferring Richard's species to this genus. Bentham (1867) followed de Candolle in assigning disciform species to *Erechtites* but reduced the number of species to six, one of which has since been transferred to *Arrhenechthites* (Belcher 1956), and recognised four varieties. These taxa remained in *Erechtites* until 1956 when Belcher placed them all in *Senecio* based largely on a comparison of style morphology. The Australian disciform taxa corresponded better to *Senecio* in having "style arm apices truncated or low-domed rather than prolonged in an appendage of fused papillose hairs" and they could also be differentiated from *Erechtites* s. str. by having "smaller and less heavily-ribbed achenes and usually smaller capitula".

Apart from the absence of an androecium, female florets differ from bisexual ones by having smaller corollas with narrower limbs and often with shorter and/or fewer lobes. In the vast majority of Australian disciform species, female florets outnumber bisexual ones by a factor of two to three.

Belcher's work in 1956 included descriptions of new non-Australian disciform species, but for Australia no new species were described. Several modifications to the previous classification were made including creation of new names made necessary through nomenclatural requirements, resurrection of names, and changes of rank. Interestingly, after the recognition in 1865 of *Senecio bipinnatisectus* (as *Erechtites atkinsoniae* F.Muell. 109 years were to elapse before the next new taxon of any rank was described, and this was by Drury, a researcher from New Zealand, who described *S. diaschides* based on material growing adventively in New Zealand. Since then two new species have been described: *S. macrocarpus* Belcher (1983) and *S. psilocarpus* Belcher and Albrecht (1994), while Lawrence (1985a) elevated *S. minimus* Poir. var. *picridioides* (Turcz.) Belcher to the rank of species as *S. picridioides* (Turcz.) M.E.Lawr.

Harden (1992) and Walsh (1999), in their respective flora treatments for New South Wales and Victoria, demonstrated that the taxonomy of the disciform senecios in Australia required further research. Harden informally recognised two new species, sp. E and sp. N, while Walsh also informally recognised two new species, sp. 1 and sp. 2. In addition, Walsh, in notes under several species, indicated that taxonomic problems still existed.

The chromosome number and reproductive biology of Australian *Senecio*, including the disciform species, has been investigated by Lawrence (1980, 1985b). The disciform species were shown to be self-compatible in contrast to discoid and radiate species, with the exception of *S. glossanthus* (Sond.) Belcher, which were self-incompatible. Lawrence's chromosomal studies are discussed below.

Materials and Methods

Herbarium specimens from AD, BRI, CANB, DNA, HO, MEL, NE, NSW, and PERTH, were examined. Field observations and collections in Victoria and south-eastern New South Wales supplemented the herbarium data. The circumscriptions of, and morphological variation within, previously recognised taxa was critically assessed and new taxonomic concepts developed and tested when the taxonomy was found wanting. A new classification was founded largely on a more detailed characterisation of previously utilised characters. Several new characters such as root morphology, achenial shape and details of the achenial hairs were also used. Distribution maps were generated using the ArcView computer program.

Morphology

Habit and longevity: Most species appear to be short-lived perennials, although longevity in several species is uncertain due to a lack of sampling of below-ground parts. The above-ground parts may die back after the initial flowering and fruiting period, or they are variably persistent with ongoing branching and secondary phases of flowering for months after the initial period. Regeneration from year to year is from a short rootstock. A few species such as *Senecio runcinifolius* and *S. laceratus* appear to grow as annuals although they potentially could persist beyond one season if conditions allowed.

Stems are commonly erect, sometimes somewhat sprawling, and in species mainly at higher altitudes, sometimes creeping and/or ascending before becoming erect. The number of stems produced in the second season varies from one to many depending on the species but also partly depending on environmental conditions.

Branching is variable but in most species occurs predominantly above mid stem associated with the development of secondary panicles. In a few species, e.g. *S.*

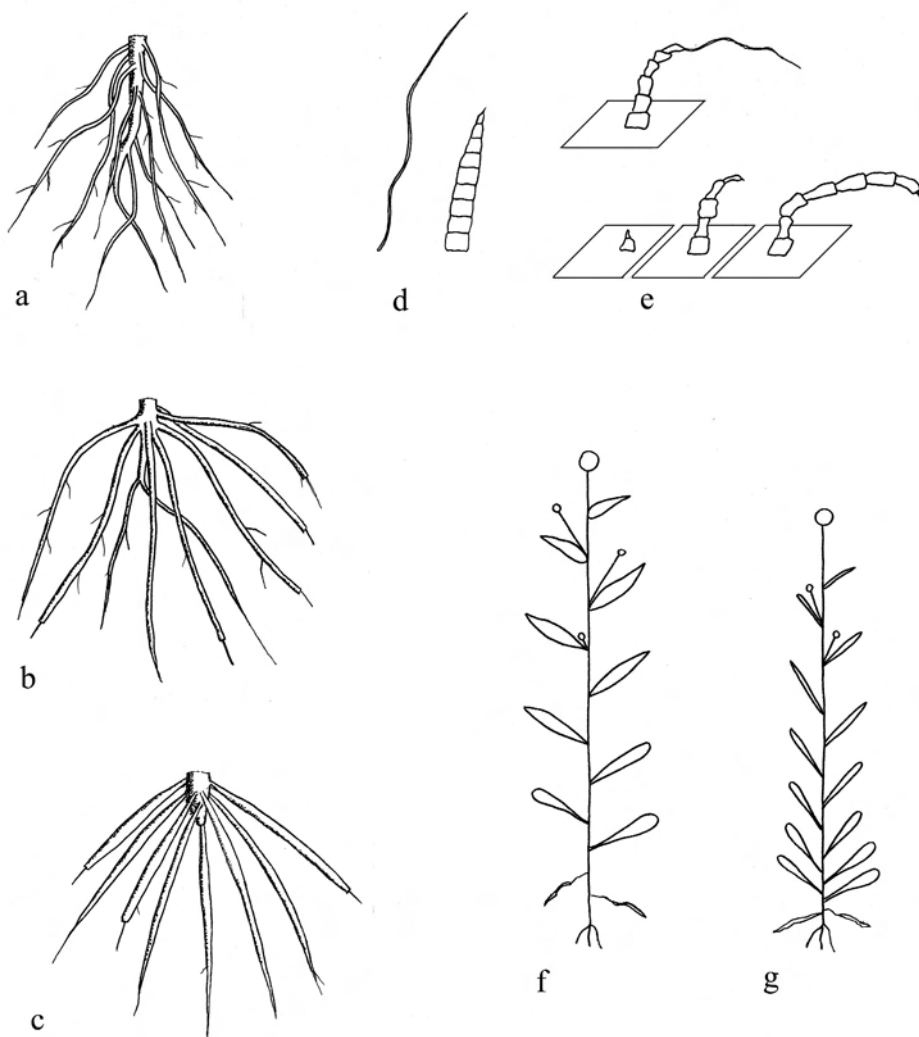


Figure 1. a–c. Root systems (x 0.5): a. Taproot well-developed, stouter than secondary roots (from *S. hispidulus*); b. Taproot slender, not stouter than fleshy secondary roots (from *S. phelleus*); c. Taproot slender or lost, secondary roots very fleshy and slightly tuberiform (from *S. prenanthoides*); d–e. Indumentum (x 30): d. hair types – fine and coarse, septate; e. coarse, septate hairs, showing variation in length and degree of wispy extension (hairs desiccated and variously collapsed and crumpled as seen in herbarium specimens); f–g. Habit (schematic): f. internode elongation progressive, leaves more or less evenly spaced and sized through middle third of stems (note also the trend in leaf shape: oblanceolate grading to lanceolate upwards); g. internode growth suppressed until near flowering period, leaves distinctly broader and more crowded in lower half of plant at flowering.

diaschides and *S. quadridentatus*, conspicuous, leafy, axillary shoots develop precociously below the inflorescence branches. *Senecio glabrescens* is unusual in having a dense, clumped appearance in its first season, becoming multistemmed from the base and with the primary stem much-branched in the lower half.

In most species, leaves are produced along a progressively elongating stem and at anthesis leafiness is fairly evenly distributed along the stem. However, in a few species, e.g. *S. prenanthoides*, *S. phelleus*, and *S. dolichocephalus*, stem elongation is somewhat suppressed for several months with a basal rosette developed, followed by a period of rapid elongation of stems. In these species, as flowering commences, the lower third of stems is distinctly leafier than the upper two-thirds.

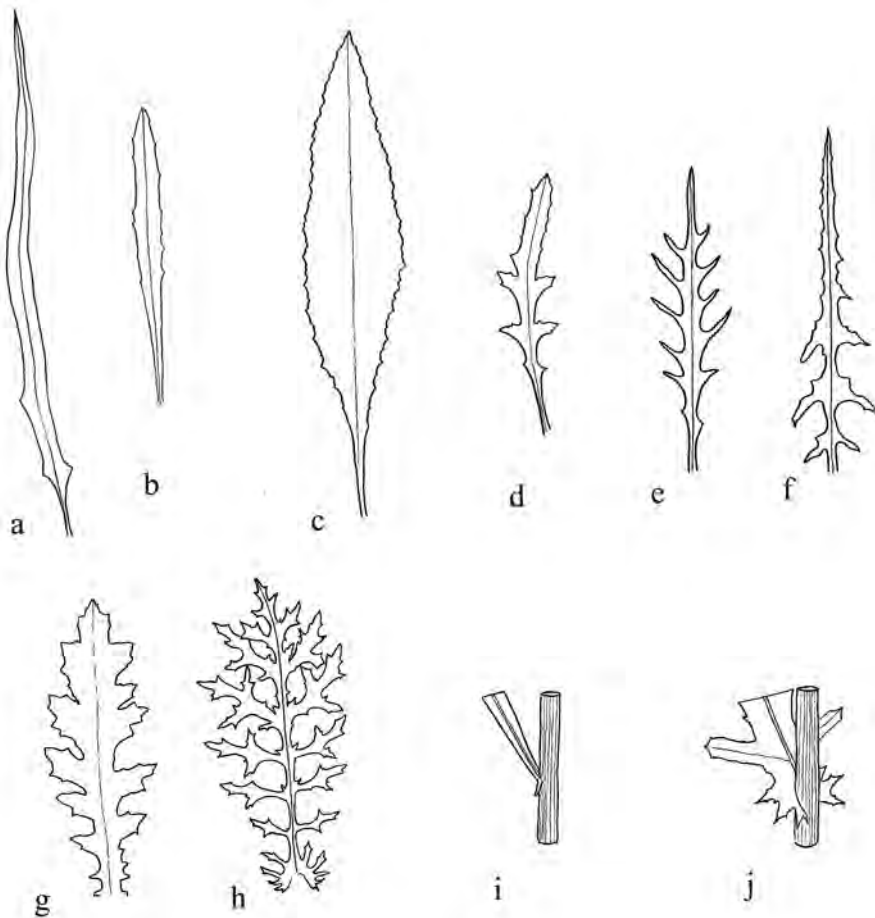


Figure 2. Examples of leaf variation (leaves from mid stem region x 0.5; basal auricles not included except in h.: a. undivided except for a few proximal lobes, margins entire (from *S. phelleus*); b. undivided, margin scattered-denticulate (from *S. prenanthoides*); c. undivided, margin crowded-denticulate (from *S. minimus*); d. coarse-dentate to deeply lobate, margin denticulate, segments and dentition proximal (from *S. hispidulus*); e. coarse-dentate to deeply lobate, margin entire (from *S. diaschides*); f. deeply lobate, segments retrorse (from *S. runcinifolius*); g. segments present along most of length, teeth on segments present in distal half (from *S. distalilobatus*); h. bipinnatisect (from *S. bathurstianus*); i. base of leaf showing small, entire auricles, non-amplexicaul (from upperstem leaf of *S. quadridentatus*); j. base of leaf showing large, dissected auricles, somewhat amplexicaul (from *S. biserratus*).

Roots (Fig. 1): The primary root system is persistent as a single taproot or as a few-branched system, but the relative size of the primary roots compared to secondary roots is variable. In species such as *S. quadridentatus* and *S. hispidulus* the taproot is considerably stouter than the secondary roots which are rather fine and hardly fleshy. Conversely, in species such as *S. phelleus* and *S. hispidissimus*, the taproot is slender and no stouter than the secondary roots which are distinctly fleshy (the cortex is enlarged) and generally unbranched except for occasional fine rootlets. Secondary roots of *S. prenanthoides* and *S. psilophyllus* become particularly fleshy and are characteristically slightly tuberiform.

Indumentum (Fig. 1): Hairs are of two types:

1. Coarse hairs. These hairs are comprised of 3–12 cells in one series arising at right-angles to the surface. They are visibly septate (the septa indicating cell boundaries) and transparent when fresh. In pressed herbarium specimens, these hairs are somewhat crumpled but the septa can still be discernible. They taper to a point or have a wispy extension. Relatively short hairs sometimes occur on leaves giving the surface a tubercular appearance. Excluding wispy extensions, hairs range from 0.2–2.0 mm long. When there is a wispy extension, a cobwebby or woolly layer may develop which may partially or totally obscure the coarser portion.
2. Fine hairs. These hairs are white and long and very fine (wispy) throughout with no cellular structure evident. Their diameter is about one-tenth of that of coarse hairs and are equivalent in form to the wispy extensions of the coarse hairs. Along stems fine hairs are typically arranged longitudinally and the term appressed-cottony describes this arrangement. Otherwise the hairs are somewhat tangled. The term cobwebby is used for loose tangles and woolly for dense tangles where the underlying surface is more or less completely obscured.

The indumentum of the lower stem region is important taxonomically. This is best examined before anthesis has progressed too long as hairs tend to be lost with age, although residual hairs can usually be identified microscopically. There are two main types of stem indumentum: coarse, spreading and appressed-cottony. The indumentum commonly changes along the stem either by a reduction in density, a transition from coarse hairs to fine e.g. in *S. glomeratus* subsp. *glomeratus*, or both. In species with an appressed-cottony indumentum, density commonly reduces upwards so that the upper stem region is more or less glabrous; however, in *S. quadridentatus* and usually also in *S. gunnii* the density tends to be maintained towards the summit. Species with particularly dense coarse spreading indumentum on their stems include *S. hispidissimus*, *S. bathurstianus* and *S. longipilus*.

Leaves (Fig. 2): Leaves are sessile, alternate, and thin to slightly coriaceous. The largest leaves of species vary from 6 to 30 cm long and the l:w ratio of these leaves varies from 2–40. There is considerable variation in dissection, development of basal auricles and indumentum. In all species there is some transition in leaf shape from lower stem region to upper stem region; in general there is a gradual shift in the broadest part of the leaf from the distal half to the proximal half and there is a gradual, or sometimes relatively rapid, reduction in leaf width upwards. Leaves in the lower third of stems are mostly oblanceolate or narrow spatulate, i.e. broadest distally, and the proximal portion is attenuate or petiole-like. Mid stem leaves are often similar in width but tend to narrow-elliptic; however, in some species, the mid stem leaves are markedly narrower than lower stem leaves. In this region the leaf-bases of many species are auriculate and amplexicaul (stem-clasping). The dissection of the auricles reflects the nature of the dissection of the main part of the lamina.

In the upper stem region internodes typically become longer, leaves become markedly smaller, and especially narrower so that the length:width ratio increases, and the broadest part of the leaf tends to be more basal. In species such as *S. picridioides* and *S. hispidulus* the upper stem leaves are commonly markedly lanceolate and the auricles are relatively large.

Leaves are often dissected and in this paper this means that the depth of incision (or sinus depth) is greater than 30% of the distance from leaf outline to midrib. The terms coarse-dentate, lobate and pinnatisect are used to describe the variation in depth (see glossary of terms below). Dissected leaves have 1 to 8 segments per side and the placement of segments along the leaf varies between species, e.g. those of *S. hispidulus* and *S. runcinifolius* do not typically extend into the distal third, whereas in *S. longipilus* they tend to be confined to the distal half and extend well into the distal third. Commonly there is a gradual reduction in the depth of dissection distally. There is some variation within species in terms of dissection. Several species can have either dissected or non-dissected leaves, and this is also influenced by environmental factors and the position of the leaf on the plant.

Smaller incursions towards the midrib (i.e. less than 30%) are treated here as dentition of the margin, and the number and frequency of callus-denticulations, denticulations or teeth of a leaf varies greatly between species (Fig. 2). *Senecio minimus* is a good example of a species with very frequent denticulations. The margin of primary segments can be entire, toothed, or sometimes themselves dissected (i.e. leaf bipinnatisect). The overall shape of segments is affected by the size, position and frequency of the marginal dentition, e.g. lobes of *S. glomeratus* subsp. *glomeratus* and *S. distalilobatus* are commonly roughly oblong or obovate due to the presence of a few relatively large teeth in the distal half of the segment, whereas lobes of *S. hispidulus* and *S. biserratus* are generally roughly triangular.

Margins are commonly narrowly recurved, but in some species they are more strongly recurved or revolute, e.g. in *S. macrocarpus* and *S. quadridentatus*. Upper stem leaves of many species are somewhat revolute, possibly partly an artifact of pressing, and marginal dentition and sometimes lobation may be hidden as a result.

The upper surface of leaves are variously green or grey-green, but sometimes this colour is obscured to some extent by appressed fine hairs. The lower surface is often green also, though commonly paler than the upper surface, or sometimes tinged with or intensely coloured purple. Leaves are glabrous on one or both surfaces or variously indumented with coarse or fine hairs or a mixture of the two. As with the stem indumentum, the indumentum of leaves typically undergoes a transition from lower leaves to upper leaves, with typically a reduction in the density of coarse hairs and sometimes with an increase in the density of fine hairs. The cobwebby indumentum on upper surfaces of some species tends to be short-lived. In some species with a coarse-hairy upper surface, the midrib of the lower surface is the same but the adjacent lamina is glabrous, e.g. *S. longipilus*, *S. macrocarpus* and forms of *S. squarrosus* and *S. multicaulis*.

Inflorescences (Fig. 3): Unit inflorescences are polychasial cymes or panicles of few to 50 or more capitula. Leafy upper stem branches commonly produce secondary inflorescences more or less at the same time as the primary inflorescence and the combined total of capitula may be several hundred. Sometimes development of leafy branches further down the stem occurs after the initial flowering period dependent on favourable conditions. The shape of inflorescences is sometimes roughly corymbiform, but is often somewhat irregularly broadly obconic with secondary inflorescences overtopping the primary inflorescence. The same phenomenon of overtopping usually occurs within an inflorescence where lateral capitula or clusters overtop their central counterparts due to longer lateral peduncles and panicle branchlets. Peduncles gradually increase in length prior to and during flowering. It is unclear at what point elongation ceases but there is no marked elongation as fruits mature. Species with larger capitula have fewer capitula on longer peduncles. Bases of peduncles and branchlets are subtended by bracts. Peduncles are bracteolate with 0–3(–5) scattered along the peduncle and 3–12 calycular bracteoles inserted on or just below the receptacle, and typically more or less appressed around the base of involucre (divergent in *S. macrocarpus*). Bracteoles are narrow-ovate to narrow-lanceolate, 1–5 mm long, and variously purple or black-tipped. Peduncular bracteoles are not or hardly longer than calycular bracteoles but in a

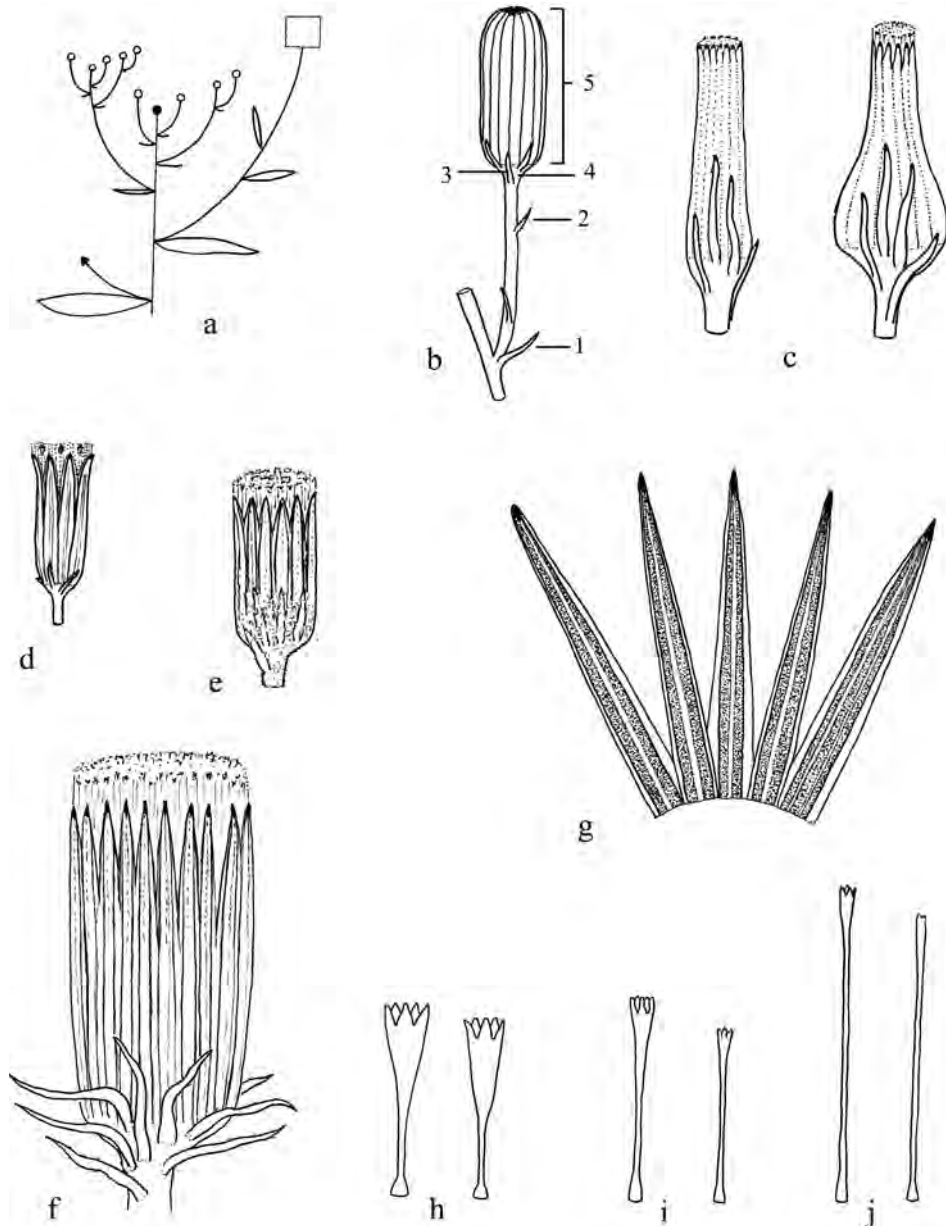


Figure 3. a. Inflorescence architecture: The primary unit inflorescence with capitula represented by circles and the initial capitulum shown as a closed circle. A secondary inflorescence, defined by presence of leaves, is also shown (cluster of capitula represented as a square). Moderate overtopping is demonstrated in this example; b. Capitulum and peduncle: 1. peduncular bract, 2. peduncular bracteole, 3. calycular bracteole, 4. receptacle, 5. involucre; c. Capitula: shape change through time: (l) just prior to anthesis, and (r) bulging basally towards fruit maturity. d–f. Capitula: major categories $\times 3$ (examples drawn from pressed material): d. Involucres of c. 8 phyllaries (from *S. minimus*); e. Involucres of c. 13 phyllaries (from *S. glomeratus* subsp. *glomeratus*; note basal woolliness); f. Involucres of c. 20 phyllaries (from *S. macrocarpus*; note spreading calycular bracteoles in this species); g. Phyllary morphology: five consecutive phyllaries of an involucre demonstrating the three major types of phyllary. From r–l: inner (margin broad, stereome with two resin ducts); outer (margin narrow, stereome with one resin duct); inner (stereome with only one resin duct); outer; intermediate (margin narrow on one side, broad on other). h–j. Florets $\times 5$: corollas of central (l) and marginal florets (r): h. a discoid species, *S. odoratus* Hornem.; i. *S. hispidulus*; j. *S. dolichocephalus*.

few species, notably *S. longipilus*, they are significantly longer. Peduncles, panicle branchlets and the margin of bracteoles are often woolly or cobwebby, or sometimes coarse-hairy, and this indumentum is variably persistent. In some species the indumentum evident at the bud stage of capitular development is largely or entirely lost by anthesis, whereas in other species, e.g. *S. glomeratus*, the wool is more persistent. The indumentum evident around the base of capitula is predominantly due to the marginal hairs of the calycular bracteoles. It is important to note that species identified as having glabrous peduncles and capitula frequently bear a few residual hair-bases on these margins (evident when inspected under moderate magnification).

Capitulum (Fig. 3): The capitulum is comprised of the receptacle (the somewhat obconical termination of the peduncle) and an involucre which surrounds the florets. Calycular bracteoles, described in the previous section, could also be considered part of the capitulum. The involucre is comprised of 7–25 phyllaries and is cylindrical or very slightly conical as florets emerge. The number of phyllaries is often relatively consistent within species with three main categories of phyllary number: a 7–9 phyllary category, a 12–14 phyllary category and a 16 or more phyllary category. A few species, e.g. *S. hispidulus* and *S. squarrosus*, appear to be close to a borderline between categories and the number of phyllaries per involucre varies more widely in these species. Post-fertilisation, the involucre becomes strongly conical in the basal half as fruits develop and in most species the receptacle broadens more or less equally to accommodate the developing fruits. In a few species, notably *S. glandulosus*, the receptacle does not broaden greatly and the involucre bulges distal to its insertion with the receptacle to accommodate the enlarging fruits.

The phyllaries are free, but with hyaline margins overlapping. They form a single series around the florets and are much more substantial structures than the calycular bracteoles which are sometimes interpreted as an outer series of phyllaries in line with interpretations of equivalent structures in other tribes in the Asteraceae. Phyllaries are very narrow-triangular or nearly linear and generally taper more strongly in the distal few millimetres. They are composed of a central green or purple stereome and a colourless hyaline margin. The stereomes are of variable thickness and convexity and, in dried specimens, have one or two slightly to strongly recessed longitudinal resin ducts. Hyaline margins strongly overlap and in the natural position at anthesis are largely hidden. Three phyllary types are recognised: outer phyllaries (stereomes narrow and with one duct, hyaline margin narrow and overlapping to the outside of margin of adjacent inner phyllaries) largely alternate with inner phyllaries (stereomes of varying width and with one or two ducts, margin broad). This alternation is imperfect however, as the third phyllary type, which is a hybrid of the outer and inner types is frequently also present (Fig. 3g).

The apex of phyllaries is ciliate and the tip, the distal most 0.2–0.5 mm, is typically pigmented black or brown, or less often purple. In many species a zone 0.5–1.5 mm long below the tip is pale to medium purple. In most species the apex is more or less erect at flowering, but in a few species, e.g. *S. squarrosus* and *S. interpositus*, the narrower distal portion is quite distorted and variably reflexed or squarrose.

Following ripening of fruit, the phyllaries become brown and adopt a characteristic orientation. Further work needs to be done to characterise this in each species. For example, in *S. glomeratus* and *S. hispidulus* the phyllaries are erect or inturned, whereas in *S. quadridentatus* the phyllaries are spreading to reflexed.

Florets (Fig. 3): Bisexual florets are central and are surrounded by a (usually) greater number of female florets. Female florets usually outnumber bisexual ones by a factor of two or three, but the ratio is nearer to one in *S. interpositus*. The demarcation between floret types is fairly clear but a few florets intermediate in morphology may be present. Corollas of florets range in length from 3 to 13 mm and are generally no more than 1 mm wide at the summit. Corollas of female florets are relatively reduced; they are on average c. 1 mm

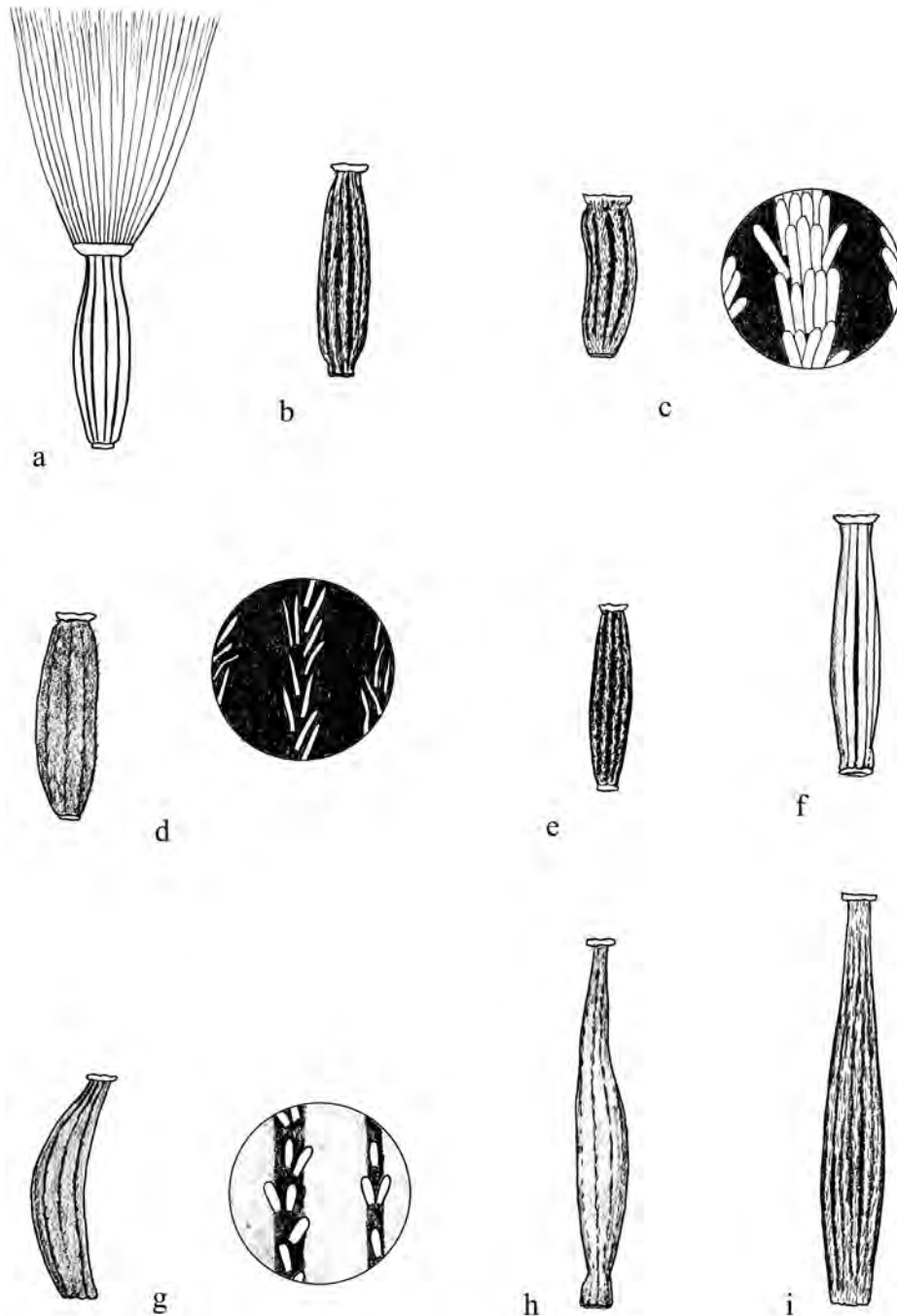


Figure 4. Achenes (x 10; close-up of papillose hairs x 40). a. General morphology showing carpododium, body with longitudinal ribs, pappus ring and pappus; b. *S. phelleus* (A.C. Beauglehole 22142 MEL); c. *S. multicaulis* subsp. *multicaulis* including close-up of dense bands of papillose hairs (G. Keighery 11693 PERTH); d. *S. distalilobatus* including close-up of narrow bands of rather fine papillose hairs (J.H. Willis MEL); e. *S. biserratus* (A.C. Beauglehole 62777 MEL); f. *S. niveoplanus* (I.R. Thompson 758 MEL); g. *S. glandulosus* including close-up of lines of short papillose hairs (I.R. Thompson 754 MEL); h. *S. longicollaris* (I.R. Thompson 704 MEL); i. *S. macrocarpus* (B. Kemp s.n. MEL).

shorter than the bisexual florets, the limb of their corolla is narrower, and the corolla-lobes are sometimes fewer and shorter. Bisexual florets have 4- or 5-lobed corollas whereas female florets have 2–4(–5)-lobed corollas with, the number often being one or two fewer than the bisexual florets in the same capitulum. The length of corolla-lobes varies subtly between species and in some species, e.g. *S. quadridentatus* and *S. queenslandicus* the corolla-limb is barely broader than the tube and lobes are barely developed. The thickness of apex of corolla-lobes also varies subtly and appears to be fairly consistent within species, e.g. the corolla-lobes of *S. longipilus* and *S. phelleus* are strongly thickened apically, whereas those of *S. quadridentatus* are hardly thickened. Some differences in the colour of the corolla-limb have been observed; in some species the disc is yellow-green but in *S. glomeratus* and *S. runcinifolius* it is yellow, and in *S. squarrosus* it is often purple. Further observation is necessary to fully evaluate this character.

Achenes (Fig. 4): Achenes range in length from 1–7 mm, and their shape varies from obloid to narrowly ellipsoid to very narrowly lageniform with necks of various lengths and slenderness. In a few species, e.g. *S. glomeratus* subsp. *glomeratus* the achene is slightly narrower basally. The carpodium is variously exerted or recessed; e.g. typically exerted in *S. glomeratus* but recessed in *S. prenanthoides*. The body of the achene is longitudinally ribbed. Ribs are narrow to broad, 6–10 in number and flat to convex; those of *S. tenuiflorus* are perhaps the most distinctly convex. The colour of the ribs varies; red-brown, brown, orange-brown, olive-brown, olive, and green have been recorded, and the surface varies from dull to lustrous. Colour can be variable within a single capitulum. Simple white or slightly translucent papillose hairs are present on the achene in most species and usually arise along the grooves between ribs to form longitudinal lines or bands of various width and density. They are termed papillose because they are short and have a rounded apex. Sometimes the distribution of hairs is more or less diffuse. The hairs are predominantly antrorse and appressed, although sometimes they are slightly divergent laterally and/or vertically. In most species the diameter of the hairs is similar but length varies somewhat and the length:width ratio ranges from 1–6. In most species with lageniform achenes the hairs are short (l:w ratio of 1–2) and arranged in narrow lines.

A pappus ring crowns the summit of the achene. Bristles arise from this ring and are fine and superficially smooth but are generally minutely and somewhat sparsely scabrid-barbellate. The pappus is not persistent and mostly is approximately the same length as the corolla, although in *S. longipilus* it typically exceeds the corolla.

Phenology: The main flowering period for most species is in spring or summer. It appears to be autumn for *S. psilophyllus*. In many species, flowering can also occur sporadically at other times of the year. Fruits mature approximately two months after flowering.

Chromosomal Studies

Lawrence (1980) obtained chromosome numbers of $n = 30$, $n = 20$ and $n = 50$ for ten named and several informal disciform species (see Index of Scientific Names for details and correspondence with current names). Strong congruence is evident between the numbers of $n = 20$ and 30 and the achenial morphology elucidated in this paper. The nine species with $n = 30$ have achenes that are obloid to narrow-obloid or oblong-ellipsoid with a poorly developed neck, and with hairs of l:w ratio c. 4–5 that form moderately dense bands. The three species with $n = 20$ have achenes that are very narrow oblong-ellipsoid or narrowly lageniform with a well-developed slender neck, and with hairs of l:w ratio c. 1–3 that are generally fewer and less crowded. The count of $n = 50$ for *S. biserratus* and *S. distalilobatus* (both as *S. biserratus* in Lawrence's paper) needs further investigation. There seems to be no particular morphological features that set these two species apart.

It is also noteworthy that the gametic chromosome number is 30 for the discoid species of *Senecio* and for the related small-headed radiate species *S. linearifolius* A.Rich. and *S. garlandii* F.Muell. ex Belcher (The *Odoratus* group of Thompson 2004). Morphologically the disciform group appears to be most closely related to the *Odoratus* group and the correspondence in chromosome number adds support to the contention that the groups are closely related. Gametic chromosome counts of 20 were obtained by Lawrence for several radiate species of *Senecio*, e.g. *S. lautus* Forst.f. ex Willd. *sensu lato*, *S. gregorii* F.Muell. and *S. magnificus* F.Muell. In this instance, however, morphological correspondence between species and the disciform species with $n = 20$ is lacking, and the independent evolution of this chromosome number is considered more likely.

Glossary of some terms used in keys and descriptions

Appressed-cottony: Having an indumentum of fine hairs arranged longitudinally along and closely appressed to stems

Calycular bracteoles: Those bracteoles clustered around the base of the capitulum. They arise on or a short distance below the receptacle of the capitulum with the greater part of the structure extending at least onto the receptacle.

Coarse hairs: coarse, septate, spreading hairs of varying length (see Fig. 1d–e). Coarse-hairy means having an indumentum containing these hairs.

Cobwebby: Bearing an indumentum of tangled fine hairs (or long fine extensions of coarse hairs) that only partially obscures the underlying structures

Dissection of leaves: Leaves are considered to be dissected if the % distance that the sinuses extend from margin to midrib is $> 30\%$ (includes coarse-dentate, c. 30–50%; lobate, c. 50–75%, and pinnatisect, $> 75\%$). Coarse teeth, lobes and pinnatisect segments of such dissected leaves have sometimes been given the general term ‘segments’ for simplicity.

Fine hairs: Thread-like hairs that are approximately 10% of the diameter of coarse hairs with no visible internal structure.

Involucral diameter: This is based on measurement of fresh material approximately $2/3$ of the distance along the involucre from base. At this point the diameter is more or less constant through the phases of development of the capitulum (the lower half of the involucre often expands substantially after fertilisation to accommodate developing fruits (see Fig. 3c) and the diameter of the apex can be affected by reflexion of the phyllaries). In pressed specimens the involucre is variably flattened, which increases the diameter by up to 50% so, if capitula are squashed by the pressing process, allowance needs to be made for this.

Lageniform: (of achenes) means bottle-shaped, i.e. the distal third is narrower and is more tapered than the proximal third (see Fig. 4g–i).

Lateral peduncle: Peduncle that arises from the ultimate bract of a flowering axis as distinct from the usually shorter central peduncle (see Fig. 3a).

Leaves: Unless indicated otherwise in the keys, ‘leaves’ refers to those leaves arising from the middle third of stems (i.e. not branch leaves or uppermost or lowermost leaves).

Overtopping: In inflorescences, where a single lateral capitulum or a lateral cluster extends above the adjacent central capitulum or central cluster. This architecture is common among the disciform species.

Scabridulous: of a surface with rather short, coarse hairs that resemble tubercles in pressed specimens.

Segments: General term used for dissected leaves to denote coarse teeth, lobes or pinnate segments.

Unit inflorescence: A terminal cluster of capitula where all the branches supporting the capitula are leafless (see Fig. 3a).

Woolly: Bearing a dense indumentum of tangled fine hairs (or long, fine extensions of coarse hairs) such that the underlying structures are more or less completely obscured.

Taxonomy

The Australian Disciform species of *Senecio*

Short-lived perennial herbs, sometimes weakly shrubby, sometimes annual, never glaucous. *Taproot* weak to stout; secondary roots fibrous or fleshy, 0.5–2.5 mm diam., hardly branched, rarely mildly tuberiform. *Rootstock* short, rarely shortly rhizomatous. *Indumentum* often present on some or all of stems, leaves, inflorescence branchlets, peduncles, margin of bracteoles, and capitula; hairs coarse, spreading, to 2 mm long, with or without wispy extensions, or entirely wispy, and then longitudinally disposed (cottony) or tangled (cobwebby or woolly). *Leaves* thin to slightly coriaceous, variously dissected or lacking dissection; margin entire, denticulate, dentate or serrate; base auriculate or not; lower surface sometimes purple. *Inflorescence* a pleiochasial cyme or panicle, corymbiform to often obconical due to overtopping, capitula per unit inflorescence 1 to many. *Capitula* disciform, heterogamous; calycular bracteoles 2–12, narrow-ovate, lanceolate or linear, 1–6 mm long; involucre 3–13 mm long, 1–5 mm diam.; phyllaries 7–25, free; stereome green or purplish, glabrous or cobwebby, flat or convex, with generally pale resin ducts. *Florets* 12–100, with female florets more numerous, surrounding bisexual florets, or rarely all florets bisexual; corollas 3–13 mm long, those of bisexual florets with limb weakly dilated, 0.5–1 mm diam. at summit, those of female florets with limb barely dilated, 0.2–0.4 mm diam. at summit. *Achenes* homomorphic, obloid to narrow-obloid, obloid-elliptic, or very narrowly lageniform, 1–7 mm long, green, olive, tan, red-brown or dark brown, ribs nearly flat to convex; papillose hairs in sparse to dense longitudinal lines or bands more or less following the grooves between ribs, uncommonly somewhat dispersed, or absent; carpodium c. 1/3–1/2 the diameter of body, exserted or not. *Pappus* caducous; bristles fine, sparsely and minutely scabrid-barbellate.

