

**COLLECTION HISTORY OF *SENECIO PSILOCARPUS*  
(SWAMP FIREWEED) IN TASMANIA**

Mark Wapstra

*Environmental Consulting Options Tasmania, 28 Suncrest Avenue, Lenah  
Valley, Tasmania 7008, email: mark@ecotas.com.au*

**SUMMARY**

The collecting history of *Senecio psilocarpus* in Tasmania is presented. The species has been collected from six disjunct locations: Cressy (site of the first collection in 1943), Forth (1987), Flinders Island (unknown date), King Island (2007), Dukes Marshes (2008) and Mt William (2008).

While the species may meet the criteria for listing (as endangered) on the Tasmanian *Threatened Species Protection Act 1995*, a cautious approach to listing is suggested. As with many other species of recently recognised species of *Senecio*, familiarity is leading to additional collections. Potential habitat for *S. psilocarpus* (natural wetlands, farm dams, marshes) is still relatively common and the species appears to have a widespread distribution so range extensions and infillings are likely. However, the species technically meets the criteria for endangered on the Tasmanian *Threatened Species Protection Act 1995*, and is already listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and thus a conservative approach to conservation management within Tasmania is advocated.

**INTRODUCTION**

In recent years it has been difficult keeping abreast of the myriad of taxonomic and nomenclatural changes that have taken place within the southeast Australian (including Tasmanian) species of *Senecio* (e.g. see Thompson 2006 and references therein). There are now thirty-seven native taxa (including infrataxa such as varieties and subspecies) and four exotic taxa recognised in Tasmania (Buchanan 2009), which is significantly more than the eighteen recognised in *The Student's Flora of Tasmania* (Curtis 1963).

During the production of a State-based key to *Senecio* (Wapstra et al. 2008), which included a review of specimens held by the Tasmanian Herbarium, it became apparent that several species were represented by very few formal collections. Some of these

are already recognised with a legislated threat status on the Tasmanian *Threatened Species Protection Act 1995* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Most others have not been formally assessed against conservation status criteria since their recognition in the Tasmanian census. However, familiarity with the revised taxonomy by several field botanists, and re-examination of the collection held at the Tasmanian Herbarium by the author, is leading to a better understanding of the distribution of many species.

This present paper describes the collecting history of *Senecio psilocarpus* in Tasmania to alert field workers to the distribution and habitat of the species (with the hope of securing further collections). The opportunity is also taken to discuss the

reservation and conservation status of the species.

#### TAXONOMY, NOMENCLATURE AND IDENTIFICATION

*Senecio psilocarpus* was described by Belcher & Albrecht (1994) from mainland Australian material. The species was recognised as being most similar to *S. squarrosus* (which also occurs in Tasmania) and most earlier collections would have been recorded as that species. *S. psilocarpus* and *S. squarrosus* are readily separated on fruit colour and fruit indumentum, the former having shiny reddish-brown to brown entirely glabrous achenes, the latter having very dark to black puberulent achenes (Belcher & Albrecht 1994).

The species is most widely known as 'swamp fireweed' (Wapstra et al. 2005), a reflection of its habitat, but has also been referred to as 'smoothfruit groundsel' (TSSC 2008), a reference to the smooth glabrous achenes (the terms 'fireweed' and 'groundsel' are applied without too much discretion to species of *Senecio*).

Wapstra et al. (2008) provides a key to Tasmanian species of *Senecio*. Belcher & Albrecht (1994) and Thompson (2004) provide detailed descriptions of *S. psilocarpus*. The species is one of the more easily identified by a combination of habitat (low-lying poorly-drained sites), achene morphology (shiny reddish-brown to brown glabrous and smooth), habit (can develop long underground 'rhizomes' or decumbent stems that root at the nodes with stems arising from these horizontal structures to emerge above the surface of the water), appearance (leaves and stems virtually glabrous) and apparently the smell emanating from bruised leaves (carrot-like in *S. psilocarpus*; tomato-like in *S. squarrosus*).

#### COLLECTING HISTORY AND DISTRIBUTION IN TASMANIA

*Senecio psilocarpus* has only been collected six times in Tasmania (Table 1, Figure 1). Three collections pre-date the formal recognition of the species by Belcher & Albrecht (1994).

