

FINDING A BOTANICAL LAZARUS: TALES OF TASMANIAN PLANT SPECIES ‘RISEN FROM THE DEAD’

Mark Wapstra¹, Fred Duncan², Alex Buchanan³ and Richard Schahinger⁴

¹ Environmental Consulting Options Tasmania, Lenah Valley.

Email: mark@ecotas.com.au. ² Forest Practices Authority, Hobart.

³ Tasmanian Herbarium, Hobart. ⁴ Threatened Species Section, Biodiversity Conservation Branch, Department of Primary Industries and Water, Hobart.

INTRODUCTION

‘Extinct’ is an emotive word. For many people it conjures up images of dodos and thylacines (but very rarely does the image of a cryptic shrub or herb pop into people’s minds). As humans, we don’t want any species to become extinct: witness the recent scientific and media interest in the Tasmanian devil being ravaged by the facial tumour disease. Unfortunately, every country in the world is ‘home’ to extinct plants and animals, and Tasmania is no different.

Currently there are around 30 species listed as ‘presumed extinct’ on the Tasmanian *Threatened Species Protection Act 1995*, including 4 birds, 1 mammal, 1 beetle, 2 caddisflies, 1 spider, 1 lichen, 15 dicotyledons, 4 monocotyledons and 1 fern. Unfortunately, we simply know that some of these are more than just ‘presumed extinct’ – there would be few scientists arguing that the King Island emu is still alive in some unsurveyed corner of the island. But other species are exactly that: ‘presumed extinct. For example, until recently (1996), the delightfully named southern hairy red snail (*Austrochloritis victoriae*) was listed as ‘presumed extinct’ (had not been collected since the 1920s). That was until Tasmanian terrestrial snail expert Kevin Bonham rediscovered the species on King Island (Bonham, 1997).

There would be few biologists who haven’t camped in the Tasmanian bush, hoping for an elusive sighting of a thylacine, but how many have been hoping to also stumble across *Festuca archeri* (if indeed the species actually exists)?

If ever a sighting of a thylacine could be confirmed by the scientific community, it would almost certainly cause a media frenzy (and not just in Tasmania). There was not much fanfare about the re-emergence of the southern hairy red snail but the recent rediscovery of the beautiful Miena jewel beetle (*Castiarina insculpta*),

caught on the back of someone's ute, got the media a little more interested.

Tasmania is (or was) home to several species of extinct plant, though these are less well known than some of their furred, feathered, shelled or winged friends. Fortunately, some of these plants have been rediscovered in recent years. The anecdotes below describe some of the recent discoveries.

THE STORIES

The stories are mostly written in the third person (by one of the authors) but some are in the first person and relate a personal tale. We're sure we've missed some interesting stories of rediscovery. However, like the plants themselves, some of these accounts are yet to be discovered, lost in the depths of herbarium specimens, dusty literature or in the dark recesses of someone's memory.

Argentipallium spiceri (*Asteraceae*), 'spicers everlasting'

For many years, this plant, under the name *Helichrysum spiceri*, was just an entry in *The Student's Flora of Tasmania* (Curtis, 1963) and no living plants were known. It was presumed to be extinct and was listed as such in the schedules of the *Threatened Species Protection Act*.

All that changed in 1997 when a single plant appeared in a bush garden, bordering *Eucalyptus obliqua* forest, near Longley in southeastern Tasmania. A specimen forwarded to the Tasmanian Herbarium confirmed the young shrub's identification and it became the prized exhibit in the Eberhard garden. It narrowly escaped another round of extinction when the family dog lay down on top of it (Rolan Eberhard, pers. comm.), but it sprang back unharmed and went on to produce flowers in the following summer (and it is now listed as endangered, although sleeping dogs are not listed as a threatening process).

This species was discovered by Augustus Simson in 1876 when he found a single individual growing on the roadside between Longley and the Sandfly coal seam. He returned the following summer and collected further material from the same plant (Simson, 1880). He showed the specimens to his friend, the Reverend William Spicer, and they determined that it was an unnamed species of *Helichrysum*. This was just in time for it to be included, as an addendum, in the Reverend Spicer's *Handbook of the Plants of Tasmania* (Spicer, 1878). At the same time, a specimen was forwarded to Ferdinand von Mueller, in Melbourne, who named it *Helichrysum spiceri* (Mueller, 1878).

Nothing further was heard about this plant in the wild until Leonard Rodway collected specimens at or near Huonville in January 1892. Rodway confused this

species with another rare *Helichrysum* from the Furneaux Islands in northeastern Tasmania. He thought that *H. obtusifolium* and *H. spicieri* were the same species and in his *The Tasmanian Flora* (Rodway, 1903) he described the two together under the former name and extended its distribution to mainland Australia. This had the effect of consigning *H. spicieri* to obscurity for the next sixty years.