KEY

- 1 Leaves deeply dissected (deeply lobate to pinnatisect) with segments of all or most leaves somewhat retrorse, or leaves deeply pinnatisect or bipinnatisect with segments arising distal to as well as proximal to midleaf and upper stem leaves mostly also pinnatisect
 - 2 Leaf segments retrorse; involucre 7.0–11.0 mm long.....**15. *S. runcinifolius***
 - 2: Leaf segments not retrorse; involucre 3.5–7.0 mm long
 - 3 Stems \pm glabrous; involucre length 3–4 times the diameter; phyllaries predominantly c. 8–10.....**5. *S. bipinnatisectus***
 - 3: Stems sparsely to densely coarse-hairy; involucre length 2–3 times the diameter; phyllaries predominantly c. 12–14
 - 4 Leaves coarse-hairy; achenes 1.5–2.0 mm long, with papillose hairs scattered**8. *S. bathurstianus***
 - 4: Leaves glabrous; achenes 2.0–2.7 mm long, with papillose hairs in bands.**7. *S. brevitubulus***
- 1: Leaves not dissected deeper than deeply lobate, with segments not retrorse, or if ever pinnatisect then segments only arising in proximal half of leaf and upper stem leaves usually not pinnatisect
 - 5 All or most involucre in an inflorescence comprising 7–13 phyllaries and florets per capitulum \leq 25 (involucral diameter, as defined in glossary, up to 1.5 mm)
 - 6 Plants lacking coarse hairs; stems densely appressed-cottony for most of length and lower surface of leaves woolly.....**19. *S. quadridentatus***
 - 6: Plants with coarse hairs (sometimes short and tubercle-like) on stems and/or leaves (close inspection required), or if not, then stems not appressed-cottony for most of length and lower surface of leaves not woolly
 - 7 Upper stem leaves densely scabridulous (coarse hairs short) on upper surface, woolly on lower surface, the wool overlying coarse basal portion

- of hairs (far eastern Australia around Queensland-New South Wales border).....**25. *S. scabrellus***
- 7: Upper stem leaves not as above
- 8 Leaves surfaces glabrous or nearly so (margin may have some hairs)
- 9 Plants erect; taproot well-developed; leafy axillary growth conspicuous in axils above mid stem as flowering commences; leaves often with narrow-triangular lobes; phyllaries 4.5–6.5 mm long; achenes oblong-ellipsoid (riparian)**2. *S. diaschides***
- 9: Plants sprawling; taproot inconspicuous; stem slender; leafy axillary growth not present or inconspicuous as flowering commences; leaves not divided, sometimes remote-dentate; phyllaries 6.0–8.0 mm long; achenes narrowly lageniform (not riparian)**30. *S. psilophyllus***
- 8: Leaves with hairs on one or both surfaces
- 10 Leaves not dissected, or if ever with segments then only 1 or 2 developed per side in proximal half; upper stem leaves usually with a l:w ratio > 10; base of leaves above mid stem not or hardly amplexicaul, with auricles lacking or triangular and entire.
- 11 Secondary roots fleshy and usually slightly tuberiform; lower stem bearing spreading coarse hairs; achenes narrowly lageniform, 2.8–4.0 mm long**29. *S. prenanthoides***
- 11: Secondary roots slightly to moderately fleshy but not tuberiform; lower stem appressed-cottony or near glabrous, stem not developing coarse hairs; achenes not or indistinctly lageniform, 2.0–2.8 mm long
- 12 Leaves sometimes remotely lobate; ribs of achenes convex, with papillose hairs sparse in narrow grooves (New South Wales and Queensland, north from Sydney region)**26. *S. tenuiflorus***
- 12: Leaves never dissected; ribs of achenes flat to slightly convex, papillose hairs crowded in grooves (south-eastern Australia largely south of Sydney)**24. *S. microbasis***
- 10: Leaves regularly dissected, with 3–6 segments per side extending into distal half, or not dissected but then margin crowded-denticulate; upper stem leaves with a l:w ratio < 10; base of leaves above mid stem somewhat amplexicaul, with auricles well-developed, variously shaped and usually toothed or lobed
- 13 Coarse hairs rather sparse; leaves usually not dissected, with sinuses typically < 25% of distance to midrib; phyllaries 7–10 .
.....**1. *S. minimus***
- 13: Coarse hairs scattered to moderately dense; leaves dissected; phyllaries 7–13
- 14 Stems and lower surface of leaves often intensely purple; segments of leaves roughly semicircular and with margin crowded-denticulate; uppermost leaves clearly broadest at auricles.....**4. *S. picridioides***
- 14: Stems and lower surface of leaves mostly green, sometimes slightly to moderately purple; segments of leaves not as above; uppermost leaves broadest at auricles or not
- 15 Mid to upper stem leaves with coarse hairs on both surfaces, cobwebby overlay not conspicuous; phyllaries predominantly 11–13, or if rarely predominantly 9–10 then achenes red-brown, < 2.2 mm long, and

- segmentation of mid to upper stem leaves confined to proximal two-thirds.
- 16 Lower half of stems sparsely to moderately coarse-haired, coarse hairs rather sparse above mid stem; apex of phyllaries with a small black spot < 0.5 mm long; achenes red-brown**9. *S. hispidulus***
- 16: Lower half of stems densely coarse-haired, coarse hairs usually frequent in upper stem region and present on inflorescence branches; apex of phyllaries marked with a purple zone c. 1 mm long; achenes tan or chocolate-brown.....**10. *S. hispidissimus***
- 15: Mid to upper stem leaves as above or one or both surfaces \pm glabrous or with a conspicuous cobwebby overlay; phyllaries predominantly 8–10, or if sometimes predominantly 11 or 12 then achenes 3–4 mm long, pale olive-brown, glabrous
- 17 Leaves with roughly triangular segments restricted to proximal 50–60% of leaf; achenes 3.0–4.0 mm long, pale olive-brown, glabrous**28. *S. niveoplanus***
- 17: Leaves with triangular, oblong or obovate segments and dissection extending into distal third of leaf; achenes 2.0–3.0 mm long, brown and with papillose hairs or red-brown with very fine papillose hairs
- 18 Primary roots inconspicuous; secondary roots fleshy; leaves with the continuous medial band of lamina (see fig. 2) roughly oblong and the distal centimetre of leaves commonly with an oblong section 2–8 mm long; achenes with a l:w ratio of c. 4–5, reddish-brown, with fine hairs in lines or somewhat scattered (montane).....**6. *S. distalilobatus***
- 18: Primary root well-developed; secondary roots not fleshy; leaves with the continuous medial band of lamina somewhat elliptic and the distal cm of leaves roughly triangular; achenes with a l:w ratio of c. 6–7, brown, with plump papillose hairs crowded in bands (coastal or occasionally montane).....**3. *S. biserratus***
- 5: All or most involucre comprising 11–25 phyllaries and florets per capitulum > 25 (involucral diameter up to 5 mm)
- 19 Stems bearing coarse spreading hairs (sometimes partly obscured by overlying wispy extensions), sometimes only in lower stem region and tending to be lost with age
- 20 Secondary roots distinctly fleshy, commonly slightly tuberiform; achenes narrowly lageniform, 2.8–4.5 mm long, with papillose hairs short (l:w ratio 1–2), and sparse to scattered in lines narrower than the ribs**29. *S. prenanthoides***
- 20: Secondary roots fleshy or not, not tuberiform; achenes 1.0–3.0 mm long, obloid, oblong-ellipsoid, or if ever slightly lageniform then papillose hairs longer than above, (l:w ratio c. 3–4), forming dense bands as broad as the ribs
- 21 Phyllaries 3.0–6.5 mm long, involucral diameter < 2.0 mm; achenes with papillose hairs forming lines or bands 1–3 hairs wide, hairs scattered to moderately crowded

- 22 Peduncles and calycular bracteoles, and often lower surface of upper stem leaves, cobwebby to woolly at anthesis; calycular bracteoles 6–12; phyllaries green or purple**12. *S. glomeratus***
- 22: Peduncles and calycular bracteoles \pm glabrous at anthesis, lower surface of leaves never cobwebby or woolly; calycular bracteoles 4–6; phyllaries green (except for minute blackish tips)**9. *S. hispidulus***
- 21: Phyllaries 4.0–12.0 mm long, involucre diameter > 2.0 mm; achenes with papillose hairs forming dense bands 4–6 hairs wide
- 23 Leaves and inflorescence bracts bearing numerous coarse hairs, 0.5–2.0 mm long on upper surface and along midrib of lower surface, but remainder of lower surface glabrous (or a few hairs present along major veins); upper stem leaves not auriculate; phyllaries usually c. 13
- 24 Leaves with segments arising in distal two-thirds; involucre 9–10 mm long, length:diam. ratio c. 3; apex of phyllaries strongly recurved (Western Australia)**34. *S. oldfieldii***
- 24: Leaves with segments arising in distal half; involucre 5–8 mm long, length:diam. ratio c. 2; apex of phyllaries not or only slightly recurved (New South Wales, Tasmania)**33. *S. longipilus***
- 23: Leaves and inflorescence bracts lacking coarse hairs or hairs generally 0.1–0.7 mm long and/or lower surface bearing coarse hairs; upper stem leaves auriculate or not; phyllaries 13–20
- 25 Involucre diameter > 2.5 mm; phyllaries commonly c. 20, sometimes c. 13; auricles not developed or small and entire or nearly so; ribs of achenes commonly blackish-brown**36. *S. squarrosus***
- 25: Involucre diameter < 2.5 mm; phyllaries commonly c. 13; auricles various; ribs of achenes tan, brown, or blackish-brown
- 26 Base of leaves above mid stem not or rarely auriculate, not amplexicaul; apex of phyllaries with a large black mark, purple zone absent; achenes slightly and narrowly lageniform, 2.5–3.0 mm long**32. *S. nigrapicus***
- 26: Base of leaves above mid stem usually auriculate and at least slightly amplexicaul; apex of phyllaries with a small black mark and often with a purple zone below it c. 1 mm long; achenes narrow-obloid, 1.5–2.5 mm long
- 27 Taproot inconspicuous, not stouter than secondary roots; leaves often with more than 3 segments per side; lower surface of leaves green; both surfaces of all leaves moderately to densely coarse-hairy; achenes tan to mid brown (eastern South Australia, Victoria, Tasmania)**10. *S. hispidissimus***
- 27: Taproot conspicuous, much stouter than secondary roots; leaves often with 3 or fewer segments per side; lower surface of leaves commonly intensely purple; leaves not entirely as above; achenes dark red-brown or brown (south-western Western Australia)**11. *S. multicaulis***
- 19: Stems not developing coarse hairs
- 28 Florets homogamous, bisexual; corolla-limbs homomorphic, 5-lobed; apex of phyllaries usually strongly reflexed at anthesis
- 29 Leaves glabrous (northern New South Wales)**38. *S. interpositus***
- 29: Leaves densely woolly on one or both surfaces

- 30 Leaves densely woolly on both surfaces; inflorescence branchlets, peduncles and bracts densely woolly; calycular bracteoles > 4 mm long (western Victoria and south-eastern South Australia)
**40. *S. helichrysoides***
- 30: Leaves densely woolly on lower surface only, inflorescence branchlets, peduncles and bracts sparsely woolly; calycular bracteoles < 4 mm long (Central and Southern Tablelands of New South Wales, or subalpine regions in Victoria and Tasmania)
**39. *S. georgianus***
- 28: Florets heterogamous, outer series female surrounding a smaller number of bisexual florets; corolla-limbs of female florets with a narrower limb and often with fewer lobes than the inner bisexual florets; apex of phyllaries usually not strongly reflexed at anthesis
- 31 Plants glabrous or nearly so on all parts; leaves elliptic, with a l:w ratio of c. 2–4, often lobed; margin of leaves denticulate or dentate, with apex of lobes and teeth acuminate; involucre 4.0–5.0 mm long (Northern Territory, South Australia from Flinders Ranges northward)
**14. *S. laceratus***
- 31: Plants variously hairy or nearly glabrous; leaves not entirely as above; involucre > 5.0 mm long
- 32 Achenes narrowly lageniform, 2.5–7.0 mm long, or if smaller and not lageniform then stems densely appressed-cottony or woolly throughout
- 33 Stems creeping before arching to erect; leaves in basal third of stem to 8 cm long, markedly broader than mid stem leaves; lower surface of leaves green, lacking coarse hairs and nearly glabrous (sub-alpine)**31. *S. lageniformis***
- 33: Stems \pm erect from base; leaves in basal third of stem not entirely as above; lowland to montane
- 34 Unit inflorescences of < 10 capitula; a majority of involucre > 3.0 mm diam.; calycular bracteoles > 3.0 mm long, commonly divergent; achenes with papillose hairs in bands covering > 40% of surface, l:w ratio of hairs c. 4.....
**37. *S. macrocarpus***
- 34: Unit inflorescences of > 5 capitula; involucre < 3.0 mm diam.; calycular bracteoles < 3.0 mm long, appressed; achenes with papillose hairs in lines or bands covering < 40% of surface, l:w ratio of hairs c. 1–2
- 35 Plants multi-stemmed and much-branched in lower half in its first season; primary stem with 5 to 10 leaves; stem leaves with bidentate auricles**19. *S. glabrescens***
- 35: Plants usually not both multistemmed and branched in lower half in its first season; primary stem leaves 5 to many; stem leaves with auricles absent or present only above mid stem and then small, triangular, entire
- 36 Plants commonly < 0.5 m tall; leaves often relatively crowded basally; mid stem leaves up to 7 mm wide; peduncles, bracteoles and phyllaries \pm glabrous at anthesis (margin of bracteoles may be minutely ciliate); stems and leaves not densely indumented above mid stem
- 37 Phyllaries 6–8 mm long (northern New South Wales; southern Queensland)
**22. *S. queenslandicus***

- 37: Phyllaries 8–12 mm long (South Australia; Victoria; Tasmania)
- 38 Capitula per stem < 15; achenes 5–7 mm long, markedly lageniform with a very long slender neck (Tasmania).....**17. *S. tasmanicus***
- 38: Capitula per stem typically > 15; achenes 3–4 mm long, only slightly lageniform (mainland Australia).....**21. *S. dolichocephalus***
- 36: Plant often > 0.5 m tall; leaves not generally crowded basally; mid stem leaves very narrow or up to 35 mm wide; peduncles, bracteoles and sometimes phyllaries cobwebby to woolly at anthesis, or if not then stems and lower surface of leaves densely indumented above mid stem
- 39 Taproot well-developed; secondary roots hardly fleshy; stems moderately to densely appressed-cottony or woolly (sometimes glabrescent with age); mid stem leaves narrow-linear, l:w ratio > 20**20. *S. quadridentatus***
- 39: Taproot slender, inconspicuous; secondary roots fleshy; stems glabrous or only sparsely cottony; mid stem leaves very narrow-elliptic to linear (usually distinctly tapering to each end), l:w ratio < 20
- 40 Mid stem leaves < 15 mm wide, l:w ratio > 15; lower surface of leaves lacking coarse hairs; involucre 5–8 mm long; achenes 2.5–4.5 mm long.....**18. *S. glandulosus***
- 40: Mid stem leaves > 15 mm wide, l:w ratio < 10; lower surface of leaves frequently with short coarse hairs; involucre 7–9 mm long; achenes 4–6 mm long.....**16. *S. longicollaris***
- 32: Achenes obloid or oblong-ellipsoid, 1.5–3.0 mm long, stems not densely appressed-cottony or woolly throughout
- 41 Apex of phyllaries strongly recurved at anthesis; c. 1/2 of florets bisexual; achenes pale tan to light brown, with papillose hairs in lines covering c. 1/5 of surface**38. *S. interpositus***
- 41: Apex of phyllaries not recurved at anthesis; c. 1/3–1/4 of florets bisexual; achenes olive-brown, brown–dark brown, orange or reddish, glabrous or with papillose hairs very sparse or in bands covering up to 2/3 of surface
- 42 Achenes glabrous or with papillose hairs few in lines within narrow grooves
- 43 Leaves with l:w ratio < 10 (montane to alpine)
- 44 Calycular bracteoles 2–3.5 mm long, not extending to midpoint of involucre; achenes > 2.5 mm long, olive-brown, usually with a few papillose hairs**27. *S. gunnii***
- 44: Calycular bracteoles 3–5 mm long, typically extending beyond the midpoint of involucre; achenes < 2.5 mm long, red-brown, glabrous**13. *S. extensus***
- 43: Leaves with l:w ratio > 10 (lowland or hills or sometimes montane)

- 45 Plants of swamps, commonly growing in water; leaves glabrous or inconspicuously scabridulous on upper surface; length of involucre c. 2.5 times the diameter; achenes glabrous, with ribs flat and grooves hardly recessed (South Australia, Victoria, Tasmania)**35. *S. psilocarpus***
- 45: Plants typically not growing in water; leaves with coarse hairs, scabridulous, and/or cobwebby; length of involucre c. 4 times the diameter; achenes glabrous or sparsely hairy, with convex ribs and deep grooves (central New South Wales to southern Queensland)**26. *S. tenuiflorus***
- 42: Achenes with papillose hairs in somewhat dense bands covering c. 1/4–2/3 of surface
- 46 Base of mid to upper stem leaves often somewhat sagittately auriculate and somewhat amplexicaul; calycular bracteoles 3–5; involucre diameter < 2.0 mm**23. *S. phelleus***
- 46: Base of mid to upper stem leaves not sagittately auriculate, not or only weakly amplexicaul; calycular bracteoles 6–10; involucre diameter > 2.0 mm.
- 47 Taproot slender, inconspicuous; involucre 6–11 mm long; phyllaries (12–)15–25 (southern Australia east of 119° longitude).....**36. *S. squarrosus***
- 47: Taproot usually well-developed; involucre 5–8 mm long; phyllaries 12–14(–16) (south-western Western Australia west of 119° longitude) ..**11. *S. multicaulis***

1. *Senecio minimus* Poir., in J.B.A.P. de Monnet Lamarck, *Encycl. Meth. Bot. Suppl.* 5: 130 (1817)

Erechtites minima (Poir.) DC., *Prodr.* 6: 437 (1838).

Type: Nouvelle-Hollande [Australia], *J.J.H. de Labillardière*; holo: FI; fragment of holo: P, *fide* R.O. Belcher, *Ann. Missouri Bot. Gard.* 43: 46 (1956).

E. pumila DC., *Prodr.* 6: 297 (1838). Type: 'in Nova Hollandia' [Australia], *J.J.H. de Labillardière*; holo: G (microfiche seen MEL), *fide* R.O. Belcher, *loc. cit.* [De Candolle stated that this species was based on *Senecio pumilus* Poir.; however, this name apparently was never published].

E. prenanthoides DC., *Prodr.* 6: 296 (1838); G. Bentham, *Fl. Austral.* 3: 658 (1867), *p.p.*; *E. labillardierei* Hieron., *Engl. Bot. Jahr.* 29: 63 (1900), *nom. illeg. superfl.*, as *Labillardieri*. Type: in Nova Hollandia [Australia], *J.J.H. de Labillardière*; holo: G, *fide* R.O. Belcher, *loc. cit.*, microfiche seen at MEL.

S. muelleri Regel, *Ind. Sem. Hort. Bot. Imp. Petrop.* 31 (1863), as *Mülleri*. Type: 'semina east nova Hollandia australia nobis communicavit' [seed sent from Australia], *F. Mueller*; *fide* R.O. Belcher, *loc. cit.*

S. heterophyllus Colenso, *Trans. N.Z. Inst.* 27: 389 (1894), as *heterophylla*. Type: *fide* R.O. Belcher, *loc. cit.*

Herbs to 2 m high. *Primary roots* well-developed; secondary roots fine, c. 0.5 mm diam. *Stems* erect, sparsely and minutely coarse-hairy below mid stem reducing to glabrous upwards. *Leaves in middle third of stems* more or less evenly spaced and sized, oblanceolate to narrow-elliptic, 8–25 cm long, l:w ratio c. 3–6, not dissected but sometimes shallowly crenate; crenations few to several per side; base auriculate, semi-amplexicaul; margin crowded-denticulate; upper surface glabrous or sparsely

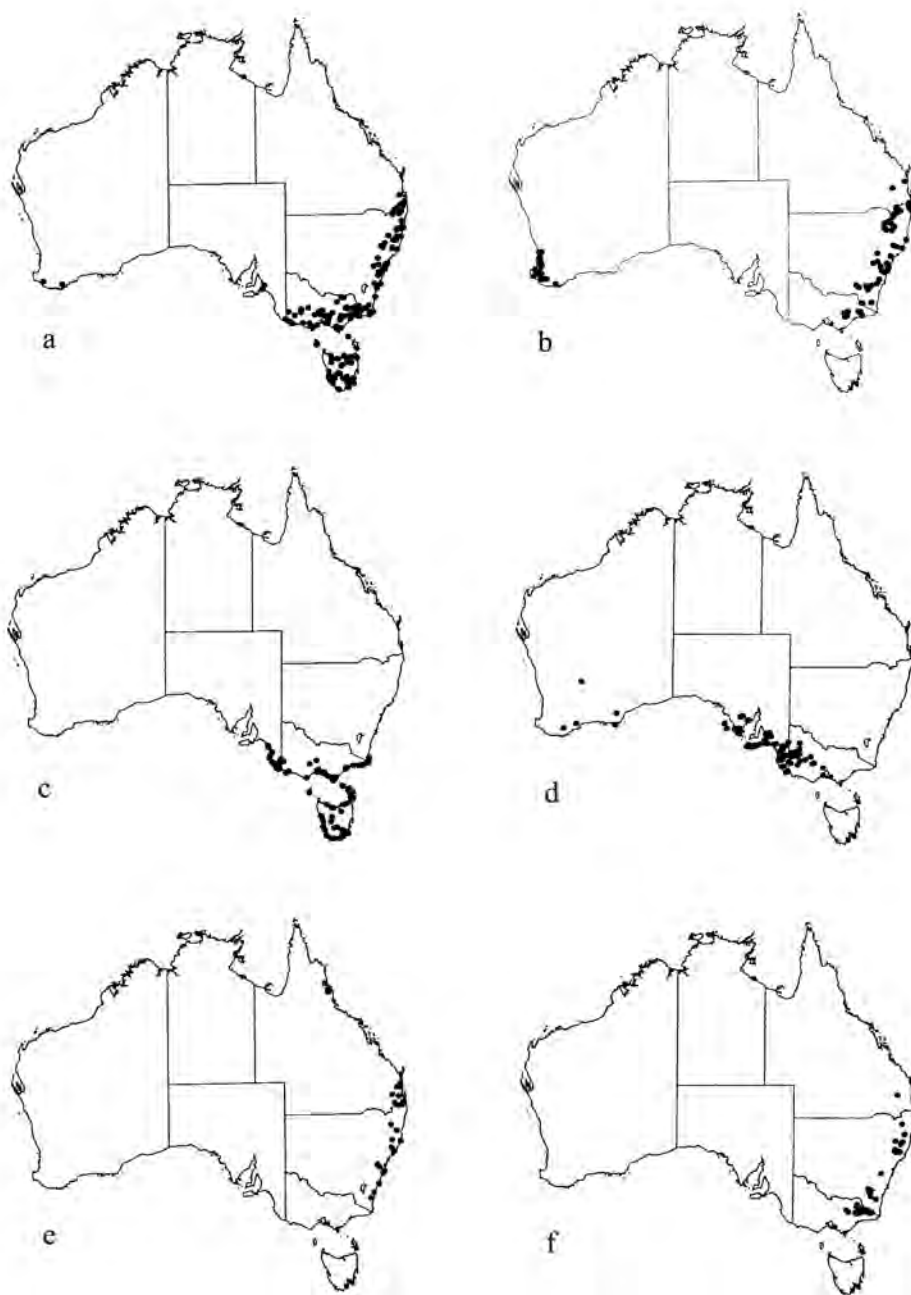


Figure 5. Distribution of a. *Senecio minimus*; b. *S. diaschides*; c. *S. biserratus*; d. *S. picridioides*; e. *S. bipinnatisectus*; f. *S. distalilobatus*.

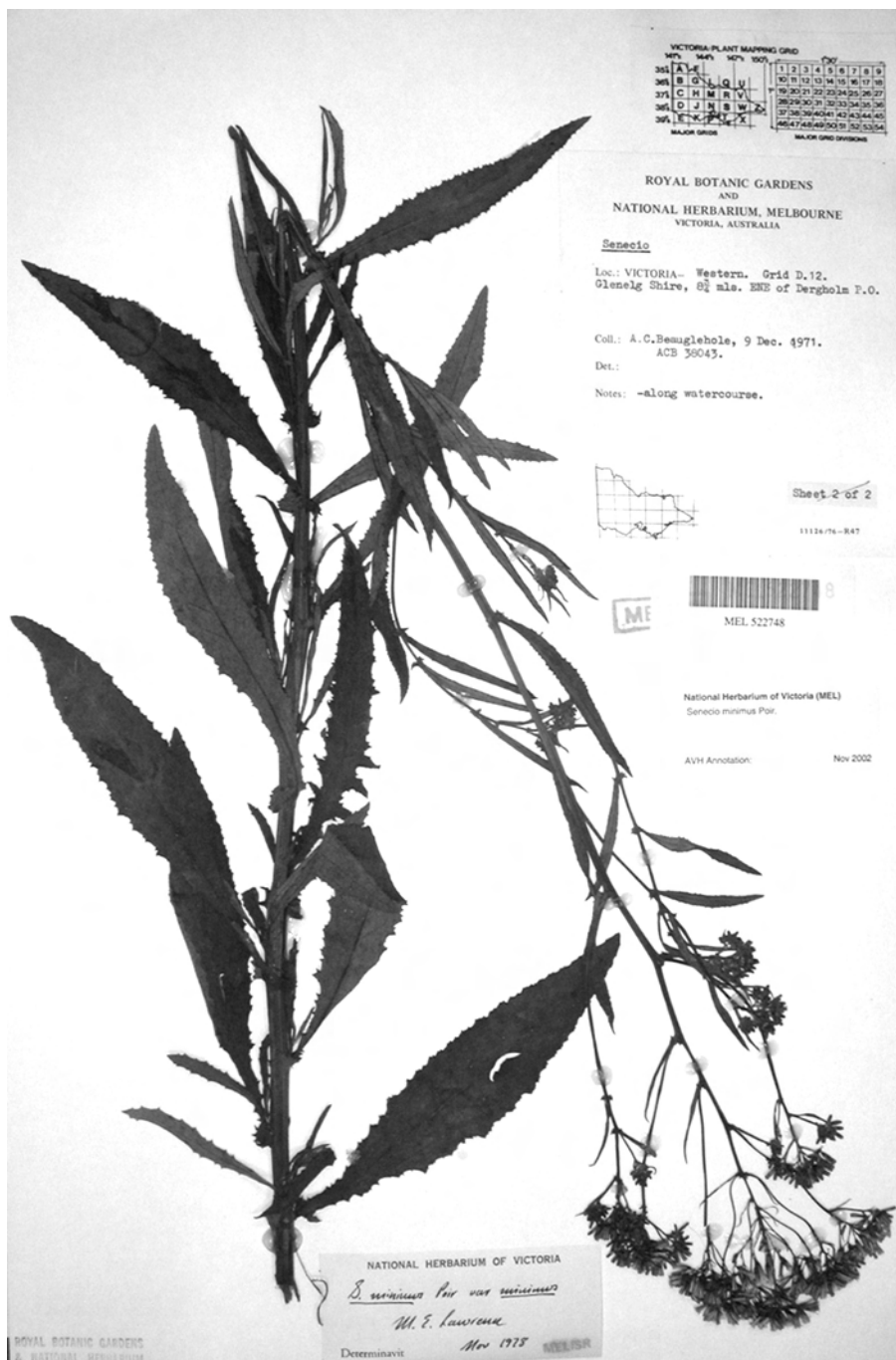


Figure 6. *Senecio minimus* (A.C. Beauglehole 38043 MEL; note: the lobed leaf is considered aberrant).

scabridulous; lower surface usually green, sparsely cobwebby, (hairs on lower stem leaves coarse basally). *Uppermost leaves* very narrow-elliptic, occasionally linear or narrow-lanceolate, l:w 3–10, sometimes widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often several hundred; overtopping absent or slight; mature lateral peduncles mostly 5–10 mm long. *Capitula*: calycular bracteoles 3–5, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous to lightly cobwebby at anthesis; involucre 4.0–6.5 mm long, 1.0–1.5 mm diam.; phyllaries 7–10, glabrous; stereomes (in dried specimens) \pm flat, green, usually with a minute black tip; post-fructescence receptacle 1.5–2.0 mm diam., with phyllaries finally reflexed. *Florets* 12–25, c. 80% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 4.5–6 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, 0.2–0.3 mm long. *Achenes* narrow-obloid, 1.6–2.5 mm long, sometimes slightly angular, dull brown or dark red-brown, commonly somewhat lustrous, with papillose hairs in lines. *Pappus* 5–6 mm long. (Figs 2c, 3c, 6)

Flowers summer–autumn.

Distribution and Habitat: Occurs in far south-western Western Australia from Pemberton east to the Porongurup Range, in south-eastern Australia from Mt Glorious in far south-eastern Queensland south through eastern New South Wales to Mallacoota in far eastern Victoria and from there west to Myponga in the Mount Lofty Range in south-eastern South Australia, and in Tasmania from Deal Island in Bass Strait south to Bruny Island (Fig. 5). Also native to New Zealand. Grows in rich soils in moister sites such as beside swamps and streams, in forest and woodland.

Notes: The inflorescences with numerous, small, slender capitula, and large leaves with more or less regular, crowded denticulations and distinct reticulate venation make this species readily identifiable. The achenes commonly have a few longitudinal ridges and it is common for the grooves of the achene and hence the lines of hairs to be found at the summit of these ridges.

Senecio prenanthoides A.Rich. has been cited as the basionym for *Erechtites prenanthoides* DC. However, the former is a different species and is based on a collection by Gaudichaud, whereas the latter is based on a collection by Labillardière.

Selected specimens examined: **WESTERN AUSTRALIA**: Halls Rock, Porongurup Range, 35 km north of Albany, G.J. Keighery 9350, 3.xii.1986 (PERTH). **SOUTH AUSTRALIA**: Lenswood, ca. 20 km east of Adelaide, A.G. Spooner 5180 (AD). **QUEENSLAND**: Mt Glorious Road, near The Summit, Mt Glorious, S.P. Phillips 521 & B.A. Phillips, 20.ix.2000 (BRI, MEL, NSW). **NEW SOUTH WALES**: Stephen's Creek (Cockwhy Ck), c. 5 km SW of Termeil, South Coast, R. Pullen 8580 & J. Story, 7.xi.1973 (CANB, NSW, PERTH); Junction of Coramba Mountain and Bushman's Range Roads, 12.6 km from turnoff at Coramba in the Orana West State Forest, R.G. Coveny 16697 & A.J. Whalen, 20.x.1993 (BRI, CANB, MEL, NSW). **VICTORIA**: Olinda Creek at Mt Evelyn Recreation Reserve, near York Road, c. 35 km east of Melbourne, A.B. Court for R.V. Smith 59/8, 21.i.1959 (AD, BRI, CANB, MEL). **TASMANIA**: Mt Field National Park, near Russell Falls, W.M. Curtis, 13.i.1943 (HO, MEL).

2. *Senecio diaschides* D.G.Drury, *New Zealand J. Bot.* 12: 522 (1974)

Type: Waipoua River, Waipoua forest [New Zealand], K.A. Allison 95, Feb. 1944; *holo*: CHR.

S. sp. B sensu M.E. Lawrence, *Australian J. Bot.* 28: 155 (1980).

S. cahillii Belcher, *Muelleria* 5: 120 (1983), *nom. illeg. superfl.* *Type*: Victoria, East Gippsland, Buchan River near junction of Reedy River, A.C. Beaglehole 41406, 6 Feb. 1973; *holo*: MEL; *iso*: MEL.

Herbs to 1.5 m high. *Taproot* well-developed; secondary roots hardly fleshy, 0.5–1 mm diam. *Stems* erect, nearly glabrous or very sparsely coarse-hairy basally; leafy axillary growth precociously developed above mid stem. *Leaves* in middle third of stems more or

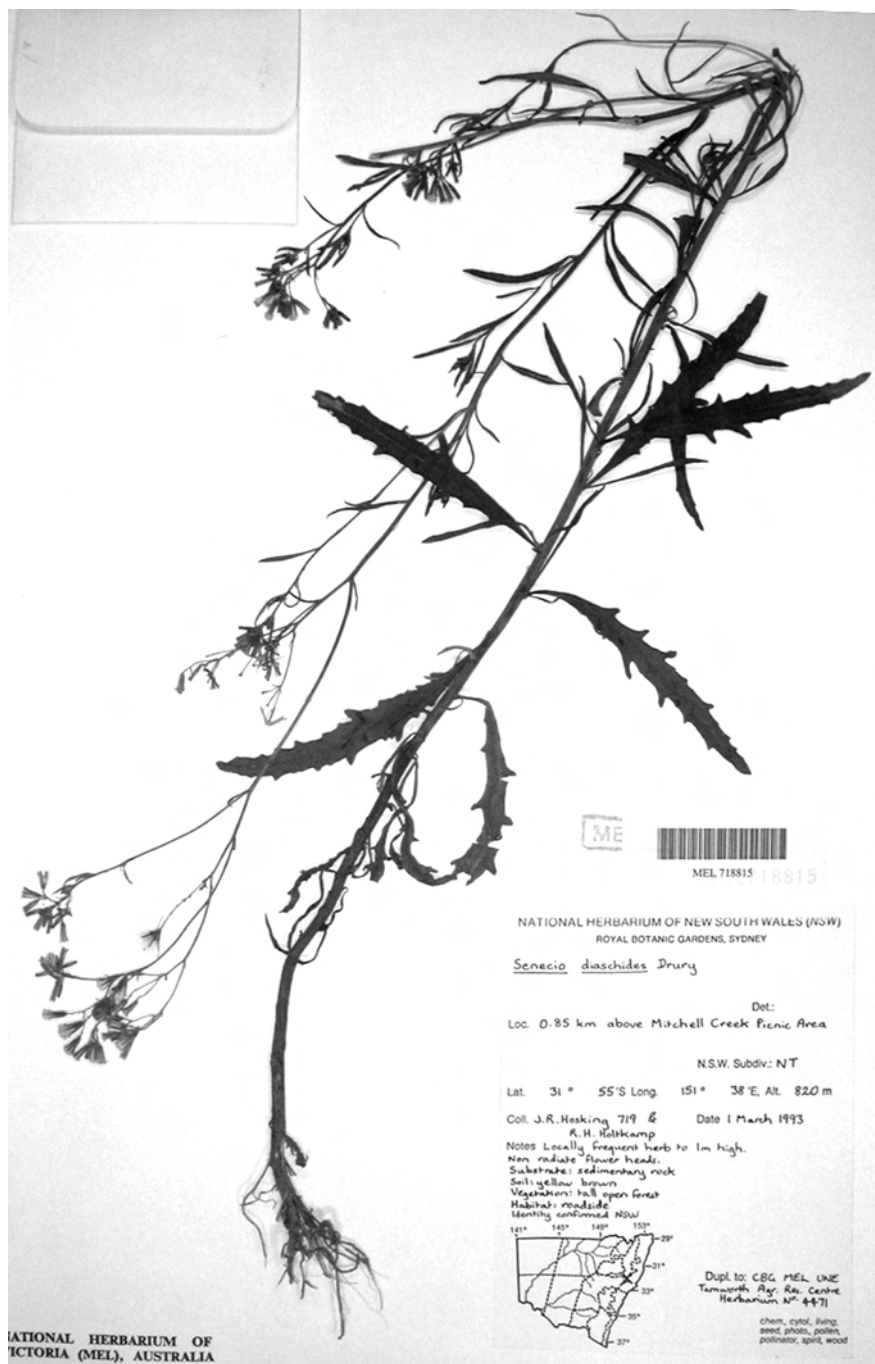


Figure 7. *Senecio diaschides* (J.R. Hosking 719 & R. Holtkamp MEL).

less evenly spaced and sized, very narrow-elliptic to linear, 7–18 cm long, l:w ratio c. 5–10, coarse-dentate to deeply lobate, or rarely primary dissection lacking; segments 2–8 per side in the proximal three-quarters, antrorse, triangular to narrow-triangular; base becoming auriculate above mid stem; auricles pinnatisect, hardly amplexicaul; margin entire, with occasional minute denticulations; both surfaces glabrous or nearly so; lower surface green. *Uppermost leaves* linear to narrow-linear (excluding auricles), sometimes widest at auricles; margin entire or appearing so due to rolling of lamina. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–200; overtopping well-developed; mature lateral peduncles mostly 6–12 mm long. *Capitula*: calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 4.5–6.5 mm long, 1.0–1.5 mm diam.; phyllaries predominantly 7–10, glabrous, with apex erect; stereomes (in dried specimens) flat or gently convex, green, commonly with a minute black tip, and sometimes also purple in a zone below tip; post-fructescence receptacle to c. 2.5 mm diam. with phyllaries commonly \pm erect. *Florets* 12–25, c. 70% female; corolla-lobes \pm triangular, thickened apically; corolla of bisexual florets 4.5–6.0 mm long, 4-lobed; corolla-lobes of female florets 3 or 4, 0.2–0.3 mm long. *Achenes* narrow oblong-ellipsoid, 2.2–2.5 mm long, brown, with papillose hairs in narrow bands, l:w ratio of hairs c. 3. *Pappus* 4–5 mm long. (Figs 2e, 7)

Flowers summer–autumn.

Distribution and Habitat: Occurs in south-western Western Australia from the Perth area SSE to Walpole, and in south-eastern Australia from Gympie in far south-eastern Queensland south through eastern New South Wales to Licola in eastern Victoria (Fig. 5). In Western Australia the lack of early records suggests that it may have been introduced to that state (Belcher 1983). Naturalised in New Zealand. Grows in alluvial soils adjacent to swamps and rivers, in forest and woodland.

Notes: The precociously developing leafy axillary growth is a feature of this species and of the otherwise dissimilar *S. quadridentatus*.

Selected specimens examined: **WESTERN AUSTRALIA**: Simmonds Block; Tuart Forest, G.J. Keighery 14115, 30.xi.1995 (PERTH). **QUEENSLAND**: Bald west of Long Plain, Bunya Mountains, R.J. Fairfax 66, 4.ii.1995 (BRI). **NEW SOUTH WALES**: 0.85 km above Mitchell Creek Picnic Area, J.R. Hosking 719 & R.H. Holtkamp, 1.iii.1993 (CBG, MEL, NSW, UNE); Long Swamp, King's Highway, c. 10 miles [16 km] east of Bungendore, M. Gray 6080, 18.xii.1967 (AD, BRI, CANB, HO, MEL, NSW). **VICTORIA**: West bank of Snowy River, c. 3 km upstream of the Snowy-Buchan River confluence, N.G. Walsh 3015, D.E. Albrecht & J. Westaway, 27.xi.1990 (MEL).

3. *Senecio biserratus* Belcher, *Ann. Missouri Bot. Gard.* 43: 43 (1956)

Senecio flaccidus A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 110 (1834), *nom. illeg. non* Less. (1831).

Type: [Tasmania], 'N. Holl. detr. d'Entrecasteaux', [D'Entrecasteaux Channel], Baudin voyage of 1826–29; *holo*: P.

Erechtites sonchoides DC., *Prodr.* 6: 296 (1838). *Type*: [?Tasmania], 'in Nova Hollandia meridionali' [southern Australia] Baudin voyage of 1826–29; G, *fide* R.O. Belcher, *loc. cit.*

Erechtites prenanthoides sensu G. Bentham, *Fl. Austral.* 3: 658 (1867), *p.p.*; *sensu* J.M. Black, *Fl. S. Australia* 609–10 (1929).

Herbs to c. 1 m high. *Primary roots* well-developed, commonly branched; secondary roots hardly fleshy, 0.5–1 mm diam. *Stems* erect, sparsely or sometimes moderately coarse-hairy basally, density reducing upwards. *Leaves in middle third of stems* more or less evenly spaced and sized, elliptic to narrow-elliptic or lanceolate, 5–15 cm long, l:w ratio c. 1.5–4, coarse-dentate to deeply lobate; segments 3–9 per side extending along

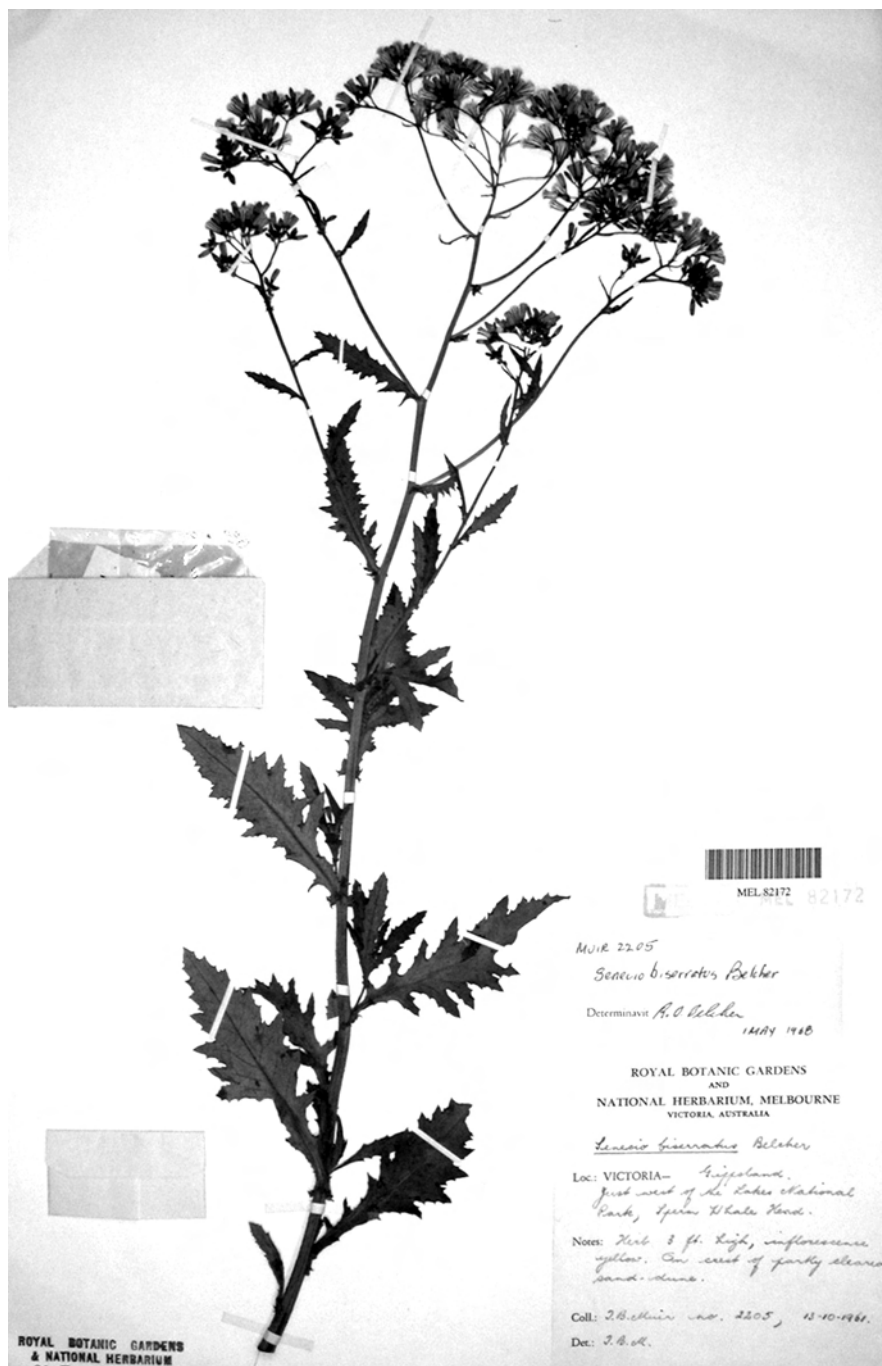


Figure 8. *Senecio biserratus* (T.B. Muir 2205 MEL).

much of length, tending to be larger in proximal two-thirds, antrorse, triangular to near oblong; base usually auriculate, with auricles divided, semiamplexicaul; margin serrulate or denticulate, with denticulations fairly frequent; both surfaces glabrous or sparsely scabridulous, rarely coarse-hairy; lower surface green or purple, \pm glabrous except on veins. *Uppermost leaves* similar but l:w ratio 3–6, sometimes widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–200; not overtopping or only moderate; mature lateral peduncles mostly 5–10 mm long. *Capitula*: calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 4.5–6.5(–7.5) mm long, 1.0–1.5 mm diam.; phyllaries predominantly 7–10, glabrous, with apex erect; stereomes (in dried specimens) flat to gently convex, thin, green, minutely purplish at tip; post-fructescence receptacle 1–2 mm diam., with phyllaries commonly finally reflexed. *Florets* 12–20, c. 70% female; corolla-lobes nearly oblong, thickened apically; corolla of bisexual florets 4.5–6 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, 0.2–0.3 mm long. *Achenes* narrow oblong-ellipsoid, (2.0–)2.5–3.2 mm long, dark brown, with papillose hairs in dense bands, l:w ratio of hairs c. 3. *Pappus* 5–6 mm long. (Figs 2j, 4e, 8)

Flowers spring–autumn.

Distribution and Habitat: Occurs in far south-eastern Australia, largely on the coast, from Younghusband Peninsula in far south-eastern South Australia east through southern Victoria to far south-eastern New South Wales; also in northern Tasmania including islands in Bass Strait (Fig. 5). Also native to New Zealand. Grows in sandy, loamy and peaty soils in coastal woodland, shrubland, and grassland, and less often in forests at low to moderate altitudes.

Notes: This species is similar to *S. distalilobatus* but differs by being usually less coarse-hairy, having leaves with more triangular segments and denticulations that are slightly serrate and very acute to acuminate rather than subacute or obtuse, achenes that are longer, more slender and with more robust papillose hairs, and by having different root morphology. *Senecio biserratus* is predominantly a coastal plant but it has been recorded from Mt Buninyong and Mt Macedon in south-central Victoria. *Senecio distalilobatus* occurs at altitudes over 800 m. *Senecio biserratus* also resembles *S. minimus* and *S. picridioides* but differs most obviously by the degree of dissection and the shape of segments of leaves.

Selected specimens examined: **SOUTH AUSTRALIA**: SE, 5.5 km SSE of Glencoe, in Honan's Scrub Native Forest, *P.J. Lang* 2461, 21.xi.1995 (AD, HO). **NEW SOUTH WALES**: Billangabee Creek, Ben Boyd National Park, 19 km SE of Eden, *R. Coveny* 5802 & *J. Armstrong*, 16.x.1974 (MEL, NSW). **VICTORIA**: Wilsons Promontory National Park. Five and Three Mile Beaches (east coast), *P.C. Heyligers* 80192, Nov. 1980 (CANB, MEL). **TASMANIA**: Elliott Point, *A. Moscal* 11877, 20.i.1986 (HO).

4. *Senecio picridioides* (Turcz.) M.E.Lawr., *J. Adelaide Bot. Gard.* 7: 292 (1985)

Erechtites picridioides Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 24(1): 200 (1851); J.M. Black, *Fl. S. Australia* 610 (1929); *E. prenanthoides* DC. var. *picridioides* (Turcz.) Benth., *Fl. Austral.* 3: 658 (1867); *S. minimus* Poir. var. *picridioides* (Turcz.) Belcher, *Ann. Missouri Bot. Gard.* 43: 48 (1956).