The first collection of *S. psilocarpus* in Tasmania was in 1943, by J.H. Wilson from a site "swamp" from "near Cressy" (annotation on HO411904), and was initially identified as *S. hispidulus*. No habitat details were provided on the collection but it is presumed to be from a poorly-drained site somewhere between Cressy and Launceston, which now comprises extensive areas of well-developed grazing and cropping ground. Interestingly, the same collector, on the same date, and apparently from the same site, also collected the first specimens of *S. campylocarpus* in Tasmania, a species only collected on one other occasion from the banks of the Elizabeth River in the heart of Campbell Town (Wapstra et al. 2006).

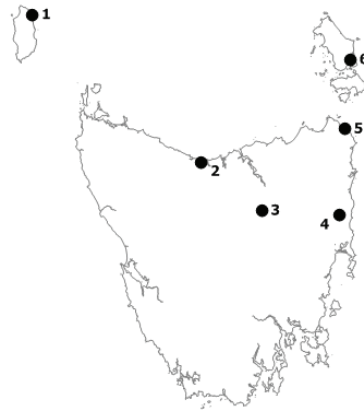


Figure 1. Distribution of *Senecio psilocarpus* within Tasmania (numbers correspond to those in Table 1)

**Table 1.** Collection details of *Senecio psilocarpus* in Tasmania

Site No.	Location [as per HO label]	Collector	Date	Tenure	Specimen	Extent Abundance
1	“Nook Swamps, King Island”	M. Wapstra	19 Nov. 2007	Lavinia State Reserve	HO547588	c. 5 x 5 m <50
2	“Forth, near road junction”	D.I. Morris	14 Dec. 1987	Private property?	HO410402	Unknown
3	“Near Cressy”	J.H. Wilson	Jan–Feb 1943	Private property?	HO411904	Unknown
4	“Dukes Marsh[es], S edge, 250 m E of bridge”	M. Visoiu	8 Jan. 2008	State forest	HO548138	c. 0.1 ha 5–10
5	“200 m N of N entrance to Forester Kangaroo Drive, Mt William”	M. Visoiu	9 Jan. 2008	Mount William National Park	HO548139	c. 0.1 ha c. 5
6	<b>Pot Boil Lagoon</b> , Flinders Island	J. Whinray?	?	? Possibly from Logan Lagoon Conservation Area	MEL? [cited in Thompson 2004]	Unknown

The second collection of *S. psilocarpus* in Tasmania was by Dennis Morris in 1987, from “Forth, near road junction” from the “edge of [a] farm dam”, and was initially identified as *S. minimus*. Examination of a topographic map suggests that collection was probably made from low-lying grazing/cropping ground, perhaps associated with drains or dams.

The third collection of *S. psilocarpus* was made by the author in November 2007, from the Nook Swamps on King Island. The collection was from a herb-rich poorly-drained grassland in a broad swale between stable sand dunes (burnt c. 2001). Collections were made but a comprehensive survey was not undertaken. Based on cursory field observations, the patch of the species was less than 5 x 5 m and comprised substantially less than 50 mature individuals.

During 2008, Micah Visoiu, during botanical collecting trips as part of the Millennium Seed Bank project, collected

*S. psilocarpus* from Mount William National Park, from adjacent to a wetland in native grassland, and Dukes Marshes, from an herbaceous marsh (Plate 1).

The date of collection of *S. psilocarpus* from Pot Boil Lagoon on Flinders Island is not precisely known. The collection was cited in Thompson (2004), based on specimens sighted at the National Herbarium of Victoria (MEL), attributed to John Whinray (Thompson pers. comm.), but not yet formally databased. There is likely to be significant areas of potential habitat in the Furneaux Group, especially the lagoon systems of southern, central and eastern Flinders Island, and the tantalising possibility of several additional populations on the island (most of which would be in reserves) is highlighted to field workers.

#### RESERVATION STATUS

*Senecio psilocarpus* is only known from six widely separated locations but is relatively well reserved (Table 1). It occurs with

certainty in the Lavinia State Reserve on King Island, and from Mount William National Park in the northeast. The collection from Dukes Marshes is on State forest from within an area coded as "Protection Informal Reserve" under Forestry Tasmania's Management Decision Classification planning system (Orr & Gerrand 1998), meaning that the site is effectively reserved from wood production (and most other activities). It is difficult to assign tenure to other sites due to the low precision of collection information.