The plant appeared again in 1958 when Winifred Curtis collected material from the road bank at the edge of the Huon Highway, immediately south of its junction with the south end of Scotts Road, near Cairns Bay. Dr Curtis recognised this plant as distinct from *H. obtusifolium* and in Part 2 of *The Student's Flora of Tasmania* she (Curtis, 1963) described it as endemic to Tasmania and known only from the Huon district. This was the last time the plant was seen until its recent rediscovery by Jo Eberhard near Longley (Buchanan, 1998).

Towards the end of this saga, Australian taxonomists studying the southern hemisphere genera of the daisy family (Asteraceae) were becoming increasingly uncomfortable with the wide range of variation in the genus *Helichrysum*. As a part of the recent revision of the genus, three Tasmanian species (*H. dealbatum*, *H. obtusifolium* and *H. spicieri*) were transferred to the newly erected genus *Argentipallium* (Wilson, 1992).

One interesting fact stood out at three of the sites where *Argentipallium spicieri* had been collected: only one individual was seen (nothing is known about Rodway's collection on this point). Despite much searching in the vicinity of the Eberhard garden, no further plants were located (Alan Gray, pers. comm.). However, at this site and at the Cairns Bay site, *A. dealbatum* occurs close by. Furthermore, it was noticed that the seeds of *A. spicieri* were hollow and wrinkled and attempts to germinate the seed were unsuccessful. This led to the realisation that *A. spicieri* was probably a hybrid. Thus, its successful propagation is only by cuttings or other vegetative means and its hybrid origin is now indicated by an 'X' before the specific name, *Argentipallium Xspicieri* (Buchanan, 2005).

Barbarea australis (*Brassicaceae*), 'riverbed wintercress'

Barbarea australis, an annual or short-lived perennial herb that occurs amongst river rocks in flood-prone rivers, is now known from about 10 river systems (chiefly the Derwent River system including the Shannon, Ouse, Clyde and Nive rivers, and also the St Patricks, Mersey, and Hellyer rivers), and is currently listed in the Tasmanian *Threatened Species Protection Act* as endangered. But until 1982, the species was only 'known' from much earlier collections (from the 1830s). Joseph Hooker described *B. australis* in 1852 (*The botany of the Antarctic voyage of H.M. Discovery ships Erebus and Terror. II. Flora No-*

vae-Zelandiae), citing the type material as having been collected by Colenso (a well known early New Zealand collector) from ‘Northern Island’ (meaning the north island of New Zealand). However, Hooker stated that his description was ‘made up chiefly from specimens from Tasmania’ and it is now known (Hewson, 1982) that the species is restricted to Tasmania (New Zealand material is the naturalised *B. intermedia* and mainland Australian material is the native *B. grayi*).

The Tasmanian Herbarium holds a Joseph Milligan specimen from around 1835, probably collected somewhere in the northwest (the specimen is labelled with a ‘W’, perhaps referring to the extensive ‘Woolnorth’ property). Hewson (1982) lectotypified the name *B. australis*, citing a Gunn collection held at Kew (collected February 1837 from the Hampshire Hills in the State’s northwest). The Milligan specimen at the Tasmanian Herbarium was not recognised as the endemic native until Dennis Morris worked on the genus in 2003 – until that time, the specimen had been placed under the naturalised *B. intermedia*.

Coincident with Hewson (1982), people in Tasmania became a little more interested. It was Ken Harris who collected the first material of *B. australis* for 145 years. Handwritten notes on his specimens indicate that he suspected the specimen was *B. australis* – despite this, they were filed under *B. intermedia*.

So what happened to *B. australis* in Tasmania between the 1830s and the 1980s? Was *B. australis* ever extinct? Probably not. It may not even have officially achieved ‘presumed extinct’ status because essentially we never really knew it existed. Hooker tried to tell us in 1852, Leonard Rodway in *The Tasmanian Flora* (Rodway, 1903) failed to heed the species, Curtis included the species in the first edition of *The Student’s Flora of Tasmania* (Curtis, 1956), noting ‘recorded by J.D. Hooker from moist or marshy districts in the centre of the island and near Launceston’ but no-one collected specimens until 1982 (and even then they were filed under an assumed name).

Bossiaea obcordata (*Fabaceae*), ‘spiny bossia’

Bossiaea obcordata is a semi-prostrate leguminous shrub with yellow and crimson (eggs and bacon) flowers. The heart-shaped leaves (that give the plant its specific epithet) are fairly sparse on its spiny branches. The species was probably described (as *Platylobium obcordatum*) by the French botanist Étienne Ventenat in 1803, apparently from plants grown in the garden of Empress Josephine, wife of Napoleon Bonaparte. Seeds of these plants would have been sourced from the struggling colony of New South Wales, though, unbeknownst to the British colonisers of Van Diemen’s land, the same spe-

cies was growing near the fledgling settlement of New Norfolk. Rodway (1903) referred to the species as *Bossiaea cinerea*, recognising the variety *rigida* for the Tasmanian material. The species was renamed *Bossiaea obcordata* in 1917 (by Druce). It also occurs in Victoria and southern Queensland.