Type: [Western Australia], 'Nova Hollandia', *J.Drummond III* 132; syn: K, FI, *fide* R.O. Belcher *loc. cit.*

Herbs to 1 m high. *Taproot* usually moderately well-developed; secondary roots fleshy, 0.7–1.5 mm diam. *Stems* erect, sparsely to moderately coarse-hairy, density reducing upwards. *Leaves in middle third of stems* sometimes becoming distinctly wider spaced and narrower upwards, elliptic to narrow-elliptic, narrow-oblong or narrow-ovate to lanceolate,



Figure 9. *Senecio picridioides* (I.C. Clarke 2299 MEL).

6–20 cm long, l:w ratio c. 2–4, lobate to deeply lobate; segments 4–6 per side extending along most of length, spreading, or more distal ones slightly antrorse, commonly roughly semicircular; base auriculate, somewhat amplexicaul; margin crowded-denticulate; both surfaces with coarse hairs; lower surface (and upper midrib) commonly strongly purple. *Uppermost leaves* narrow-oblong or lanceolate, l:w ratio c. 3–5, usually widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–100; overtopping usually moderate; mature lateral peduncles mostly 6–12 mm long. *Capitula*: calycular bracteoles 2–6, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 6–8 mm long, c. 1.2–1.8 mm diam.; phyllaries 7–10, glabrous, with apex erect; stereomes (in dried specimens) flat to gently convex, green, commonly minutely purple at tip; post-fructescence receptacle c. 3 mm diam., with phyllaries commonly finally erect. *Florets* 15–30, c. 70% female; corolla-lobes triangular, not or slightly thickened apically; corolla of bisexual florets 5.5–6.6 mm long, 5-lobed; corolla-lobes of female florets 4, c. 0.2 mm long; corolla-limb commonly also with a deeper cleft on inner face. *Achenes* narrow obloid, 2.0–2.2 mm long, brown, with papillose hairs in bands, l:w ratio of hairs c. 3–4. *Pappus* 5.5–6 mm long. (Fig. 9)

Flowers spring–summer.

Distribution and Habitat: Occurs in southern Western Australia from the Stirling Ranges east to Mt Buraminy, and in south-eastern Australia from the Marble Range in south-central South Australia east to Werribee in south-central Victoria (Fig. 5). Grows in sand, red-brown loam derived from ironstone, or clay-loam, often in depressions and shaded and rocky sites, in dune scrub, woodland and sometimes dry forest.

Notes: The typically strong purple coloration of stems and lower surface of leaves, the nature of the primary dissection and the strongly amplexicaul leaves make this species readily identifiable. The name *E. picridioides* Turcz. should not be confused with the illegitimate name *E. picridioides* Sond. which is *S. runcinifolius* Willis.

Selected specimens examined: **WESTERN AUSTRALIA**: c. 1.6 km NE of Bungalbin Hill, Helena and Aurora Range, B.J. Lepschi 2068, 27.ix.1995 (CANB, MEL, NSW, PERTH). **SOUTH AUSTRALIA**: Kangaroo Island, eastern end. Dudley Peninsula, G. Jackson 863, 14.xi.1971 (AD); Hundred of Moorooroo. Upper tributary of Tanunda Creek near Schlenke Gully, P.J. Lang 1700, 25.vii.1985 (AD, BRI). **VICTORIA**: Little Desert National Park, central block. Broughton's Waterhole, 23 km SSE of Kaniva, I.C. Clarke 2299, 20.x.1993 (AD, CANB, MEL).

5. *Senecio bipinnatisectus* Belcher, *Ann. Missouri Bot. Gard.* 43: 41 (1956)

Erechtites atkinsoniae F.Muell., *Fragm.* 5: 88 (1865); G. Bentham, *Fl. Austral.* 3: 658 (1867); *S. atkinsoniae* F.Muell., *Fragm.* 5: 88 (1865), *nom. inval.* [placed in synonymy under *E. atkinsoniae*]

Type: [New South Wales], Blue Mountains, L. Atkinson; lecto: K, *fide* R.O. Belcher, *loc. cit.*; isolecto: MEL. [Remaining syntype: Monkey Creek near Port Jackson, W. Woolls; MEL]

Herbs to 1.5 m high. *Primary roots* well-developed; secondary roots not fleshy, 0.5–1 mm diam. *Stems* erect, nearly glabrous. *Leaves in middle third of stems* more or less evenly spaced and sized, broad-elliptic, 10–15 cm long, l:w ratio c. 1.5–2, pinnatisect to bipinnatisect; segments 4–6 per side extending along most of length, antrorse, shape various depending on secondary dissection; base auriculate, with auricles pinnatisect, slightly amplexicaul; margin with occasional denticulations or teeth; upper surface \pm glabrous; lower surface green, sparsely coarse-hairy or \pm glabrous. *Uppermost leaves* pinnatisect, l:w ratio c. 2–3, not widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–200; overtopping usually moderate; mature lateral peduncles mostly 6–12 mm long. *Capitula*: calycular bracteoles 3–6, 1.5–2.5 mm long; peduncle and margin of bracteoles glabrous or nearly so at anthesis; involucre

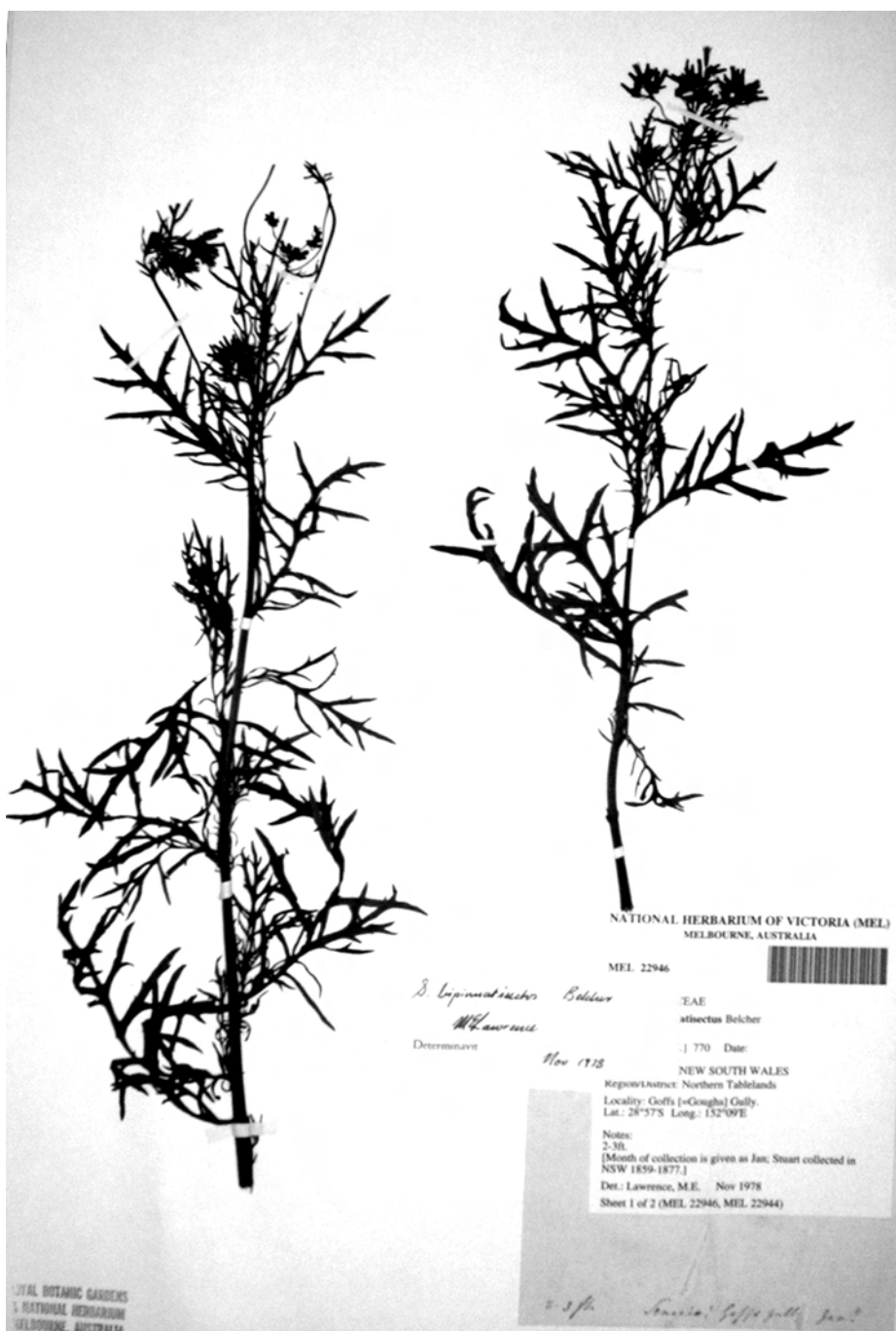


Figure 10. *Senecio bipinnatisectus* (C. Stuart 770 MEL).

5.0–7.0 mm long, c. 1.2–1.8 mm diam.; phyllaries 8–10(–13), glabrous, with apex erect; stereomes (in dried specimens) flat to gently convex, green, minutely purple or black at tip; post-fructescence receptacle to c. 2.5 mm diam., with phyllaries commonly finally reflexed. *Florets* 15–25, c. 70% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 5–5.5 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.2 mm long. *Achenes* narrow obloid, 1.8–2.2 mm long, dark red-brown, minutely granular; with papillose hairs somewhat sparse in lines, l:w ratio of hairs c. 3. *Pappus* 4–5 mm long. (Fig. 10)

Flowers most times of year.

Distribution and Habitat: Occurs in eastern Australia, in far north Queensland and disjunctly from Candle Mountain in south-eastern Queensland south to Mt Dromedary in far south-eastern New South Wales (Fig. 5). Naturalised in New Zealand. Grows in forests, woodlands, and shrublands

Notes: Similar in leaf form to *S. bathurstianus* and *S. brevityubulus* but differing from these two species in indumentum and capitular characters. Involucres are longer, more slender, and with fewer, less convex phyllaries, and florets are fewer.

Selected specimens examined: **QUEENSLAND:** Near Sunday Creek forestry camp, 20 miles [32 km] WNW of Maleny, coll. unknown (BRI); Mt Mitchell, Cunningham's Gap, *P.I. Forster PIF11107* & *R. Reilly*, 18.viii.1992 (BRI, MEL). **NEW SOUTH WALES:** 15.4 km west of Gingers Creek, Oxley Highway, *R.H. Holtkamp 15* & *A. Maguire*, 9.ii.1993 (CBG, MEL, NSW, UNE); Base of Mt Killiecrankie, Oakes State Forest, WSW of Bellingen, *A.R. Bean 14599*, 30.i.1999 (BRI).

6. *Senecio distalilobatus* I.Thomps., *sp. nov.*

A *S. hispidulo* A.Rich. radice principali redacta, indumento caulium plerumque densiore, lobis foliorum distalioribus, pedunculis brevioribus, phyllariis plerumque paucioribus differt; a *S. biserrato* Belcher radice principali redacta, indumento caulium plerumque densiore, dentibus foliorum non antrorsibus, acheniis brevioribus papillis debilibus differt.

Type: Victoria, Razorback Forest Block, 1.4 km north of Mt Cooper, Razorback Spur Track, 500m south of Limestone Creek Track, alt. 1180 m, *G.W. Carr 10361*, 1 Feb. 1985; holotype: MEL.

Herbs to 1.5 m high. *Taproot* inconspicuous; secondary roots fleshy, 0.5–1.2 mm diam. *Stems* erect; moderately coarse-hairy, density reducing upwards, rarely nearly glabrous throughout. *Leaves in middle third of stems* more or less evenly spaced and sized, narrow-oblong to narrow-elliptic, 6–12 cm long, l:w ratio c. 2–4, lobate to subpinnatisect; segments 3–6 per side extending along most of length, slightly antrorse, triangular, oblong or obovate; base attenuate or leaves above mid stem usually auriculate, with auricles divided, slightly amplexicaul; margin with scattered denticulations or teeth; both surfaces coarse-hairy, occasionally nearly glabrous; lower surface green, sometimes with a cobwebby overlay over coarse hairs. *Uppermost leaves* narrow-elliptic, l:w 3–6, not usually widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–100; overtopping variable; mature lateral peduncles mostly 5–10 mm long. *Capitula:* calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles sparsely hairy or \pm glabrous at anthesis; involucre 5.0–7.0 mm long, 1.0–1.5 mm diam.; phyllaries 7–10(–12), glabrous, with apex erect; stereomes (in dried specimens) flat to gently convex, green, sometimes purplish, commonly minutely black at tip; post-fructescence receptacle to c. 2 mm diam., with phyllaries commonly finally reflexed. *Florets* 12–20, c. 70% female; corolla-lobes \pm triangular, thickened apically; corolla of bisexual florets 5–6 mm long, 5-lobed; corolla-lobes of female florets 4 or 5,



Figure 11. *Senecio distalilobatus* (holotype: G.W. Carr 10361 MEL).

c. 0.2 mm long. *Achenes* narrow obloid to narrow-ellipsoid, 2.0–2.8 mm long, medium to dark red-brown, with relatively fine papillose hairs in lines or somewhat scattered; l:w ratio of hairs c. 3. *Pappus* 5–6 mm long. (Figs 2g, 4d, 11)

Flowers summer–early autumn.

Distribution and Habitat: Occurs in south-eastern Australia from Glen Elgin in north-eastern New South Wales south to eastern Victoria and as far east as Mt Howitt. Possibly also in the Bunya Mountains in south-eastern Queensland (Fig. 5). Grows in loam soils in forests usually at altitudes over 800 m.

Etymology: The epithet alludes to the relatively distal occurrence of primary and marginal dissection (L: *distalis*, distal, and *lobatus*, lobed).

Notes: *Senecio distalilobatus* was previously regarded as a form of *S. biserratus*. Differences are outlined under the latter. *Senecio distalilobatus* also resembles *S. hispidulus* but its leaves have a more distal development of segments and teeth, upper stem leaves are narrow-elliptic rather than lanceolate to linear, auricles are relatively smaller, involucre contain usually fewer, less convex and finally reflexed phyllaries, corolla-lobes of female florets are shorter, and achenial hairs are finer. In the Bunya mountains specimens have been collected that are difficult to distinguish from *S. hispidulus*.

Selected specimens examined: **QUEENSLAND**: Bunya Mt., Bell road about 3 miles [5 km] south of Mt Mowbullin Guest House, *R.W. Johnson* 455 & *L. Pedley*, 3.v.1958 (BRI). **NEW SOUTH WALES**: Point Lookout, *T. Bisalputra*, 25.ii.1958 (NE); Compartment 31, Stewarts Brook State Forest, Barrington Tops, *J.R. Hosking* 683, 11.ii.1993 (CBG, MEL, NE); Bendora to Mt Franklin A.C.T. near Parrot Rd. turnoff, *M. Gray* 5022, 7.ii.1961 (CANB, MEL); Port Philip Trail, Kosciuszko N.P., *I.R. Thompson* 751 & *N.G. Walsh.*, 31.i.2002 (MEL). **VICTORIA**: East Gippsland. Mt Tennyson, *J.V. Yugovic* 262 & *A.M. Opie*, 12.iii.1986 (MEL); Tingaringy National Park. Mt Tingaringy, *A.C. Beauplehole* 67850, 29.i.1980 (MEL); North-east – 46 km SSE from Whitfield via Upper Rose River Road to creek crossing on McCartney's Basin track in Wabonga Plateau State Park, *A. Piesse* 809, 18.ii.1987 (MEL).

7. *Senecio brevitybulus* I.Thomps., *sp. nov.*

A *S. bathurstianus* (DC.) Sch.Bip. foliis glabris, acheniis longioribus, papillis non dispersis differt; a *S. bipinnatisectus* caulibus pilis grossis instructus, phyllariis et flosculis multioribus, corollis brevioribus differt.

Type: Queensland, about 1/2 mile north of Woodford-Kilcoy-Beerwah road junction on both sides of road for about 1/2 mile, 26°57' S, 152°46' E, *H.S. Tutt*, Nov. 1969; holo: BRI.

Herbs to c. 1 m high. *Roots* not seen. *Stems* coarse-hairy, sparsely so on upper stem. *Leaves in middle third of stems* more or less evenly spaced and sized, broad-elliptic to narrow-elliptic, 8–12 cm long, l:w ratio c. 1.5–3, pinnatisect; segments 3–6 per side extending along most of length, antrorse, ±linear or variously shaped if secondary dissection present; base auriculate, with auricles pinnatisect, moderately stem clasping; margin with scattered denticulations or teeth; both surfaces glabrous or a few coarse hairs on midrib of lower surface; lower surface green. *Uppermost leaves* pinnatisect, l:w ratio c. 2–4, not widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–100; overtopping moderate; mature lateral peduncles mostly 4–10 mm long. *Capitula*: calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles ±glabrous at anthesis; involucre 3.5–4.5 mm long, c. 1.4–1.8 mm diam.; phyllaries 11–13, glabrous, with apex erect; stereomes (in dried specimens) moderately convex, green, commonly black at tip; post-fructescence receptacle to 2.5 mm diam., with orientation of phyllaries unknown. *Florets* 30–45, c. 80% female; corolla-

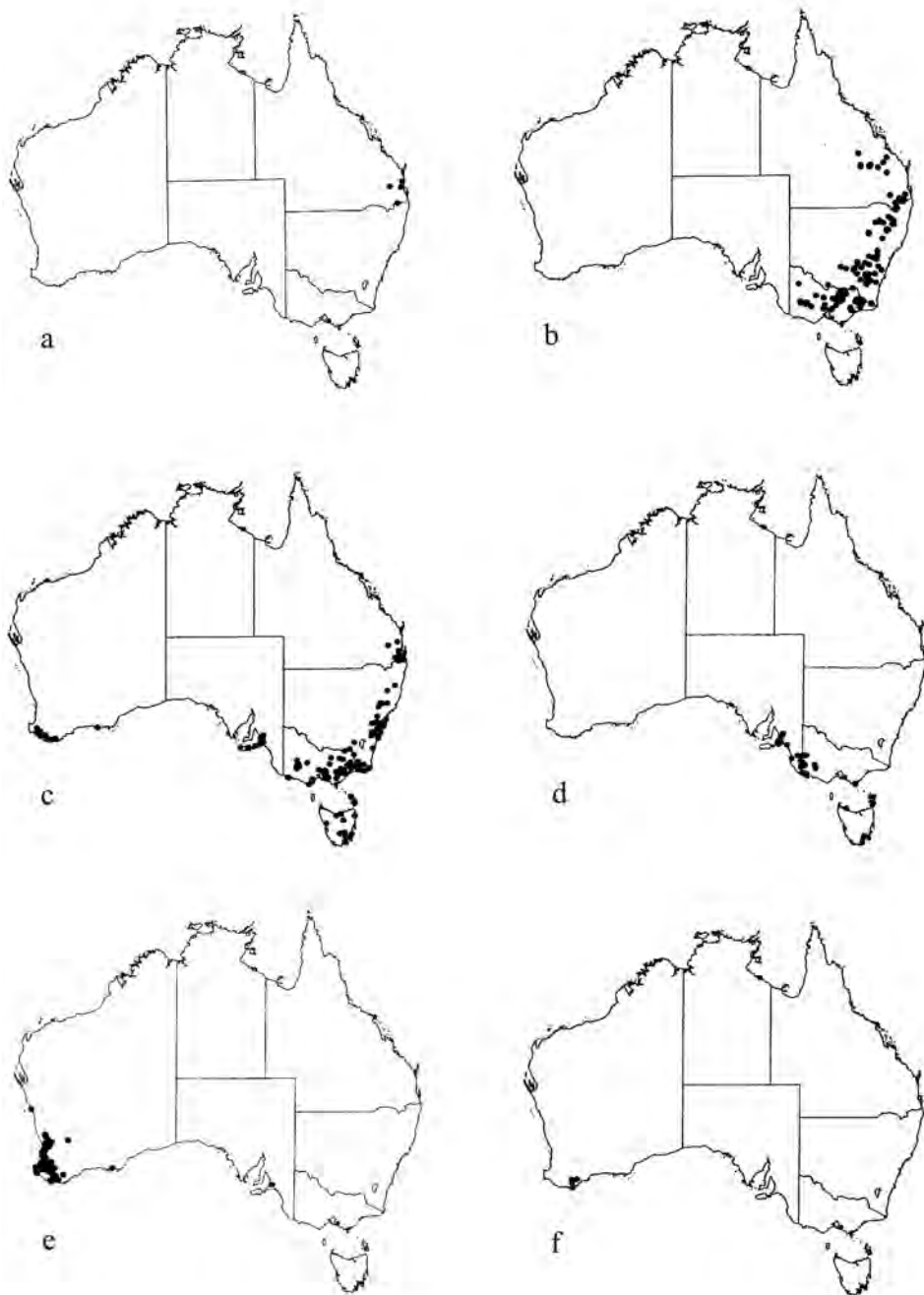


Figure 12. Distribution of a. *Senecio brevitubulus*; b. *S. bathurstianus*; c. *S. hispidulus*; d. *S. hispidissimus*; e. *S. multicaulis* subsp. *multicaulis*; f. *S. multicaulis* subsp. *stirlingensis*.

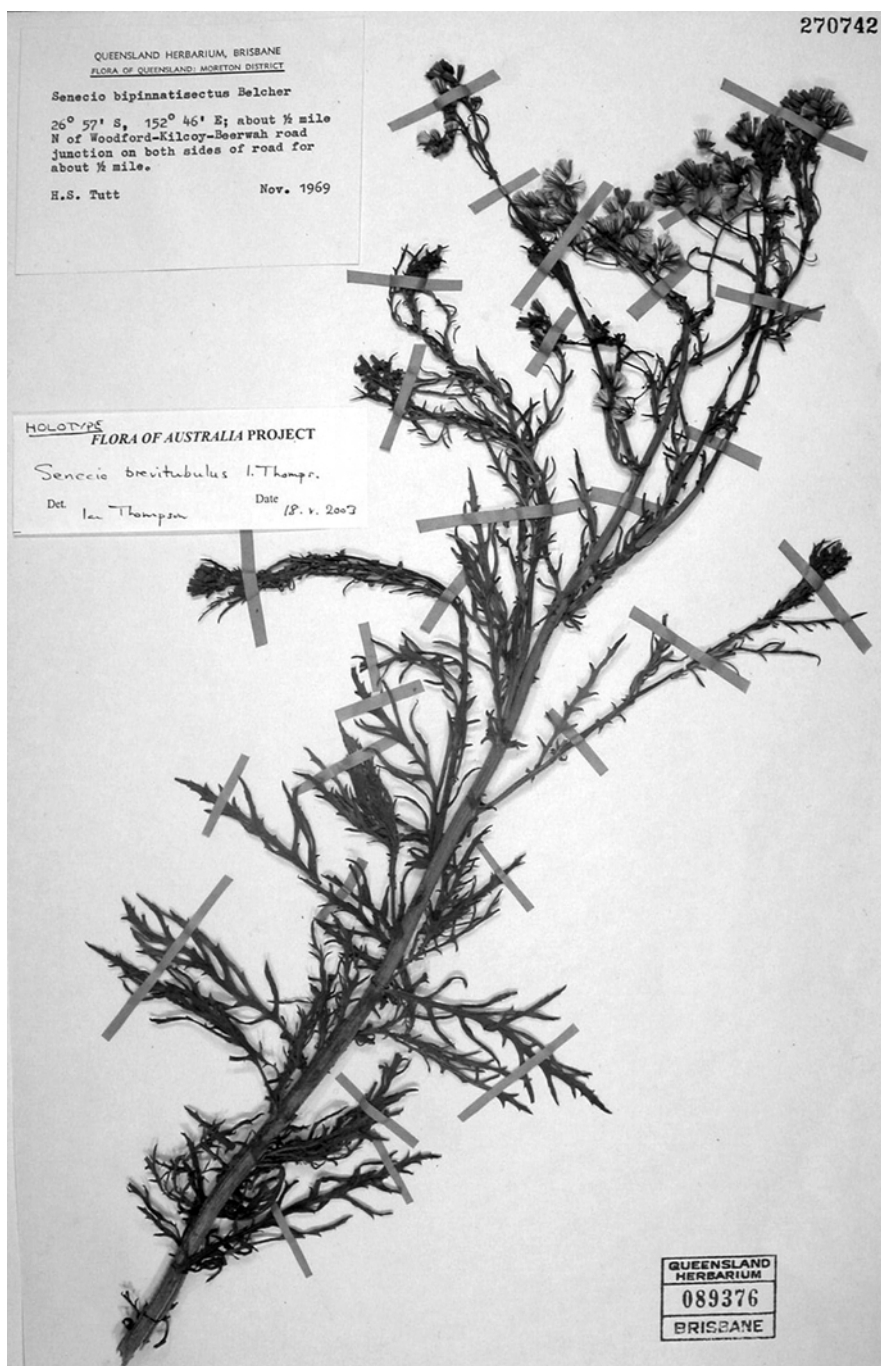


Figure 13. *Senecio brevityubulus* (holotype: H.S. Tutt s.n. BRI).

lobes triangular, thickened apically; corolla of bisexual florets 4–5 mm long, 4-lobed; corolla-lobes of female florets 3 or 4, 0.1–0.2 mm long. *Achenes* narrow oblong-ellipsoid, 2.0–2.7 mm long, red-brown, with papillose hairs in lines, l:w ratio of hairs c. 3. *Pappus* 4–5 mm long. (Fig. 13)

Flowers late spring–early autumn.

Distribution and Habitat: Occurs in south-eastern Queensland from Cooroy west to the Bunya Mtns, and in far north-eastern New South Wales on Acacia Plateau near the Queensland-New South Wales border (Fig. 12a). Grows in rainforest clearings.

Etymology: The epithet alludes to the relatively short, tubular corollas. The corolla of female florets is less than twice as long as the mature achene. (L: *brevis*, short, and *tubulus*, tubule).

Notes: Similar in leaf form to *S. bipinnatisectus*, but perhaps more closely related to *S. bathurstianus* because of its coarse-hairy stems and short, relatively plump capitula with an involucre of c. 13 phyllaries. Achenes of *S. brevityubulus* are longer than those of the aforementioned species, but the corolla is shorter.

Selected specimens examined: **QUEENSLAND:** West Cooroy; on roadside, *N.J. Douglas*, Dec. 1959 (BRI); Saddle Creek, Bunya Mtns National Park, *R.J. Fensham R/JF3501*, 18.xi.1998 (BRI). **NEW SOUTH WALES:** Acacia Plateau, near Q[ueensland] border, *C.T. White 12734*, 16.iii.1944 (BRI).

8. *Senecio bathurstianus* (DC.) Sch.Bip., *Flora* 28: 498 (1845)

Erechtites bathurstiana DC., *Prodr.* 6: 297 (1838); *E. arguta* (A.Rich.) DC. var. *dissecta* Benth., *Fl. Austral.* 3: 659 (1867); *E. arguta* (A.Rich.) DC. var. *bathurstiana* (DC.) Domin, *Biblioth. Bot.* 89: 685 (1930); *S. hispidulus* A.Rich. var. *dissectus* (Benth.) Belcher, *Ann. Missouri Bot. Gard.* 43: 69 (1956).

Type: [New South Wales], around Bathurst, *A. Cunningham 135*; holo: G (microfiche seen MEL).

Herbs to 1.5 m high. **Taproot** well-developed; secondary roots fine, c. 0.5 mm diam. **Stems** erect, ±densely coarse-hairy density reducing upwards, sparse in upper third, rarely ±glabrous. **Leaves** in middle third of stems more or less evenly spaced and sized, broad-elliptic to elliptic in outline, 7–15 cm long, l:w ratio c. 1.5–3, pinnatisect to sub-bipinnatisect; segments 4–6 per side extending along most of length, antrorse, shape various depending on secondary dissection; base auriculate, with auricles pinnatisect; margin with scattered denticulations or teeth; both surfaces coarse-hairy; lower surface green or tinged purple, with coarse hairs, sometimes with cobwebby overlay. **Uppermost leaves** pinnatisect or at summit sometimes linear, l:w ratio c. 3–5, usually not widest at auricles. **Unit inflorescences** of many capitula; total number of capitula per stem often 50–200; overtopping moderate; mature lateral peduncles mostly 7–20 mm long. **Capitula:** calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles sparsely hairy or ±glabrous at anthesis; involucre 3.5–6.0(–7.0) mm long, 1.5–2.0 mm diam.; phyllaries (9–)11–13, glabrous, with apex erect; stereomes (in dried specimens) moderately convex, green, sometimes minutely brown or black at tip; post-fructescence receptacle 3–4 mm diam., with phyllaries commonly finally erect. **Florets** 20–35, c. 80% female; corolla-lobes oblong, thickened apically; corolla of bisexual florets 4–5.5 mm long, 5-lobed; corolla-limb of female florets 4 or 5, 0.2–0.3 mm long. **Achenes** ±narrow obloid, 1.5–2.0 mm long, red-brown or blackish, with papillose hairs, somewhat scattered or sometimes in bands, l:w ratio of hairs c. 3–4. **Pappus** 4–5 mm long. (Figs 2h, 14)

Flowers spring–summer.

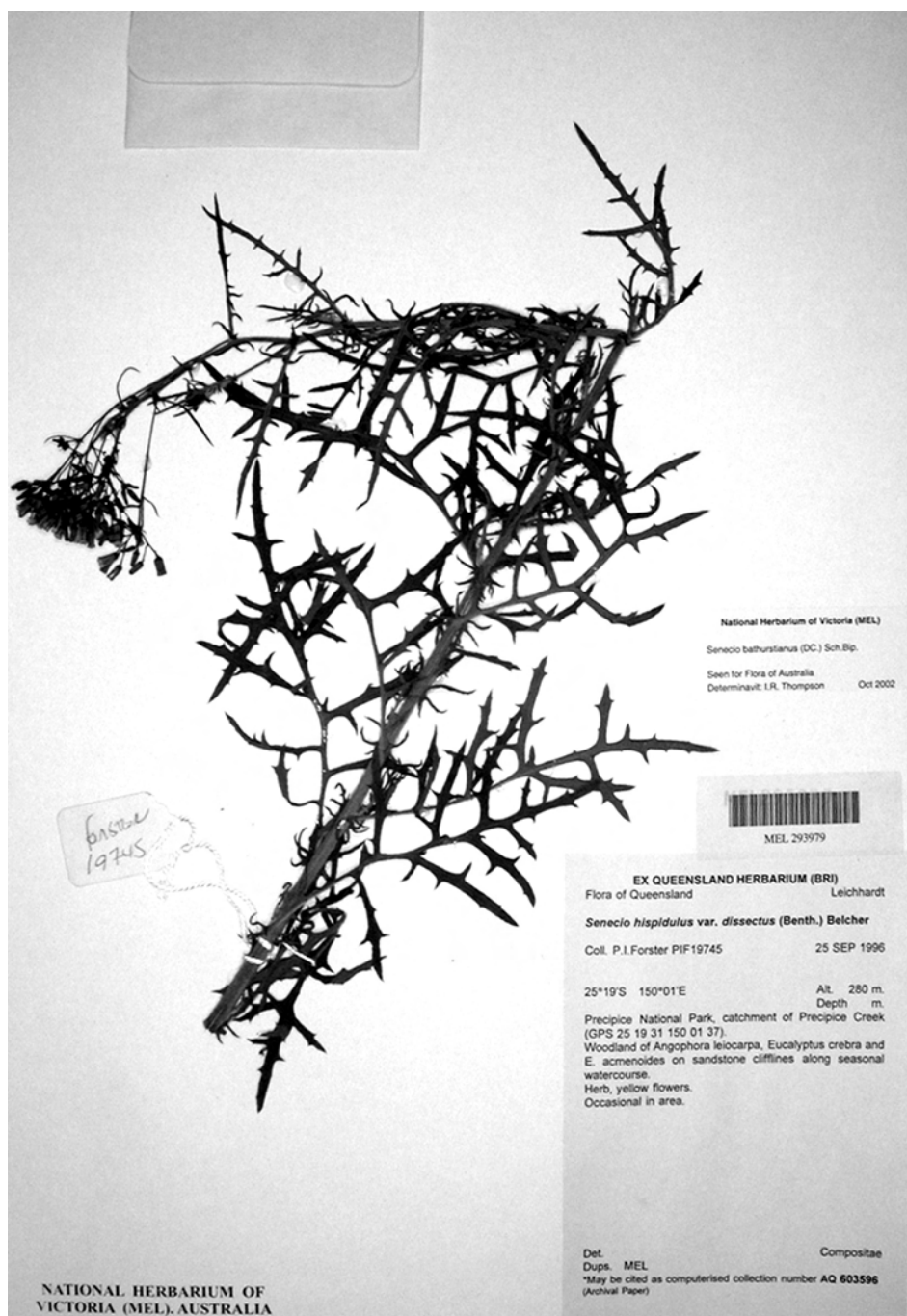


Figure 14. *Senecio bathurstianus* (P.I. Forster 19745 MEL).

Distribution and Habitat: Occurs in eastern Australia from Kroombit Tops National Park near Biloela in south-eastern Queensland south through eastern New South Wales to the Upper Genoa River in far eastern Victoria and from there west to Mt Bepcha in western Victoria (Fig. 12b). Often grows in poorer soils and often associated with rocky outcrops, eg. of sandstone or granite, in drier forest and woodland.

Notes: Similar in leaf form to *S. bipinnatisectus* and *S. brevityubulus*. Also similar to *S. hispidulus* which has less divided leaves, but with stems and leaves more densely coarse-hairy, capitula usually with more florets, and achenes with papillose hairs more scattered. *Senecio glomeratus* has similar-sized capitula and leaf dissection sometimes approaching that of *S. bathurstianus*, but the latter has calycular bracteoles shorter and fewer, and not cobwebby at anthesis. A specimen from Molonglo Gorge in the Australian Capital Territory (*H.S. McKee 11781*, BRI) is typical of *S. bathurstianus* except that it is glabrous. A specimen from Tarana, New South Wales (*H.S. McKee 7047*, CANB) is atypical in having involucre of only 8 or 9 phyllaries.

Selected specimens examined: **QUEENSLAND:** Palmgrove National Park, NW of Taroom, Bigge Range, *P.I. Forster PIF23765* & *R. Booth*, 4.xi.1998 (BRI, MEL). **NEW SOUTH WALES:** Weddin Mountain, c. 18 km west of Grenfell, *R. Pullen 10236*, 6.xii.1975 (AD, CANB, MEL, NSW). **VICTORIA:** Reef Hills Regional Park SW of Benalla, *A.C. Beauglehole 66149*, 2.xi.1979 (CANB, HO, MEL, NSW, PERTH); 9.3 km SSW of Mt Tambo. Spring Hill Tk, near summit of Spring Hill, *G.W. Carr 10279*, 11.xii.1984 (AD, CANB, MEL).

9. *Senecio hispidulus* A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 92, t. 34 (1834)

Erechtites hispidula (A.Rich.) DC., *Prodr.* 6: 296 (1838).

Type: [Tasmania], 'Crescit in Insula Van Diemen', 1828, *A. Lesson 18*; holo: P.

Erechtites arguta sensu J.D. Hooker, *Fl. Tasmania* 1: 220 (1860), *p.p.*; sensu G. Bentham, *Fl. Austral.* 3: 660 (1867), *p.p.*; sensu L. Rodway, *Tasman. Fl.* 94 (1903), *p.p.*, sensu J.M. Black, *Fl. S. Australia* 610 (1929), *p.p.*; sensu A. Ewart, *Fl. Victoria* 1180 (1931) *p.p.*

Herbs to 1.5 m high. **Taproot** well developed; secondary roots hardly fleshy, 0.5–1 mm diam. **Stems** erect, sparsely to moderately coarse-hairy reducing to \pm glabrous above mid stem. **Leaves** in middle third of stems more or less evenly spaced and sized, narrow-ovate to lanceolate, less often narrow-elliptic or linear, 7–15 cm long, l:w ratio c. 2.5–6, usually coarse-dentate to sub-pinnatisect; segments 2–5 per side predominantly in proximal two-thirds, larger divisions usually in proximal half, slightly antrorse, triangular–narrow-triangular, or occasionally sub-oblong; base auriculate, with auricles divided, semiamplexicaul; margin with scattered denticulations or teeth; both surfaces coarse-hairy; lower surface green or tinged purple, sometimes with a weak cobwebby overlay over coarse hairs. **Uppermost leaves** narrow-lanceolate or linear, l:w ratio c. 5–15 (excluding auricles), lobate or appearing undissected due to rolling of lamina, often widest at auricles. **Unit inflorescences** usually of many capitula; total number of capitula per stem often 50–100; overtopping marked; mature lateral peduncles mostly 7–14 mm long. **Capitula:** calycular bracteoles 3–6, 1.0–2.5 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 4.5–6.0 mm long, 1.4–1.8 mm diam.; phyllaries (9–)11–13, glabrous, with apex erect; stereomes (in dried specimens) moderately convex, green, minutely black at tip; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally erect. **Florets** 18–35, c. 70% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 4.5–6 mm long, 5-lobed; corolla-lobes of female florets 4, 0.3–0.5 mm long. **Achenes** narrow-obloid, 1.5–2.2 mm long, red-brown, glabrous or with papillose hairs in lines or narrow bands, l:w ratio of hairs c. 3. **Pappus** 4–6 mm long. (Figs 1a, 2d, 3i, 15)

Flowers spring–summer.

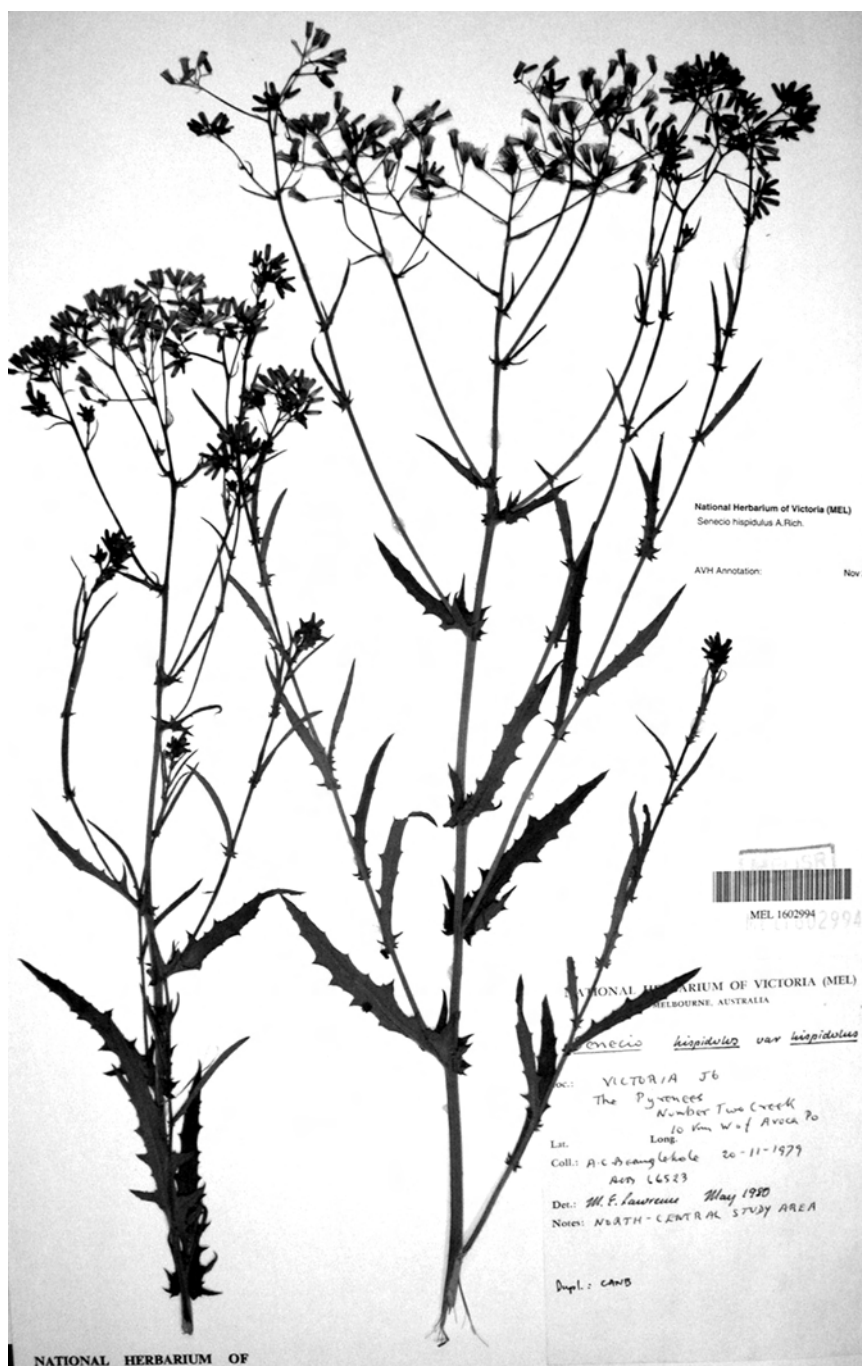


Figure 15. *Senecio hispidulus* (A.C. Beaughole 66523 MEL).

Distribution and Habitat: Occurs in far south-western Western Australia from Nannup south-east to Denmark with an outlier on Thomas Island, and in south-eastern Australia from the Bunya Mountains in south-eastern Queensland south through eastern New South Wales to Victoria, and from Mallacoota in far eastern Victoria west to Kangaroo Island in south-eastern South Australia (Fig. 12c). Also native to New Zealand. Grows in forest and woodland.

Notes: Involucres of this species mostly comprise 11–14 phyllaries, but occasional plants have involucres of predominantly 9 or 10. Compared to *S. bathurstianus* the leaves of *S. hispidulus* are less deeply dissected, capitula are mostly more slender and with fewer florets, stems and leaves are less densely coarse-hairy and achenes are glabrous or with hairs arranged more in lines. Glabrous achenes are predominantly found in specimens from New South Wales.

The name *S. hispidulus* was misapplied by Bentham to species with larger capitula, specifically *S. squarrosus* and *S. macrocarpus*, and this misapplication persisted in Australian floras until 1956 when Belcher clarified its application.

Selected specimens examined: **WESTERN AUSTRALIA:** Bibbulmun Track, Donnelly River Valley, 200 m south of Campers hut, V.L. Tunstall, R. Cranfield & R. Hearn 163, 8.xii.1999 (PERTH). **SOUTH AUSTRALIA:** Southern Lofty. At Jupiter Creek below dam, R.J. Bates 26777, 23.xii.1991 (AD, MEL, NSW). **QUEENSLAND:** Mt Roberts, McPherson range, S.T. Blake 21561, 20.viii.1961 (BRI). **NEW SOUTH WALES:** Southern Tablelands. Corner Hill, SE slope, c. 11 km NW Captains Flat, N.M. Taws 806, 23.xii.1995 (CANB). **VICTORIA:** The Pyrenees Number Two Creek 10 km west of Avoca, A.C. Beaglehole 66523, 20.xi.1979 (CANB, MEL); 1.3 km SE Lang Lang on road to Nyora, M.E. Lawrence 1084, 3.xii.1978 (MEL). **TASMANIA:** Outskirts of Hobart: Forest Road extension, Knocklofty, A.E. Orchard 5016, 16.iv.1978 (HO).

10. *Senecio hispidissimus* I.Thomps., sp. nov.

A. S. hispidulo A.Rich. radice principali minore, incisio foliorum proximalis minus, indumento foliorum et caulis densiore, capitulis majoribus, phyllariis purpureis apicem versus differt.

Type: Victoria, Little Desert National Park, central block. c. 1 km SE of Broughtons Waterhole, north of Sambells Track, I.C. Clarke 2380, 21 Oct. 1993; holo: MEL.

Erechtites arguta DC. var. *asper* Hook.f., *London. J. Bot.* 6: 122 (1847). *Type:* Tasmania, Woolnorth, R.C. Gunn; syn: K (photo seen MEL).