#### CONSERVATION STATUS

*Senecio psilocarpus* is listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. At the time of listing, which was a continuation of the listing of the species on the preceding Commonwealth threatened species legislation, the species was only known from Victoria and South Australia. The species is also listed as vulnerable under the South Australian *National Parks and Wildlife Act 1972* and the Victorian *Advisory List for Rare or Threatened Plants of Victoria 2005* (TSSC 2008).

In Tasmania, the most closely related species, *S. squarrosus* ('leafy fireweed'), is presently listed as rare on the Tasmanian *Threatened Species Protection Act 1995*, which by virtue of legislative precedents means that *S. psilocarpus* is listed by default on the same Act. However, *S. squarrosus* is proving to be a widespread, locally common, relatively well-reserved, disturbance-ophile such that its status as a threatened species is probably tenuous. As such, the status of *S. psilocarpus* in its own right needs to be considered.

The extent of occurrence of *S. psilocarpus* is c. 40,000 km<sup>2</sup>, but this estimate is based on a minimum convex polygon that includes large expanses of Bass Strait. The

area of occupancy is less than 5 ha, but this is based on limited surveys. There are likely to be substantial areas of potential habitat close to known sites. On present estimates, the total population of mature individuals is less than 100.

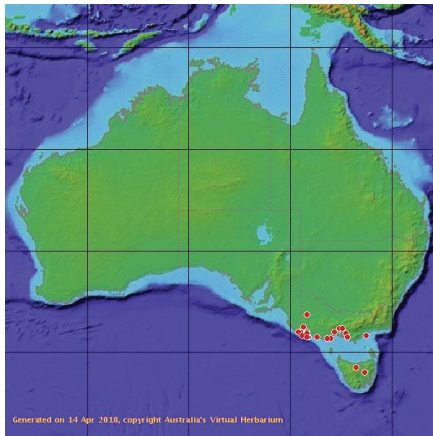
*Senecio psilocarpus* meets the criteria for listing as endangered, meeting criterion B (extent of occurrence realistically estimated to be less than 500 km<sup>2</sup>), specifically, B1 (severely fragmented) and B2c (continuing decline in area, extent and/or quality of habitat); and criterion D (total population extremely small or area of occupancy very restricted), specifically D1 (total population estimated to number fewer than 250 mature individuals).

While the species may meet the criteria for listing on the Tasmanian *Threatened Species Protection Act 1995*, formally listing the species should be approached with caution. As with many other species of recently recognised species of *Senecio*, familiarity is leading to additional collections. Potential habitat for *S. psilocarpus* (natural wetlands, farm dams, marshes) is still relatively common and the species appears to have a widespread distribution so range extensions and infillings are likely. However, the species technically meets the criteria for endangered on the Tasmanian *Threatened Species Protection Act 1995*, and a conservative approach to conservation management is warranted.

#### DISTRIBUTION, HABITAT AND RESERVATION STATUS ON MAINLAND AUSTRALIA

*Senecio psilocarpus* occurs in western Victoria and southeastern South Australia (Belcher & Albrecht 1994; Barker et al. 2005; Thompson 2004), where it has a scattered distribution (Figure 2), known from approximately ten sites between

Wallan, about 45 km north of Melbourne, and Honans Scrub in southeastern South Australia (TSSC 2008).



**Figure 2.** Distribution of *Senecio psilocarpus* within Australia (map generated from the *Australia's Virtual Herbarium*, 14 April 2010, does not show all Tasmanian collections held at HO)

On mainland Australia, *S. psilocarpus* occurs in high-quality herb-rich wetlands on plains. During winter such sites can be inundated with up to 60 cm or more of water, but are almost dry in summer. A tree canopy is absent from most sites, or rarely, *Eucalyptus camaldulensis* (river red gum) is the overstorey species in a woodland formation. The understorey is rich in grasses and sedges and miscellaneous aquatics. The more easterly populations grow in grey to black silty clay soils whereas the westerly populations grow on peatier soils (Belcher & Albrecht 1994; TSSC 2008).

In Victoria, most populations occur in small areas of less than 0.4 ha and only one occurs within a gazetted biological reserve, at Red Gum Swamp in Lower Glenelg National Park, near Drik Drik. Other

populations occur within rail reserves, bushland reserves, state forests or uncommitted public land near Lal Lal, Casterton and Koroit. South Australian populations are at Honans Scrub and Piccaninnie Ponds, with the latter appearing to be within Piccaninnie Ponds Conservation Park (Belcher & Albrecht 1994; TSSC 2008).