The first Tasmanian record was in 1895, when Leonard Rodway collected *B. obcordata* from 'The Rocks near New Norfolk' (which was taken to be Derbyshire Rocks) on the northern bank of the River Derwent to the east of the town. He repeated this performance in 1898. However, it was decades before the species resurfaced, in curious circumstances, after being collected by a Forestry Commission worker, Wolfgang (Wally) Pataczek, north of Fingal in 1971.

Wolfgang had inherited an interest in plants from his native Sudetenland, and established a herbarium at the Forestry Commission. While working in pine plantations near Tower Hill, he collected an unidentified floral object, from a strip of remnant *Eucalyptus sieberi* forest adjacent to a ridgetop spur road (Cox 10 Spur). The UFO was subsequently transferred to a Forestry Commission herbarium sheet, where it lay alone and unidentified for several years, until Wolfgang took the plant (and several other UFOs) to the Tasmanian Herbarium for an outing. Unfortunately it was not until some time later that Wolfgang's specimens resurfaced again, and it was at this stage that Alex Buchanan determined that Wolfgang's plant was not a *Bossiaea nova* - rather, the elusive *B. obcordata* had been fortuitously rediscovered. After revisiting Wolfgang's work diaries to remember where the plant had been found years earlier, Alex and he visited the site in the early 1980s, resulting in a file-full of correspondence flowing between the Forestry Commission and Parks and Wildlife Service about management of the species. This included the possibility of giving a fertiliser boost to the few plants struggling on the desperate mudstone soils of the Cox 10 ridgeline, and caging them to protect them from the equally desperate marsupials that were browsing them to ground-level in this nutrient-poor environment. Several plants were eventually caged with chicken wire, and produced branches, leaves, flowers and fruit in the traditional fashion. A topiary effect was created when these protruded through the wire and the animals yielded to temptation and resumed their pruning activities.

It is worth mentioning that Wolfgang also delivered to the Tasmanian Herbarium a distinctive wattle, which had been collected from Tower Hill by Max Gilbert. The wattle was named *Acacia pataczekii* (wallys wattle) by Dennis Morris, to the chagrin of Dr Gilbert.

In the last twenty years, many more populations of *Bossiaea obcordata*

have been discovered, although searches at New Norfolk have failed to relocate Rodway's population. Most new sites lie north of the Fingal Valley. Mark Neyland and Jasmine Lynch have been the most prolific of the *Bossiaea* spotters, and several sites were found by Forestry Tasmania and Forest Practices Authority field workers. Some of the most vigorous plants are on steep roadside batters, possibly because they are too sheer for browsing marsupials. Most sites are on early Devonian - Silurian Mathinna quartzwacke turbidite sequences of interbedded sandstone, siltstone and mudstone (which is enough to induce withdrawal symptoms in any species), but *B. obcordata* has also been recorded from granite in the Rossarden area, dolerite south of Fingal and on mudstone near Tunnack. Jasmine Lynch compiled a detailed report (Lynch, 1993) on the distribution and ecology of *B. obcordata* and several other species of uncommon legumes, including *Acacia pataczekii*.

Bossiaea obcordata is listed as a Rare species (Schedule 5) on the *Tasmanian Threatened Species Protection Act*. It occurs in Castle Cary Forest Reserve and Sawpit Ridge Forest Reserve, and in several informal reserves established on State Forest to protect populations of the species.

Lycopus australis (*Lamiaceae*), 'Australian gipsywort'

Lycopus australis was presumed to be extinct, as it had not been recorded in Tasmania since 1943 (from around Cressy). It was rediscovered in January 2000 during plant surveys in the northeast (on the flood plains of the Lower Ringarooma River). Further populations were discovered in 2002 along the West Tamar in *Phragmites australis* wetlands and disturbed paperbark swamp forests, and in 2004 along a creek near Port Sorell.

So where has *L. australis* been hiding? Almost certainly much of its former potential habitat is long gone (drained and cultivated to create fertile grazing and cropping country). That the species has been found so close to Launceston indicates that perhaps it never disappeared, simply ducked underneath our radar for a few decades.

Could *L. australis* have been mistaken for a weed? When Rae Glazik reported her rediscovery of *L. australis*, she wrote '...I came across what I thought was another weed, but was unsure of its identification...I presented the 'poxy weed' to Dennis Morris and he identified it as the extinct native gipsywort...' (Glazik, 2000). Most keen botanists and naturalists would probably follow Rae Glazik's example, so it is unlikely that the species has gone unnoticed in too many more places.