S. sp. C forms 3 and 4 *sensu* M.E. Lawrence, *Australian J. Bot.* 28: 155 (1980).

Herbs to 1 m high. *Taproot* inconspicuous; secondary roots fleshy, c. 1–1.5 mm diam. *Stems* erect, typically densely coarse-hairy, density gradually reducing upwards. *Leaves in middle third of stems* sometimes becoming distinctly wider spaced and narrower upwards, narrow-elliptic or linear, 6–13 cm long, l:w ratio c. 4–7, coarse-dentate to lobate, occasionally not dissected; segments 3–7 per side, predominantly in distal two-thirds, slightly antrorse, triangular to sub-oblong; base auriculate, with auricles dissected or not, semiamplexicaul; margin with occasional denticulations or teeth; both surfaces moderately to densely coarse-hairy; lower surface green. *Uppermost leaves* very narrow-oblong to narrow-lanceolate, l:w ratio c. 7–10, commonly widest at auricles. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 10–100; overtopping marked; mature lateral peduncles mostly 8–25 mm long. *Capitula:* calycular bracteoles 5–8, 1.5–3.0 mm long; peduncles \pm glabrous at anthesis, margin of bracteoles often sparsely coarse-hairy; involucre (5.0–)6.0–9.0 mm long, 1.8–2.5 mm diam.; phyllaries mostly 11–14, glabrous, with apex erect; stereomes (in dried specimens) flat to gently convex, green with a purple apical zone c. 0.5–2 mm long or sometimes entirely purple; post-fructescence receptacle 3–4 mm diam., with phyllaries commonly finally erect. *Florets* 20–45, c. 80% female, rarely c. 50% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 5.5–7.5 mm long, 5-lobed;

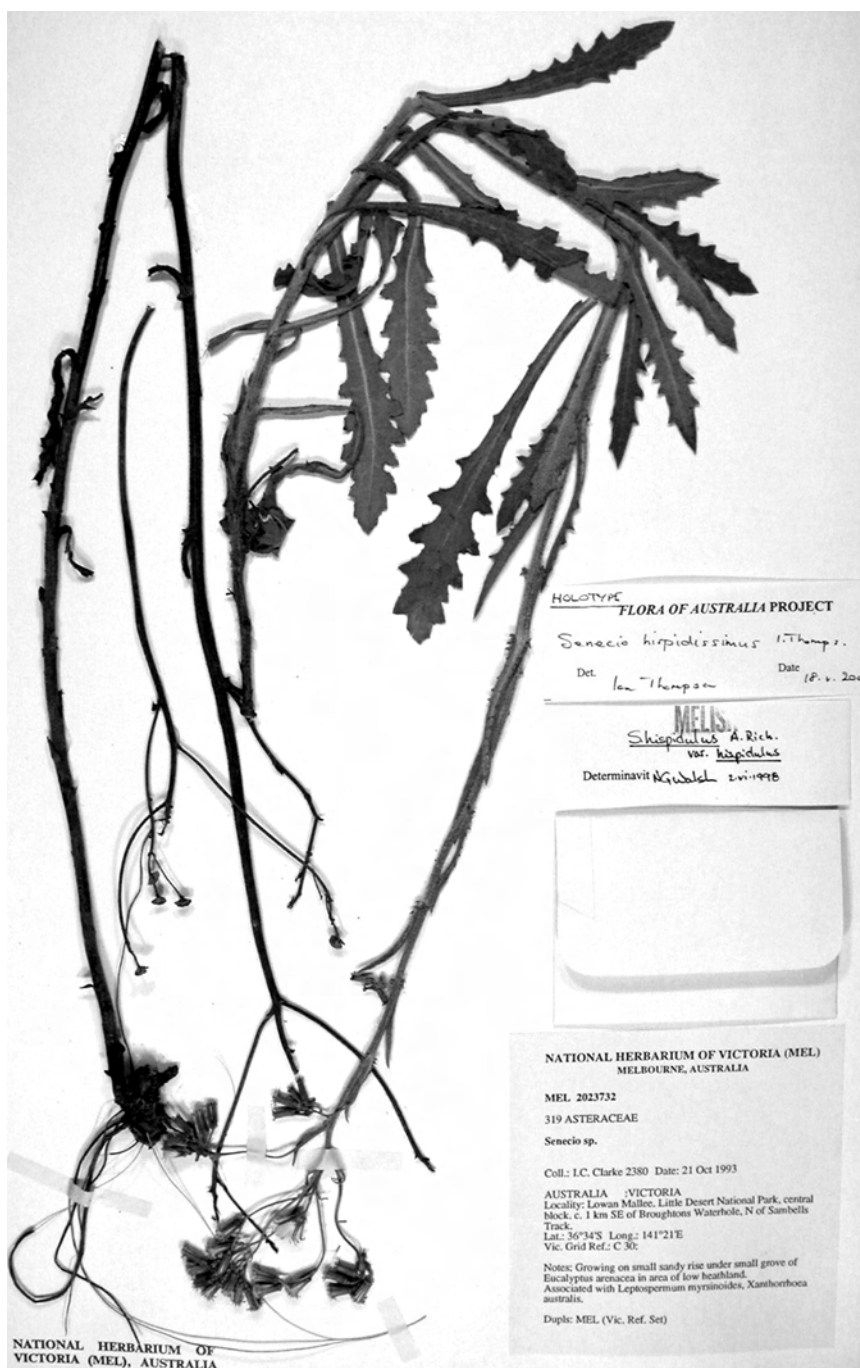


Figure 16. *Senecio hispidissimus* (holotype: I.C. Clarke 2380 MEL).

corolla-lobes of female florets 4, 0.2–0.3 mm long. *Achenes* narrow-obloid to narrow-ellipsoid, 1.5–2.8 mm long, tan or brown, with papillose hairs, in dense bands, l:w ratio of hairs c. 3–4. *Pappus* 6–7 mm long. (Fig. 16)

Flowers spring–autumn.

Distribution and Habitat: Occurs in far south-eastern Australia from Vivonne Bay, Kangaroo Island east to the Grampians in western Victoria, on Wilson's Promontory in south-central Victoria, and in Tasmania in the north-west, south-east, and on Bass Strait islands of the Furneaux Group (Fig. 12d). Grows in sandy soils in heathland, woodlands and shrublands in lowland areas.

Etymology: The epithet alludes to the indumentum of coarse hairs covering the stems and leaves, which is generally denser than in other species of this group (L: *hispidissimus*, most hispid).

Notes: Similar to *S. squarrosus* but more densely coarse-hairy, and with smaller capitula with usually fewer phyllaries. Similar to *S. hispidulus* but more densely coarse-hairy and with usually broader capitula and longer phyllaries that are purple or with an apical zone that is purple. A few collections from southern Victoria have narrower capitula with fewer florets and have stems less densely coarse-hairy than typical; these populations may differ from the typical form due to introgression with *S. hispidulus*. On the north-western coast of Tasmania a few collections have unusually short capitula and achenes. Further collections of these forms are desirable. All pieces on a sheet from K on which J.D. Hooker apparently based his *Erechtites arguta* var. *asper* Hook.f. appear to be this small-headed Tasmanian form.

Selected specimens examined: **SOUTH AUSTRALIA**: North of Bangham Scrub, R.J. Bates 15675, 3.x.1988 (AD); 1.46 km from Meningie at 145 degrees 48, L.D. Williams 11483, 21.ix.1980 (AD, CBG); Knotts Hill, R.J. Bates 35502, 5.xii.1993 (AD); Blackford, M. Beek 107, 4.x.1971 (AD); Section 120 (Lot 30), Hundred of Encounter Bay "Mt Alma", P.J. Lang D8559, 7.xii.1988 (AD). **VICTORIA**: 8 m. [13 km] SW of Dergholm PO, A.C. Beaglehole 38071, 16.xii.1971 (MEL); 6 m [10 km] NNW of Dergholm PO. Rocky Creek north of Baileys Rocks Reserve, A.C. Beaglehole 37985, 27.xi.1971 (AD, MEL); Discovery Bay Coastal Park, Swan Lake Rd, at intersection where road to lake turns S, I.R. Thompson 738, 1.i.2002 (MEL, CANB); Lower Glenelg National Park. Heath Rd south of Mt Deception Rd, I.R. Thompson 744, 2.i.2002 (MEL); The Grampians. Cassidy Gap near Dunkeld, E. N.S. Jackson, 29.x.1969 (AD); Lower Glenelg National Park. c. 400 m along unnamed track east of Heath Rd, I.R. Thompson 743, 2.i.2002 (AD, CANB, MEL). 10.7 km east Nelson along forest track through Lower Glenelg N.P, M.E. Lawrence 1166, 6.xii.1978 (AD). **TASMANIA**: Labillardiere Peninsula, Great Taylors Bay, South Bruny Island, A.M. Buchanan 4029, 6.xi.1984 (HO).

11. *Senecio multicaulis* A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 92, t. 34 (1834)

Type: [Western Australia], 'Crescit in Novae-Hollandiae loco vulgò dicto Port du Roi-Georges' [King George Sound], 1826–29, A. Lesson; holo: P.

Herbs to 1.5 m high. *Taproot or primary roots* well-developed; secondary roots not fleshy, c. 0.5 mm diam. *Stems* erect, coarse-hairy, sparsely appressed-cottony or nearly glabrous. *Leaves in middle third of stems* commonly becoming distinctly wider spaced and narrower upwards; leaves elliptic to very narrow-elliptic, narrow-ovate or very narrow-oblong to linear, 3–13 cm long, l:w ratio c. 2–10, not dissected or coarse-dentate to lobate; segments 1–5 per side extending along most of length, spreading or slightly antrorse, ±triangular; base attenuate or developing small auricles upwards, hardly amplexicaul; margin with occasional denticulations; upper surface sparsely to moderately scabridulous; lower surface often purple, with indumentum as for upper surface, or glabrous except for midrib, or cobwebby, or somewhat woolly. *Uppermost leaves* narrow-

elliptic or linear to narrow-linear, l:w ratio c. 3–30; base auriculate, auricles usually bidentate, slightly to moderately amplexicaul; indumentum sometimes woolly. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 50–100; overtopping usually marked; mature lateral peduncles mostly 8–24 mm long. *Capitula*: calycular bracteoles 6–10, 1.0–2.5 mm long; peduncle and margin of bracteoles ±glabrous or slightly cottony at anthesis; involucre 4.0–8.0 mm long, 2.0–2.8 mm diam.; phyllaries 12–14, glabrous, with apex erect; stereomes (in dried specimens) flat to moderately convex, green or rarely tinged purple, commonly minutely black at tip, occasionally also purple in a zone c. 1 mm long below tip; post-fructescence receptacle 3–4 mm diam., with phyllaries commonly finally erect. *Florets* 30–50, c. 70% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 5–8 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.2–0.3 mm long. *Achenes* narrow obloid, 1.5–2.5 mm long, red-brown, brown, or blackish, with papillose hairs in dense bands, l:w ratio of hairs c. 3. *Pappus* 5–7 mm long.

Flowers spring–summer

There are two subspecies:

Length:width ratio of mid to upper stem leaves (excluding auricles) mostly > 6; lower surface glabrous or indumentum sparse to moderate; involucre 5–8 mm long, l:w ratio c. 2.5–3.5.....**1a.** subsp. *multicaulis*

Length:width ratio of mid to upper stem leaves (excluding auricles) mostly < 6; lower surface moderately to densely woolly; involucre 4–6 mm long, l:w ratio 2.0–2.5.....**1b.** subsp. *stirlingensis*

11a. *Senecio multicaulis* A.Rich. subsp. *multicaulis*

Senecio pusillus A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 99 (1834).

Type: [Western Australia], 'Crescit in Novae-Hollandiae loco vulgò dicto Port du Roi-Georges' [King George Sound], 1826–29, A. Lesson; holotype: P.

Mid and upper stem leaves with l:w ratio 6–30, undissected with margin entire or dentate; lower surface glabrous, sparsely coarse-hairy, or cobwebby; involucre 5–8 mm long, 2.0–2.5 mm diam. (Figs 4c, 17)

Distribution and Habitat: Occurs in south-western Western Australia from Gin Gin north of Perth south to Walpole and south-south-east to the Stirling Ranges with a northern outlier at Geraldton and an eastern outlier at Cape le Grand National Park (Fig. 12e). Grows in sandy or sandy clay soils over granite or laterite in forest, heathland and woodland.

Notes: In recent Western Australian floras this taxon has been included under *Senecio hispidulus*. True *S. hispidulus* also occurs in Western Australia where it is much less widespread than *S. multicaulis* subsp. *multicaulis*. *Senecio hispidulus* has smaller capitula, leaves that are more deeply lobed, has well-developed coarse hairs which persist to the uppermost leaves, and lacks fine hairs. *Senecio multicaulis* subsp. *multicaulis* is variable in indumentum density and type; lower stem leaves are usually coarse-hairy but coarse hairs are commonly largely absent in mid to upper stem leaves, and sometimes replaced on the lower surface by a cobwebby indumentum. In these respects and to a lesser extent leaf shape, it is similar to *S. squarrosus* but *S. multicaulis* subsp. *multicaulis* has smaller and more numerous capitula. There is a tendency in this subspecies to flower intermittently (presumably moisture dependent) with branching from basal to mid stem axils frequently developing some time after the initial flowering, and these inflorescences typically greatly overtop the initial inflorescence. Hybridisation has been recognised as occurring between *S. multicaulis* subsp. *multicaulis* and the following three species: *S. hispidulus*, *S. diaschides* and *S. quadridentatus*.



Figure 17. *Senecio multicaulis* subsp. *multicaulis* (V. Mann 22 & A.S. George PERTH).

Selected specimens examined: **WESTERN AUSTRALIA:** Willyung Hill, 6 km north of Albany, *G.J. Keighery* 5639, 10.xi.1982 (PERTH); 20 km from Frankland to Cranbrook, *G.J. Keighery* 6580, 29.x.1983 (PERTH); Dardanup Forest Block, SE Bunbury, *G.J. Keighery* 15140, 13.x.1996 (PERTH); Site 13, down Ridley Road, 1.2 km SW Mount Billy, *M.G. Allen* 958, 13.xi.1996 (PERTH); Near Pt 5102, Kordabup Road, 4.3 km from South Coast Highway, 18 km west of Denmark, *A.R. Annels* 1882, 5.xi.1991 (PERTH); John Forest National Park near western boundary, c. 1.2 km SSE of Rocky Pool picnic area, *A. Markey* 69, 13.ix.1996 (PERTH); Scott National Park, Sunshine Ave, *C.J. Robinson* 259, 23.x.1990 (PERTH); Esperance Bay district, Neridup, ca. 3 km north-east of Howick Hill, in Location 251, *A.E. Orchard* 1139, 21.ix.1968 (AD, CANB).

11b. *Senecio multicaulis* subsp. *stirlingensis* I.Thomps., *subsp. nov.*

A subspecies typica foliis latoribus indumento inferne lanatiore, capitulis plerumque brevioribus differt.

Type: Western Australia, Mt Trio, Stirling Ranges, *G.J. Keighery s.n. & J.J. Alford*, 15 Sept. 1985; *holo:* PERTH.

Mid and upper stem leaves with l:w ratio 2–6, lobate or undissected with margin dentate; lower surface moderately to densely woolly, hairs coarse-based or not; involucre 4.0–6.0 mm long, 2.0–2.8 mm diam. (Fig. 18)

Distribution and Habitat: Occurs in far south-western Western Australia in the Stirling Ranges and the nearby Porongurup Ranges with an outlier further east at Pt Anne in Fitzgerald River National Park (Fig. 12f). Grows in soils derived from granite in woodland and forest.

Etymology: The epithet alludes to the fact that the subspecies is largely found in the Stirling Ranges and adjacent Porongorups in Western Australia.

Notes: Plants in the Stirling Ranges have leaves that are more conspicuously coarse-hairy and the hairs on the lower surface of its leaves are coarse (and obscured by the woolly overlay).

Selected specimens examined: **WESTERN AUSTRALIA:** Stirling Ranges National Park, Bluff Knoll, c. 0.5 km SSW from summit, beside walking track, *N.G. Walsh* 5453, 2.xi.2001 (MEL, PERTH); On walking track up east side of Devils Slide from the Pass at head of Bolganup Creek, ca. 200 m below summit; Porongorup Range, Porongorup National Park, *W.R. Barker* 2380, 14.ix.1977 (AD); Porongorup, *A. Meebold* 1142, Nov. 1928 (AD).

12. *Senecio glomeratus* Desf. ex Poir., *Encycl. Suppl.* 5: 130 (1817)

Type: probably cultivated, origin unknown; *neo:* FI (right hand specimen), *fide* R.O. Belcher, *Ann. Missouri Bot. Gard.* 43: 62 (1956).

Herbs to 2 m high. *Taproot* generally well developed; and prominent; secondary roots not or slightly fleshy, 0.5–1 mm diam. *Stems* erect or ascending to erect, moderately coarse-hairy, becoming sparsely coarse-hairy and/or appressed-cottony, or nearly glabrous upwards. *Leaves in middle third of stems* more or less evenly spaced and sized, elliptic to narrow-elliptic, 5–20 cm long, l:w ratio c. 2–7, coarse-dentate to deeply lobate, or rarely not dissected; segments 2–7 per side extending along most of length or confined to middle third, slightly antrorse, oblong, obovate, or triangular; base auriculate, with auricles dissected, semiamplexicaul; margin with scattered or rather frequent denticulations or teeth; both surfaces usually coarse-hairy but commonly coarse hairs sparse or absent above mid stem; lower surface green or sometimes tinged purple, above mid stem appressed woolly, cobwebby, or \pm glabrous. *Uppermost leaves* narrow-elliptic, lanceolate, or linear, l:w ratio c. 3–10; dentate or margin appearing entire due to rolling. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–300; overtopping variable; mature lateral peduncles mostly 4–13 mm long. *Capitula:* calycular



Figure 18. *Senecio multicaulis* subsp. *stirlingsensis* (G. Keighery s.n. & J.J. Alford PERTH).

bracteoles 6–12, 1.0–3.0 mm long; peduncle and margin of bracteoles cobwebby to densely woolly at anthesis; involucre 3.0–6.0 mm long, 1.5–2.5 mm diam.; phyllaries predominantly 12–14, glabrous or slightly cobwebby basally, with apex erect; stereomes (in dried specimens) gently to moderately convex, green, black at tip, sometimes purple in a zone c. 1 mm long immediately below tip, sometimes entirely purple; mature receptacle 3–4 mm diam., with phyllaries finally erect. *Florets* 26–50, c. 80% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 3.5–6.5 mm long, 5-lobed; corolla-lobes of female florets 2–4, mostly 0.2–0.3 mm long; corolla-limb commonly deeper cleft on inner face. *Achenes* narrow obloid to narrow-ellipsoid, sometimes slightly clavate, 1.0–2.2 mm long, light to dark reddish-brown, sometimes olivaceous or green, especially marginal achenes, with papillose hairs, in lines or narrow bands, l:w ratio of hairs c. 3. *Pappus* 3.5–7 mm long.

Flowers mostly late spring–autumn.

Notes: Sometimes confused with *S. hispidulus* which has capitula of similar size. *Senecio hispidulus* differs from *S. glomeratus* by having more slender, always green and never cobwebby capitula containing fewer florets and on longer peduncles, fewer and generally shorter calycular bracteoles, and upper stem leaves that are at least slightly coarse-hairy and which generally do not develop a cobwebby or woolly indumentum. *Senecio bathurstianus* also has capitula of similar-size but they too are never cobwebby basally.

There are two subspecies:

Achenes < one third of phyllary length (phyllaries 4.0–6.0 mm long; achenes 1.0–1.7 mm long), achenes commonly all medium to dark red-brown; pappus usually > 5 mm long **12a.** subsp. *glomeratus*

Achenes > one third of phyllary length (phyllaries 3.0–5.0 mm long; achenes 1.3–2.2 mm long), marginal achenes greenish or olive, others medium brown; pappus usually < 5 mm long **12b.** subsp. *longifructus*

12a. *Senecio glomeratus* Desf. ex Poir. subsp. *glomeratus*

S. argutus A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 1: 258 (1832), *nom. illeg. non* Kunth (1820); *Erechtites arguta* (A.Rich.) DC., *Prodr.* 6: 296 (1838); G. Benth., *Fl. Austral.* 3: 659 (1867), *p.p.*; A. Ewart, *Fl. Victoria* 1180 (1931) *p.p.*

Type: 'Havre de l'Astrolabe, détroit de Cook' [Cook Strait, New Zealand]; *holo:* P.

E. arguta (A.Rich.) DC. var. *obovata* Hook.f., *Hooker's London J. Bot.* 6: 122 (1847).

Type: none designated, annotated specimens at K, *fide* R.O. Belcher *op. cit.* 43: 64 (1956).

E. glomerata DC., *Prodr.* 6: 297 (1838), *nom. illeg.*; *E. arguta* (A.Rich.) DC. var. *glomerata* (DC.) Domin, *Biblioth. Bot.* 89: 684 (1930), as *Erechtites* [specimen cited by Domin not seen; it was collected from Tambourine Mts, Queensland and is unlikely to be *S. glomeratus*]. *Type:* 'In Nova-Hollandia meridionali'; *holo:* G, *fide* R.O. Belcher, *op. cit.* 43: 61 (1956).

E. glomerata DC. var. *subincisa* DC., *Prodr.* 6: 297 (1838), *nom. illeg.* *Type:* 'In Nova-Hollandia', *ex itin.* Baudin; G, *fide* R.O. Belcher, *loc. cit.*

E. glomerata DC. var. *polycephala* DC., *Prodr.* 6: 297 (1838), *nom. illeg.* *Type:* 'in Nova-Zeelandia ad fretum Bass' [Bass Strait, New Zealand], *d'Urville*; G, *fide* R.O. Belcher, *loc. cit.*

S. lessonianus Sch.Bip., *Flora oder Allgemeine Bot. Zeitung* 28: 498 (1845), *nom. illeg. non* Steud. (1841). *Type:* ?not designated.

[*Erechtites arguta* (A.Rich.) DC. var. *dissecta* *auct. non* Benth.: J.M. Black, *Fl. S. Australia* 610 (1929)]

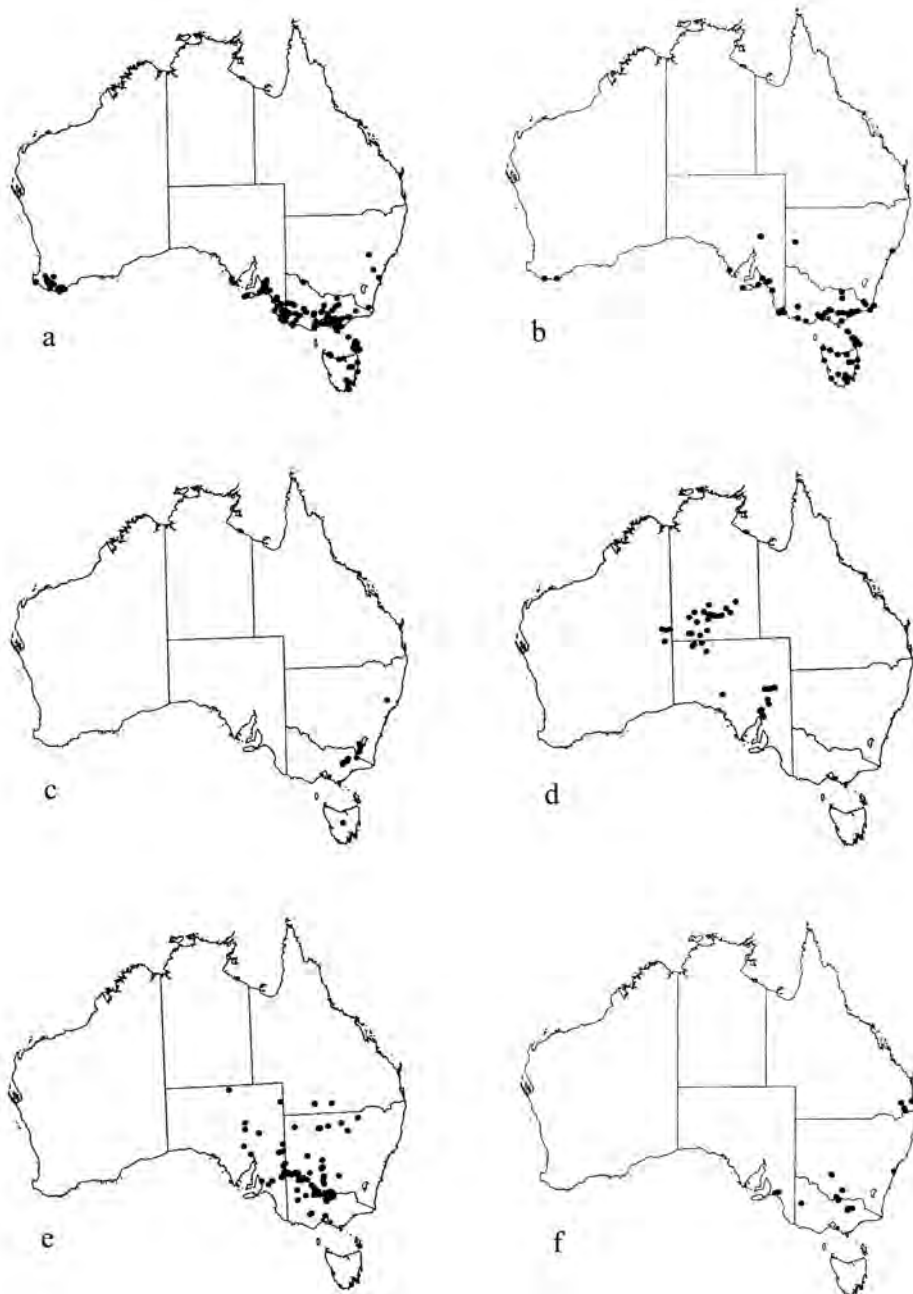


Figure 19. Distribution of a. *Senecio glomeratus* subsp. *glomeratus*; b. *S. glomeratus* subsp. *longifructus*; c. *S. extensus*; d. *S. laceratus*; e. *S. runcinifolius*; f. *S. longicollaris*.



Figure 20. *Senecio glomeratus* subsp. *glomeratus* (A.C. Beaulehole 78563 MEL).

Herbs to 2 m tall. *Lower surface of upper stem leaves* commonly whitish due to a moderately dense cobwebby indumentum. *Peduncles* and calycular bracteoles somewhat densely cobwebby or woolly at anthesis; involucre 4.0–6.0 mm long, up to 3 times longer than broad; phyllaries often purple throughout. *Bisexual florets* 5–7 mm long; marginal florets 4–6 mm long. *Achenes* 1.0–1.7 mm long, usually all mid to dark reddish-brown, uncommonly some greenish. *Pappus* 5–7 mm long. (Figs 3d, 20)

Distribution and Habitat: Occurs in far south-western Western Australia from Scott National Park east to near Albany; in south-eastern Australia from Port Lincoln in south-central South Australia east to Buchan in eastern Victoria with more northern outliers in the Flinders Ranges in South Australia and at Mudgee in central-east New South Wales; and from the Furneaux Group of Islands south to South Bruny Island in Tasmania (Fig. 19a). Also native to New Zealand. Grows in a range of soil types in forest, woodland and heathland, sometimes adjacent to water.

Notes: The numerous, crowded, small and often purple capitula surrounded basally by many cobwebby calycular bracteoles give this subspecies a distinctive appearance. It is often a rather tall plant in forest environments. It sometimes grows near water and then is sometimes sympatric with subsp. *longifructus*. It is likely that hybridisation takes place between subspecies in these environments.

Selected specimens examined: **WESTERN AUSTRALIA:** Farra Dam, 8 km west of Kojonup, C. M. Lewis 455, 10.x.1999 (PERTH). **SOUTH AUSTRALIA:** Southern Lofty. Kyeema corner. On Willunga to Meadows Road, A. W. Bell 52, 28.xi.1976 (AD, MEL). **VICTORIA:** Dundas River, 14 km NNW of Cavendish, L. G. Adams 3876, 27.xi.1981 (CANB, MEL); 2.5 km west of Whitfield on the Mansfield Road, I. C. Clarke 2772, 13.xi.1996 (CANB, MEL). **TASMANIA:** Yarra Creek Gorge, east coast of King Island, J. H. Willis, 6.iii.1966 (MEL); Birch's Bay, L. Rodway 75, 2.i.1931 (CANB).

12b. *Senecio glomeratus* subsp. *longifructus* I. Thomps., *subsp. nov.*

A subspecies typica capitulis plerumque brevioribus modice latioribus, acheniis longioribus, pappo brevior differt.

Type: Victoria, Beloka Forest Block, 3.2 km SSE of Johnnies Top, Buenba Gap Rd, 6.2 km east of Beloka Range Track, G. W. Carr 10286, 12 Jan. 1985; *holo:* MEL; *iso:* AD.

?*Erechtites arguta* (A. Rich.) DC. var. *microcephala* sensu J. M. Black, *Fl. S. Australia* 610 (1929).

Herb to 1.5 m tall. *Lower surface of upper stem leaves* commonly nearly glabrous or weakly cobwebby, occasionally moderately cobwebby. *Peduncles* and calycular bracteoles sparsely to moderately cobwebby at anthesis; involucre 3.0–4.5(–5) mm long, usually no more than c. twice as long as broad, phyllaries sometimes with an apical purple zone c. 1 mm long, rarely entirely purple. *Bisexual florets* 4.5–5.5 mm long; marginal florets 3–4.5 mm long. *Achenes* 1.3–2.2 mm long, predominantly light to dark brown but usually a few to several marginal achenes olivaceous or green. *Pappus* 3.5–5 mm long. (Fig. 21)

Distribution and Habitat: Occurs in south-eastern Australia, from Kangaroo Is. in south-eastern South Australia east to Newton's Beach in far south-eastern New South Wales, and in Tasmania on eastern Bass Strait islands, in the Hobart area, at Welcome Inlet in the far north-west, and on the south-west coast at Ummarrah Creek (Fig. 19b). Grows adjacent to streams and swamps.

Etymology: The epithet alludes to the achenes of this subspecies which are longer than in subsp. *glomeratus* (L: *longus*, long, and *fructus*, fruit).

Notes: Subsp. *longifructus* has shorter phyllaries, corollas, and a shorter pappus than subsp. *glomeratus*, but its capitula are equally wide or wider and its achenes are longer.



Figure 21. *Senecio glomeratus* subsp. *longifructus* (holotype: G.W. Carr 10286 MEL).

Generally speaking, it has a less dense indumentum on the calycular bracteoles, peduncles and lower surface of leaves. It also tends to be a shorter plant and appears to more consistently associated with water. Inflorescences generally have fewer and less congested capitula and overtopping is more pronounced. The involucre of capitula are less commonly all purple although this may be simply because it is more often in shaded environments.

Hybridisation between either *S. hispidulus* and *S. minimus* and either of the two subspecies is likely and it may be difficult to distinguish such hybrids from subsp. *longifructus*. However, as *S. hispidulus* and *S. minimus* have narrower capitula than *S. glomeratus*, one would expect any hybrid to have capitula noticeably narrower than those of subsp. *longifructus*.

Hybridisation between the two subspecies is likely as they can occupy similar habitats, and this is a probable reason for difficulties in assigning some specimens to either subspecies. Regions where intermediate specimens have been collected include the Furneaux Group of Islands in Bass Strait, and on the Fleurieu Peninsula of South Australia.

Selected specimens examined: **SOUTH AUSTRALIA:** Marsh's Swamp area, *I.B. Wilson* 835, 13.vii.1968, (AD); Carpenter Rocks, *A.G. Spooner* 5567, 6.xi.1977 (AD). **VICTORIA:** Nadgee Nature Reserve; Newtons Beach, *D.E. Albrecht* 1500, 21.i.1985 (MEL). **VICTORIA:** Flat on Beynon's Creek at bridge, Morgan's Mill, 7 km (direct) NW of Erica, *N.H. Scarlett* 84-177, 3.iii.1984 (AD); Upper Delegate River, east branch above "The Forks", 10.5 km (direct) SSW of Bendoc, *N.H. Scarlett* 84-130, 17.ii.1984 (AD); East Gippsland. Ewing Marsh Wildlife Reserve, end of Beach Road, *J.V. Yugovic* 374, 28.xi.1987 (MEL). **TASMANIA:** Near mouth of Welcome Inlet, *A.M. Buchanan* 9081, 28.xii.1986 (HO); Furneaux Group. Gull Island. Just east of main northern outcrop, *J.S. Whinray* 8545 (HO, MEL); South Esk, *Miss Oakden*, 1887 (MEL).

13. *Senecio extensus* I.Thomps., *sp. nov.*

A S. glomerato Desf. ex Poir. planta brevi, caulibus sine pilis grossis, capitulis majoribus, bracteolis longioribus, acheniis glabris differt.

Type: Victoria, Alpine National Park, Howitts Plain, south end, *I.R. Thompson* 629, *N.G. Walsh & A. Tolsma*, 22 Jan. 2001; holo: MEL; iso: BRI, CANB, HO, NSW.

Senecio sp. 1 *sensu* N.G. Walsh, *Fl. Victoria* 4: 961 (1999).

Herbs to 0.5 m high. *Roots* unknown. *Stems* ascending to erect, sparsely to moderately appressed-cottony, glabrescent. *Leaves* in middle third of stems often becoming distinctly wider spaced and narrower upwards, oblanceolate or spatulate, 5–12 cm long, l:w ratio c. 4–9, lobate or less often not dissected; segments 3–5 per side, occurring in distal two-thirds, antrorse, triangular, oblong, or obovate; base attenuate to cuneate; margin with occasional denticulations or teeth; both surfaces glabrous or scabridulous and/or slightly cobwebby; lower surface green. *Uppermost leaves* very narrow-elliptic, l:w ratio c. 5–10, lobate to deeply lobate; base commonly auriculate, with auricles dissected, slightly amplexicaul. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping variable; mature lateral peduncles mostly 5–20 mm long. *Capitula:* calycular bracteoles 6–8, (2.0–)3.0–5.0 mm long; peduncle and margin of bracteoles often slightly cobwebby at anthesis (moderately so shortly prior to anthesis); involucre 5.0–7.0 mm long, c. 1.8–2.0 mm diam.; phyllaries 12–14, glabrous or nearly so, with apex erect; stereomes (in dried specimens) ±flat, green or partially purple, black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally erect. *Florets* 30–45, c. 80% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 5–6 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.2 mm long. *Achenes* narrow obloid to narrow oblong-ellipsoid, 2.0–2.2 mm long, red-brown, lustrous, glabrous. *Pappus* 5–6 mm long. (Figs 3f, 22)



Figure 22. *Senecio extensus* (holotype: I.R. Thompson 629 MEL).

Flowers mid-summer–autumn.

Distribution and Habitat: Occurs in south-eastern Australia from Kiandra in far south-eastern New South Wales south-west to Howitt Plains in eastern Victoria with a disjunct occurrence in north-eastern New South Wales at Barrington Tops (Fig. 19c). Grows in grasslands/herbfields or open shrublands in subalpine areas.

Etymology: The epithet alludes to the long calycular bracteoles, which extend over the involucre to a greater extent than other disciform species (*L. extensus*, extended).

Notes: Readily distinguished by its long calycular bracteoles and glabrous, lustrous achenes. Some populations in the Southern Tablelands of New South Wales have slightly shorter bracteoles and/or narrower heads.

Selected specimens examined: **NEW SOUTH WALES:** Kosciuszko National Park, Long Plain, c. 200 m SW from confluence of Murrumbidgee R and Boundary Ck, *N.G. Walsh 5511*, *K. McDougall & J. Walsh*, 11.xii.2001 (MEL); Kosciuszko National Park, Long Plain, near confluence of Murrumbidgee R and Boundary Ck, *I.R. Thompson 746 & N.G. Walsh*, 31.i.2002 (MEL, NSW); Mt Kosciuszko, nr summit, *coll. unknown*, Jan 1898 (MEL); Kosciuszko National Park, 1 km ESE from Happys Hut, near crossing of Happy Jacks Creek by 4WD track, *N.G. Walsh 4891*, *K. McDougall & G. Wright*, 9.xii.1998 (MEL). **VICTORIA:** Snowy Range airstrip, *S. J. Forbes 1953*, 28.i.1984 (MEL, NSW); East Gippsland. The Playground below Cobberas No. 1, *A.C. Beauglehole 36712*, 9.ii.1971 (MEL); Bogong High Plains. Buckety Plain, *A.C. Beauglehole 15746*, 28.i.1966 (MEL); Dargo High Plains, *J. Strudwick 782*, 17.i.1990 (MEL). **TASMANIA:** Mackenzies Tier, *A. Moscal 6394*, 22.ii.1984 (HO).

14. *Senecio laceratus* (F.Muell.) Belcher, *Ann. Missouri Bot. Gard.* 43: 51 (1956)

Erechtites lacerata F.Muell., *Linnaea* 25: 417 (1853).

Type: [South Australia], Cudnaka River [Kanyaka R., Flinders Ranges], *F. Mueller*; *holo:* MEL.

E. arguta sensu G. Bentham, *Fl. Austral.* 3: 659 (1867), *p.p. min.*

Herbs to 1 m high. *Taproot* well-developed; secondary roots fine. *Stems* erect or sprawling, \pm glabrous; secondary and tertiary branching often relatively well-developed. *Leaves* in middle third of stems more or less evenly spaced and sized, elliptic to narrow-elliptic, 8–20 cm long, l:w ratio c. 2–3, not dissected or coarse-dentate to lobate; segments 3–7 per side, predominantly in proximal two-thirds, antrorse, roughly triangular; base truncate to shallowly cordate, sometimes slightly amplexicaul; margin with rather frequent denticulations, serrations or teeth, apex acuminate; both surfaces \pm glabrous; lower surface green. *Uppermost leaves* narrow-elliptic, narrow-oblong or lanceolate, l:w ratio c. 3–4. *Unit inflorescences* of several to many capitula; total number of capitula per stem commonly 30–100; overtopping marked; mature lateral peduncles mostly 5–12 mm long. *Capitula:* calycular bracteoles 3–6, 1.0–2.0 mm long; involucre 4.0–5.0 mm long, 1.8–2.0 mm diam.; phyllaries 12–14, glabrous, with apex erect; stereomes (in dried specimens) moderately convex, green, minutely black at tip; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally erect. *Florets* 30–40, c. 80% female; corolla-lobes triangular, hardly thickened apically; corolla of bisexual florets 5–6 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, c. 0.3 mm long. *Achenes* \pm narrow-obloid, 1.8–2.2 mm long, dark brown, with papillose hairs, in bands or more or less evenly scattered, l:w ratio of hairs c. 3. *Pappus* 3–4 mm long. (Fig. 23)

Flowers most of year (rainfall dependent).

Distribution and Habitat: Occurs in central Australia extending from the Dulcie Ranges in southern Northern Territory south-west to the Rawlinson Range in central-eastern Western Australia and south-south-west to Mt Illbillie in north-western South Australia, and in eastern South Australia from Weetootla Gorge south to Telowie Gorge



Figure 23. *Senecio laceratus* (A.C. Beauglehole 44628 MEL).

in the Flinders Ranges with an outlier at Mt Finke further west (Fig. 19d). Grows on rocky slopes usually in shaded seepage areas, and/or adjacent to water in skeletal, sandy or gravelly soils of sandstone, or quartzite derivation in open woodland.

Notes: *Senecio laceratus* extends further north in Central Australia than any other disciform species. The leaves are distinctive in that the apex of segments and teeth are usually markedly acuminate. It appears to grow as an annual under normal conditions. Secondary and tertiary branching is usually well-developed, contingent on moisture availability, a characteristic it shares with *S. runcinifolius*. In capitular and achenial morphology it is very similar to *S. bathurstianus*.

Selected specimens examined: **WESTERN AUSTRALIA:** Pass in Blackstone Range, A.S. George 8755, 17.vii.1967 (PERTH). **NORTHERN TERRITORY:** Reedy Creek, George Gill Range, G. Chippendale, 14.viii.1957 (AD, CANB, DNA, MEL, PERTH). **SOUTH AUSTRALIA:** Everard Ranges, Victory Well. Mt Illbillee, D. Kraehenbuehl 5126, 5.ix.1968 (AD).

15. *Senecio runcinifolius* J.H.Willis, *Proc. Roy. Soc. Queensland* 62: 106, t. 7 (1952).

Type: [South Australia] Moorundee near Blanchetown, Murray River, F. Mueller, Feb. 1851; holo: MEL.

Erechtites picridioides Sond., *Linnaea* 25: 523 (1853), *nom. illeg. non* Turcz. (1851). *Type:* State uncertain, 'Murray'; holo: MEL.

[*Erechtites mixta* auct. *non* (A.Rich.) DC.: G. Benth, *Fl. Austral.* 3: 659 (1867); J.M. Black, *Fl. S. Australia* 610 (1929); A. Ewart, *Fl. Victoria* 1179 (1931)]

Herbs to 1.2 m high. *Taproot* usually well-developed; secondary roots slightly fleshy, c. 1 mm diam. *Stems* erect, glabrous or nearly so; secondary and tertiary branching often well-developed. *Leaves* in middle third of stems more or less evenly spaced and sized, narrow-elliptic to narrow-lanceolate, 7–20 cm long, l:w ratio c. 2.5–6, deeply lobate to sub-pinnatisect, petiole-like basally; segments 4–8 per side in middle third, predominantly retrorse, roughly triangular; base attenuate; margin with scattered denticulations or teeth; upper surface \pm glabrous; lower surface green or purple, sparsely coarse-hairy or glabrous. *Uppermost leaves* similar but petiole-like portion shorter. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–100; overtopping variable; mature lateral peduncles mostly 8–25 mm long. *Capitula:* calycular bracteoles 3–6, 2.0–3.0 mm long; peduncle and margin of bracteoles \pm glabrous or receptacle cobwebby at anthesis; involucre 7.0–11.0 mm long, 1.5–2.5 mm diam.; phyllaries 12–14, glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green or tinged purple, sometimes black at tip, rarely with a purple zone immediately below tip; post-fructescence receptacle 3–5 mm diam., with phyllaries commonly finally spreading. *Florets* 40–60, c. 80% female; corolla-lobes triangular, not or slightly thickened apically; corolla of bisexual florets 8–11 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.1 mm long. *Achenes* narrow oblong-ellipsoid, 2.5–3.0 mm long, pale brown, with papillose hairs in narrow bands, l:w ratio of hairs c. 3. *Pappus* 8–13 mm long. (Figs 2f, 24)

Flowers mostly winter–spring, also other times of year (moisture dependent).

Distribution and Habitat: Occurs in central and south-eastern Australia extending from the Lake Eyre basin in South Australia east to Gilruth Plains in far south-western Queensland and south-east to Melbourne in south-central Victoria (Fig. 19e). Grows on margin of swamps, lakes, or in seasonally damp sites on heavy soils on lowland plains.

Notes: A plant of inland floodplains distinctive by virtue of its runcinate leaves. The showy display of the relatively long pappus-bristles at fruit maturity is also a feature of this plant. Hybrids with *S. quadridentatus* have been recorded.

Selected specimens examined: **SOUTH AUSTRALIA:** East of Flinders Range. Koonamore (ca. 60 km north of Yunta, HJ. Eichler 12422, 13.vii.1956 (AD)). **QUEENSLAND:** Warrego district.