#### THREATENING PROCESSES AND MANAGEMENT

On the mainland, the threats to *S. psilocarpus* are not entirely understood, but grazing pressure by both stock and introduced herbivores and weed invasion are considered to be the main threatening processes for this species. Other potential threats to the species include trampling by domestic stock and kangaroos and changed hydrology leading to salinity (TSSC 2008).

In Tasmania, threats to *S. psilocarpus* have historically been extensive land clearing of low-lying ground for the development of pasture and cropping lands, which included substantial modifications to many areas of natural wetlands. Contemporary threats to Tasmanian populations of the species are probably similar to those potentially operating on mainland Australian populations, although most of the known sites are not presently subject to stock grazing.

A warmer climate and longer periods of drought may deleteriously impact on the habitat of *S. psilocarpus*, through effects such as drying out of low-lying areas and competition with weeds.

Lack of knowledge on the distribution of the species is also a concern because many potentially suitable sites are probably subject to ongoing intensive primary production activities. It is likely that minor modifications to agricultural practices would result in a significantly higher level

of security for the species: as with most species of *Senecio*, some level of disturbance is acceptable, if not necessary, for persistence of populations. Small populations separated by long distances supporting unsuitable habitats are also not conducive to genetic exchange and potentially exacerbate the risk of stochastic events eliminating populations of *S. psilocarpus* in Tasmania.

#### DISCUSSION

Several Tasmanian species of *Senecio* are represented by one or few records including *S. extensus* (single highland record from 1984), *S. longipilus* (three records, only one from 1800s with details suggesting a lowland distribution), *S. georgianus* (single collection from 1800s), *S. campylocarpus* (two historical and one recent record) and *S. macrocarpus* (one historical collection).

Of the thirty-three native taxa (including infrataxa in this total), only one, *S. macrocarpus*, is currently formally listed as Extinct on the Tasmanian *Threatened Species Protection Act 1995*. It is represented by a single old record from northern Tasmania (South Esk River area close to Launceston/Perth). On the mainland, it typically grows in low-lying areas, and has been recorded from basalt-derived clay or clay-loam soils in grassland, sedgeland and woodland (Wapstra et al. 2008).

In the most recent version of *A Census of the Vascular Plants of Tasmania* (Buchanan 2009), only *S. tasmanicus* has been accorded the status of "extinct". This is a Tasmanian endemic but has not been recorded since the mid 1800s. The most likely habitat is lowland plains near swamps. *S. campylocarpus* was another species of low-lying swampy ground represented by only two records (from 1800s and 1943) that has only recently been

"re-discovered" from the heart of Campbell Town (Wapstra et al. 2006). *S. longipilus*, represented by only one 1800s collection, is probably also a species of low-lying areas. Buchanan (2009) appears to have been appropriately hesitant in assigning the "presumed extinct" status in the case of *S. campylocarpus*. This may prove to be the case for many other species as previously unexamined or misidentified herbarium specimens are examined and new collections of *Senecio* are made from the State. It is certainly the situation with *S. psilocarpus* in Tasmania, with its geographically and temporarily widely separated collecting history.

Further collections of specimens of *Senecio* from poorly-drained low-lying terrain throughout Tasmania (particularly the northern Midlands, but also coastal hinterlands and Bass Strait islands) are needed to further clarify the status of *S. psilocarpus* and similarly poorly-collected and poorly-understood species of similar habitats. Targeted surveys of potential habitat radiating out from known locations are likely to be a productive method of detecting further sites.

#### ACKNOWLEDGMENTS

Wendy Potts provided the impetus for this paper by making me aware of the threatened status of *Senecio psilocarpus* on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, a fact that had hitherto escaped my attention. Ian Thompson confirmed the identification of *S. psilocarpus* from King Island. Richard Schahinger provided the logistics of the King Island survey trip. Micah Visoiu provided information on his collections of *S. psilocarpus*. Alex Buchanan (Tasmanian Herbarium) and Ian Thompson provided collection information for other sites. Tim Leaman provided information on the tenure of the Dukes Marshes site. Wendy Potts and

Lorilee Yeates provided useful commentary on an earlier version of the manuscript.



**Plate 1.** Specimen of *Senecio psilocarpus* from Dukes Marshes – note the multi-stemmed growth habit from the base of the plant

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