The species also occurs in Victoria, New South Wales, South Australia and Queensland – such a widespread distribution might indicate a poten-

tially wider distribution in Tasmania, although numerous wetland surveys (e.g. Kirkpatrick and Harwood, 1983a,b) would unfortunately suggest a more restricted distribution in this State (and it remains listed as an endangered species). The Tasmanian Herbarium holds a single record prior to the 2000–2004 collections. This record is from around Cressy from 1943. Oddly, Rodway, in *The Tasmanian Flora*, describes the habitat and distribution of *L. australis* in Tasmania as “moist, shady places in many parts”.

Mentha australis (*Lamiaceae*), ‘river mint’

While undertaking a routine botanical assessment of a proposed forestry coupe on private property near Lake Trevallyn, my (Mark Wapstra) roving botanical eye was distracted by what looked like more interesting lakeside vegetation. While munching a sandwich and peering out from the shelter of a copse of dogwood, my senses (sight and smell) were caught by a plant I did not immediately recognise.

Growing in a small patch along the water’s edge was an erect, highly aromatic white-flowered herb. I took some specimens and keyed them out using *The Student’s Flora of Tasmania* (Curtis, 1967), easily identifying them as *Mentha australis*. The Flora stated that its distribution was ‘local in marshes in northern and central Tasmania’, an almost verbatim quote from Rodway’s *The Tasmanian Flora* (Rodway, 1903). Specimens were taken to the Tasmanian Herbarium, where Dennis Morris and Alex Buchanan confirmed the identification (amusingly, we first used a field guide to the weeds of New Zealand to do this). The Tasmanian Herbarium holds very few records of the species, most with limited collection information.

At the time of the rediscovery of the plant, bureaucratic machinations were underway to officially list the taxon as ‘presumed extinct’ on the Tasmanian *Threatened Species Protection Act 1995*. The species is now listed as ‘endangered’ (although it did make it to the Act as ‘presumed extinct’ for a short period – impossible to stop the wheels of the bureaucratic machine once they are turning). It is only known from the Lake Trevallyn population (further searches have failed to turn up additional populations in the immediate area).

Mentha australis occurs elsewhere in Australia (Conn, 1999), often along rivers (hence its common name of river mint). It belongs to the family Lamiaceae, which includes many familiar garden herbs such as the mints. It is collected and grown as a culinary herb and apparently aborigines used it as a food flavouring and for treating colds. A population is now maintained at the Royal Tasmanian Botanical Gardens for anyone who might want to see this attractive plant. And

anyone with a keen eye and nose should keep the senses alert while in the vicinity of slow-moving or still water bodies in 'northern and central districts'.

Myosurus australis (*Ranunculaceae*), 'southern mousetail'

This little member of the buttercup family belongs to a genus that occurs in the temperate regions of both hemispheres; one species is known from Australia. The species are not easily separable and our *Myosurus australis* has been, at various times, included with the European *M. minimus* and the South American *M. apetalus*. Currently, we follow Mueller's interpretation and recognise the Australian plant as a distinct species. This is based on variation in the shape of the little fruits (or achenes). *M. australis* has longer and more angular achenes than other species.

Myosurus australis was first discovered in Tasmania in 1970, by Dennis Morris, in a small rocky depression near Jericho. This was thought to be a remnant of a formerly more extensive population, now reduced by habitat modification (farmland). However, in later years, despite careful searching in the same location, no further plants have been found. This once-only occurrence, together with the location, near a farm dam in grazing country, raised the possibility that it might have been introduced from mainland Australia, where it is widespread but not common. By the 1990s no further populations had been discovered and, being an annual, new plants would have to become established regularly, probably each year, for the continuation of the species. Thus *M. australis* was considered to be extinct in Tasmania.

And then in 2005, Andrew North came across the species once again, near Penstock Lagoon in the Central Highlands. This time, it was found in cracks in a rocky dolerite pavement amongst an open forest of *Eucalyptus pauciflora* and *E. dalrympleana*, but also associated with grazing country, the site being used as a "sheep camp". In this highland environment the plants are small and inconspicuous, growing to only one or two centimetres tall. Perhaps it is more common than we realise, its diminutive stature and small greenish flowers making it easily overlooked.

When Andrew first found the specimens in January, they were no more than dry dead plants which he considered were of an unfamiliar introduced species. However on closer inspection he recalled their similarity to an illustration of *Myosurus minimus*. Suspecting the conservation significance and scientific interest of the plants, Andrew brought these rather poor specimens to the attention of Dennis Morris at the Tasmanian Herbarium. Dennis was able to immediately confirm their identification and noticing the presence of seeds suggested that Alan Gray could have a go at germinating them. One plant grew on quite happily on Alan's window sill, developing into a spectacular individual of *M. australis*, much to the

excitement of many people. Given the association with sheep at both locations where it has been recorded in Tasmania and recognising the extensive movement of stock between Tasmania and mainland Australia, the question of whether *M. australis* is native or naturalised in Tasmania will probably remain a mystery until further sites are found. Certainly it can no longer be considered extinct.