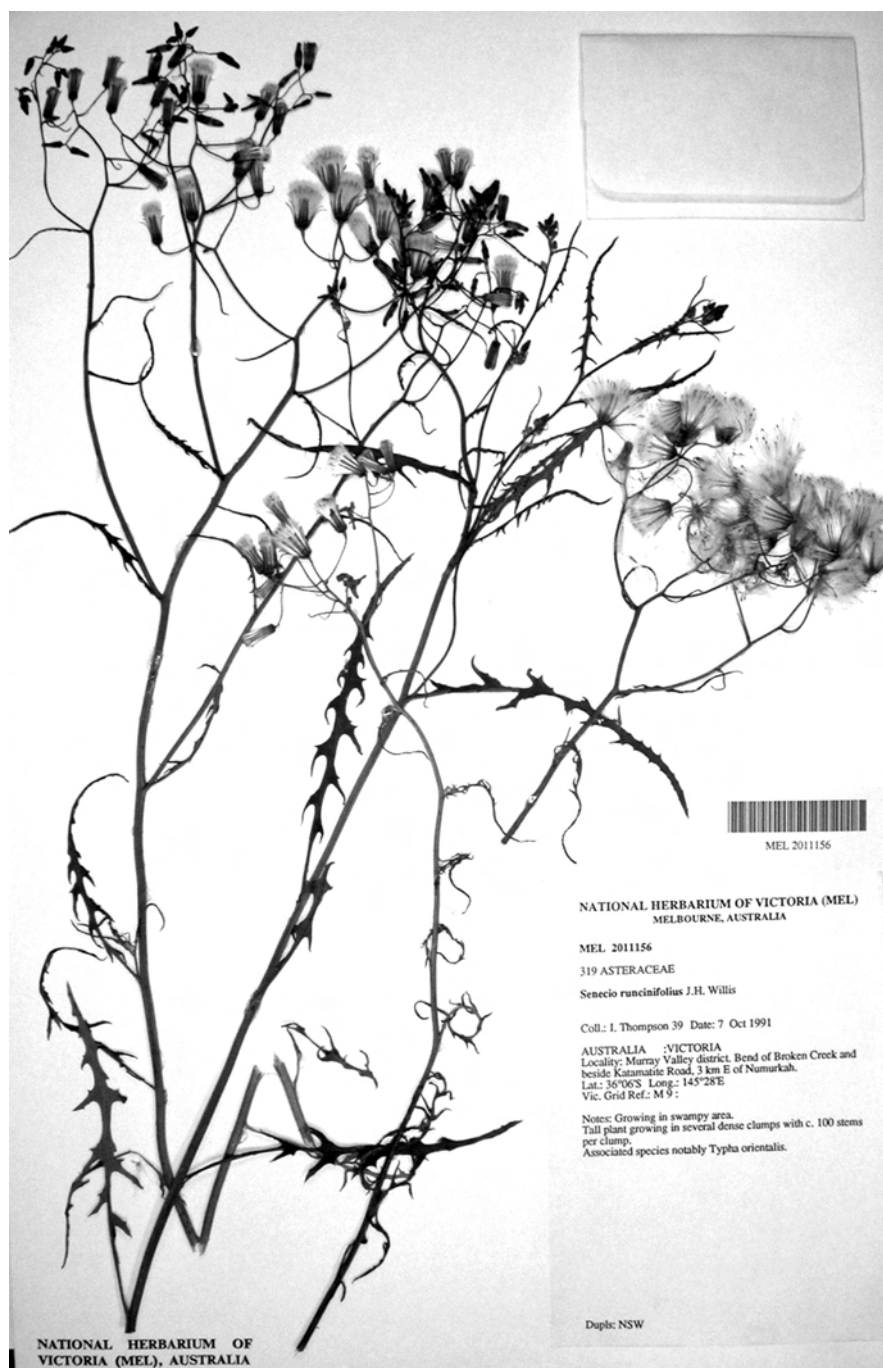


Figure 24. *Senecio runcinifolius* (I.R. Thompson 39 MEL).

Lake Bindegolly, east of Thargomindah on road to Eulo, *R.J. Chinnock* 6249, 25.ix.1984 (AD, MEL). **NEW SOUTH WALES:** 16 km north of Booroorban and 74 km north of Deniliquin, *M.D. Crisp* 1709, 25.xi.1975 (CBG, NSW); Barwon R., Collarenebri, *R.G. Coveny* 12667, *P. Cuneo*, & *B. Wiecek*, 22.viii.1987 (AD, BRI, MEL, NSW). **VICTORIA:** Lake Watchem Reserve, *A.C. Beauglehole* 85027, 8.x.1986 (AD, MEL).

16. *Senecio longicollaris* I.Thomps., *sp. nov.*

A. S. quadridentato Labill. caulibus glabris, foliis latioribus inferne hispidis, capitulis latioribus plerumque lanationibus, acheniis plerumque longioribus differt.

Type: Victoria, beside road to Lake William Hovell, c. 4 km SW of Cheshunt, *I.R. Thompson* 720, 29 Nov. 2001; holo: MEL; iso: CANB.

Herbs to 1.8 m high. *Taproot* reduced; secondary roots fleshy, 1–2 mm diam. *Stems* erect, glabrous or sparsely appressed-cottony, glabrescent. *Leaves in middle third of stems* more or less evenly spaced and sized, very narrow-elliptic, 8–24 cm long, l:w ratio c. 4–12, not dissected; base attenuate or with small, entire auricles; margin with moderately frequent denticulations; upper surface sparsely appressed-cottony, glabrescent; lower surface green, sparsely to moderately coarse-hairy, with hairs short, sometimes only cobwebby. *Uppermost leaves* similar; base cuneate. *Unit inflorescences* of many capitula; total number of capitula per stem often 30–100; overtopping marked; mature lateral peduncles mostly 10–25 mm long. *Capitula:* calycular bracteoles 4–8, 1.0–2.0 mm long; peduncle and margin of bracteoles somewhat woolly at anthesis; involucre 7.0–9.0 mm long, 2.0–3.0 mm diam.; phyllaries mostly 12–14, cobwebby or sometimes nearly glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green or tinged purple, sometimes minutely black at tip; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally reflexed. *Florets* 30–50, c. 80% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 6–8 mm long, 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.2 mm long. *Achenes* lageniform, usually extremely attenuate apically, 4.0–6.0 mm long, brown, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* 6–7 mm long. (Figs 4h, 25)

Flowers all year round, mostly summer–autumn.

Distribution and Habitat: Occurs in far south-eastern Queensland (all records old), central-eastern and south-central New South Wales (Booligal and Wanganella), in north-central Victoria from Porepunkah west to the Barmah Forest, and in far south-eastern South Australia at Lake Alexandrina. Grows on floodplains and by water in forest, woodland and shrubland (Fig. 19f).

Etymology: The epithet alludes to the long-necked achenes (L: *longus*, long, and *collaris*, of the neck).

Notes: Similar to *Senecio glandulosus* but with broader leaves that are often coarse-hairy on the lower surface, larger capitula, phyllaries that are more densely cobwebby, and longer, and particularly longer-necked, achenes. The achenes of *S. tasmanicus* are like those of *S. longicollaris* but the former is smaller, has smaller leaves that are crowded basally at anthesis and the capitulum is more or less glabrous at anthesis. Specimens from southern Queensland and coastal New South Wales tend to have shorter capitula with the indumentum relatively sparse, leaves with a higher length:width ratio, and with larger denticulations. Further collections to better characterise these poorly collected, more northern populations is desirable.

Selected specimens examined: **SOUTH AUSTRALIA:** Millowar, *D.E. Murfet* 2647 & *R.L. Taplin*, 20.iv.1997 (AD). **QUEENSLAND:** Main Range between Spring Bluff and Murphy's Creek, *C.T. White* 7021, 2.viii.1930 (BRI); Gladfield, *C.J. Gwyther* (BRI). **VICTORIA:** Lake Wm. Hovell near Cheshunt - bushland area south of lake, *J. Strudwick* JS827, 14.ii.1990 (MEL); 13.6 km SW from Porepunkah new bridge to SE corner of extended Mt Buffalo National Park via



Figure 25. *Senecio longicollaris* (holotype: I.R. Thompson 720 MEL).

Buckland River bridge – 300 m up Buffalo creek from the river, *N.T. Rossiter & A. Piesse* 862, 20.v.1987 (MEL); Lake Waringa, *Dallachy* (MEL); Barmah Forest, east end, Sandspit Creek area just south of Murray River, *I.R. Thompson* 689, 30.ix.2001 (MEL); Beside road to Lake William Hovell, c. 4 km SW of Cheshunt, *I.R. Thompson* 754 & *N.G. Walsh*, 1.ii.2001 (AD, MEL, NSW); Broken Creek, c. 4 km east of Numurkah, *I.R. Thompson* 768, 10.vii.2002 (MEL); Lake Nhill, south edge of Nhill, c. 1 km SE of Nhill P.O., *A. Paget* 2457, 19.x.1996 (MEL).

17. *Senecio tasmanicus* I.Thomps., *sp. nov.*

A *S. quadridentato* Labill. indumento caulis sparsiore, foliis inferiore pilis grossis instructi, pedunculis et capitulis glabris, acheniis longioribus differt; a *S. macrocarpo* Belcher capitulis tenuioribus, papillis acheniorum paucioribus differt.

Type: Tasmania, *Archer*, date unknown; holo: NSW 27852 [excluding piece on far left which is *S. prenanthoides* A.Rich.]

Herbs to 0.4 m high. *Taproot* inconspicuous; secondary roots fleshy, to c. 1.5 mm diam. *Stems* erect, sparsely appressed-cottony or nearly glabrous. *Leaves in middle third of stems* becoming distinctly wider spaced and narrower upwards, oblanceolate to very narrow-elliptic, 3–8 cm long, l:w ratio c. 6–15, not dissected or coarse-dentate; segments 2–4 per side in middle third, spreading, triangular; base attenuate; margin with scattered denticulations or teeth; upper surface sparsely scabridulous or nearly glabrous; lower surface green with scattered short, coarse hairs, often with a cobwebby overlay. *Uppermost leaves* narrow-linear, l:w ratio c. 15–30, not dissected; base sometimes with very small, entire auricles; surfaces sparsely cobwebby or glabrous. *Unit inflorescences* of several capitula; total number of capitula per stem c. 8–20; overtopping not marked; mature lateral peduncles mostly 20–50 mm long. *Capitula:* calycular bracteoles 3–6, 2.0–4.0 mm long; peduncle and margin of bracteoles glabrous or nearly so at anthesis; involucre 9.0–11.0 mm long, 2.0–2.4 mm diam.; phyllaries 12–16, glabrous, with apex erect; stereomes (in dried specimens) ±flat, green or partially purple, minutely black at tip, sometimes purple in a zone c. 1 mm long immediately below tip; post-fructescence receptacle not seen. *Florets* 40–60, c. 75% female, corolla-lobes c. triangular, hardly thickened apically; corolla of bisexual florets 6.5–8 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.1 mm long. *Achenes* lageniform, 5.0–7.0 mm long, neck 2–3 mm long, light brown, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* c. 7 mm long. (Fig. 27)

Flowers late spring–summer.

Distribution and Habitat: Occurs in Tasmania but not recorded since the mid 1800s and possibly extinct (Fig. 26a). Likely to grow in lowland plains near swamps.

Notes: A species previously overlooked and it is likely that its habitat has been destroyed by land clearing since that period. It has similarities with *S. longicollaris* in terms of achene morphology in particular but also similar in leaf and stem indumentum. Also, similar to *S. dolichocephalus* in habit and capitular dimensions and similar to *S. macrocarpus* in capitulum length (but not width) and in having inflorescences of few capitula.

Selected specimens examined: **TASMANIA:** Formosa, *Gunn* 508 (NSW; left hand specimen).

18. *Senecio glandulosus* (DC.) Sch.Bip., *Flora oder Allgemeine Bot. Zeitung* 28: 498 (1845)

Erechtites glandulosa DC., *Prodr.* 6: 295 (1838); *E. quadridentata* var. *glandulosa* (DC.) Domin, *Biblioth. Bot.* 89: 685 (1930), as *Erechthites*.

Type: [New South Wales], ‘ad ripas flum. Lachlan in Nova-Hollandia interiore’ [Lachlan River], *A. Cunningham* 141; G (microfiche seen MEL).

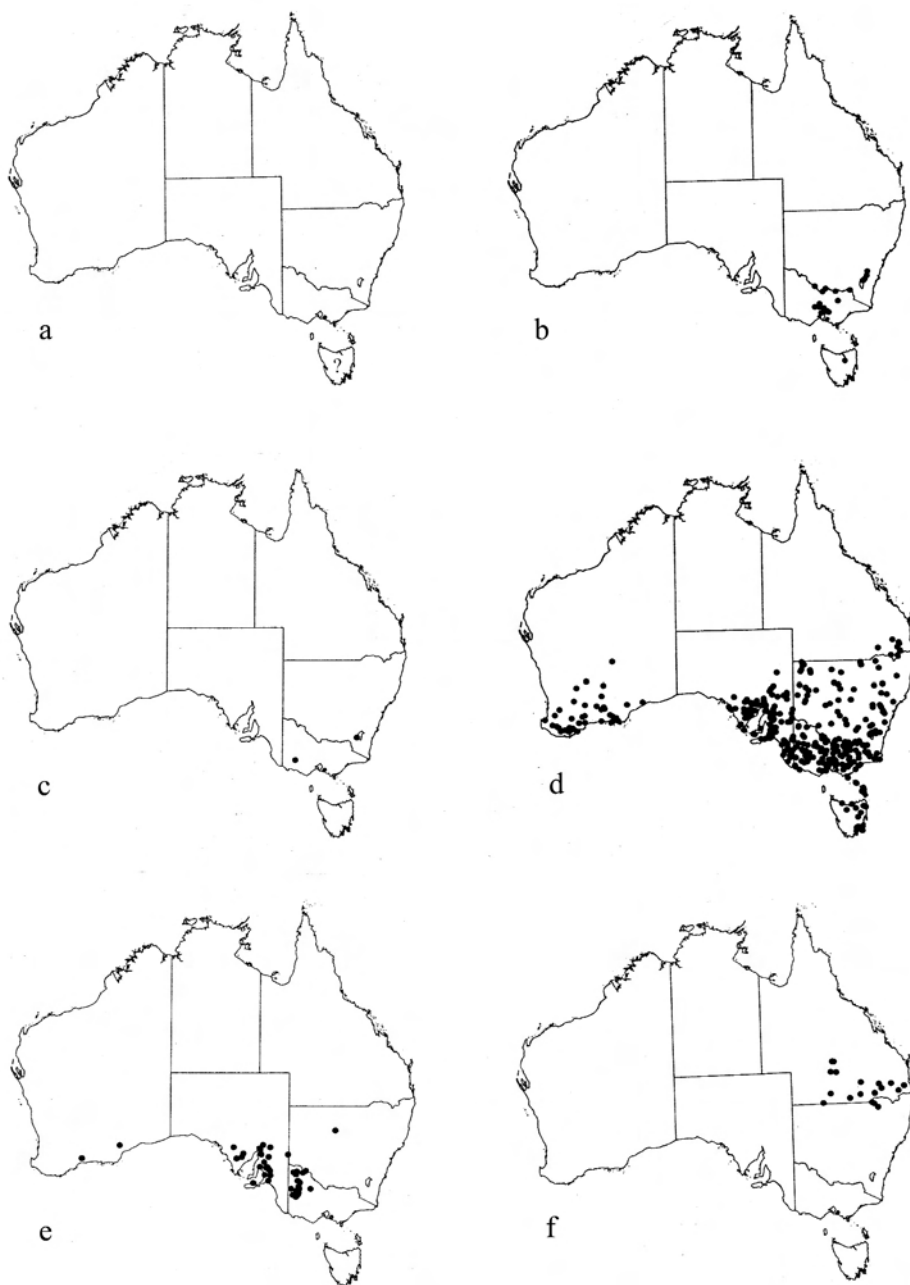


Figure 26. Distribution of a. *Senecio tasmanicus*; b. *S. glandulosus*; c. *S. glabrescens*; d. *S. quadridentatus*; e. *S. dolichocephalus*; f. *S. queenslandicus*.



Figure 27. *Senecio tasmanicus* (holotype: Archer NSW 27852, excluding piece on far left).

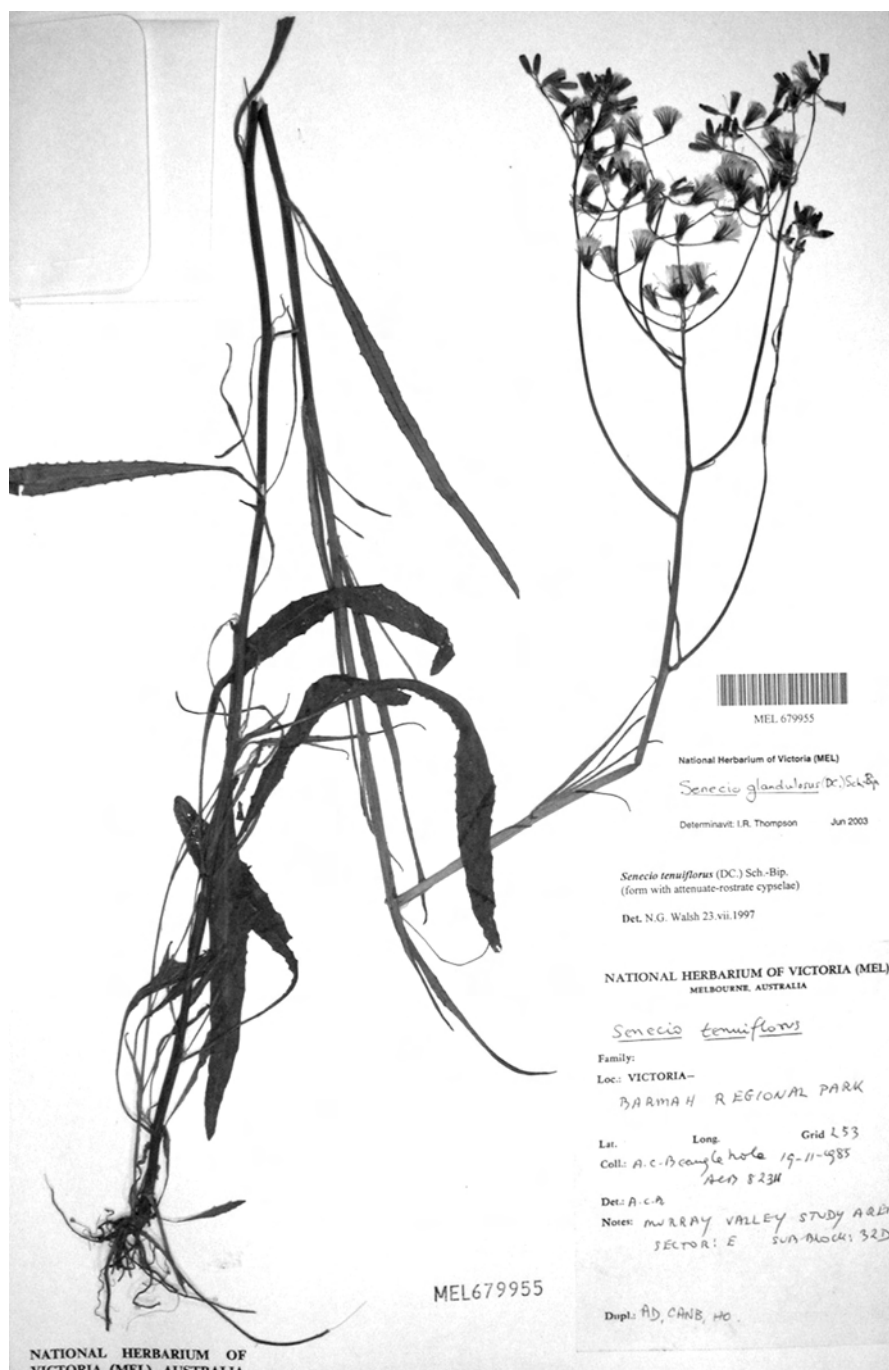


Figure 28. *Senecio glandulosus* (A.C. Beaglehole 82311 MEL).

Herbs to 1.5 m high. *Taproot* inconspicuous; secondary roots fleshy, 1–2 mm diam. *Stems* erect, sparsely appressed-cottony, glabrescent. *Leaves* in middle third of stems more or less evenly spaced and sized, very narrow-elliptic to linear, 10–24 cm long, l:w ratio c. 12–16, not dissected; base attenuate; margin usually minutely denticulate; surfaces \pm glabrous or sparsely appressed-cobwebby, glabrescent. *Uppermost leaves* sometimes developing small, entire auricles, hardly amplexicaul. *Unit inflorescences* of many capitula; total number of capitula per stem often 30–100; overtopping slight to moderate; mature lateral peduncles mostly 6–25 mm long. *Capitula*: calycular bracteoles 4–8, 1.0–2.0 mm long; peduncle and margin of bracteoles moderately cobwebby at anthesis; involucre 5.0–8.0 mm long, 1.8–2.2 mm diam.; phyllaries mostly 12–14, sparsely cobwebby, glabrescent, with apex erect; stereomes (in dried specimens), relatively thin, \pm flat, green or partially purple, minutely black at tip, sometimes purple in a zone c. 1 mm long immediately below tip; post-fructescence receptacle 3 mm diam., with phyllaries commonly finally somewhat reflexed. *Florets* 30–50, c. 80% female; corolla-lobes triangular, hardly thickened apically; corolla of bisexual florets 4.5–6 mm long, 4-lobed; corolla-lobes of female florets 3 or 4, 0.1–0.2 mm long. *Achenes* lageniform, outer ones often rather curved, 2.5–3.5 mm long, brown, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* 5–6 mm long. (Figs 4g, 28)

Flowers spring–autumn.

Distribution and Habitat: Occurs in south-eastern Australia: in south-eastern New South Wales and the Australian Capital Territory between Crookwell and Canberra; in central Victoria along the Murray River and south to the coast at Welshpool; and in north-eastern Tasmania near Cressy (Fig. 26b). Grows in loam to clay soils in forest and woodland, usually in seasonally inundated areas.

Notes: Similar to *S. quadridentatus* but differs by its sparsely haired to glabrous leaves and stems, broader leaves tapering distinctly to each end, broader phyllaries reflexed rather than spreading at maturity, shorter florets with more corolla-lobes, curved fruits, and the smaller taproot and fleshier secondary roots. The receptacle undergoes relatively little expansion as the achenes develop and, because of this, the capitula become slightly more urceolate than those of other species.

Selected specimens examined: **VICTORIA**: Macleys Plain, A. Cunningham 61 (MEL); McAlister Travelling Stock Reserve, c. 6.5 km SE of Laggan on Goulburn Road; headwaters of Wollondilly River, I. Crawford 5159, 14.xii.1998 (CANB). **WESTERN AUSTRALIA**: Canberra, Belconnen Naval Station, Ginninderra Creek, I. Crawford 3271, 27.x.1995 (CBG); Brooke's Creek, Federal Highway, L.G. Adams 4194, 12.xii.1999 (CANB). **VICTORIA**: Woori Yallock–Kooweerup Road c. 3 km south of Woori Yallock, I.R. Thompson 704, 14.xi.2001 (AD, BRI, CANB, MEL, NSW); Barmah Regional Park, A.C. Beaglehole 82311, 19.xi.1985 (AD, CANB, HO, MEL); Hepburn Regional Park, A.C. Beaglehole 70601, 8.v.1982 (MEL); Spadonis Reserve, to immediate west of junction of Olinda Creek and Yarra River, 2.5 km WNW of Yering, D. Frood s.n., 23.x.1996 (MEL); Laverton, W.R.A. Baker, 20.v.1905 (MEL); Rail Reserve, Herne's Swamp, at end of access road from N, D.E. Albrecht 5274, 6.vi.1993 (MEL); Campaspe River, west of Redesdale, A.C. Beaglehole 70618, 25.iv.1982 (AD, CANB, MEL). **TASMANIA**: Near Launceston, coll. unknown, 21.iii.1888 (MEL); Swamp near Cressy, J.H. Wilson, Feb 1943 (HO).

19. *Senecio glabrescens* (DC.) Sch.Bip., *Flora oder Allgemeine Bot. Zeitung* 28: 498 (1845)

Erechtites glabrescens DC., *Prodr.* 6: 295 (1838); *E. quadridentata* var. *glabrescens* (DC.) Benth., *Fl. Austral.* 3: 660 (1867) p.p.

Type: [New South Wales], 'In Novae-Hollandiae, ad merid. Lacus Georgii lat 35° 50' [south of Lake George], A. Cunningham; holo: G (microfiche seen MEL).

Herbs to 0.4 m high. *Taproot* well-developed; secondary roots c. 1 mm diam., hardly fleshy. *Stems* erect, nearly glabrous or sparsely appressed-cottony; stems multiple from



Figure 29. *Senecio glabrescens* (N.D. Middleton 163 & C. Marks MEL).

base and branching from lower axils in first season. *Leaves in middle third of primary stem* rather few, more or less evenly spaced and sized, very narrow-elliptic or linear, 8–12 cm long, l:w ratio c. 8–12, not dissected; base auriculate, with auricles bi- or tri-dentate, slightly amplexicaul; upper surface glabrous or minutely scabridulous on lowerstem leaves; lower surface green, sparsely to moderately cobwebby. *Uppermost leaves* narrow-lanceolate or linear, commonly widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 50–200; overtopping marked; mature lateral peduncles mostly 10–20 mm long. *Capitula*: calycular bracteoles 3–6, 1.0–2.0 mm long; peduncle and margin of bracteoles cobwebby at anthesis; involucre 6.0–8.0 mm long, 1.8–2.2 mm diam.; phyllaries 12–14, cobwebby basally, with apex erect; stereomes (in dried specimens), \pm flat, green, sometimes minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle c. 3 mm diam., with phyllaries commonly finally spreading to reflexed. *Florets* 30–40, c. 80% female; corolla-lobes triangular, slightly thickened; corolla of bisexual florets 5–6 mm long, 4-lobed; corolla-lobes of female florets 3, c. 0.1 mm long. *Achenes* lageniform, 4.0–5.0 mm long, orange-brown or brown, with papillose hairs in lines, l:w ratio of hairs c. 1–2. *Pappus* 5–7 mm long. (Fig. 29)

Flowers summer–autumn.

Distribution and Habitat: Recorded from the Grampians in western Victoria, the Kiandra region in south-eastern New South Wales, and from South Ironcap in southern Western Australia (Fig. 26c). Recorded from margins of watercourses and lakes.

Notes: Differs from *S. quadridentatus* by having much sparser indumentum on stems and leaves, being branched from near the base, and having fewer and fleshier stem leaves with better developed auricles. *Senecio glandulosus* is similar in terms of indumentum characters but it is taller, is unbranched near the base, has fleshier secondary roots, and has more numerous, longer and basally attenuate leaves. It is very poorly collected, possibly overlooked, and the three known localities are very disjunct.

Selected specimens examined: **WESTERN AUSTRALIA:** 5 km south of South Ironcap, *K. Newbey* 5219, 8.vii.1979 (PERTH). **NEW SOUTH WALES:** Nungar Plain, Kosciuszko National Park, *I.R. Thompson* 753 & *N.G. Walsh* (MEL, CANB). **VICTORIA:** Victoria Valley near Grampians National Park, Freshwater Lake Reserve, along Victoria Valley Road, approx. 10 km north of Dunkeld, *N.D. Middleton* 163 & *C. Marks*, 9.ii.2003 (AD, BRI, CANB, HO, MEL, NSW, PERTH); Australia Felix, *coll. unknown* (MEL 22801).

20. *Senecio quadridentatus* Labill., *Nov. Holl. Pl.* 2: 48, t.194 (1806)

Erechtites quadridentata (Labill.) DC., *Prodr.* 6: 295 (1838).

Type: [Tasmania], ‘Nova Hollandia in capite van Van-Dieman’, *J.J.H. de Labillardiere*; iso: BM, K, *fide* R.O. Belcher *Ann. Missouri Bot. Gard.* 43: 58 (1956).

E. incana Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 24(2): 85 (1851). **Type:** [Western Australia], Swan River, *J. Drummond* 379; iso: FI, K (photo seen MEL).

?*E. erecta* F.Muell. ex Lange, *Botanisk Tidsskrift* ser. 2, 4: 6 (in obs) (1874). **Type:** not known, *fide* R.O. Belcher, *loc. cit.* (1956).

Herbs to 1.2 m high. *Taproot* well-developed; secondary roots c. 1 mm diam., hardly fleshy. *Stems* erect, moderately to densely appressed-cottony, sometimes reducing nearer summit to moderately cottony, sometimes glabrescent and wool clumping before being lost; axillary growth commonly precociously developed; secondary and tertiary branching often well developed. *Leaves in middle third of stems* more or less evenly spaced and sized, linear to narrow-linear, 8–22 cm long, l:w ratio c. 15–40, (or 7–10 if lobes present), mostly not dissected, uncommonly coarse-dentate to lobate; segments remote, 1–3 per side largely in proximal half, spreading, triangular; base attenuate or occasionally with small, entire auricles, not amplexicaul; margin entire or with frequent



Figure 30. *Senecio quadridentatus* (A.C. Beaglehole 85348 MEL).

minute denticulations, usually appearing entire due to revolute margin; upper surface appressed-cobwebby, soon or later glabrescent; lower surface green or rarely flushed purple, moderately to densely woolly. *Uppermost leaves* similar; auricles more commonly present, sometimes divided. *Unit inflorescences* usually of many capitula; total number of capitula per stem often 50–200; overtopping variable; mature lateral peduncles mostly 5–25 mm long. *Capitula*: calycular bracteoles 4–8, 1.0–3.0 mm long; peduncle and margin of bracteoles cobwebby to woolly at anthesis, rarely \pm glabrous; involucre 6.0–10.0 mm long, c. 1.2–2.0 mm diam.; phyllaries (8–)11–14, cobwebby basally or \pm glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green or partially purple, sometimes minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 2–3 mm diam., with phyllaries commonly finally spreading. *Florets* 18–50, c. 80% female; corolla-lobes triangular, not or hardly thickened apically; corolla of bisexual florets 6–9 mm long, 4-lobed; corolla-lobes of female florets 3, c. 0.1 mm long. *Achenes* mostly lageniform, (1.6–)2.5–4.5(–5.0) mm long, rarely narrow-obloid and then very small, reddish or brown, sometimes green, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* 6–8 mm long. (Fig. 30)

Flowers mostly spring–summer, commonly at other times.

Distribution and Habitat: Occurs in south-eastern Australia: in far south-eastern Queensland south from Dalby; throughout New South Wales and Victoria; in south-eastern South Australia as far west as Streaky Bay; and in northern and eastern Tasmania including the eastern Bass Strait islands. Also occurs in southern Western Australia from Perup in the far south-west east to Caiguna and north-east to Laverton (Fig. 26d). Also native to New Zealand. Grows in a wide range of soil types, in cleared land, urban wasteland, grassland, shrubland, woodland and drier forests from sea level to montane altitudes.

Notes: A very widespread species that has adapted well to urban environments. It is usually easily recognised by its grey aspect caused by its woolly or cottony indumentum on stems and on both or the lower surface of leaves. Coarse hairs are absent or only present on the lowermost leaves (these withered at anthesis) and then sparse and inconspicuous. Leaves are typically numerous along stems and are relatively crowded, and the precocious leafy axillary growth is usually evident in axils above mid stem as the initial flowering period commences.

Senecio quadridentatus has historically encompassed a much broader range of forms. The recognition of *S. quadridentatus*-like entities with coarse hairs as *S. tenuiflorus* (in this paper split into several species) in recent years reduced the complex somewhat. In this treatment a degree of splitting of the remaining entities that lack coarse hairs has been achieved, but *S. quadridentatus sensu stricto* (i.e. as circumscribed herein) still exhibits considerable variation. This variation mostly involves capitulum size and achenial shape and size.

Populations on the Fleurieu Peninsula around and south of Adelaide in South Australia commonly have achenes that are not or hardly lageniform and only 1.6–2.2 mm long and inflorescences are more congested than usual. Some Victorian collections are similar. At the other extreme, some populations in north-western New South Wales have lageniform achenes 5 mm long. Several collections from Tasmania have involucre predominantly of 8–10 phyllaries and florets per capitula of c. 18–20. Old records from Rockhampton in south-eastern Queensland are unusually sparsely indumented but in other respects are typical.

A specimen collected by Charsley in 1886 from Silverton in far western New South Wales appears to be allied to *S. quadridentatus* but phyllaries are 16–20. It differs from *S. squarrosus* in the length of bracteoles, thickness of stereomes (in dried specimens) of phyllaries, and shape of basal auricles. Further collections are needed to adequately characterise this entity.

Hybrids with *S. dolichocephalus* have been recorded at Hambidge Reserve on the Eyre Peninsula of South Australia, and hybrids with *S. runcinifolius* have been recorded from the Murray River near Mildura.

Selected specimens examined: **WESTERN AUSTRALIA:** Bokerup Nature Reserve, *G.J. Keighery & N. Gibson 2485*, 21.x.1997 (CANB, PERTH). **SOUTH AUSTRALIA:** Mt Lofty Range. Spring Mount, ca. 8 km south-east of Adelaide, *D.J.E. Whibley 1709* (AD); Mt Crawford Forest Res., Kersbrook Forest, *H.P. Vonow 102* (AD, HO, MEL). **QUEENSLAND:** 2.2 km east of Allora along Forest Plain Road, *A.R. Bean 10851*, 4.x.1996 (BRI). **NEW SOUTH WALES:** Dead Horse Gully. Sturt National Park, *B. Wiecek 350*, *R.G. Coveny & M. Savio*, 6.ix.1989 (MEL, NSW, PERTH); Smiggin's Holes to Sawpit Ck., Kosciusko area, *M. Gray 6081* (AD, BRI, CANB, HO, MEL, NSW). **VICTORIA:** Dergholm State Park, c. 2 km east of Baileys Rocks, *I.C. Clarke 2559*, 25.x.1995 (AD, CANB, MEL); Fraser National Park, on western side of Eildon Reservoir, *T.B. Muir 3588*, 29.x.1964 (MEL). **TASMANIA:** Huon Road, near Hobart, *W.M. Curtis*, 5.ii.1952 (HO, MEL); St. Helens, *T.E. Burns 200*, 24.xii.1959 (HO).

21. *Senecio dolichocephalus* I.Thomps., *sp. nov.*

A *S. quadridentato* Labill. indumento caulis sparsiore, caulibus multo foliosioribus prope basin, foliis inferiore pilis grossis instructi, inferne purpureis, pedunculis et bracteolis glabris, capitulis plerumque longioribus differt; a *S. phelleo* I.Thomps. radice principali majore, capitulis longioribus, limbo corollae tenuiore, acheniis longioribus modice attenuatis apicem versus differt.

Type: Victoria, Wyperfeld National Park, Wonga Lake, ± 7.5 km NNW of Wonga Hut, WNW side of Lake, *A.C. Beaulehole 55288*, 7 Nov. 1976; holo: MEL.

Herbs to 0.6 m high. *Taproot* moderately developed; secondary stems fleshy, to c. 1.5 mm diam. *Stems* erect, often woolly basally, appressed-cottony up to mid stem then sparsely cottony or \pm glabrous above mid stem. *Leaves in middle third of stems* commonly becoming distinctly wider spaced and narrower upwards, oblanceolate to very narrow-elliptic, 3–12(–15) cm long, l:w ratio c. 4–15, not dissected, or less often coarse-dentate to lobate; segments 1–3 per side in middle third, spreading, triangular; base attenuate; margin with scattered denticulations or teeth; upper surface commonly scabridulous, sometimes transiently sparsely cobwebby also, becoming glabrous upwards; lower surface usually purple, coarse-hairy, often with a weak cobwebby overlay. *Uppermost leaves* narrow-linear, l:w ratio c. 15–30, usually not dissected; upper surface \pm glabrous, cobwebby, sometimes very sparsely coarse-hairy; lower surface cobwebby; base sometimes with small, entire auricles. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping marked; mature lateral peduncles mostly 8–25 mm long. *Capitula:* calycular bracteoles 4–8, 1.0–3.0 mm long; peduncle and margin of bracteoles glabrous or nearly so at anthesis; involucre 8.5–12.0 mm long, 1.5–2.0 mm diam.; phyllaries 12–14, glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green or partially purple, minutely black at tip, sometimes purple in a zone c. 1 mm long immediately below tip; post-fructescence receptacle 3 mm diam., with phyllaries commonly finally spreading. *Florets* 40–60, c. 80% female; corolla-lobes triangular-oblong, hardly thickened apically; corolla of bisexual florets 8–10 mm long, 4- or 5-lobed; corolla-lobes of female florets mostly 3, c. 0.1 mm long. *Achenes* weakly lageniform, 3.0–4.0 mm long, reddish or brown, sometimes green, with papillose hairs in lines, l:w ratio of hairs c. 1–2. *Pappus* 7–9 mm long. (Figs 3j, 3l)

Flowers spring–summer.

Distribution and Habitat: Occurs in south-eastern Australia from the Eyre Peninsula in south-central South Australia east to Wycheproof in north-western Victoria. Also disjunctly recorded from Ravensthorpe and Balladonia in southern Western Australia (Fig. 26e). Grows in sandy soils in woodlands and shrublands.

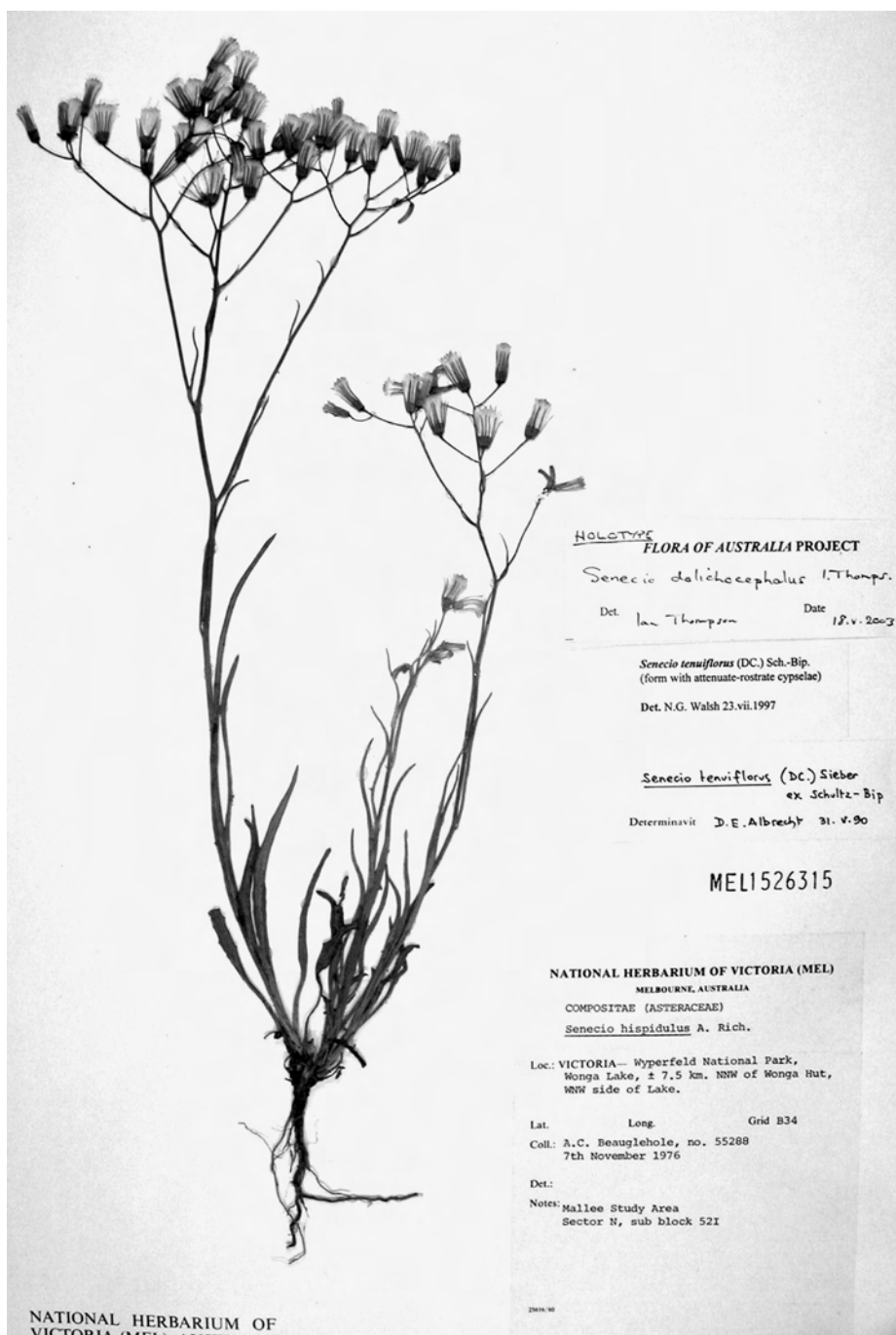


Figure 31. *Senecio dolichocephalus* (holotype: A.C. Beauglehole 55288 MEL).

Etymology: The epithet alludes to the relatively long capitula (Gk: *dolichos*, long, and *cephale*, head).

Notes: *Senecio dolichocephalus* is somewhat intermediate in morphology between *S. quadridentatus* and *S. phelleus*. The capitula are much longer than in *S. phelleus* and at the higher end of the range for *S. quadridentatus*. As in *S. phelleus*, the leaves of *S. dolichocephalus* tend to be broader and relatively crowded basally. *Senecio queenslandicus* has a similar habit but its capitula are shorter, phyllaries are thinner (at least on drying), and achenes are more strongly tapered to form a slender neck.

Selected specimens examined: **WESTERN AUSTRALIA**: 10 km ESE of Ravensthorpe, *K. Newbey* 5124, 18.ix.1978 (PERTH); 18 mi. [30 km] west of Balladonia, Eyre Highway, *B.L. Turner* 5252, 12.viii.1965 (MEL); Kalgoorlie, *J.H. Maiden*, Sept. 1909 (NSW, PERTH). **SOUTH AUSTRALIA**: The Pines Reserve (District Council of Kapunda), near NW corner, c. 7 km NW Kapunda, *P.J. Lang* 2171, 30.ix.1993 (AD); Murray Region, ca. 3 km west of Tepko, *K. Czornij* 230, 3.x.1968 (AD); Eastern. Hundred of Parnaroo, some 20 km east of Ucolta, *C.R. Alcock* 10602, 15.ix.1986 (AD, NE); Eyre Peninsula, Carrappee Hill about and above campsite, *D.E. Symon* 8831, 14.ix.1974 (AD); 2 km west of Keyneton P.O. Section 503, Hd of Jellicoe, *D. Cooke* 452, 3.x.1984 (AD); Mt. Lofty Range. Adelaide foothills, ridge above Brown Hill Creek, *Hj. Eichler* 17051, 16.x.1960 (AD, MEL); 11/2 m [2.5 km] north Winulta P.O., *D.E. Symon s.n.*, 14.ix.1961 (AD); Hambidge Reserve NW corner on flats, *D.E. Symon* 4240, 9.x.1966 (AD); Eyre Peninsula, Paney Station, *South Australia NPWS*, 9.x.1985 (AD); Mt Remarkable National Park, 11.7 km [from] Melrose at 271 degrees, *L.D. Williams* 12593, 20.ix.1982 (AD). **VICTORIA**: Murrawong North Roadside Reserve, *A.C. Beauglehole* 83942, 8.ix.1986 (MEL); Glenlee Flora and Fauna Reserve, *A.C. Beauglehole* 84322, 13.ix.1986 (MEL); Eastern Little Desert National Park, Kiata Lowan Sanctuary, *A.C. Beauglehole* 84465, 15.ix.1986 (MEL); Wyperfeld National Park, Wonga Lake, ± 7.5 km NNW of Wonga Hut, WNW side of Lake, *A.C. Beauglehole* 55288, 7.xi.1976 (MEL); Wail State Forest, *A.C. Beauglehole* 86070, 15.x.1986 (MEL); Mallee, *F.M. Reader*, 16.ix.1898 (MEL); Little Desert. Near Broughton's Waterhole, 23 km SSE of Kaniva PO, *A.C. Beauglehole* 66326, 8.xi.1979 (MEL).

22. *Senecio queenslandicus* I.Thomps., *sp. nov.*

A S. quadridentato Labill. indumento lanato multo sparsiore, indumento foliorum pilis grossis instructo, foliis caulis paucioribus, capitulis plerumque brevioribus, flosculis numerosioribus differt.

Type: Queensland, 5 km SE of The Gums, *R.W. Johnson* 553, 2 Sept. 1958; holo: BRI; iso: NSW.