Phebalium daviesii (*Rutaceae*), 'davies waxflower'

Generally, most plants that were first described from Tasmanian collections fall into three categories: those that were collected and described by voyaging visitors e.g. Labillardière and Brown; those that were collected by resident collectors and consigned in regular shipments to Kew Herbarium in London e.g. Gunn and Milligan collections; and those that were collected and described by Australian or Tasmanian botanists as in the modern era. *Phebalium daviesii* does not fit any of these categories, but falls somewhere between the last two.

Phebalium daviesii was discovered by Reverend Richard Henry Davies about 1855, near the site of present-day St Helens, probably on the banks of the George River near its mouth. He was a grazier and ran cattle on this land. Davies forwarded his collection to William Archer of 'Cheshunt' and eventually it reached Joseph Hooker at Kew. Hooker described the new shrub and named it after the discoverer (although the translation of Archer's handwritten notes resulted in R.H. becoming R.N. Davies); this was just in time for it to be included in the 'Additions etc' of his *Flora Tasmaniae* (Hooker, 1859).

The next collector to record the existence of this species was Augustus Simson. He made collections in three successive years, 1876, 1877 and 1878, during his regular visits to St Helens as agent for the tin miners of the area. He sent duplicate material to Mueller in Melbourne and his own specimens are now in the Tasmanian Herbarium.

The next collections were made in October 1892 and became part of Leonard Rodway's herbarium. It is not clear who collected this material but it may have been William Fitzgerald, because he made extensive collections from the Georges Bay area at this time. This suite of specimens is the first with a locality more precise than just Georges Bay. They were collected from Constable Creek and this probably represented a new site, about four kilometres southwest of the George River site. Constable Creek was the scene of intensive alluvial tin mining at that time and it is thought that the outwash of silt and gravel, deposited in the lower reaches of the valley, is the reason why this plant was never found there again.

Phebalium daviesii then became extinct, or so we thought. It eluded the

eyes of field botanists, despite much searching, for almost a hundred years. Then in December 1990, a sharp-eyed pteridophile, Michael Garrett, re-discovered a small population on the banks of the George River. This was probably the same population that Davies found about 130 years earlier. Another small population has since been located a few kilometres upstream.

Australia celebrated its Centenary of Federation in 2001. As part of the celebrations, each State was asked to nominate a ‘federation flower’, a plant that would be ready for release as an ornamental – *P. daviesii* was Tasmania’s choice. This attractive shrub has been propagated from the small wild population, and residents of St Helens and many other places are proud to display this threatened plant in their gardens (the species is listed as endangered). They will help assure its survival into the future.

Prasophyllum concinnum (*Orchidaceae*), ‘trim leek-orchid’

In 1947, famous Tasmanian botanist Winifred Curtis collected the type specimen of *Prasophyllum concinnum* from Blackmans Bay, south of Hobart. However, it was not until 1992 that another collection of the species was made, oddly enough from at or near the type locality, by local orchid experts Hans and Annie Wapstra (Ziegeler, 1994). The area supporting the species, a beautiful patch of remnant heathland and woodland nestled among farmland and the ever-expanding suburbia of Blackmans Bay/Kingston, was under threat from a proposed major housing estate development. But after much work by locals and a committed and cooperative government of the day, the area was dedicated as a reserve in 1997 (Kirkpatrick, 1999). Now known as the Peter Murrell Nature Reserve, the area is host to many more interesting species and remains a hotspot for orchid enthusiasts (many probably trip unwittingly over the cryptic caterpillars of the threatened chaostola skipper butterfly, which also has been rediscovered in the reserve in recent years). Fortunately for *P. concinnum*, it has been found to be much more widespread and common than previously thought and has been removed entirely from the *Threatened Species Protection Act*.

Senecio campylocarpus (*Asteraceae*) ‘bulging fireweed’

The genus *Senecio* has recently undergone significant revision (e.g. Thompson, 2004), which has resulted in several ‘new’ species for Tasmania. Until recently, one of these species, *S. campylocarpus*, was represented by two Tasmanian collections held at the Tasmanian Herbarium (although the species is widespread and common in Victoria). The two collections are from 1888 (near Launceston, collector unknown) and 1943 (by J.H. Wilson from a ‘swamp near Cressy’).

Recently (April 2006), I (Mark Wapstra) located several small patches of a relatively short-statured entire-leaved *Senecio* along the grassy/weedy banks and margins of the Elizabeth River in the heart of Campbell Town (Figure 1) which turned out to be the long-lost *S. campylocarpus*. Why did I collect specimens? Well, I wasn't going to at first because I was on a week-long field trip, but the fact that a native-looking *Senecio* was growing in the middle of the gentle rapids made me stop and pick some plants.

Based on the fact that the species has persisted in a council park that is regularly mown, and that similar swampy habitat (e.g. on farms, along rivers and creeks) is still widespread in Tasmania, it is likely that the species is more widespread than indicated by the three records (although a search of several hundred metres of the Macquarie River near the Ross bridge in May 2006 failed to locate the species).

People should also watch out for *S. tasmanicus*, listed as extinct in the Census (Buchanan, 2005) but not yet on the *Threatened Species Protection Act 1995*. It too is likely to have simply been overlooked since 1888, when it was last collected, and probably occupies similar habitat to *S. campylocarpus*.



Figure 1. The Elizabeth River running through Campbell Town. *Senecio campylocarpus* was found growing between the open water and the well maintained lawn, in the boggy reeds/grass and also in the rocky rapids beneath the footbridge over the river.

Tetratheca gunnii (*Tremandraceae*), 'shy pinkbells'

Tetratheca gunnii is a spreading undershrub with attractive pale lilac to purple flowers towards the end of its branches. A single specimen was collected from the Asbestos Range by Ronald Gunn in 1843, and was named by Joseph Hooker after its discoverer. After this fleeting moment of fame, *Tetratheca gunnii* went to ground and remained incognito for the next 142 years. The species (or specimen!) was subsumed into the *Tetratheca pilosa* complex by Rodway (1903) and Curtis (1956), but was resurrected by Thompson (1976), who described distinctive floral features that separated *T. gunnii* from the more vigorous *T. pilosa*.

The 1980s was a period of exponential growth in knowledge about Tasmania's vegetation. Mick Brown of the Tasmanian National Parks and Wildlife Service was one of the most enthusiastic catalysts for flora research and conservation, with a strong focus on Tasmanian endemic species (e.g. Brown *et al.*, 1983). With support from the Forestry Commission and Australian NPandWS, Mick assembled a motley crew (Neil Gibson, Jamie Bayly-Stark, Fred Duncan and himself) to undertake a mission impossible - locate (but not destroy) the secretive *T. gunnii*. The *modus operandi* was to wander aimlessly for a day in the serpentine (ultramafic) country of the Asbestos Range - on the assumption that *T. gunnii*, like some other localised Tasmanian endemics known from this area (*Spyridium obcordatum*, *Epacris virgata*), would be confined to this substrate. On a fine morning in October 1985, after picking up vital supplies at Exeter Bakery, the *Tetratheca* hunters followed local custom by abandoning their vehicle along Tattersalls Road to the northwest of Beaconsfield. They then wandered aimlessly, as per instructions, into some nondescript *E. amygdalina* forest typical of the area.

About two minutes after leaving the road and the bakery products, the indefatigable Dr Brown tried to rally his flagging troops by declaring 'Well, here's *Tetratheca pilosa*!' when he passed a clump of this robust species. I (Fred Duncan) had been trailing behind the others (a function of sleep deprivation induced by a five-month-old daughter) when I looked down at that instant and saw a solitary *Tetratheca* with more straggly appearance, and smaller in flowers and leaves, than my mental image of *T. pilosa*. So I announced to my sceptical companions '...and here's *Tetratheca gunnii*!!!' (complete with the three exclamation marks). We collected a sprig and returned to the car, where the plant matched perfectly Thompson's description of the long-lost *T. gunnii*. We searched several other sites in a remarkably successful day - finding three more small populations (of 1, 2 and 20 plants), the largest on a spoil heap downslope of an old mine shaft. The results of this expedition are described in Brown *et al.* (1986).

Since then, there have been many botanical studies in the serpentinite-based forests in the Beaconsfield area, including coordinated searches for *T. gunnii* by teams of botanists (totalling 40 person days during the flowering period in 1995). About ten populations of *T. gunnii* have come to light, varying in size from 1 to about 30 individuals. The populations tend to be unstable, with numbers often fluctuating over short periods. Some populations we found in 1985 have declined or vanished. Barker (1996a) notes that *T. gunnii* exhibits an unusual form of rarity: sparse in a sparse habitat. There have been detailed investigations into the ecology and management of the species (e.g. Barker, 1996a, b), one impetus being the susceptibility of *T. gunnii* to *Phytophthora cinnamomi*, the root-rot pathogen which has infected at least two of the populations. There have also been studies of the associated threatened endemics *Spyridium obcordatum* and *Epacris* aff. *virgata* (Gibson *et al.*, 1992; Coates, 1991; Keith, 1998).

The good news is that the reservation status of *T. gunnii* (and the other serpentine endemics) has improved tremendously, with most populations now being located in the Dans Hill Forest Reserve. This includes populations that occurred on private land that was acquired through the Private Forest Reserves Program and added to the Dans Hill reserve in 2003. Planning systems have flagged the potential for serpentine substrates to support important flora values, and procedures have been put in place to avoid spreading *Phytophthora* through mining, forestry or recreational activities.

For all that, *Tetratheca gunnii* remains one of Tasmania's most threatened plant species, and is listed as 'endangered' (Schedule 3) on the Tasmanian *Threatened Species Protection Act*. It is also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act*. However, they breed them tough in Beaconsfield, so hopefully it will prove as resilient as some other endangered locals that have had a higher profile in recent months.