Herbs to 0.4 m high. *Taproot* well-developed; secondary roots 0.5–1 mm diam. *Stems* erect or briefly ascending to erect; sparsely to moderately cottony, sometimes becoming \pm glabrous nearer summit; commonly multiple stems developing in first season. *Leaves in middle third of stems* rather few, more or less evenly spaced and sized, very narrow-elliptic, narrow-oblongate or \pm linear, 5–10 cm long, l:w ratio c. 6–15, not dissected, or occasionally coarse-dentate to lobate; segments 1–3 per side in middle third, spreading, triangular; base attenuate; margin with scattered denticulations or teeth; both surfaces usually sparsely scabridulous becoming cobwebby or nearly glabrous upwards. *Uppermost leaves* linear to narrow-linear, l:w ratio c. 10–40; auricles sometimes developed, small, entire, hardly amplexicaul; surfaces sparsely coarse-hairy or cobwebby or \pm glabrous. *Unit inflorescences* of several to many capitula; total number of capitula per stem typically 10–50; overtopping marked; mature lateral peduncles mostly 8–20 mm long. *Capitula*: calycular bracteoles 4–6, 1.0–3.0 mm long; peduncle and bracteole margin \pm glabrous at anthesis; involucre 6.0–8.0 mm long, 2.0–2.5 mm diam.; phyllaries 12–14(–18), glabrous, with apex erect; stereomes (in dried specimens) rather thin, \pm flat, green, commonly minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally spreading. *Florets* 50–80, c. 80% female;

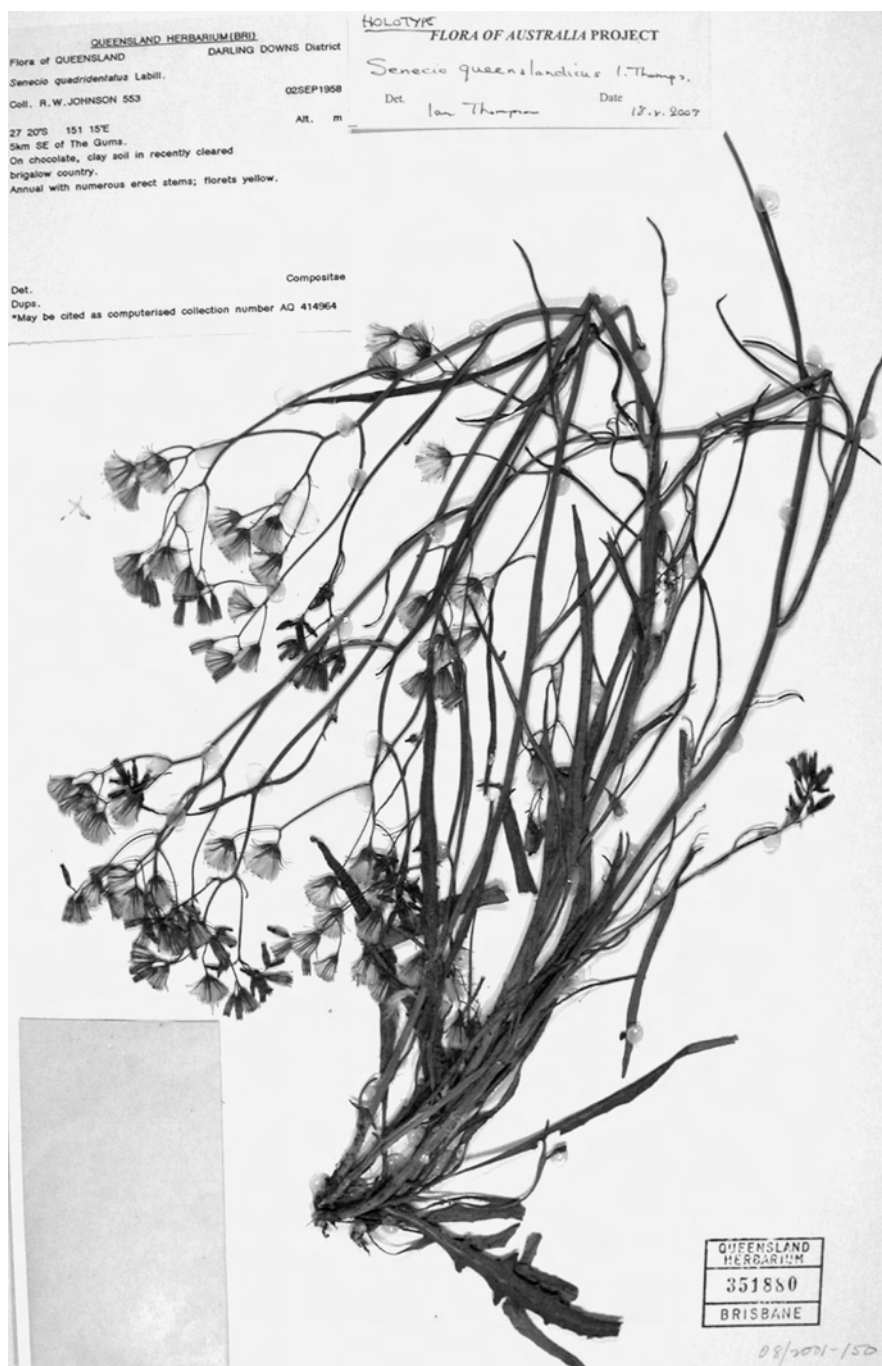


Figure 32. *Senecio queenslandicus* (holotype: R.W. Johnson 553 BRI).

corolla-lobes triangular, not or hardly thickened apically; corolla of bisexual florets 5.5–7 mm long, 4-lobed; corolla-lobes of female florets 3, c. 0.1 mm long. *Achenes* lageniform, 2.5–4.0 mm long, neck relatively slender, reddish, brown or green, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* 5.5–6.5 mm long. (Fig. 32)

Flowers most of year, more so in spring–summer.

Distribution and Habitat: Occurs in south-eastern Queensland from Blackall east-south-east to Moggill, and in north-central New South Wales from Weemelah to Moree and disjunctly further south-east near Muswellbrook (Fig. 26f). Grows in a wide range of soil types, in cleared land, grassland, shrubland, woodland at low altitudes in semiarid climates.

Etymology: The epithet alludes to the fact that this species predominantly occurs in Queensland.

Notes: *Senecio queenslandicus* differs from *S. quadridentatus* by having a shorter stature, fewer stem leaves, lack of precocious axillary growth, sparser stem and leaf indumentum and \pm glabrous peduncles and capitula at anthesis, and inner phyllaries that are broader and more often with two resin channels. It differs from *S. dolichocephalus* by having shorter capitula with broader phyllaries and more numerous florets, and achenes tapering more distinctly to a slender neck. It appears to typically grow as an annual.

Selected specimens examined: **QUEENSLAND**: Inglewood-Texas road, 600 m north of Brush Creek, A.R. Bean 6553, 21.ix.1993 (BRI); “Iolanthe”, c. 26 km SW of Garah, K.L. Wilson 1919, 28.ix.1978 (BRI, NSW); c. 4 miles [7 km] east of Meandarra in melon hole country, M.J. Russell, 1.viii.1969 (BRI); 80 km SSW of Blackall, L. Pedley 5474, 23.viii.1989 (AD, BRI); Moonie Highway, 45 miles [70 km] SW of Dalby, S.L. Everist 6217, 3.ix.1960 (BRI); The Oaks 22 m [36 km] west of Tara, S.L. Everist 2675, 17.viii.1946 (BRI); “Tamanick”, 80 km SE of Mitchell, C.M. Warrian CMW388, 30.xi.1990 (BRI); Aurifer Downs NW of Toobeah, Swarbrick 5200, 7.ix.1970 (BRI); Langlo Crossing, 71.6 km WNW of Charleville on road to Adavale, B.J. Lepschi & A.V. Slee 1116, 12.x.1993 (BRI, CANB, MEL). **NEW SOUTH WALES**: “Iolanthe”, c. 26 km SW of Garah, K.L. Wilson 1919 28.ix.1978 (AD, BRI, NSW); Gingham’s Channel near Weemelah, E.J. McBarron 15769, 19.ix.1968 (NSW); Burning Mountain NR [Nature Reserve] between Muswellbrook–Murrurundi, M. Roser, J.J. Bruhl & I.R. Telford, 10862, 3.x.1998 (NE).

23. *Senecio phelleus* I.Thomps., *sp. nov.*

A *S. tenuifloro* (DC.) Sieber ex Sch.Bip. radice principali minore, foliis sagittatis, phyllariis tenuioribus, papillis acheniorum pluribus, costis acheniorum planis differt; a *S. prenanthoides* A.Rich. caulibus appresso-byssaceis, foliis saepe auriculatis, capitulis latioribus pro ratione, acheniis non lageniformibus differt.

Type: Victoria, “The Common”, east of Armstrong, \pm 9 km NNE of Ararat P.O., A.C. Beaglehole 61220 & Field Naturalists Club of Ballarat 307, 1 Nov. 1978; *holo*: MEL.

Herbs to 1.5 m high. *Taproot* reduced, obscure; secondary roots fleshy, 1–1.5 mm diam. *Stems* erect, sparsely to moderately appressed-cotony, gradually reducing in density upwards, sparsely cotony or \pm glabrous in upper stem region. *Leaves in middle third of stems* becoming distinctly wider spaced and narrower upwards, oblanceolate, very narrow-elliptic or linear, 6–17 cm long, l:w ratio c. 6–12, not dissected or coarse-dentate to lobate; segments 1–3 per side in middle third, spreading, triangular; base attenuate or narrowly sagittate, not or slightly to moderately amplexicaul; margin with frequent denticulations or \pm entire; upper surface coarse-hairy; lower surface commonly purple, coarse-hairy, usually with cobwebby overlay. *Uppermost leaves* linear to narrow-linear, l:w ratio c. 12–30; base as for middle stem leaves; surfaces with coarse hairs few or absent; lower surface usually somewhat cobwebby. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–100; overtopping slight to

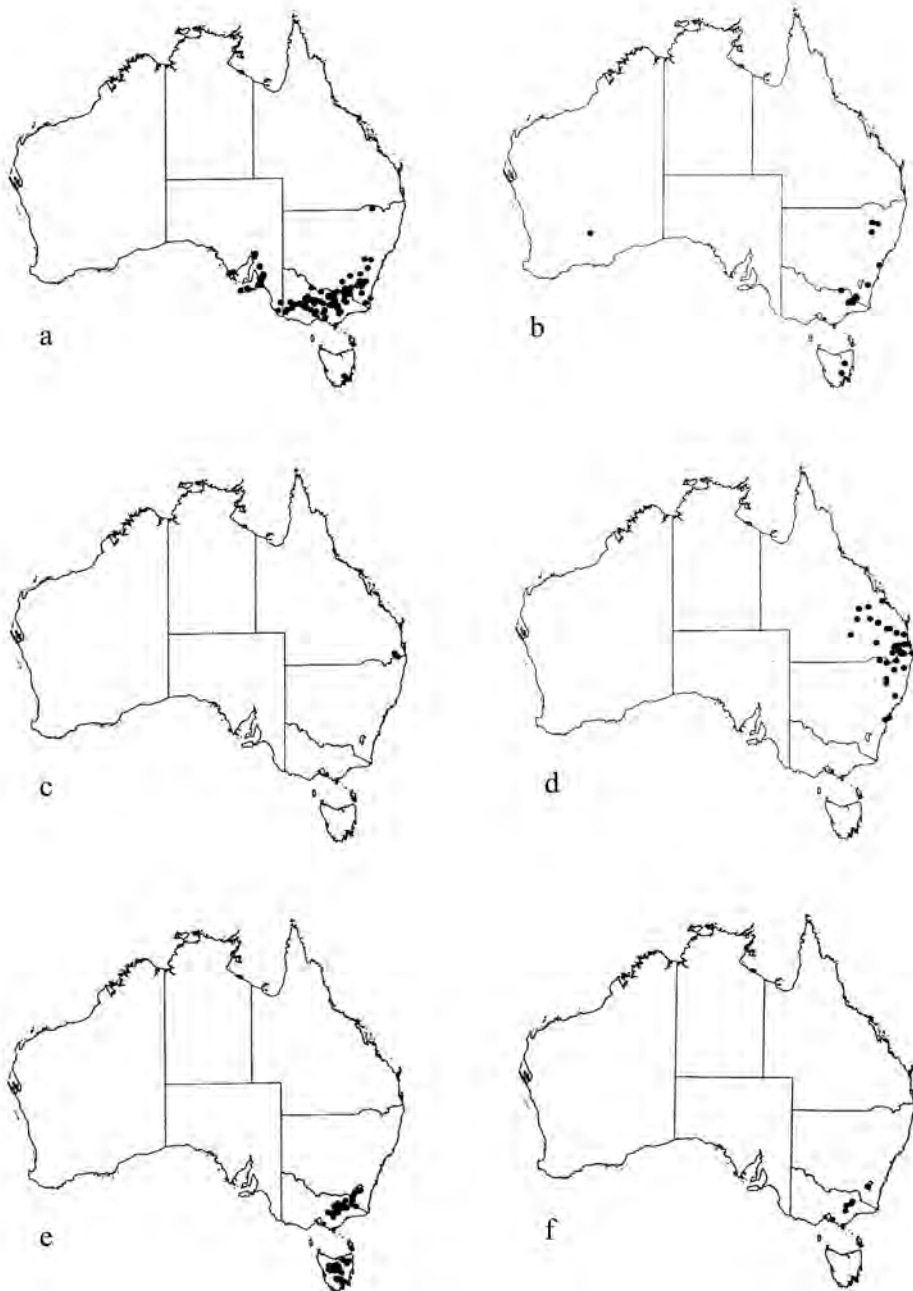


Figure 33. Distribution of a. *Senecio phelleus*; b. *S. microbasis*; c. *S. scabrellus*; d. *S. tenuiflorus*; e. *S. gunnii*; f. *S. niveoplanus*.



Figure 34. *Senecio phelleus* (holotype: A.C. Beauglehole 61220 MEL).

moderate; mature lateral peduncles mostly 5–25 mm long. *Capitula*: calycular bracteoles 3–5, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 6.0–7.5 mm long, 1.5–2.0 mm diam.; phyllaries 12–14, glabrous, with apex erect; stereomes (in dried specimens) mostly gently convex, green, rarely tinged purple, minutely black at tip, sometimes purple in zone c. 1 mm long below tip; post-fructescence receptacle 2.5–3 mm diam., with phyllaries commonly finally erect. *Florets* 30–45, c. 80% female; corolla-lobes triangular, thickened apically; corolla of bisexual florets 6–7 mm long, mostly 5-lobed; corolla-lobes of female florets 4, 0.3 mm long. *Achenes* narrow-obloid to narrow oblong-ellipsoid, 2.0–2.5(–3.0) mm long, orange-brown, with papillose hairs scattered or dense in bands, l:w ratio of hairs c. 2–3. *Pappus* 6–7.5 mm long. (Figs 1b, 2a, 4b, 34)

Flowers mostly spring–autumn.

Distribution and Habitat: Occurs in south-eastern Australia, from Bathurst in central-eastern New South Wales south to eastern Victoria then west to Adelaide in south-eastern South Australia, disjunctly further west on the Eyre Peninsula, and near Hobart in south-eastern Tasmania (Fig. 33a). Grows in sandy or heavy soils, often in rocky sites in heathland, and in, usually, drier forest and woodland.

Etymology: The epithet alludes to the stony, often skeletal soils where this species commonly occurs (Gk: *phelleus*, stony ground).

Notes: A common species in eastern South Australia and Victoria. In the past it has been identified as *S. quadridentatus* and more recently as *S. tenuiflorus*. See under *S. microbasis*, *S. tenuiflorus* and *S. prenanthoides* for differences between it and these similar species.

A specimen of this species (Fiedler's section in South Australia, Behr, MEL), was cited by Sonder as corresponding to the type of *Senecio apargiifolius* Walp., when he recombined this species as *Erechtites apargiifolius* (Walp.) Sond. Although Sonder stated that the specimen agreed with the type, Walper's description of *S. apargiifolius* stated that all florets are bisexual, and his description disagrees in several other respects from Behr's specimen. Whether Walpers' type does actually correspond to Behr's can not be verified as it cannot be located (see Belcher 1956). Thus the name *S. apargiifolius* could not be applied to the taxon described above.

Senecio phelleus is similar to *S. quadridentatus* but with a smaller taproot, sagittate leaf-bases, shorter capitula, glabrous peduncles and capitula, corollas of bisexual florets 5-lobed, with lobes more thickened, and achenes not lageniform. It is also similar to *S. prenanthoides*, which has in recent years been included with this species under *S. tenuiflorus*, in habit, indumentum of leaves, and bracteole number, but differing by having the lower stem region with an appressed-cobwebby indumentum, more florets per capitulum; secondary roots not subtuberosus, leaf-bases commonly sagittate, and achenes shorter and not narrowly lageniform. It is also similar to *S. microbasis* but differs by its lower leaves being broader, capitula larger and with more florets, leaf-bases sagittate, and neck of achenes less slender.

Selected specimens examined: **SOUTH AUSTRALIA**: Southern Lofty. Telephone Road Mt Crawford, R.J. Bates 35559, 23.xii.1993 (AD, MEL). **NEW SOUTH WALES**: Travelling Stock Reserve 39, western paddock, c. 600m in from Snowy Mountains Highway. Turnoff c. 2 km past Cooma Caravan Park, J. Miles s.n., 15.xii.1998 (CANB). **AUSTRALIAN CAPITAL TERRITORY**: Lower east slopes of Black Mtn, Canberra, R. Pullen 2370, 20.xi.1960 (CANB, MEL, NSW). **VICTORIA**: Hard Hills Flora reserve, 6 km NE of St Arnaud PO, A.C. Beauglehole 65531, 25.x.1979 (AD, MEL); 2.5 km north of Tallarook, on east side of Hume Highway, T.B. Muir 6194, 12.x.1978 (MEL); Woodland south west of 'Jindalee', Greta West, J.R.Hosking 664, 30.xii.1992 (CBG, MEL, NE). **TASMANIA**: Betsey Island, K. Harris s.n., 15.x.1983 (HO).

24. *Senecio microbasis* I.Thomps., *sp. nov.*

A *S. tenuifloro* (DC.) Sieber ex Sch.Bip. foliis non lobatibus, costis acheniorum planioribus papillis sparsioribus differt.

Type: Victoria, Splitters Range, c. 15 km direct east of Omeo, Mt Shaw Road 3.3 km east of intersection with Spring Hill Track, *I.R. Thompson* 726, 4 Dec. 2001; holo: MEL; iso: BRI, CANB, HO, NSW.

Herbs to 0.6 m high. *Taproot* usually moderately developed; secondary roots hardly fleshy, 0.5–0.8 mm diam. *Stems* erect, \pm glabrous or sparsely appressed-cottony basally. *Leaves in middle third of stems* often becoming distinctly wider spaced and narrower upwards, narrow-oblongeolate to linear, 4–10 cm long, l:w ratio c. 8–15, not dissected; base attenuate; margin \pm entire or with scattered denticulations or teeth; surfaces scabridulous; lower surface purple. *Uppermost leaves* narrow-linear, l:w ratio c. 15–40; base sometimes with very small, entire auricles, not amplexicaul; surfaces sparsely coarse-hairy or glabrous. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping often marked; mature lateral peduncles mostly 8–20 mm long. *Capitula:* calycular bracteoles 3–5, 1.0–2.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 5.0–7.0 mm long, 1.0–1.4 mm diam.; phyllaries 7–13, glabrous, with apex erect; stereomes (in dried specimens) flat or gently convex, green or rarely tinged purple, minutely black at tip; post-fructescence receptacle 1.5 mm diam., with phyllaries commonly finally reflexed. *Florets* 12–25, c. 80% female; corolla-lobes triangular, not or slightly thickened apically; corolla of bisexual florets 5–6 mm long, mostly 4-lobed; corolla-lobes of female florets 3, c. 0.2 mm long. *Achenes* narrow oblong-ellipsoid or slightly lageniform, 2.0–2.8 mm long, red-brown or dark brown, with papillose hair, in lines, l:w ratio of hairs c. 2. *Pappus* 4.5–6 mm long. (Fig. 35)

Flowers spring–summer.

Distribution and Habitat: Occurs predominantly in south-eastern Australia from Mt Kaputar in north-central New South Wales south to near Omeo in eastern Victoria, and in eastern Tasmania (Fig. 33b). There is a single record from Kambalda in southern Western Australia which is probably an introduction. Grows in drier forest and woodland.

Etymology: The epithet alludes to the small receptacle (Gk: *micro*, small, and *basis*, base).

Notes: This species is similar to *S. phelleus* but with narrower leaves near the base of the plant, leaf-bases never sagittately auriculate, capitula narrower and with fewer florets, phyllaries thinner and finally reflexed, corolla-lobes fewer and less thickened apically, and the achenes with a more slender neck. Similar to *S. tenuiflorus* but the leaves are never lobed, auricles if ever developed are much smaller, and the achenes have flatter ribs and more numerous papillose hairs. Similar to *S. prenanthoides* but the lower stem lacks coarse hairs and the achenes are shorter and not as distinctly lageniform.

Selected specimens examined: **WESTERN AUSTRALIA:** 14.1 km from Higginsville Pump Station on a bearing of 179 degrees, south of Kambalda, *A.A. Mitchell* 5049, 8.xii.1997 (PERTH). **NEW SOUTH WALES:** Major's Creek to Araluen scarp, *M. Gray* 6074, 18.xii.1967 (AD, MEL, NSW); south of Woodsreef mine, *J.R. Hosking* 1319, 15.x.1996 (CANB, MEL, NE, NSW). **VICTORIA:** 10.3 km SSW of Mt Tambo, 5 m NW of Mt Shaw Rd, 3.3 km east of Spring Hill Tk, *G.W. Carr* 10233, 8.xii.1984 (AD, MEL); East Gippsland, Mt Menaak, Suggan Buggan, *A.C. Beaglehole* 36671 & *E.W. Finck*, 2.ii.1971 (MEL); East Gippsland, Boundary Creek, Gelantipy, *N.A. Wakefield* 2776, 10.i.1949 (MEL); Tambo River Reference Area, *A.C. Beaglehole* 77127, 18.ix.1984 (CANB, MEL). **TASMANIA:** Near Conara, *A.C. Rozefelds* 909, 22.x.1998 (HO); Weedons Hill area, north of Fox's gully, Elderslie area, *F. Duncan* 1026, 30.iv.1985 (HO).

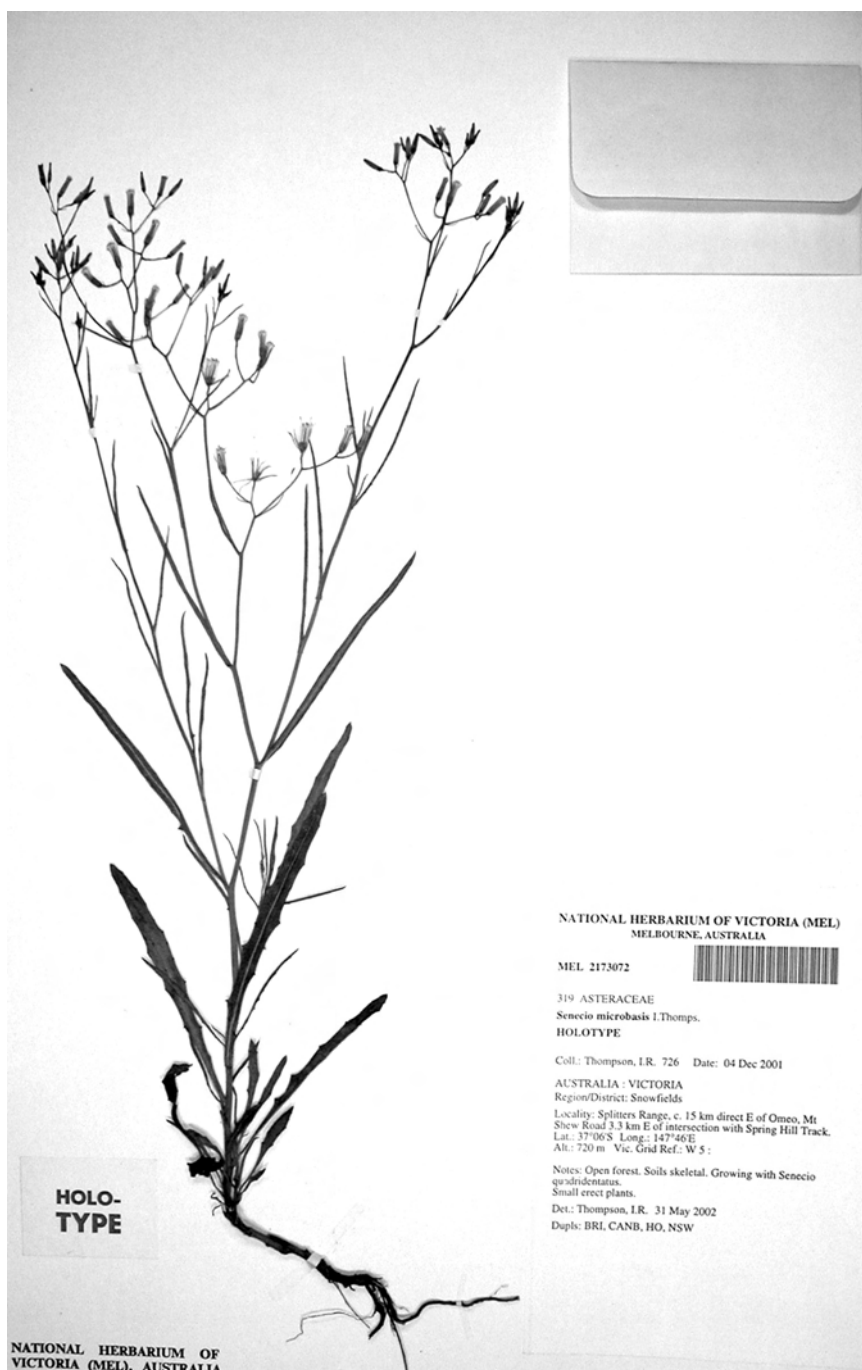


Figure 35. *Senecio microbasis* (holotype: I.R. Thompson 726 MEL).

25. *Senecio scabrellus* I.Thomps., *sp. nov.*

A. S. tenuifloro (DC.) Sieber ex Sch.Bip., pilis grossis foliorum pluribus, foliis superis et pedunculis lanatioribus, acheniis tenuioribus papillis multioribus differt.

Type: Queensland, Mt Mitchell, Cunningham's Gap, *P.I. Forster PIF11098* & *R. Reilly*, 18 Aug. 1992; holo: BRI; iso: K, MEL.

Herbs to 0.5 m high. *Primary roots* well-developed; secondary roots slightly fleshy, c. 1 mm diam. (only one example seen). *Stems* erect or sprawling, somewhat coarse-hairy mainly below mid stem, glabrescent, becoming sparsely to moderately appressed-cottony or woolly in upper stem region; secondary and tertiary branching often well-developed. *Leaves in middle third of stems* more or less evenly spaced and sized, narrow-elliptic to linear, 5–10 cm long, l:w ratio c. 6–15, not dissected or occasionally coarse-dentate; segments 2 or 3 per side in middle third, spreading, triangular; base auriculate, with auricles sometimes dentate; margin usually with frequent denticulations; upper surface densely scabrid, sometimes a little obscured by cottony hairs; lower surface densely woolly, the woolly indumentum obscuring coarse hair-bases. *Uppermost leaves* similar in shape, l:w ratio c. 10–20; margin often appearing entire due to rolling. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping not ascertained; mature lateral peduncles mostly 7–15 mm long. *Capitula:* calycular bracteoles 3–5, 1.0–1.5 mm long; peduncle and margin of bracteoles patchily woolly or cobwebby at anthesis; involucre 5.0–7.0 mm long, 1.0–1.5 mm diam.; phyllaries mostly 7–10, glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green, commonly minutely black at tip; post-fructescence receptacle 1.5 mm diam., with phyllaries finally variously oriented. *Florets* 12–25, c. 70% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 5–5.5 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, 0.2–0.3 mm long. *Achenes* very narrow obloid to slightly lageniform, 2.8–3.2 mm long, ribs convex, light or dark brown or reddish, with papillose hairs scattered to crowded in lines, l:w ratio of hairs c. 2–3. *Pappus* 5–6 mm long. (Fig. 36)

Flowers mostly winter–spring.

Distribution and Habitat: Occurs over a small mountainous area of far south-eastern Queensland and far north-eastern New South Wales almost on the border between the two states and c. 100 km inland from the coast (Fig. 33c). Grows on rocky (rhyolite) cliff-lines and trachyte pavements in heathland or woodland on or near mountain summits

Etymology: The epithet alludes to the short, coarse hairs densely covering the upper surface of leaves (*L. scabrellus*, minutely roughened).

Notes: *Senecio scabrellus* is characterised by a much-branched habit, leaves both densely scabridulous and woolly, branches and peduncles woolly, capitula slender and few-floreted, and achenes relatively slender. Its closest relative is probably *S. tenuiflorus*, which has similarities in habit, indumentum type, and in having convex ribs on the achenes.

Selected specimens examined: **QUEENSLAND:** Mt Huntley, western slopes, *P.I. Forster PIF11832*, *D. Halford* & *R. Reilly*, 4.x.1992 (BRI); Mt Cordeaux, *R.W. Johnson* 1159, 9.x.1959 (BRI); Mt Lindesay, *P.I. Forster PIF12180*, 26.x.1992 (BRI). **NEW SOUTH WALES:** Mt Lindesay, 7 miles (11.2 km) ESE of Woodenbong, *R. Coveny* 4558 & *A.N. Rodd*, 9.ix.1972 (BRI, NSW).

26. *Senecio tenuiflorus* (DC.) Sieber ex Sch.Bip., *Flora* 28: 498 (1845)

Erechtites tenuiflora DC., *Prodr.* 6: 296 (1838).

Type: [New South Wales], 'In Nova-Hollandia', *Sieber* 435; lecto (here designated): MEL; isolecto: G (microfiche seen MEL).

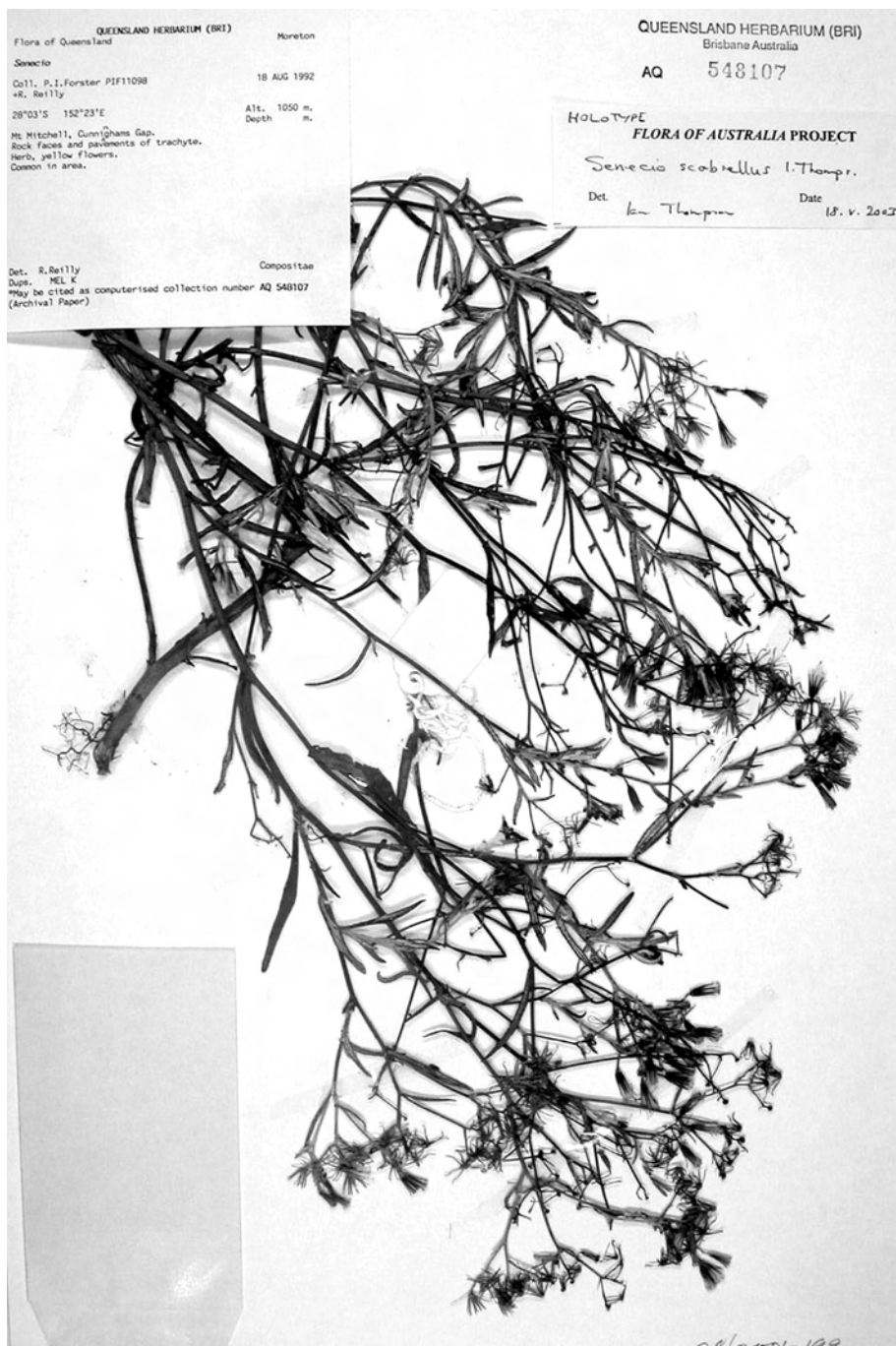


Figure 36. *Senecio scabrellus* (holotype: P.I. Forster 11098 & R. Reilly BRI).

Herbs to 0.6 m high. *Taproot* well-developed; secondary roots hardly fleshy, 0.5–0.8 mm diam. *Stems* erect, \pm glabrous or sparsely appressed-cottony; commonly becoming moderately branched. *Leaves in middle third of stems* sometimes becoming distinctly wider spaced and narrower upwards, narrow-oblongate, narrow-lanceolate, or linear, 7–15 cm long, l:w ratio c. 8–20, not dissected or remotely lobate to deeply lobate; segments 1–3 per side mostly in proximal half, spreading, triangular to narrow-triangular; base attenuate or auriculate, with auricles narrow-triangular to 5 mm long, not amplexicaul; margin nearly entire or with scattered denticulations or sometimes with a few teeth; both surfaces coarse-hairy; lower surface green or purple, usually hairs with a cobwebby overlay. *Uppermost leaves* l:w ratio c. 15–40 or much lower if lobes present; base auriculate, with auricles often rather long, entire, narrow-triangular, hardly amplexicaul; upper surface sparsely coarse-hairy or glabrous; lower surface sometimes moderately cobwebby or woolly, hairs not obviously coarse-based. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping moderate; mature lateral peduncles mostly 6–22 mm long. *Capitula*: calycular bracteoles 2–6, 1.0–1.5 mm long; peduncle and margin of bracteoles glabrous or slightly cobwebby; involucre 5.0–7.0 mm long, 1.0–1.5 mm diam.; phyllaries 7–13, glabrous, with apex erect; stereomes (in dried specimens) rather thin, \pm flat, green, sometimes minutely black at tip; post-fructescence receptacle 2–3 mm diam., with phyllaries commonly finally reflexed. *Florets* 15–35, c. 80% female; corolla-lobes triangular, hardly thickened apically; corolla of bisexual florets 5.5–7 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.2 mm long. *Achenes* narrow-oblong-ellipsoid to narrow-ellipsoid, often rather curved, 2.0–2.5 mm long, olive-brown, orange-brown or reddish, ribs convex, relatively crowded, glabrous or with papillose hairs sparse in recessed lines, l:w ratio of hairs c. 2–3. *Pappus* 5–6 mm long. (Figs 4, 37)

Flowers most of year.

Distribution and Habitat: Occurs in eastern Australia from Rockhampton in south-eastern Queensland south to the Sydney area in central-eastern New South Wales and extending inland in south-eastern Queensland as far as Mitchell (Fig. 33d). Grows in loams and sands, often on rocky slopes, in forest and woodland.

Notes: The name *S. tenuiflorus* was resurrected by Belcher through the application of determinavit slips, but without any supporting publication, in the 1980s. This name was largely applied to a suite of entities from eastern Australia previously referred to *S. quadridentatus* but with coarse hairs and with achenes not always lageniform. In this paper several entities that Belcher and others included under *S. tenuiflorus*, based on their determinations, are described as separate species. These are *S. prenanthoides*, *S. phelleus*, *S. dolichocephalus* and *S. microbasis*.

The achenial morphology of *Senecio tenuiflorus* is distinctive. Ribs are typically somewhat convex and closely spaced with short papillose hairs absent or sparse in intervening grooves, and the outer achenes of a capitulum are usually distinctly curved. The stereomes of the phyllaries are relatively thin and flat on drying like those of *S. queenslandicus* and *S. quadridentatus*. Apart from these characters, *S. tenuiflorus* differs from *S. phelleus* by the better developed taproot, the leaf-bases that have triangular lateral lobes rather than sagittate ones, and the less thickened apex of corolla-lobes. *Senecio prenanthoides* is also similar but it has a coarse-hairy lower stem region and lageniform achenes. *Senecio microbasis* has smaller leaves lacking narrow-triangular lobes and auricles, and its achenes are more densely papillose and less convexly ribbed.

Only the MEL duplicate of the type collection Sieber 435 has been examined. De Candolle is likely to have examined the duplicate at G when describing *Erechtites tenuiflora* but, because there is a possibility that the G specimen is not the same as that at MEL, the latter is chosen here as the lectotype.

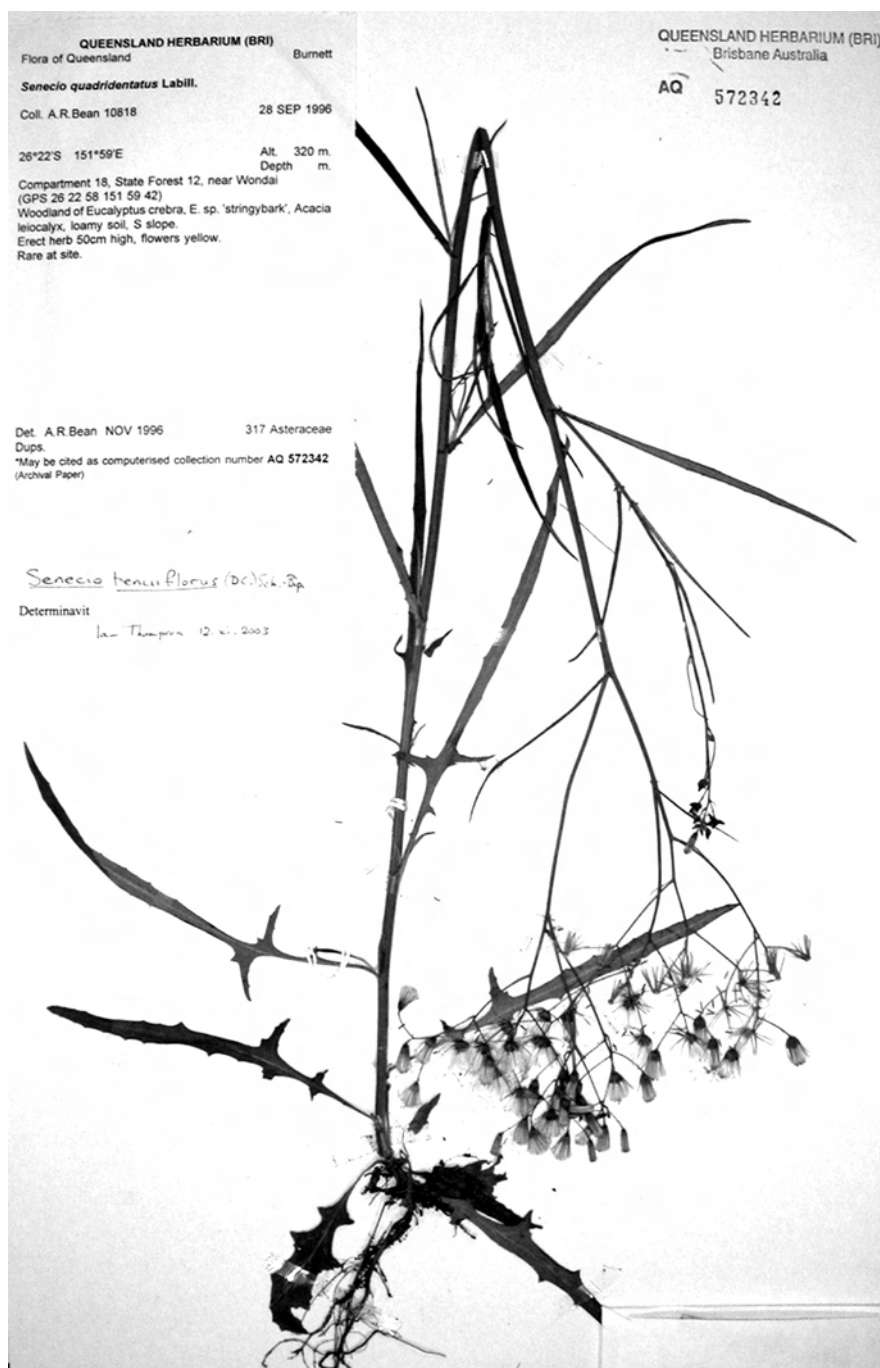


Figure 37. *Senecio tenuiflorus* (A.R. Bean 10818 BRI).

Selected specimens examined: **QUEENSLAND:** Maryvale Rubbish Tip, NE of Warwick, A.R. Bean 9514, 6.i.1996 (BRI); Mt Glorious, B.A. Lebler & L. Durrington, 28.xi.1972 (BRI); Mount Toowoona, 11 km WSW of Maroon, D. Halford Q1511, P.I. Forster & R. Reilly, 3.ix.1992 (BRI); Palmgrove National Park, NW of Taroom, Bigge Range, P.I. Forster PIF23731 & R. Booth, 4.xi.1998 (BRI); Helidon, Pickerings Gully, L.H. Bird & P.I. Forster PIF2998, 30.viii.1987 (BRI); Bunya Mountains, Big Falls area, L.S. Smith, 15.xii.1954 (BRI); Kenilworth Bluff, about 8 km north of Kenilworth, P.R. Sharpe 4652 & T. Bean, 7.iii.1987 (BRI); Blackdown Tableland, ca. 35 km SE of Blackwater, R.J. Henderson 993, L. Durrington & P. Sharpe, 4.ix.1971 (BRI, MEL); Gap Creek Road, east of Springsure, A.R. Bean 14159, 13.x.1998 (BRI); Beeron holding, 7 km west of "Toondahra", P.I. Forster 7128, 20.viii.1990 (BRI, MEL). **NEW SOUTH WALES:** North Western Slopes: North Western Slopes: Kwiambal National Park, c. 130 km NW of Glen Innes, junction of McIntyre and Severn Rivers, J.T. Hunter s.n., Nov 1997 (NE); Attunga State Forest, J.R. Hosking 210, 25.x.1990 (NE, NSW); Copeland, c. 14 miles [23 km] NW of Gloucester, R. Coveny s.n., 2.i.1967 (NSW); Rotherwood Road off Mt Hercules Road, Razorback range [10 km SSW of Camden], R. Coveny 7468, D. Benson & H. Bryant, 17.iii.1976 (NSW).

27. *Senecio gunnii* (Hook.f.) Belcher, *Ann. Missouri Bot. Gard.* 43: 64 (1956)

Erechtites gunnii Hook.f., *Hooker's London J. Bot.* 6: 122 (1847); *E. quadridentata* DC. var. *gunnii* (Hook.f.) Benth., *Fl. Austral.* 3: 660 (1867).

Type: [Tasmania], Marlboro, R.C. Gunn 700/1842, Jan. 1841; syn: K, NSW.

Herbs to 1 m high. *Taproot* sometimes well-developed; secondary roots fleshy, 0.8–1.5 mm diam. *Stems* erect, moderately appressed-cottony, sometimes sparser upwards, rarely nearly glabrous. *Leaves* in middle third of stems more or less evenly spaced and sized, oblanceolate, narrow-elliptic or very narrow-elliptic, 6–12 cm long, l:w ratio c. 3–7, not dissected or occasionally coarse-dentate to lobate; segments 4–6 per side mostly in middle third, spreading, triangular; base attenuate or cuneate; margin entire or with frequent denticulations or teeth; upper surface sparsely to densely appressed-cobwebby, glabrescent; lower surface often purple, moderately densely, or rarely sparsely, appressed-cobwebby. *Uppermost leaves* very narrow-elliptic, l:w ratio c. 5–9; base cuneate or with small entire, auricles. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 10–100; overtopping slight; mature lateral peduncles mostly 6–15 mm long. *Capitula:* calycular bracteoles 3–6, 2.0–3.5 mm long; peduncle and margin of bracteoles cobwebby to woolly at anthesis; involucre 5.0–7.5 mm long, c. 1.7–2.0 mm diam.; phyllaries 11–14, cobwebby or glabrous, with apex erect; stereomes (in dried specimens) ±flat, green, minutely black at tip, sometimes purple in a zone c. 1 mm long immediately below tip; post-fructescence receptacle 2–4 mm diam., with phyllaries finally erect or spreading. *Florets* 26–40, c. 70% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 6–7 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.2–0.3 mm long. *Achenes* very narrow oblong-ellipsoid, 2.5–4.0 mm long, olive-brown, usually with very few papillose hairs in lines, l:w ratio of hairs c. 2. *Pappus* 5–6 mm long. (Fig. 38)

Flowers summer–autumn.