Vittadinia australasica var. *oricola* (*Asteraceae*), 'coast New-Holland-daisy'

Vittadinia australasica is an annual or short-lived perennial herb, mostly 10–30 cm high, with inconspicuous mauve-coloured flowers that appear during November and December.

Nancy Burbidge described the species in a paper published posthumously in 1982 (Burbidge, 1982), its presence in Tasmania being based on a single specimen collected in the 19th century (held at the Melbourne Herbarium), with the less than expansive locality annotation of 'V.D.L.'. The taxon is also known from coastal areas of far southwestern Victoria, as well

as South Australia and Western Australia. It was not until November 2000 that the species was found growing in Tasmania, to the south of Temma in the State's far northwest. The other species in the genus in Tasmania grow in grassy habitats in the Midlands and Derwent Valley; the Temma site is a further 200 km to the west, making it very much an outlier for the genus.

The discovery of *V. australasica* was two years in the making and, as tends to be the case, was not even in our thoughts back in 1999 when we first ventured into the Arthur-Pieman area. A group from the Nature Conservation Branch – Hans and Annie Wapstra, Karen Johnson and myself (Richard Schahinger) – were led to a grassy coastal dune area by a local Parks ranger, hoping to find the diminutive *Pterostylis rubenachii* (Arthur River greenhood). No such luck, but we did stumble across a spectacular display of *Euphrasia*, prompting an opportunistic revisit the following year (accompanied by Paul Black). And then slowly the significance of the area began to emerge, with confirmation of the species' identity by Neville Walsh of the Melbourne Herbarium, and the realisation that 'V.D.L.' almost certainly stood for Van Diemen's Land Company, a large agricultural firm granted land in northwestern Tasmania.

Several hundred *V. australasica* plants have now been recorded from the Temma site over an area of about 3 ha. Intensive searches of similar habitat between Woolnorth and the Pieman River in the years since have failed to turn up any new plants, highlighting the fortuitous nature of our initial discovery. The site in question has also proven to be home to several other elusive plants, including one that was about to be listed as extinct in Tasmania (*Euphrasia collina* subsp. *tetragona*), and another that had not been recorded previously on the mainland of Tasmania (*Scaevola albida*). The quest to find more populations of *V. australasica* ultimately led to the description of a grassland community unique to the near-coastal strip of northwestern Tasmania, a community that has all but disappeared since European settlement due to the impact of cattle and adverse fire regimes (Schahinger, 2002; Stockton, 1982). The species' hopes of survival in the wild remain tenuous (it is now listed as 'endangered'), with expanding dune blowouts triggered by off-road vehicles threatening to smother at least some plants. The Royal Tasmanian Botanical Gardens has successfully propagated the species from seed, however, providing at least some insurance against its return to 'extinction'.

DISCUSSION

In palaeontology, a 'Lazarus taxon' is one that disappears from one or more periods of the fossil record, only to appear again later. The term refers to the New

Testament story of Lazarus, whom Jesus miraculously raised from the dead. The Wollemi pine *Wollemia nobilis* is an example of a Lazarus taxon that has gained much notoriety in both the botanical and wider world after a relict stand of this fossil species was rediscovered in sandstone terrain northwest of Sydney (Jones *et al.*, 1995). The term 'Lazarus taxon' has also found some acceptance in neontology, the study of extant organisms, as contrasted with palaeontology, as an organism that is rediscovered alive after having been widely considered extinct for years.

This article has presented several stories of Tasmanian Lazarus species. Hopefully it highlights that with a little knowledge, and a sense of alertness for the unusual, anyone with more than a passing interest in natural history can get in on the act of rediscovering our 'lost' plant species.

We know that some of our plants and animals are extinct forever (although some people still think the thylacine may be alive, or can be revived by the wonders of modern science). But others, especially the plants, may simply be 'lost to science', surviving on an isolated mountain top or in some uninviting marsh. Others are probably living closer to home (like *Mentha australis* that was found along the shores of the lake supplying Launceston with its drinking water and power).

In recent years, many species, not previously recorded from Tasmania, have been discovered in parts of the State that were settled early by Europeans and have been substantially modified by agriculture or the development of towns and cities. For example in the Midlands, several species fall into this category, including *Pterostylis commutata*, *Austrodanthonia popinensis* and *Leucopogon virgatus* var. *brevifolius*. Most are species that have very localised extant distributions, but seem to occupy habitat that was probably much more widespread in the past. In fact, some were close to death's door when they were first discovered. Vegetative material of an unknown orchid was dug up from Ross Cemetery by Rod Fensham in 1985, during a survey of Tasmania's native grasslands (Kirkpatrick *et al.*, 1988). It was grown on in an old milk container and blossomed into *Pterostylis commutata*, one of the State's most spectacular orchids. *Colobanthus curtisiae* was first found, in the same year, by Rod Fensham and Fred Duncan on native grassland adjacent to a Campbell Town cemetery. In more recent years, the delightfully named *Prasophyllum taphanyx* (graveside leek-orchid) has also been discovered in a Campbell Town cemetery. Hopefully these discoveries of plants in cemeteries are not some sort of bizarre premonition of future survival prospects!