Distribution and Habitat: Occurs in south-eastern Australia from the Brindabella Ranges in the Australian Capital Territory and far south-eastern New South Wales south-east to Lake Mountain in south-central Victoria, and from Mt Arthur in northern Tasmania south to Mt Wellington and south-west to Eldon Bluff (Fig. 33e). Grows in woodlands, grasslands, herbfields and open shrublands in montane to alpine areas.

Notes: *Senecio gunnii* resembles *S. quadridentatus* in terms of type and density of indumentum but it differs by having broader, narrow-elliptic leaves, more convex stereomes, bisexual florets with 5-lobed corollas, female florets with larger corolla lobes, and more sparsely haired and non-lageniform achenes. A specimen from Tinderry South



Figure 38. *Senecio gunnii* (R.M. King 9767 MEL).

Peak near Canberra (*J.H. Willis*, 12 Jan. 1970, MEL), is possibly a hybrid; vegetatively it resembles *S. gunnii*, but the capitula are atypical of this species in having fewer and longer phyllaries and fewer florets, and in these respects it more closely resembles *S. prenanthoides*.

Selected specimens examined: **NEW SOUTH WALES:** Kangaroo Range, ca 3 miles [5 km] from Mt Kosciuszko [Kosciuszko] summit, *C. Totterdell* 114, 27.ii.1970 (CANB, MEL, NSW). **VICTORIA:** Blue Rag Range, c. 15 km SE of Mt Bernard on Hotham–Dargo road, *L. Haegi* 1638, 5.ii.1979 (MEL, NSW). **TASMANIA:** Ben Lomond National Park, Ski Village, *S.J. Forbes* 1381, 3.ii.1983 (CBG, HO, MEL).

28. *Senecio niveoplanus* I.Thomps., *sp. nov.*

A *S. gunnii* (Hook.f.) Belcher pilis grossis instructis, phyllariis et flosculis plerumque paucioribus, acheniis glabris differt; a *S. prenanthoides* A.Rich. foliis auriculatis, foliis summis lanceolatis, acheniis pallidis glabris non lageniformibus differt.

Type: Victoria, Alpine National Park, Northern end of Howitts Plain, c. 300 m west along Butcher Country Track from intersection with Howitt Plain Road, *I.R. Thompson* 758, 6 Feb. 2002; holotype: MEL; isotype: AD, CANB, HO, NSW.

Herbs to 1.2 m high. *Taproot* not known; secondary roots fleshy, c. 1 mm diam. *Stems* erect, coarse-hairy, density reducing upwards, glabrous or sparsely cottony near summit. *Leaves in middle third of stems* more or less evenly spaced and sized, narrow-elliptic or lanceolate, 7–16 cm long, l:w ratio c. 3–6, coarse-dentate to lobate; segments 3 or 4 per side in proximal half to two-thirds, spreading, triangular; base usually auriculate above mid stem, with auricles divided, not or slightly amplexicaul; margin usually with frequent denticulations and occasional teeth; both surfaces coarse-hairy; lower surface commonly purple, sometimes with a cobwebby overlay over coarse hairs. *Uppermost leaves* lanceolate, l:w ratio c. 5–7, dentate or lobate proximally, not widest at auricles. *Unit inflorescences* of many capitula; total number of capitula per stem often 30–100; overtopping variable; mature lateral peduncles mostly 7–15 mm long. *Capitula:* calycular bracteoles 3–4, 2.0–3.0 mm long; peduncle and margin of bracteoles sparsely cobwebby at anthesis; involucre 6.0–8.0 mm long, 1.5 mm diam.; phyllaries 8–13, glabrous, with apex erect; stereomes (in dried specimens) gently convex, green, sometimes minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle unknown. *Florets* 15–25, c. 70% female; corolla-lobes triangular, hardly thickened apically; corolla of bisexual florets 6–7 mm long, 5-lobed; corolla-lobes of female florets 4, 0.3 mm long. *Achenes* narrow oblong-ellipsoid, 3.0–4.0 mm long, olive brown, glabrous. *Pappus* 6–7 mm long. (Figs 4f, 39)

Flowers late summer to autumn.

Distribution and Habitat: Occurs in eastern Victoria between Licola and Falls Creek, and in the Australian Capital Territory at Cribb's Creek (Fig. 33f). Grows in subalpine woodland.

Etymology: The epithet alludes to its habitat (L: *niveus*, snow, and *planus*, plain).

Notes: Plants seen growing at Howitt Plain in Victoria were many-stemmed. *Senecio niveoplanus* is similar in indumentum and capitulum size to *S. prenanthoides* but leaves are not crowded basally and are much broader and more lobed above mid stem, bracts and bracteoles are longer, and achenes are glabrous and not lageniform. *Senecio gunnii* has a similar leaf shape but its stems and leaves are not coarse-hairy, leaves are shorter, auricles are less developed, capitula have more florets and achenes are generally sparsely haired.

Selected specimens examined: **AUSTRALIAN CAPITAL TERRITORY:** Cribbs Creek, upper Cotter Valley, Namadgi National Park, *P. Gilmour* 6455, 3.i.1988 (CBG). **VICTORIA:** 73 miles [115 km] north of Heyfield, ca. 39 miles [60 km] north of Licola, beyond Trapyard Hill, *J.*



Figure 39. *Senecio niveoplanus* (holotype: I.R. Thompson 758 MEL).

Carrick 3146, 20.i.1972 (AD); 4 m. [7 km] NW of Falls Creek, Kiewa area, A.C. Beauglehole 22383, 24.i.1967 (MEL); Dargo High Plains, Lightbound Creek, A.C. Beauglehole 41658, 23.iii.1973 (MEL).

29. *Senecio prenanthoides* A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 96 (1834).

Type: [New South Wales], 'Crescit in Novae Hollandiae, loco dicto Port Jackson' [Sydney], *Gaudichaud* 4; *holo*: P.

S. tenuiflorus sensu N.G. Walsh, *Fl. Victoria* 4: 962 (1999), *p.p.*

S. sp. aff. tenuiflorus sensu J.H. Ross in *Census of Vascular Plants in Victoria* 5 (1996).

S. sp. C forms 1 and 2 *sensu* M.E. Lawrence, *Australian J. Bot.* 28: 155 (1980).

S. sp. E sensu G.J. Harden, *Flora of New South Wales* 3: 305 (1992) *p.p. maj.*

Herbs to 0.6 m high. *Taproot* inconspicuous; secondary roots fleshy, often tuberiform, 1–2.5 mm diam. *Stems* erect; coarse-hairy in lower third sometimes with a cottony overlay, variably glabrescent, coarse hairs giving way to a sparse appressed-cottony indumentum or stems becoming glabrous. *Leaves in middle third of stems* becoming distinctly wider spaced and narrower upwards, oblanceolate to narrow-oblanceolate, or linear, 6–17(–22) cm long, l:w ratio c. 4–13, not dissected or occasionally 1 or 2 triangular to narrow-triangular lobes per side in proximal half; base attenuate; margin entire or with frequent denticulations or teeth; both surfaces coarse-hairy; lower surface commonly purple. *Uppermost leaves* narrow-lanceolate or linear to narrow-linear, l:w ratio c. 7–30, sometimes lobate in proximal quarter; margin entire or dentate proximally; base sometimes with small, entire auricles, not amplexicaul; surfaces coarse-hairy giving way to glabrous or slightly cobwebby upwards. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping marked; mature lateral peduncles mostly 8–30 mm long. *Capitula*: calycular bracteoles 3–5, 1.5–2.5 mm long; peduncle and margin of bracteoles slightly cobwebby or glabrous at anthesis; involucre (5.0–)6.0–9.0 mm long, 1.3–1.6 mm diam.; phyllaries 8–13, glabrous, with apex erect; stereomes (in dried specimens) ±flat or gently convex, green or occasionally somewhat purple, commonly minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 2–2.5 mm diam., with phyllaries commonly finally reflexed. *Florets* 15–35, c. 70% female, corolla-lobes triangular, thickened apically; corolla of bisexual florets 6.5–8 mm long, mostly 5-lobed; corolla-lobes of female florets 4, 0.2–0.3 mm long. *Achenes* lageniform, 2.8–4.5 mm long, orange-brown, or (in bisexual florets) dark brown, with papillose hairs scattered in lines, l:w ratio of hairs c. 1–2. *Pappus* 6–8 mm long. (Figs 1c, 2b, 41)

Flowers late spring–autumn.

Distribution and Habitat: Occurs in eastern Australia. Apart from a northern outlier at Mt Fox, it extends from the Blackdown Tableland in south-eastern Queensland south through eastern New South Wales, Victoria and Tasmania to Huon Island in southern Tasmania. Also extends west from far eastern Victoria to the Adelaide region in south-eastern South Australia (Fig. 40a). Grows in sandy and loamy soils, in scrub, woodland, and forest, from sea-level to 1500 m.

Notes: One of several species forming a rosette of leaves until the phase of rapid elongation leading up to flowering. As flowering commences, leaves tend to be relatively crowded and are significantly broader in the lower half of the plant. In this respect, as well as in the type of leaf indumentum and capitular dimensions, *S. prenanthoides* is similar to *S. phelleus*. Both of these species have recently been identified as *S. tenuiflorus*, in particular in South Australia and Victoria where they are both common. In Walsh (1999), the form of *S. tenuiflorus* with rostrate achenes is referable to *S.*

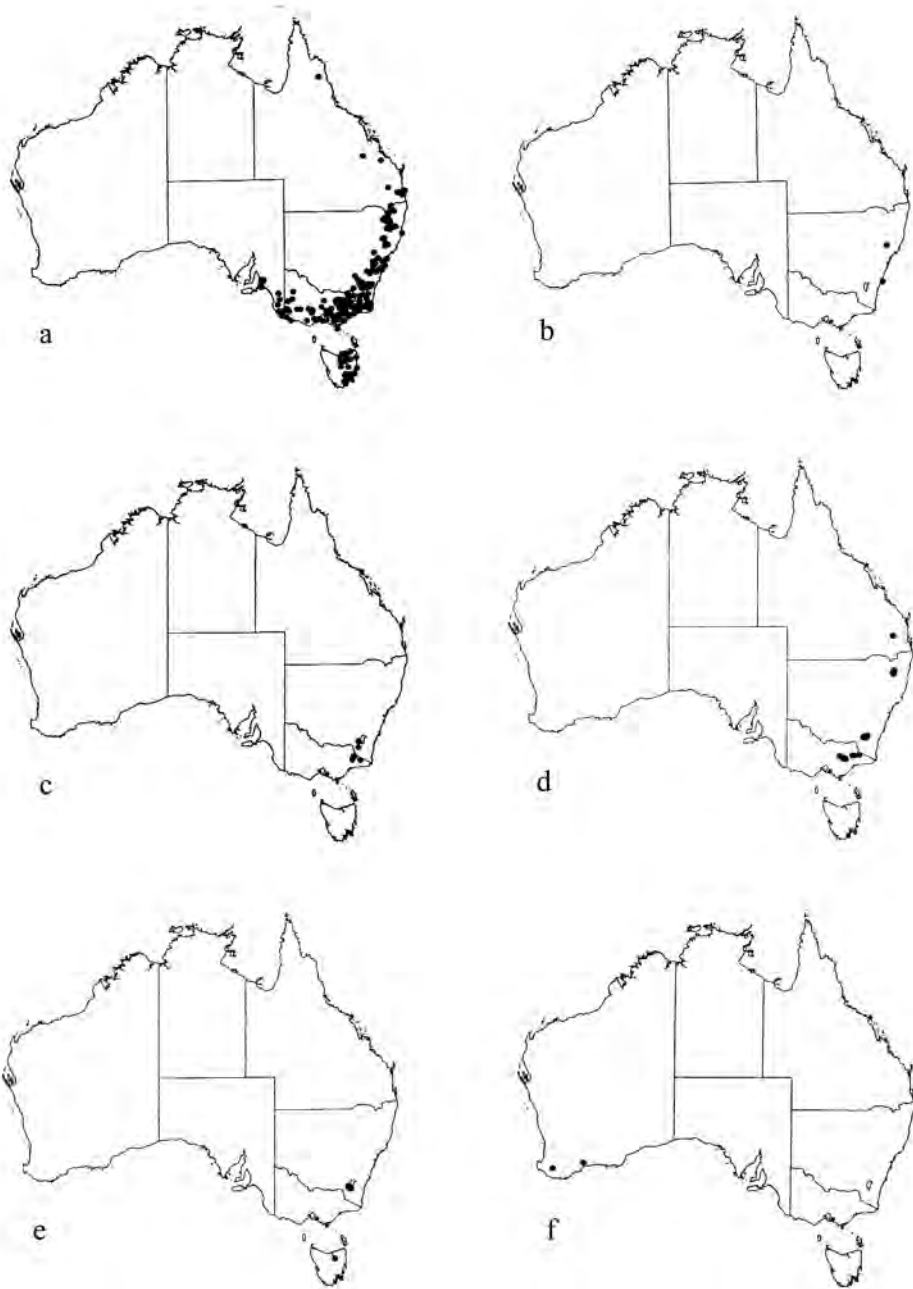


Figure 40. Distribution of a. *Senecio prenanthoides*; b. *S. psilophyllus*; c. *S. lageniformis*; d. *S. nigrapicus*; e. *S. longipilus*; f. *S. oldfieldii*.

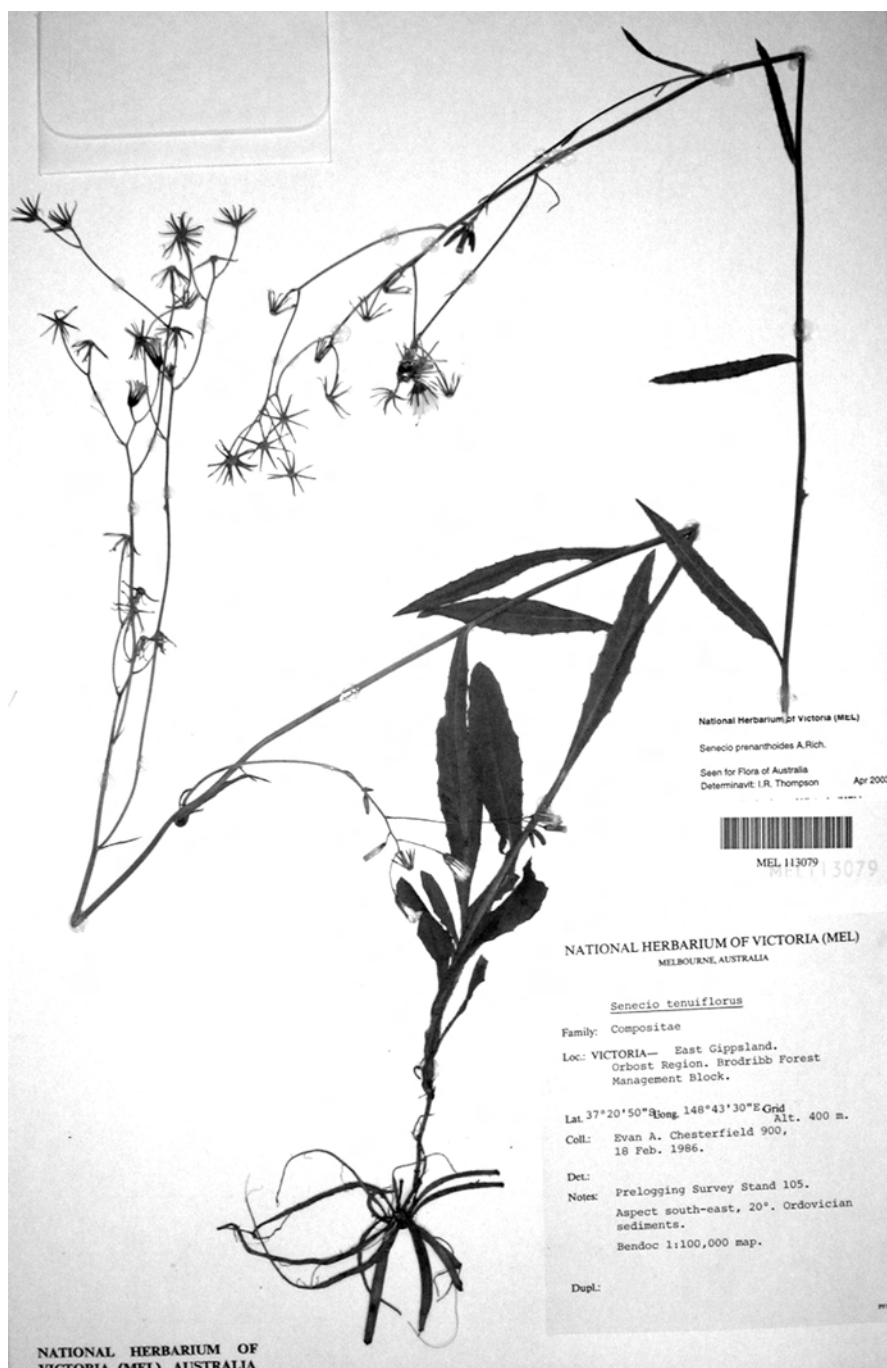


Figure 41. *Senecio prenanthoides* (E.A. Chesterfield 900 MEL).

prenanthoides and the form with non-rostrate achenes is referable to *S. phelleus*. The form with a dense cover of coarse hairs also mentioned under *S. tenuiflorus* in this flora is referable to *S. hispidissimus*.

Senecio prenanthoides differs from *S. phelleus* by having slightly tuberiform roots, basal regions of stems with coarse hairs, auricles when present, not sagittate or amplexicaul, phyllaries sometimes fewer and usually finally reflexed, and achenes longer and lageniform. Populations in Victoria and South Australia have capitula with a higher length:diameter ratio than occurs in *S. phelleus*, but further north this distinction is lost.

The type collection, collected from the Sydney area, is of only the upper stem region and inflorescence. However, the presence of coarse hairs on the lowermost leaf of the specimen (disconnected and found in envelope) and the shape of the achenes enable it to be matched to this widespread species. The description by the author, A. Richard, is typically unhelpful.

Hybrids have been recognised between this species and *S. hispidulus*, *S. glandulosus*, and *S. glabrescens*.

Selected specimens examined: **SOUTH AUSTRALIA:** Lenswood Recreation Park, *R. Bates* 9250, 8.ii.1987 (AD); Big Heath Reserve, *D. Hunt* 2577, 4.xi.1965 (AD); Padthaway, ca. 40 km SSW of Bordertown, *P. Canty*, 23.x.1980 (AD); Caroline State Forest, c. 15 km south-south-east of Mt Gambier, *P. Wilson* 1318, 17.xi.1959 (AD); Mt Burr. 5 km south of summit, *R. Bates* 7689, 26.x.1986 (AD); Mt Lofty Range, *E.H. Ising*, 10.iv.1927 (AD). **QUEENSLAND:** Kroombit Tops State Forest, *E.J. Thompson* BIL94, *G.P. Turpin* & *P.I. Forster*, 16.ii.1995 (BRI); Jolly's Lookout, D'Aguilar Range, *S.T. Blake* 21051, 31.x.1959 (BRI); Mt Gravatt, near Brisbane, *C.T. White*, 8.iv.1931 (BRI); Blackdown Tableland ca. 32 km SE of Blackwater, *R.J. Henderson* 856, *S.B. Andrews* & *P. Sharpe*, 26.iv.1971 (BRI); Moreton Island, *C.T. White*, Sept 1908 (BRI); Baldy right (nth) Bunya Mountains, *R.J. Fairfax* 203, 14.iii.1995 (BRI). **NEW SOUTH WALES:** Middle Arm Travelling Stock Reserve, 24.5 km directly north of Goulburn, *I. Crawford* 5090, 14.xii.1998 (CANB); Tinderry Mountains, *T.G. Hartley* 13601, 12.iii.1972 (CANB); Southern Tablelands: Bombala River, c. 17 km NE of Bibbenluke, north of confluence with Back Creek, *I. Crawford* 740, 21.xii.1987 (CBG); Northern Tablelands. Barrington Swamp, Barrington Tops, *W.M. Dowling* BT 12/6 & *A. Heinrich*, 30.i.1998 (CANB); Warra SF, east Llangothlin, 300m south Crown Mtn FR gate, *J.T. Hunter* 2684, 1996 (NE); Northern Tablelands. Dodds Trail, 1 km ESE of north entrance to Single National Park, *L.M. Copeland* 2156, 12.xi.1999 (NE); east boundary of Goonoowigall BR, 13 km SE of Inverell, Arm Rd, *G.J. White*, *D.M. Bell* & *M.B. Henderson*, 22.xii.1992 (NE); Warrabah National Park, *J.R. Hosking* 801, 25.ix. 1989 (CBG, MEL, NE, NSW). **AUSTRALIAN CAPITAL TERRITORY:** "80 acres", Cotter Hut Road, upper Cotter Valley, Namadgi National Park, *P. Gilmour* 6395, 1.i.1988 (CBG); Summit of Stockyard Spur, 2.5 km WSW of Corin Dam Wall, *B.J. Lepski* 735, 1.iii.1992 (CANB). **VICTORIA:** Nepean State Park, *A.C. Beauglehole* 71276 & *L.K.M. Elmore*, 9.xi.1982 (MEL); Near Mallacoota, Genoa Peak, 10 km from Princess Hwy. End of track, *B. Nordenstam* & *A. Anderberg* 1294, 12.xi.1989 (MEL); Carpendeit Reference Area, 32 km WSW of Colac PO, *A.C. Beauglehole* 67286, 13.xii.1979 (MEL); 9 m [14 km] NNW of Dergholm PO, *A.C. Beauglehole* 37946, 25.xi.1971 (CANB, MEL); Just west of the Lakes National Park, Sperm Whale Head, *T.B. Muir* 2309, 13.x.1961 (MEL); Grampians. Jimmy Creek area, 26 km south of Hall's Gap, *A.C. Beauglehole* 66959, 6.xii.1979 (MEL); Snowfields. Clover Flat, west side of Moroka Road, 47 km NE of Licola. Licola is 257 km east of Melbourne, *P. C. Jobson* 1981, 7.iii.1993 (BRI, MEL); Gippsland Plain. Morwell National Park, *K. Harris* s.n., 12.xii.1992 (MEL); East Gippsland. Orbost Region. Brodribb Forest Management Block, *E. A. Chesterfield* 777, 11.ii.1986 (MEL); Discovery Bay Coastal Park, Swan Lake Rd c. 5 km north of Swan Lake, *I.R. Thompson* 736 & *J. Stubbings*, 1.i.2002 (MEL). **TASMANIA:** By Channel Highway, opposite Huon Island, about 30 miles S. of Hobart, *R. Melville* 2422, *J. Willis* & *W. Curtis* (MEL); Mt Maria Track. Maria Island, *A.M. Buchanan* 2028, 10.xii.1983 (CANB, HO); Oakden Hill, *A. Moscal* 8770, 7.xi.1984 (CANB, HO); Barnes Gully area, Magra, *F. Duncan* 1401, 27.xi.1985 (HO); Hardwickes Hill, east of summit, *A.M. Buchanan* 1770, 24.xi.1983 (HO); River Ouse – Monpeelyata Canal, *A. Moscal* 6483a, 24.ii.1984 (HO).

30. *Senecio psilophyllus* I.Thomps., sp. nov.

A *S. prenanthoides* A.Rich. caulibus et foliis glabris, caulibus aequaliter foliosis, foliis tenuioribus differt.

Type: Australian Capital Territory, Booderee National Park, c. 200 m SW along foreshore from Murray's boat ramp, *N.M. Taws 540*, 31 July 1996; holotype: CANB.

Herbs to 0.4 m high. *Taproot* inconspicuous; secondary roots fleshy, slightly tuberiform, 1–2 mm diam. *Stems* erect, glabrous. *Leaves in middle third of stems* more or less evenly spaced and sized, linear to narrow-linear, 10–13 cm long, l:w ratio c. 10–14, not dissected; base cuneate; margin mostly callus-denticulate or with a few remote teeth, mostly proximal; surfaces glabrous or short, coarse hairs present on margin of lower leaves; lower surface green or tinged purple. *Uppermost leaves* similar; base sometimes with small auricles, not amplexicaul. *Unit inflorescences* of several to many capitula; total number of capitula per stem c. 40; overtopping slight; mature lateral peduncles mostly 8–20 mm long. *Capitula:* calycular bracteoles 3–5, 1.0–1.5 mm long; peduncle and margin of bracteoles glabrous at anthesis; involucre 6.0–7.5 mm long, 1.3–1.6 mm diam.; phyllaries 8–13, glabrous, with apex erect; stereomes (in dried specimens) flat or gently convex, green, sometimes minutely black at tip and/or purple in a zone c. 1 mm long below tip; post-fructescence receptacle 2 mm diam., the phyllaries ?finally reflexed. *Florets* 20–25, c. 70% female; corolla-lobes narrow-triangular, moderately thickened apically; corolla of bisexual florets 6 mm long, 5-lobed; corolla-lobes of female florets 3 or 4, c. 0.2 mm long. *Achenes* lageniform, 3.0–3.5 mm long, light brown, with papillose hairs in lines, l:w ratio of hairs 1–2. *Pappus* c. 6 mm long. (Fig. 42)

Flowers autumn–winter.

Distribution and Habitat: Occurs in the Australian Capital Territory in Booderee National Park, on the southern margin of Jervis Bay. A possible disjunct record is recorded from near Scone (Fig. 40b). Grows in pale grey sand on the coast in open forest.

Etymology: The epithet alludes to the nearly glabrous mature leaves (Gk: *psilos*, naked, and *phyllus*, leaf).

Notes: Currently this species is known only from the Booderee National Park south of Jervis Bay, where it has been collected from three different sites several kilometres apart. Similar to *S. prenanthoides*, particularly in capitulum, achene, and root morphology, but with stems and leaves (except for the margin) glabrous, leaves not crowded basally, and achenes more densely papillose.

Selected specimens examined: **NEW SOUTH WALES:** Woolooma Mt, Beltrees, Scone, A.L. White, Nov. 1903 (NSW). **AUSTRALIAN CAPITAL TERRITORY:** Track to Steamer's Beach, Booderee National Park, *I.R. Thompson 790*, 23.ix.2003 (MEL).

31. *Senecio lageniformis* I.Thomps., sp. nov.

A *S. quadridentato* Labill. indumento sparsiore, caulibus repentibus, plerumque brevioribus, capitulis latioribus, flosculis hermaphroditis pluribus differt.

Type: New South Wales, Kosciuszko National Park, Long Plain, near confluence of Murrumbidgee River and Boundary Creek, *I.R. Thompson 747 & N.G. Walsh*, 31 Jan. 2002; holotype: MEL; isotype: AD, CANB, HO, NSW.

Senecio sp. 2 *sensu* N.G. Walsh, *Fl. Victoria* 4: 962 (1999).

Senecio sp. N *sensu* G.J. Harden, *Fl. New South Wales* 3: 306 (1992), *p.p.*

Herbs to 0.4 m high. *Root system* not seen. *Stems* creeping then ascending to erect; \pm glabrous or transiently sparsely cottony. *Leaves in middle third of stems* commonly becoming wider spaced and broader upwards, oblanceolate 4–8(–10) cm long, l:w ratio c. 4–10, not dissected; base attenuate; margin with scattered denticulations or teeth;



Figure 42. *Senecio psilophyllus* (holotype: N.M. Taws 540 CANB).

surfaces glabrous or minutely scabridulous; lower surface green. *Uppermost leaves* very narrow-elliptic to narrow-linear, l:w ratio c. 7–20; base sometimes with small, entire auricles, not amplexicaul. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 5–40; not or only slightly overtopping; mature lateral peduncles mostly 15–40 mm long. *Capitula*: calycular bracteoles 3–5, 1.5–2.5 mm long; peduncle and margin of bracteoles cobwebby at anthesis; involucre 6.0–8.0 mm long, c. 2.0–2.6 mm diam.; phyllaries mostly 12–14, cobwebby or glabrous, with apex erect; stereomes (in dried specimens) \pm flat, green or tinged purple, occasionally minutely black at tip, commonly purple in a zone c. 1 mm long below tip; post-fructescence receptacle 3–4 mm diam., with phyllaries commonly finally spreading. *Florets* 50–60, c. 70% female; corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 6–7 mm long, 4- or 5-lobed; corolla-lobes of female florets 3 or 4, 0.2–0.3 mm long. *Achenes* lageniform, 3.5–4.5 mm long, dark brown, with papillose hairs scattered in lines, l:w ratio of hairs 1–2. *Pappus* 5–6 mm long. (Fig. 43)

Flowers summer–autumn.

Distribution and Habitat: Occurs in far south-eastern Australia from Long Plain near Kiandra in far south-eastern New South Wales south-south-west to Bentley Plains in eastern Victoria (Fig. 40c). Grows in grasslands, herbfields, low open heathland, or grassy open woodland in subalpine areas.

Etymology: The epithet alludes to the achenes, which resemble a slender bottle (L: *lageniformis*, flask-shaped).

Notes: Allied to *S. quadridentatus*, *S. prenanthoides* and several other species in achenial morphology and in the number and size of calycular bracteoles. It differs mostly in habit, diameter of involucre, and in the high number of bisexual florets. The undissected leaves help to distinguish this species from other subalpine species.

Selected specimens examined: **NEW SOUTH WALES**: Kosciuszko National Park, Long Plain, c. 100 m west of confluence of Boundary Ck and Murrumbidgee R, *N.G. Walsh* 4886 & *K. McDougall*, 9.xii.1998 (MEL); Kosciuszko National Park, Nungar Plain, knoll c. 2 km due east from western extremity of plain, north side of Nungar Ck, *N.G. Walsh* 5512, *K. McDougall* & *J. Walsh*, 11.xii.2001 (MEL). **VICTORIA**: East Gippsland. Rocky Plain, *A.C. Beaglehole* 35860 & *K.C. Rogers*, 6.i.1971 (MEL); 1.5 km north-east along Cowombat Flat track from its intersection with the Limestone Road, *D. E. Albrecht* 3009, 24.i.1987 (MEL); Forlorn Hope Plain, Nunniong Plateau, *D.E. Albrecht* 1394, 30.xii.1984 (MEL); East Gippsland. Benambra–Wulgulmerang Road, Native Dog Plain, Buchan River area, *A.C. Beaglehole* 33321, *K.C. Rogers* & *E.W. Finck*, 7.i.1970 (MEL).

32. *Senecio nigrapicus* I.Thomps., *sp. nov.*

A. S. squaroso A.Rich. pilis grossis caulis persistentioribus, foliis plerumque non auriculatis, pedunculis brevioribus, capitulis pluribus parvioribus, phyllariis paucioribus macula anthracina apicali majore, acheniis dilute lageniformibus differt.

Type: Victoria, Alpine National Park, Dimmick's Lookout, c. 10 km south of Howitt Plains, *I.R. Thompson* 760, 6 Jan. 2002; holo: MEL; iso: CANB, NSW

Herbs to 0.8 m high. *Taproot* well-developed; secondary roots mostly fine, 0.5–1 mm diam. *Stems* coarse-hairy in lower third giving way to mildly appressed-cottony or glabrous upwards. *Leaves in middle third of stems* more or less evenly spaced and sized, narrow-oblongate or very narrow-elliptic, 7–10 cm long, l:w ratio c. 4.5–13, not dissected or lobate; segments 3–5 per side largely in middle third, antrorse, triangular; base attenuate; margin with scattered denticulations or teeth; upper surface a rather pale grey-green, sparsely scabridulous or glabrous; lower surface pale green, sparsely coarse-hairy, cobwebby, or glabrous. *Uppermost leaves* narrow-elliptic or linear, l:w ratio c. 5–20, commonly appearing undissected and with entire margin due to rolling of lamina; base

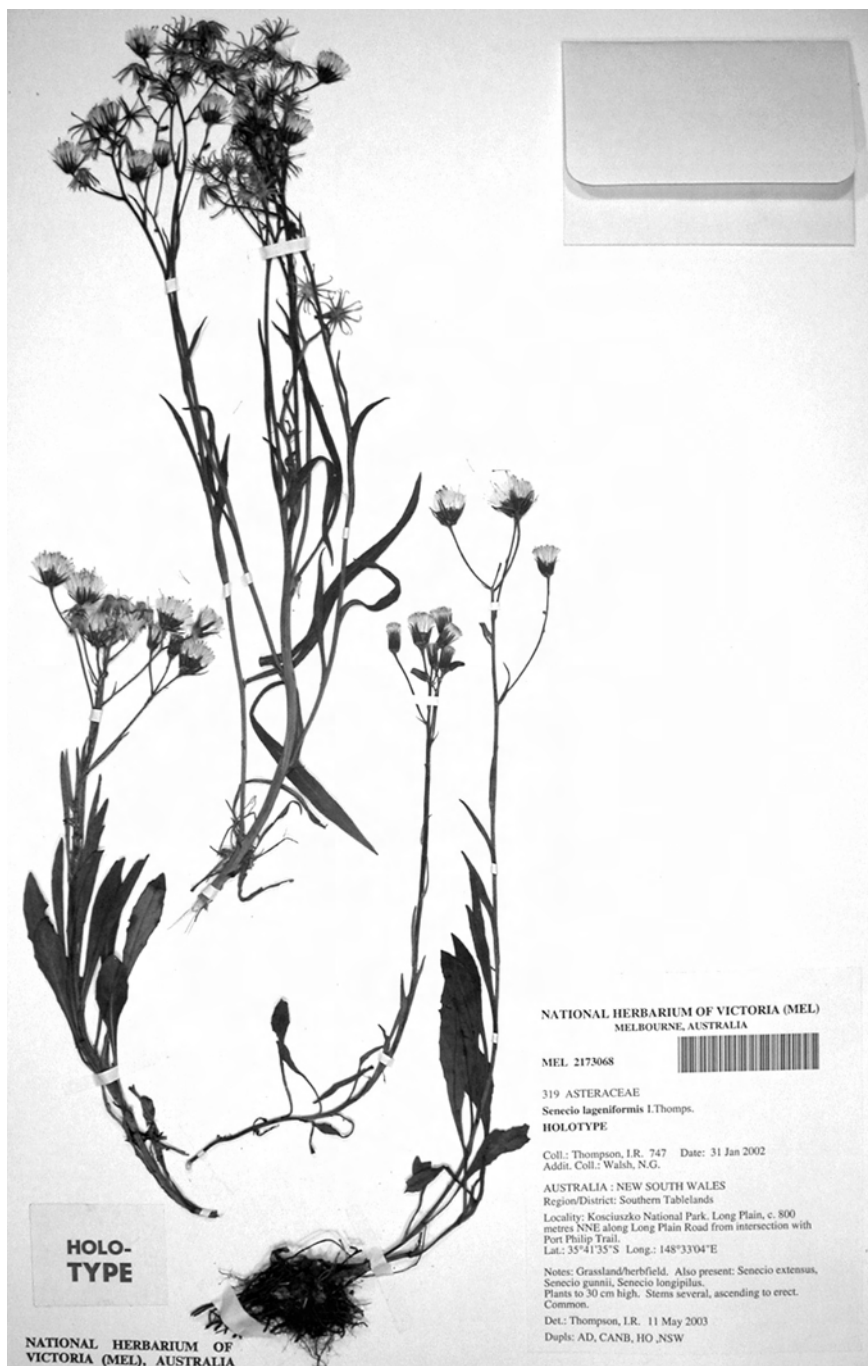


Figure 43. *Senecio lageniformis* (holotype: I.R. Thompson 747 MEL).

attenuate or sometimes auriculate, with auricles divided, hardly amplexicaul; surfaces glabrous or slightly cobwebby. *Unit inflorescences* of many capitula; total number of capitula per stem often 30–100; not overtopping or overtopping slight; mature lateral peduncles mostly 10–20 mm long. *Capitula*: calycular bracteoles 8–12, 2.0–3.0 mm long; peduncle and margin of bracteoles glabrous or often cobwebby at anthesis; involucre 6–8 mm long, c. 2.2–2.8 mm diam.; phyllaries mostly 12–14, glabrous, with apex often reflexed; stereomes (in dried specimens) thickened, flat or gently convex, green or tinged purple, black at tip, the mark relatively large; post-fructescence receptacle 3–3.5 mm diam., with phyllaries commonly finally erect. *Florets* 40–60, c. 80% female, corolla-lobes ±oblong, moderately thickened apically; corolla of bisexual florets 5–6.5 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.2–0.3 mm long. *Achenes* narrow oblong-ellipsoid or slightly lageniform, 2.5–3.0 mm long, red-brown or brown, long with papillose hairs, in dense bands, l:w ratio of hairs c. 3–5. *Pappus* 5–6 mm long. (Fig. 44)

Flowers summer–autumn.

Distribution and Habitat: Occurs predominantly in eastern Australia: from Mt Timbertop in eastern Victoria east to Wulgulmerang then north-east to the Brindabella Ranges in the Australian Capital Territory; and disjunctly much further north around Guyra in north-eastern New South Wales and in the Bunya Mtns in south-eastern Queensland where known from a single old record (Fig. 40d). Grows in forest and woodland in lowland areas or at elevations over 800 m.

Etymology: The epithet alludes to the relatively prominent black mark on the apex of the phyllaries (*L. niger*, black, and *apex*, tip)

Notes: Similar in capitular dimensions and leaf shape to *S. multicaulis* but differs by having leaves, when dissected, with more numerous lobes and with relatively smaller auricles, a more prominently black-marked apex on phyllaries, less overtopping in inflorescences, and slightly lageniform achenes. Similar to *S. interpositus* but with coarse-hairy lower stems and with a higher percentage of florets female.

Selected specimens examined: **QUEENSLAND**: Bunya Mts, C.T. White, Oct. 1919 (BRI). **NEW SOUTH WALES**: 10 km south of Ben Lomond, in railway reserve, R. Bates 13731, 1.i.1988 (AD). **AUSTRALIAN CAPITAL TERRITORY**: Smokers Gap, L.G. Adams 4137, 17.iv.1984 (CANB); Eastern slopes of Mt Tennent, near Tharwa, P. Gilmour 6085, 22.xii.1986 (CBG). **VICTORIA**: Splitters Range. Spring Hill Track, c. 1 km from intersection with Lees Track, c. 12 km east of Omeo, I.R. Thompson 725, 4.xii.2001 (BRI, HO, MEL, NSW); Mt Timbertop, D.E. Albrecht 1565, 28.i.1985 (MEL); 4 miles [7 km] north-east of Mt Arbuckle, on the Doolan Plains road, T.B. Muir 4531, 17.i.1967 (MEL); East Gippsland. Wulgulmerang, Little River, K. C. Roger's property, A.C. Beauglehole 36132, 15.i.1971 (MEL, NSW).

33. *Senecio longipilus* I.Thomps., *sp. nov.*

A *S. squarrosus* A.Rich. pilis grossis caulis persistentioribus, lobis foliorum plerumque apicem versus, pilis grossis foliorum longioribus, phyllariis plerumque paucioribus et latioribus non purpureis apicem versus macula anthracina apicali majore, acheniis dilute lageniformibus differt.

Type: New South Wales, Kosciuszko National Park, Long Plain, near confluence of Boundary Creek and Murrumbidgee River beside Long Plain Road, I.R. Thompson 748 & N.G. Walsh, 31 Jan. 2002; holo: MEL; iso: NSW, CANB, HO, PERTH.

Senecio sp. N *sensu* G.J. Harden, *Fl. New South Wales* 3: 306 (1992), *p.p.*

Herbs to 0.5 m high. *Taproot* obscure; secondary roots fleshy, 0.5–2 mm diam. *Stems* erect or ascending to erect; densely coarse-hairy, sometimes with a cottony overlay, density reducing upwards and predominantly appressed-cobwebby near summit. *Leaves* in middle third of stems more or less evenly spaced and sized or becoming wider spaced



Figure 44. *Senecio nigrapicus* (holotype: I.R. Thompson 760 MEL).

and narrower upwards, oblanceolate to narrow-elliptic, 7–15 cm long, l:w ratio c. 5–8, not dissected or coarse-dentate to lobate; segments 3–6 per side largely in distal half, antrorse, triangular; base attenuate or cuneate; margin entire or with scattered denticulations distally; upper surface coarse-hairy, with hairs rather long (to 2 mm); lower surface green, glabrous except for coarse-hairy midrib. *Uppermost leaves* narrow to very narrow-elliptic, l:w 5–8; base attenuate; coarse-hairy indumentum persisting especially on margin and present on margin of bracts also. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 20–60; overtopping variable; mature lateral peduncles mostly 10–30 mm long; peduncular bracteoles rather long. *Capitula*: calycular bracteoles 6–8, 3.0–5.0 mm long; peduncle sparsely cobwebby or glabrous but margin of bracteoles ciliate at anthesis; involucre (5.0–)6.0–8.0 mm long, 2.8–3.5 mm diam., phyllaries 12–15(–18), glabrous or sparsely cobwebby, with apex erect; stereomes (in dried specimens) thickened, flat, green or sometimes tinged purple, black at tip, the mark relatively large; post-fructescence receptacle 4–5 mm diam., the final phyllary orientation unclear. *Florets* 40–60, c. 80% female; corolla-lobes oblong, much thickened apically; corolla of bisexual florets 6.5–8 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, c. 0.3 mm long. *Achenes* narrow oblong-ellipsoid or slightly lageniform, 2.5–3.0 mm long, red-brown or dark brown, with papillose hairs in dense bands, l:w ratio of hairs c. 3–4. *Pappus* 6–8 mm long. (Fig. 45)

Flowers summer.

Distribution and Habitat: Occurs in far south-eastern New South Wales in the Kiandra area, and in northern Tasmania near Perth. All records from Tasmania are old (Fig. 40e). Grows in sand or loam soils in grassland, herbfields, shrubland and woodland, mostly at elevations over 1000 m but sometimes lowland.

Notes: Distinguishable from other species with broad capitula by the relatively long (1–2 mm) coarse hairs on stems, leaves and bracts, and the relatively long bracts and peduncular bracteoles. Phyllaries are fewer than in *S. macrocarpus* and is usually fewer than in *S. squarrosus*. The apex of phyllaries is typically strongly black-marked, a character it shares with *S. nigrapicus* and *S. oldfieldii*. The pappus is usually relatively densely bristled and relatively long, and it commonly exceeds the florets by c. 1 mm, obscuring them at anthesis. Pappus bristles are more scabrid-barbellate than in other related species. Compared to *S. squarrosus* the stereomes of the phyllaries are broader and this distinction is most evident in the distalmost 1.5 millimetres of the phyllary.

Selected specimens examined: **NEW SOUTH WALES**: Kosciuszko National Park. Long Plain, near confluence of Boundary Creek and Murrumbidgee River beside Long Plain Rd, I.R. Thompson 748 & N.G. Walsh, 31.i.2002 (NSW, CANB, HO, PERTH); Kosciuszko National Park, c. 100 m west of confluence of Boundary Creek and Murrumbidgee River, N.G. Walsh 4885 & K.L. McDougall, 9.xii.1998 (MEL); Upper Snowy River, F. Mueller, Jan. 1855 (MEL); Kosciuszko National Park, Port Philip Trail, I.R. Thompson 752 & N.G. Walsh, 31.i.2002 (BRI, MEL). **TASMANIA**: near Perth, South Esk R., R.C. Gunn 767 (MEL).

34. *Senecio oldfieldii* I.Thomps., *sp. nov.*

A *S. squarroso* A.Rich. pilis grossis caulis longioribus persistentioribus, capitulis angustioribus, phyllariis paucioribus non purpureis apicem versus macula anthracina apicali majore differt.

Type: Western Australia, near centre road through Perup Field Centre, south drainage line, A. R. Annels ARA 4699 & R. W. Hearn, 21 Oct. 1994; *holo*: PERTH.

Herbs to 1.0 m high. *Roots* unknown. *Stems* erect, densely coarse-hairy, density reducing to sparse or glabrous near summit, not cottony. *Leaves in middle third of stems* sometimes becoming distinctly more widely spaced and narrower upwards, oblanceolate, very narrow-elliptic or linear, 7–15 cm long, l:w ratio c. 5–14, coarse-dentate to deeply



Figure 45. *Senecio longipilus* (holotype: I.R. Thompson 748 & N. G. Walsh MEL).



Figure 46. *Senecio oldfieldii* (holotype: A.R. Annels 4699 & R. W. Hearn PERTH).

lobate; segments 3–5 per side slightly more frequent in distal half, antrorse, triangular to narrow-triangular; base attenuate; margin \pm entire; upper surface coarse-hairy, with rather long hairs (0.5–2 mm); lower surface possibly always green, glabrous except for coarse hairs on midrib and major veins. *Uppermost leaves* linear to narrow-linear, l:w ratio c. 10–20; base attenuate; coarse-hairy indumentum persisting and present on margin of bracts also. *Unit inflorescences* of several capitula; total number of capitula per stem often 5–20; overtopping not marked; mature lateral peduncles not seen, immature ones 10–30 mm long; peduncular bracteoles rather long. *Capitula*: calycular bracteoles 8–10, 3.0–5.0 mm long; peduncle sparsely cobwebby or glabrous, margin of bracteoles ciliate at anthesis; involucre 8.5–10.0 mm long, c. 3 mm diam.; phyllaries c. 13, glabrous, with apex reflexed or distorted; stereomes (in dried specimens) thickened, flat, green, black at tip, the mark relatively large; post-fructescence receptacle not seen. *Florets* c. 60, c. 70% female, corolla-lobes oblong, much thickened apically; corolla of bisexual florets 9–10 mm long, 5-lobed; corolla-lobes of female florets 4, c. 0.4 mm long. *Achenes* moderately papillose hairy, not seen mature. *Pappus* 6–8 mm long. (Fig. 46)

Flowers spring.

Distribution and Habitat: Occurs in far south-western Western Australia in the Manjimup area and possibly further east at Ravensthorpe (Fig. 40f). Grows in lowlying areas in shrubland and forest.

Etymology: The epithet recognises a prominent early collector in Western Australia, Augustus Frederick Oldfield.

Notes: Although first collected in the mid-1800s, *S. oldfieldii* was not collected again until 1994. Similar to *S. longipilus* in having an indumentum of long, coarse hairs, but with narrower upper stem leaves, longer capitula, and the apex of phyllaries more reflexed. A specimen from near Ravensthorpe with developing capitula is tentatively identified as this species although the leaves are considerably larger than in the two other collections. Specimens from the proposed Perup Nature Reserve (A.R. *Annels* 4931 & R.W. *Hearn* PERTH) have some features of *S. oldfieldii* but are more likely to be hybrids between this species and *S. multicaulis*.

Selected specimens examined: **WESTERN AUSTRALIA**: West River Crossing, Old Ongerup Road, ca. 30 km WSW of Ravensthorpe, K. *Newbey* 11258, 8.x.1986 (PERTH); Low places, Blackwood River, A.F. *Oldfield* (MEL).

35. *Senecio psilocarpus* Belcher & Albr., *Muelleria* 8: 113 (1994)

Type: Victoria, SW edge of bushland reserve west of Mumbannar along Princes Highway, 37°54'12"S, 141°07'32"E, D. *Frood* 1/92, 13 Mar. 1992; holotype: MEL.

Herbs to 0.8 m high. *Taproot* inconspicuous; secondary roots fleshy, c. 1 mm diam. *Stems* sprawling, glabrous or nearly so. *Leaves in middle third of stems* more or less evenly spaced and sized, narrow-oblongate, very narrow-elliptic, or linear, 7–10 cm long, l:w ratio c. 7–10, not dissected or lobate; segments 3 or 4 per side generally in middle third, spreading, triangular; base attenuate or auriculate, with auricles small; margin with scattered denticulations; upper surface \pm glabrous or sparsely scabridulous; lower surface glabrous. *Uppermost leaves* narrow-linear (excluding auricles), l:w ratio c. 20–30; base auriculate, with auricles often bidentate, mildly amplexicaul; margin often appearing entire due to rolling. *Unit inflorescences* of several capitula; total number of capitula per stem often 8–30; overtopping absent or slight; mature lateral peduncles mostly 15–45 mm long. *Capitula*: calycular bracteoles 6–10, 2.0–4.0 mm long; peduncle and margin of bracteoles \pm glabrous at anthesis; involucre 4.5–6.5(–7.5) mm long, 2.3–2.8 mm diam.; phyllaries predominantly 12–16, glabrous, with apex erect; stereomes (in dried specimens) slightly thickened, flat or gently convex, green or rarely tinged purple, commonly minutely black at tip, often purple in a zone c. 1 mm long below tip; post-

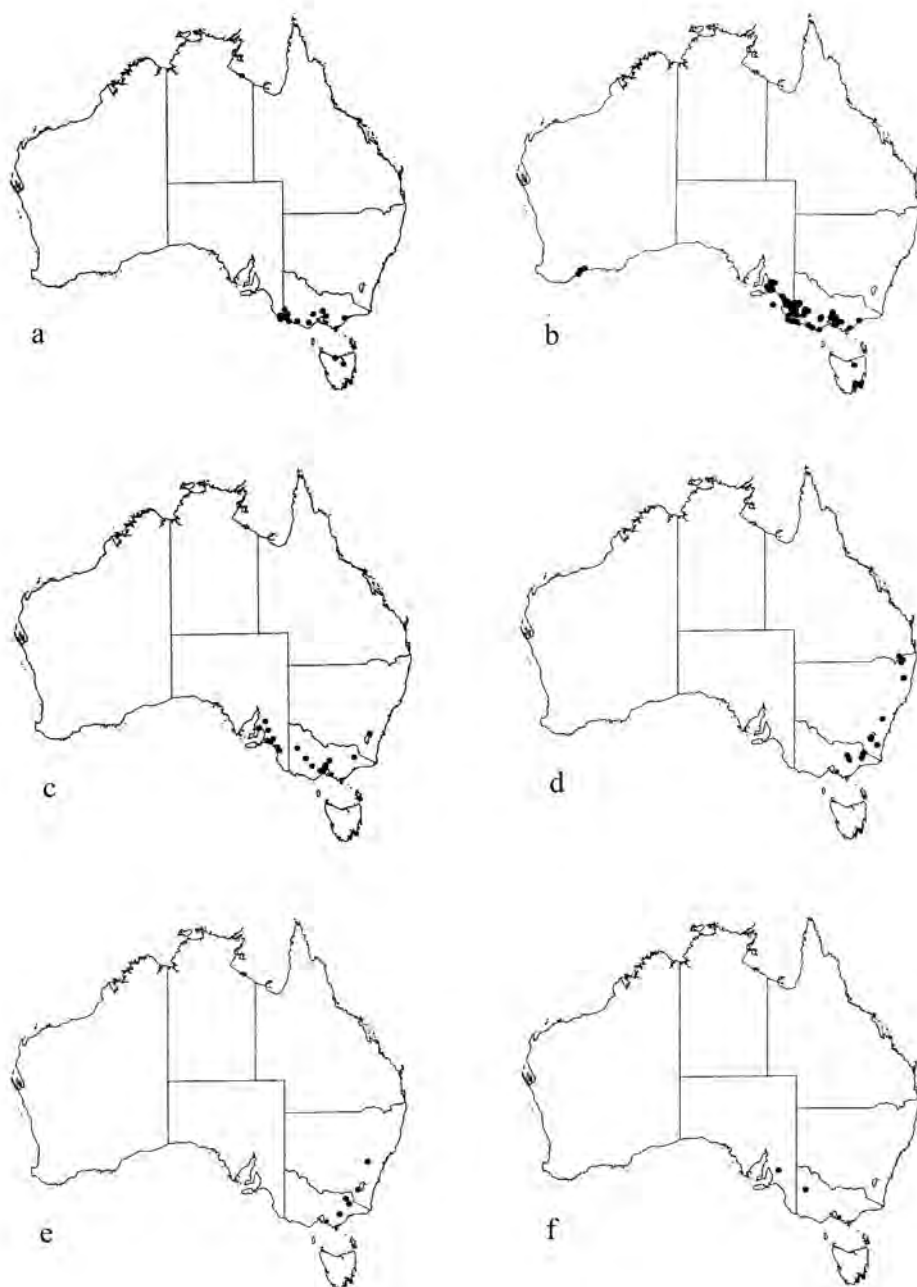


Figure 47. Distribution of a. *Senecio psilocarpus*; b. *S. squarrosus*; c. *S. macrocarpus*; d. *S. interpositus*; e. *S. georgianus*; f. *S. helichrysoides*.

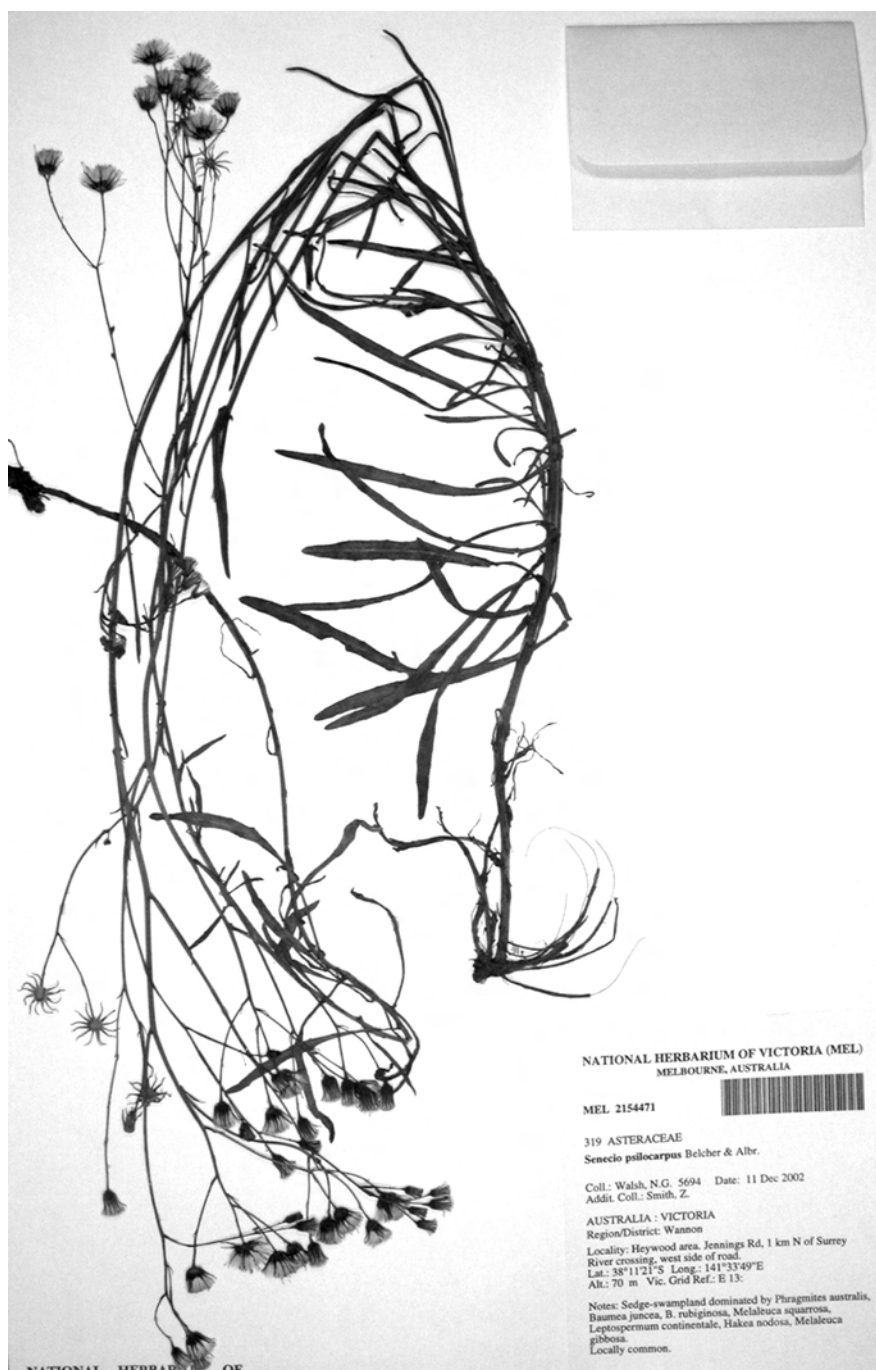


Figure 48. *Senecio psilocarpus* (N.G. Walsh 5694 & Z. Smith MEL).

fructescence receptacle 4.5–6.5 mm diam., with phyllaries finally in various orientations. *Florets* 50–60, c. 80% female, corolla-lobes triangular, slightly thickened apically; corolla of bisexual florets 4.5–6.5 mm long, 4- or 5-lobed; corolla-lobes of female florets 4, c. 0.2 mm long. *Achenes* \pm narrow-obloid, 1.8–2.5 mm long, usually orange to reddish-brown, glabrous, lustrous. *Pappus* 5–6 mm long. (Fig. 48)

Flowers summer–autumn.

Distribution and Habitat: Occurs in far south-eastern Australia; on the mainland from Honan's Scrub near Mt Gambier in South Australia east to Sale in south-eastern Victoria, and in north-eastern Tasmania from Flinders Island south-west to Cressy (Fig. 47a). Grows in swamps.

Notes: *Senecio psilocarpus* resembles *S. squarrosus* but has a sparser indumentum, shorter capitula, and glabrous achenes. The two species have a similar distribution, but the former has a stronger preference for aquatic habitats.

Selected specimens examined: **SOUTH AUSTRALIA**: Honans Scrub, Woods Forests, near Glencoe, R.L. Taplin 670 & D.E. Murfet, 9.iv.1994 (AD). **VICTORIA**: Connover Swamp (also known as Red Gum Swamp), SE of Drik Drik, D.E. Albrecht 5157, I.C. Clarke & S.Day, 3.xii.1992 (AD, CBG, MEL); Lysterfield Lake Park, A.C. Beauglehole 71574, 18.xi.1982 (MEL). **TASMANIA**: Cressy near Launceston, J.H. Wilson, Jan 1943 (HO).

36. *Senecio squarrosus* A.Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 107 (1834)

Erechtites richardiana DC., *Prodr.* 6: 297 (1838), *nom. illeg.*

Type: [New South Wales], 'Crescit in Novae-Hollandiae, loco vulgò Port Jackson [Sydney], Gaudichaud 5; holo: P.

[*Erechtites hispidula* auct. non (A.Rich.) DC.; G. Benth, *Fl. Austral.* 3: 660 (1866), *p.p.*; J.M. Black, *Fl. S. Australia* 610 (1929); A. Ewart, *Fl. Victoria* 1179 (1931)]

Herbs to 0.8 m high. *Taproot* inconspicuous; secondary roots fleshy, 1–2 mm diam. *Stems* erect to sprawling, sometimes with scattered coarse hairs, with hairs commonly lost by anthesis, otherwise sparsely appressed-cottony particularly toward summit or glabrous. *Leaves in middle third of stems* sometimes becoming distinctly wider spaced and broader upwards, narrow-oblongate, very narrow-elliptic or linear, 7–13 cm long, l:w ratio c. 7–15, not dissected or coarse-dentate to lobate; segments 1–3 per side generally in middle third, antrorse, triangular or rarely roughly oblong; base attenuate; margin entire or with scattered denticulations or teeth; upper surface coarse-hairy; lower surface sometimes purple, coarse-hairy or glabrous except for midrib. *Uppermost leaves* mostly linear to narrow-linear, l:w ratio c. 10–30, sometimes lobate proximally; base auriculate, sometimes sagittately, with auricles often entire, sometimes bidentate, mildly amplexicaul; margin entire. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 10–40; overtopping slight to moderate; mature lateral peduncles mostly 15–60 mm long. *Capitula*: calycular bracteoles 6–12, 2.0–4.0 mm long; peduncle and margin of bracteoles cobwebby at anthesis; involucre 6.0–11.0 mm long, 2.8–4.0 mm diam.; phyllaries (12–)16–25, glabrous, with apex sometimes recurved; stereomes (in dried specimens) gently to moderately convex, green or purple, minutely black at tip, commonly purple in a zone c. 1 mm long below tip; post-fructescence receptacle 4–6 mm diam., with phyllaries commonly finally \pm erect. *Florets* 50–70, c. 80% female, corolla-lobes narrow-triangular, sometimes purple, moderately thickened apically; corolla of bisexual florets 6–10 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.3–0.4 mm long. *Achenes* narrow-obloid, 2.0–3.0 mm long, brown or blackish-brown, with papillose hairs in dense bands, l:w ratio of hairs 3–4. *Pappus* 6–8 mm long. (Figs 4, 49)

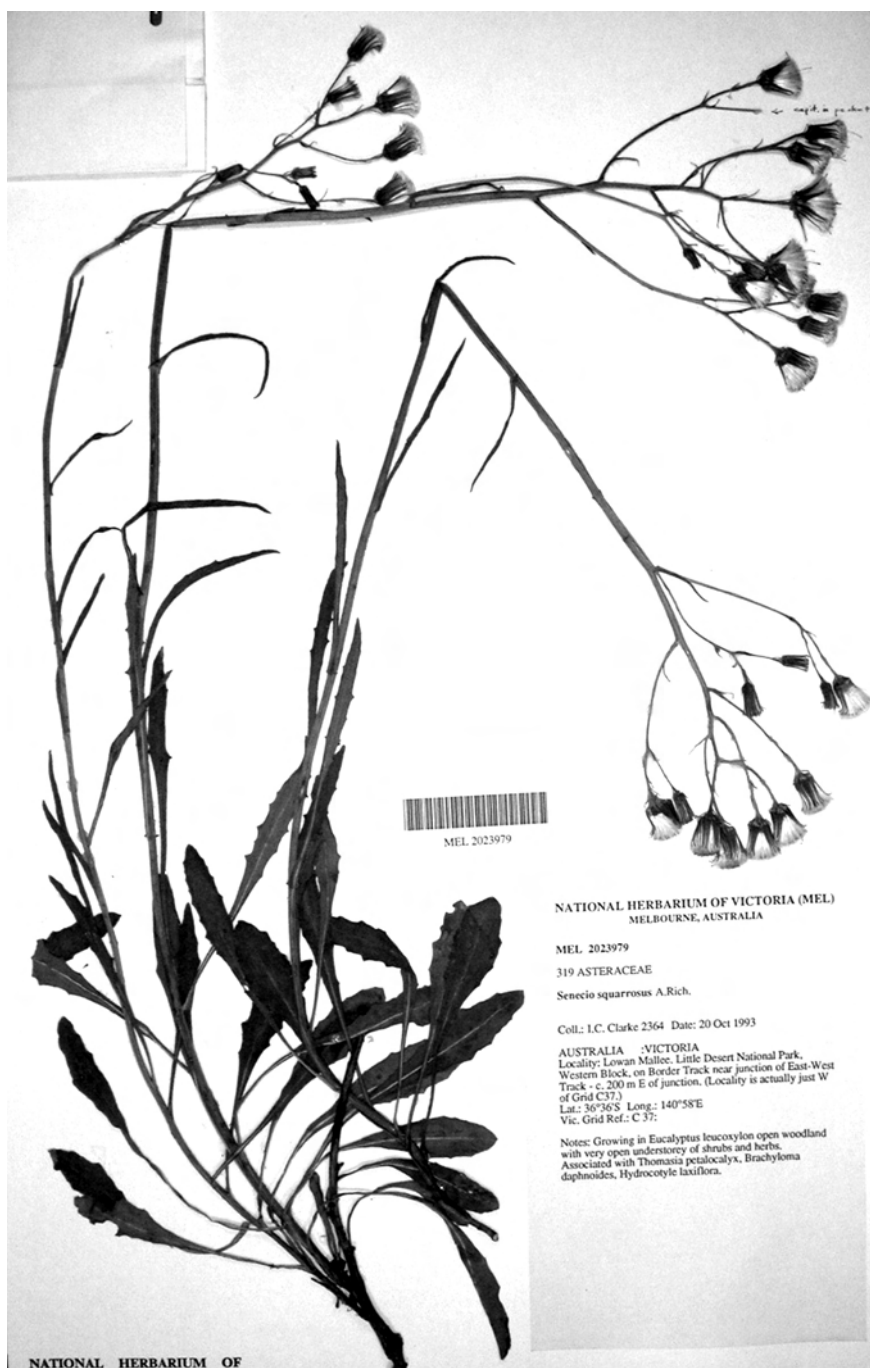


Figure 49. *Senecio squarrosus* (I.C. Clarke 2364 MEL).

Flowers mostly spring.

Distribution and Habitat: Occurs in southern Australia: from the Fleurieu Peninsula in south-eastern South Australia east-south-east to Bairnsdale in south-eastern Victoria, in north-eastern Tasmania at Launceston and in south-eastern Tasmania around Hobart. In Western Australia it occurs in the south-west in the Fitzgerald River and Bremer River areas east of Albany. The type specimen is from central-eastern New South Wales but there have been no collections from New South Wales since (Fig. 47b). Grows in sandy or clay soils commonly in lower lying areas in open forest and woodland.

Notes: The type specimen, collected in New South Wales, differs slightly from extant populations in South Australia, Victoria and Tasmania by having leaves more deeply dissected, lobation persisting in the bracts of the inflorescence, and coarse hairs more persistent on stems, but without more complete material, the type cannot with certainty be treated as taxonomically distinct. Leaves are sometimes glabrous on the lower surface and sometimes coarse-hairy. Purple corolla-lobes is an unusual feature recorded only in this species. Populations in far western Victoria and south-eastern South Australia have relatively large capitula and more densely coarse-hairy leaves than forms further east and in Tasmania.

Selected specimens examined: **WESTERN AUSTRALIA:** 11.2 km WSW of Annie Peak, Eyre Range (Fitzgerald River National Park), *K.R. Newbey 11349*, 1.xi.1986 (PERTH); Bremer R., ±10 miles [16 km] from mouth, *A.S. George 6990*, 29.x.1965 (PERTH). **SOUTH AUSTRALIA:** Kuitpo forest North-East, *A.G. Spooner 12444*, 18.xi.1990 (AD). **VICTORIA:** Westernport area. Bittern, 1.2 km SSE of Bittern PO, *R.J. Adair 2378*, 27.x.1990 (MEL); Little Desert National Park. Western Block, on Border Track near junction of East-West Track, *I.C. Clarke 2364*, 20.x.1993 (MEL). **TASMANIA:** Domain, Hobart, *W.M. Curtis*, 30.x.1958 (HO).

37. *Senecio macrocarpus* F.Muell. ex Belcher, *Muelleria* 5: 119 (1983)

Type: [Victoria], Wimmera district, Walmar station, *Dallachy 23*, 18 Sept. 1860; holo: MEL 22987.

[*Erechtites hispidula* auct. non (A.Rich) DC.: G. Bentham, *Fl. Austral.* 3: 660 (1866), *p.p. min.*; J.M. Black, *Fl. S. Australia* 610 (1929), *p.p.*]

Herbs to 0.6 m high. *Taproot* inconspicuous; secondary roots fleshy, c. 1–2 mm diam. *Stems* ±erect, sparsely to moderately densely appressed-cottony, becoming moderately branched from lower stem region. *Leaves in middle third of stems* more or less evenly spaced and sized, very narrow-elliptic, linear, or narrow-linear, 8–15 cm long, l:w ratio c. 8–20, not dissected or rarely lobate; segments 1–4 per side scattered along most of length including distal quarter, spreading, triangular–narrow-triangular; base attenuate; margin strongly revolute, entire or appearing so; upper surface coarse-hairy or glabrous, often transiently cobwebby; lower surface green, glabrous except for coarse-hairy midrib. *Uppermost leaves* narrow-linear, l:w ratio c. 20–50, not dissected or rarely with near-basal triangular lobes; base hardly auriculate; surfaces often cobwebby, with coarse hairs few or absent. *Unit inflorescences* of few to several capitula; total number of capitula per stem often 3–20; overtopping variable; mature lateral peduncles mostly 20–90 mm long. *Capitula:* calycular bracteoles 8–12, 3.0–6.0 mm long, often divergent; peduncle and margin of bracteoles sparsely cobwebby or glabrous at anthesis; involucre (7.0–)9.0–13.0 mm long, 3.0–5.0 mm diam.; phyllaries (13–)20–25, glabrous, with apex erect; stereomes (in dried specimens) gently convex, green or sometimes tinged purple, sometimes minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 5–7 mm diam., with phyllaries commonly finally erect. *Florets* c. 50–100, c. 80% female; corolla-lobes oblong-triangular, moderately thickened apically; corolla of bisexual florets 9–12 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.3–0.4 mm long. *Achenes*

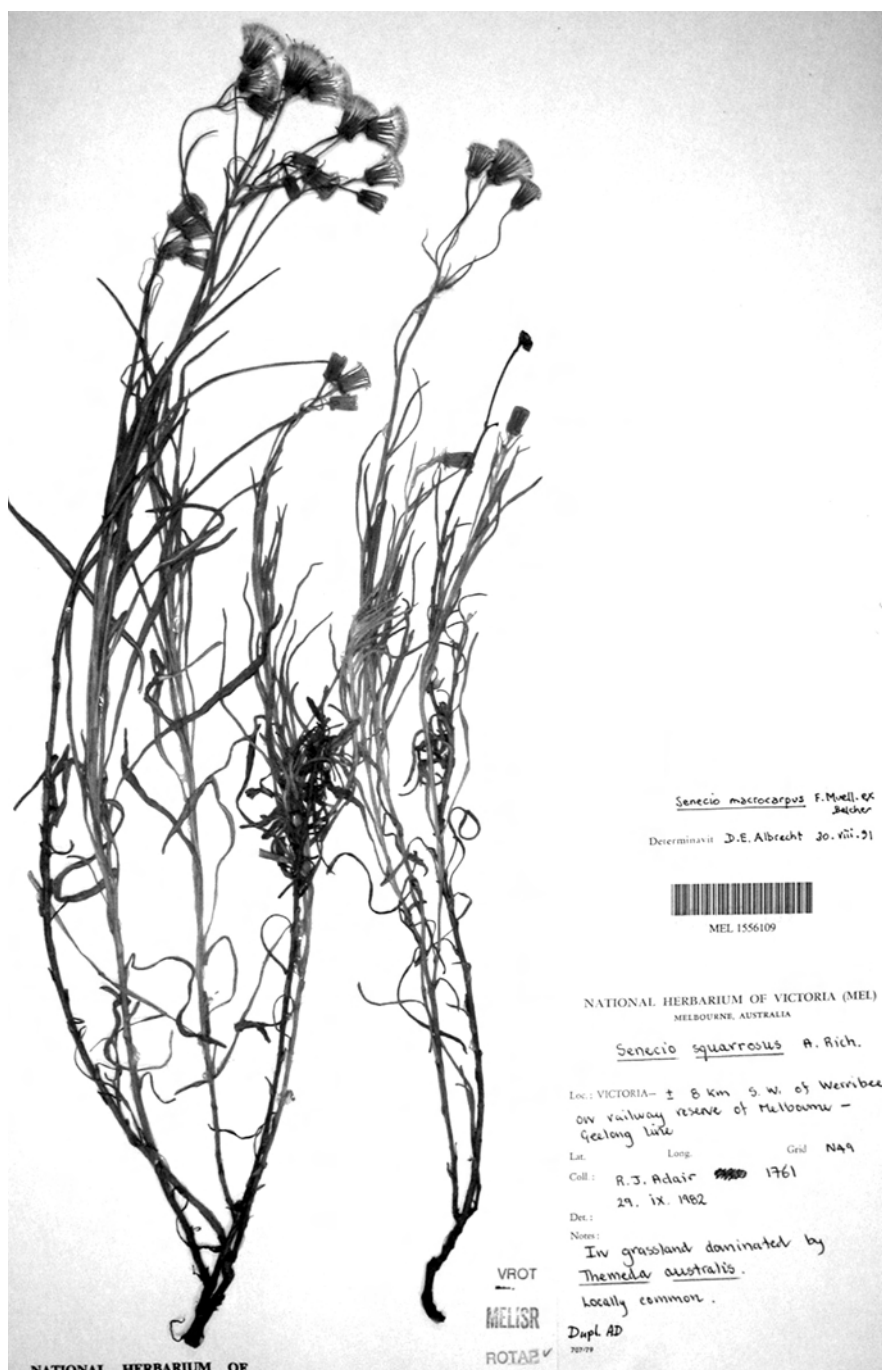


Figure 50. *Senecio macrocarpus* (R.J. Adair 1761 MEL).

lageniform, 3.0–6.0 mm long, brown, papillose hairs in dense bands, l:w ratio of hairs c. 3–4. *Pappus* 7–10 mm long. (Figs 3e, 4i, 50)

Flowers mostly winter–spring.

Distribution and Habitat: Occurs in south-eastern Australia from Ardrossan in south-eastern South Australia south-east to Yan Yean in south-central Victoria, with an outlier recently recorded at Gundaroo in south-eastern New South Wales. There are only old records from northern Tasmania (Fig. 47c). Grows typically in low-lying areas, and recorded from basalt-derived clay or clay-loam soils, in grassland, sedgeland and woodland.

Notes: A species readily recognisable by its narrow-linear branch leaves, small number of very large capitula, and long, densely papillose-hairy, lageniform achenes. Lobed leaves usually only occur on primary stems. A collection from Yorke Peninsula in South Australia (*T. Smith* 772, AD) resembles *S. macrocarpus* but is atypical in having a coarse-hairy stem and leaves more densely coarse-hairy. It is possibly the result of hybridisation with *S. hispidissimus*.

An old collection from the Omeo plains of eastern Victoria (*Mueller* 1854, MEL) is similar to *S. macrocarpus* but capitula are smaller and phyllaries fewer. It also resembles both *S. nigrapicus* and *S. longipilus*. *Senecio nigrapicus* has been recorded from the Omeo area. This species has smaller and more numerous capitula than this specimen.

A specimen from Lake Hindmarsh (*D'Alton*, Oct. 1892, MEL) and to a lesser extent specimens from near Stawell (*Berwick s.n.*, 3 Sept. 1995, MEL) differ from typical *S. macrocarpus* in developing long basal or near-basal lobation on the uppermost leaves.

Senecio macrocarpus apparently hybridises with *S. squarrosus* in south-eastern South Australia.

Selected specimens examined: **SOUTH AUSTRALIA:** South-eastern. Messent Conservation Park, *R. Davies, P. Cooke & P. Green* 62(1)e, 17.ix.1986 (AD). **NEW SOUTH WALES:** Gundaroo, Lot 99 Dairy Creek Road. At junction of two gullies. NE section of lot, *D.A. Taylor* 75, Nov. 2001 (CANB, MELU). **VICTORIA:** ±8 km SW of Werribee, on railway reserve of Melbourne–Geelong line, *R.J. Adair* 1761, 29.ix.1982 (AD, MEL). **TASMANIA:** South Esk R., coll. unknown (MEL).

38. *Senecio interpositus* I.Thomps., *sp. nov.*

A. S. squarroso A.Rich. foliis glabris, non auriculatis, capitulis parvioribus, phyllariis paucioribus, flosculis hermaphroditis proportione pluribus differt.

Type: Australian Capital Territory, Namadgi National Park, Smokers Flat, *L.G. Adams & M. Gray* 3976, 13 Mar. 1986; holo: CANB; iso: MEL.

Herbs to 1.0 m high. *Taproot* inconspicuous (not well-known); secondary roots fleshy, 1–1.5 mm diam. *Stems* ascending to erect or erect, sparsely appressed-cotony or ±glabrous. *Leaves in middle third of stems* commonly becoming distinctly wider spaced and narrower upwards, very narrow-elliptic, 6–12 cm long, l:w ratio c. 6–10, not dissected or more often coarse-dentate to lobate; segments 4–8 per side in distal two-thirds, spreading to slightly antrorse, triangular; base attenuate; margin usually with scattered denticulations or teeth; upper surface ±glabrous or sparsely appressed-cotony; lower surface green, ±glabrous. *Uppermost leaves* very narrow-elliptic, or linear to narrow-linear, l:w ratio c. 8–20; base attenuate. *Unit inflorescences* of several to many capitula; total number of capitula per stem mostly 8–60; overtopping sometimes marked; mature lateral peduncles mostly 8–20 mm long. *Capitula:* calycular bracteoles 6–8, 2.0–3.0 mm long; peduncle and margin of bracteoles sparsely to moderately cobwebby at anthesis; involucre cylindrical, 5.0–6.5 mm long, 2.0–2.5 mm diam.; phyllaries mostly 11–14, glabrous or sparsely cobwebby, with apex commonly strongly recurved;



Figure 51. *Senecio interpositus* (holotype: L.G. Adams & M. Gray 3976 CANB).

stereomes (in dried specimens) thickened, flat, green or variably purple, minutely black at tip, sometimes purple in a zone 1–2 mm long below tip; post-fructescence receptacle 3–4 mm diam., with phyllaries usually finally erect. *Florets* 25–50, all bisexual or up to c. 50% female or at least with reduced corolla lobes, corolla-lobes triangular, not or slightly thickened apically; corolla of bisexual florets 5–7 mm long, 5-lobed; corolla-lobes of female florets 4 or 5, 0.4–0.8 mm long. *Achenes* \pm narrowly obloid or oblong-ellipsoid, 2.5–3.0 mm long, tan or dark brown, glabrous or with papillose hairs scattered in lines, l:w ratio of hairs c. 2–3. *Pappus* 5–6 mm long. (Fig. 51)

Flowers summer–autumn.

Distribution and Habitat: Occurs in eastern Australia from Amiens in far south-eastern Queensland south to Bullock Creek east of Armidale in north-eastern New South Wales, and from the Brindabella Ranges in the Australian Capital Territory south-west to the McAlister River in eastern Victoria (Fig. 47d). Grows in peaty clay soils in elevated or sub-alpine swampy flats or grassland and in woodland at altitudes over 900 m.

Etymology: The epithet alludes to the composition of the florets, with a higher proportion of bisexual florets than other disciform species but often a lower proportion than discoid species (*L. interpositus*, placed between)

Notes: Capitula of this species are usually disciform with outer florets female or at least with only female structures emergent from the corolla tube, and with distinctly smaller corollas. Although relatively reduced, the limbs and lobes of the corollas of the female florets are generally larger than in other disciform species. In the Northern Tablelands of New South Wales, however, a few specimens have been collected with discoid capitula. In all other respects these specimens match the disciform *S. interpositus*.

The obconic corolla-bases of this species are relatively large and elongate. The glabrous, lobed leaves and purple-pigmented, strongly recurved phyllary apices and basally-cobwebby capitula also help to distinguish this species. In the New England area achenes of some specimens are dark brown and glabrous; achenes with papillose hairs more or less restricted to narrow grooves occur throughout the range of the species.

Selected specimens examined: **QUEENSLAND**: Watson's Swamp, 6 km north of Amiens, A.R. Bean 5850 & P.I. Forster (BRI, NSW). **NEW SOUTH WALES**: New England, C. Stuart (MEL); Near Tuross Falls, 8 km ESE of Countegany, L.G. Adams 3284, 8.i.1974 (CANB); Tuross Falls Track, Badja State Forest, L.G. Adams & M.Gray 3925, 2.i.1984 (CANB, MEL); Northern Tablelands. Bullock Creek, D.L. Jones 5544 & C.H. Broers, 7.xii.1989 (CBG); south end of Boonoo Boonoo National Park, 35 km NE of Tenterfield, P.H.H. Cowper & G.J. White 38, 8.ii.1994 (NE); Bullock Ck Swamp on Point Lookout Rd, H.J. Wissmann, 24.iii.1981 (MEL, NE). **AUSTRALIAN CAPITAL TERRITORY**: Kangaroo Creek, Corin Dam Road, N.T. Burbidge 7549, 19.i.1966 (BRI, CANB, MEL); Leura Gap, J.H. Willis, 13.i.1970 (MEL). **VICTORIA**: East Gippsland. Cowombat Plain, A.C. Beauglehole 36555, 26.i.1971 & E.W. Finck (MEL); Bentley Plain, 2.8 km east of Mt Nugong, N.G. Walsh 822, 24.ii.1982 (MEL); Swamp margins of Pine Creek, between the Caledonia and McAlister Rivers, N.H. Scarlett 84-12, 8.i.1984 (AD); Mt Cobberas, R.J. Bates 27243, 7.i.1992 (AD).

39. *Senecio georgianus* DC., *Prodr.* 6: 371 (1838)

Type: [New South Wales] 'in Nova-Hollandia ad ripas lacus Georgii' [Lake George], A. Cunningham; holotype: G (microfiche seen MEL); isotype: K (photo seen CANB).

Erechtites candicans Hook.f., *Hooker's London J. Bot.* 6: 122 (1847). *Type*: [Tasmania], Van Diemens Land, R.C. Gunn; holotype: K. (photo seen CANB).

Herbs to 0.5 m high. *Roots* not seen. *Stems* erect, appressed-cobwebby. *Leaves* in middle third of stems more or less evenly spaced and sized, mostly narrow-oblongate, very narrow-elliptic, or linear, 6–8 cm long, l:w ratio c. 8–12, not dissected; base attenuate; margin revolute, appearing entire but actually minutely denticulate; upper

surface appressed-cottony, glabrescent; lower surface densely appressed-woolly. *Uppermost leaves* linear, l:w ratio c. 15–30; base attenuate. *Unit inflorescences* of several to many capitula; total number of capitula per stem often 10–40; overtopping moderate; mature lateral peduncles mostly 3–11(–20) mm long. *Capitula*: calycular bracteoles 6–10, 2.0–3.0 mm long; peduncle and margin of bracteoles glabrous or sparsely cobwebby at anthesis; involucre 5.0–7.0 mm long, 1.8–2.4 mm diam.; phyllaries 12–14, glabrous, with apex recurved; stereomes (in dried specimens) thickened, flat, green, minutely black at tip, sometimes purple in a zone c. 1 mm long below tip; post-fructescence receptacle 3–4 mm diam., with phyllaries commonly finally erect. *Florets* 30–40, all bisexual, corolla-lobes triangular, thickened apically; corolla of central florets 5–6.5 mm long; corolla-lobes of outer florets 5, 0.5 mm long. *Achenes* \pm narrow-obloid, 2.5–3.0 mm long, mostly very dark brown, sometimes olivaceous, papillose hairs in dense bands, l:w ratio of hairs c. 2–3. *Pappus* 5–6 mm long. (Fig. 52)

Flowers late summer–autumn.

Distribution and Habitat: Recorded from far south-eastern Australia but not recorded for over 140 years. Early records are from Lake George in south-eastern New South Wales, Omeo, and the McAllister River in Victoria, and from Tasmania where no locality given (Fig. 47e). Grows in woodlands, grasslands, herbfields or open shrublands in montane to subalpine areas.

Notes: The only specimen of this species collected from Tasmania is the type of *Erechtites candicans*. Vegetative features are consistent in all collections; however, from the McAllister River area, collections are of inflorescences with marked differences in capitulum size.

Selected specimens examined: **VICTORIA**: Lake Omeo, *F. Mueller* (MEL).

40. *Senecio helichrysoides* F.Muell., *Trans. Proc. Victoria Inst. Adv. Sci.* 39 (1855)

Type: [South Australia], ‘on low sandy loamy hills near the Wheal Barton mine’ [near Truro], *F. Mueller*, Jan. 1847; holo: MEL.

Herbs to 0.5 m high. *Roots* not known. *Stems* erect, densely woolly. *Leaves in middle third of stems* more or less evenly spaced and sized, mostly narrow to very narrow-elliptic, 6–8 cm long, l:w ratio c. 4–7, not dissected or lobate; segments 3–6 per side, antrorse, triangular; base attenuate; margin entire; both surfaces densely woolly. *Uppermost leaves* linear, l:w ratio c. 10; base attenuate. *Unit inflorescences* of several capitula; total number of capitula per stem c. 20; overtopping not determined; mature lateral peduncles unknown. *Capitula*: calycular bracteoles 6–8, 4.0–5.0 mm long; peduncle and margin of bracteoles densely woolly; involucre c. 6 mm long, c. 3 mm diam.; phyllaries 12–14, woolly, with apex recurved; stereomes (in dried specimens) \pm flat; post-fructescence receptacle unknown. *Florets* c. 40, all bisexual, corolla-lobes triangular, hardly thickened apically; corolla of central florets 5–6 mm long, corolla-lobes c. 0.5 mm long. *Achenes* glabrous (according to protologue; not seen). *Pappus* c. 6 mm long. (Fig. 53)

Flowers summer.

Distribution and Habitat: Recorded from south-eastern South Australia and north-western Victoria (Fig. 47f). Grows in sandy areas on low hills or flats.

Notes: A distinctive species but only three collections have been made and none since the mid-1800s. Allied to *S. georgianus* and *S. interpositus* and placed by Benthham under the former, but differing by its extreme woolliness on all parts and its long calycular bracteoles. A few specimens collected from northern Victoria and housed at K appear to match the holotype of *S. helichrysoides* although the leaves are coarsely dentate. A



Figure 53. *Senecio helichrysoides* (F. Mueller MEL).

specimen from Lake Hindmarsh is sterile and is labelled by Mueller as *S. odoratus* var. *spodochrous*, and another, *Robertson 321*, is a flowering specimen.

Selected specimens examined: **VICTORIA:** Lake Hindmarsh, *coll. unknown* (MEL).

Doubtful or excluded names

Senecio laticostatus Belcher, *Ann. Missouri Bot. Gard.* 43: 64 (1956); *Erechtites arguta* var. *microcephala* Benth., *Fl. Austral.* 3: 659 (1867).

Type: Flats beyond the Brodribb River, *F. Mueller*, Jan. 1855; holo: MEL.

The specimen on which these names are based appears to be an aberrant specimen with several features discordant with *Senecio* morphology and with apparently non-viable achenes.

Senecio apargiaefolius Walp., *Linnaea* 14: 309 (1840), as *apargiaefolius*; *Erechtites apargiifolia* (Walp.) Sond., *Linnaea* 25: 524 (1853), as *apargiaefolia*.

Type: [New South Wales], 'Nova Hollandia' [Maneroo region according to G. Benthams], *Lhotsky*; holo: ?KIEL, according to Belcher (1956).

The identity of the type specimen remains unclear. Walpers described it as a species with homogamous capitula and glabrous achenes, and it differs in several other ways from the specimen cited by Sonder as an example of *E. apargiifolia*, which is in fact a specimen of *S. phelleus*.

Erechtites muelleri Lange, *Ind. Sem. Hort. Acad. Haunensi* 28 (1862), as *Mulleri*

Type: Australia, 'Hab. Nova Hollandia'.

Belcher (1956) discusses this species under his *S. hispidulus* × *S. quadridentatus*. Although he did not see the type, apparently at Copenhagen, specimens from Vienna determined as *E. muelleri* and said to have been raised from seed from Copenhagen, were examined by him. From his description these specimens are likely to be *S. tenuiflorus*, but while there is doubt about the nature of the type specimen, it is best to exclude this name.

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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*. Chromosome numbers of Lawrence (1980) are indicated under current names and the names used by Lawrence. The numbers refer to the number of the accepted species or subspecies as given in the taxonomy section. Excl. refers to names listed under Excluded Names. Square brackets indicates a misapplication of the name.

Name	No.	Page no.
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<i>arguta</i> var. <i>asper</i> Hook.f.	10	138
<i>arguta</i> var. <i>bathurstiana</i> (DC.) Domin.	8	134
<i>arguta</i> var. <i>dissecta</i> Benth.	8, [12a]	134
<i>arguta</i> var. <i>glomerata</i> (DC.) Domin	12a	145
<i>arguta</i> var. <i>microcephala</i> Benth.	[12b], excl.	211
<i>arguta</i> var. <i>obovata</i> Hook.f.	12a	145
<i>atkinsoniae</i> F.Muell.	5	127
<i>bathurstiana</i> DC.	8	134
<i>candicans</i> Hook.f.	39	207
<i>erecta</i> F.Muell. ex Lange	20	164
<i>glabrescens</i> DC.	19	162
<i>glandulosus</i> DC.	18	158
<i>glomerata</i> DC.	12a	145
<i>glomerata</i> DC. var. <i>subincisa</i> DC.	12a	145
<i>glomerata</i> DC. var. <i>polycephala</i> DC.	12a	145
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<i>incana</i> Turcz.	20	164
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<i>prenanthoides</i> DC.	1	118
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<i>pumila</i> DC.	1	118
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<i>quadridentata</i> var. <i>gunnii</i> (Hook.f.) Benth.	27	181
<i>richardiana</i> DC.	36	201
<i>sonchoides</i> DC.	3	123
<i>tenuiflora</i> DC.	26	177
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<i>bipinnatisectus</i> Belcher [2n = 60]	5	127
<i>biserratus</i> Belcher [n = 50]	3	123
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<i>cahillii</i> Belcher	2	121
<i>diaschides</i> D.G.Drury [n = 30]	2	121

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<i>sp. C, forms 3 & 4 sensu</i> M.E. Lawrence (1980) [n = 30]	10	138
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tasmanicus I.Thomps.	17	158
<i>tenuiflorus</i> (DC.) Sch.Bip	26	177