Other recently described species have similarly restricted (albeit less morbid) habitats. For example, *Ozothamnus reflexifolius* has only been recorded from an

insolated rock plate on Mount Direction on Hobart's eastern shore (Leeson and Rozefelds, 2003); and *Hibbertia basaltica* only from basalt outcrops in native grassland remnants near the historic town of Pontville (Buchanan and Schahinger, 2005).

At the same time, several species that were collected from environments which are now much modified have not been rediscovered, and are still presumed extinct. *Deyeuxia lawrencei* is known only from the type specimen collected by Robert Lawrence about 1831, possibly in the Launceston area (Curtis and Morris, 1994). *Banksia integrifolia* has not been recorded from King Island (possibly once its Tasmanian stronghold) since 1876, probably because it occupied a small part of the 70% of the island that has been cleared for agriculture; and the lone plant on Long Islet in the Hogan Group died in 1985.

Table 1 lists the plant species currently regarded as Presumed Extinct in Tasmania, with some comments on when they were last seen, what sort of habitats they were known to occur in and where people might want to look. But remember, you need a permit to collect threatened plants – be careful, use a digital camera or take someone back to your site (don't kill the last dodo!).

The recent discoveries of very small populations of some species (newly described endemics and mainland species not previously known from this state) suggest that many of our less common species have localised distributions, (i.e. they are not rare simply because of human-induced habitat loss). This, together with the almost certain extinction of some species which were collected in the past, provides circumstantial evidence that many species have been lost without face or trace, including species from groups (e.g. orchids) that have a high degree of endemism. The potential for extinction to have occurred (and for extinctions to continue to occur) is highest in regions such as the Bass Strait islands, north coast and hinterland and the Midlands, which have all suffered great modification to native vegetation (over 70% for some of these regions, and over 90% for some of their forest communities). However, all of these regions have some environmental affinity to parts of the southeastern Australian mainland, so some of Tasmania's 'unknown departed' may well be extant in Victoria, New South Wales or South Australia.

According to the 2005 census of Tasmania's vascular flora (Buchanan, 2005), Tasmania has about 1840 native taxa, with nearly 400 being Tasmanian endemics. About three species have been added to our native flora each year for the past ten years, partly by the discovery of new species and partly through taxonomic machinations. Tasmania's flora is very diverse for the size of the island and its temperate latitudes. It is sobering to think of how many species have been lost

since European settlement, and even more sobering to think that some threatening processes - notably continued clearance of some vegetation types, disease (*Phytophthora cinnamomi*) and gradual attrition and degradation of habitat - will inevitably push more of our species towards the abyss of non-existence.

However, the message is not entirely pessimistic. As we have shown in this paper, some species which were presumed extinct have survived, sometimes against mighty odds and with their situation still tenuous. There is additional hope in the greater awareness in the Tasmanian and Australian community about the importance of our biodiversity, and this is reinforced by legislation to protect threatened species and communities, and an ever-increasing body of knowledge about the distribution, ecology and management of Tasmania's natural attributes, including its threatened flora.

Table 1. Flora *still* presumed extinct in Tasmania. Species formally listed as 'extinct' on the Tasmanian *Threatened Species Protection Act 1995* are marked (*); inclusion of other species is based on information held at the Tasmanian Herbarium (HO).

Name	When and where last seen and by whom
<i>Ballantinia antipoda</i> * (Brassicaceae) - 'southern shepherds purse	Known from a single collection in Tasmania, collected by Mary Ballantine (after whom the genus is named) in 1842 from Macquarie Plains.
<i>Banksia integrifolia</i> var. <i>integrifolia</i> * (Proteaceae) - 'coast banksia'	Excluding ornamental plantings in suburban gardens, the last official sighting of this species appears to be 1985. There are very few Tasmanian collections: one from King Island collected by the lighthouse keeper (Sprong) in 1876, and a series of records from Long islet in the Hogan Group from the outer Furneaux islands in eastern Bass Strait. These latter collections start with a collection by Scarlet in 1968, followed by collections by John Whinray in 1974 (Whinray, 1974) and Nigel Brothers in 1984 and 1985. Unfortunately, Brothers reported the single specimen to be dead in 1985.

Table 1. contd.

Name	When and where last seen and by whom
<i>Botrychium australe</i> * (Ophioglossaceae) - 'parsley fern'	Garrett (1996) notes that " <i>a specimen collected by Gunn in 1847 from 'Marlborough' is annotated 'very abundant all over the country about Marlborough'. An intensive search by the author of the Bronte Park and Nive River locality failed to locate the species. A second Gunn collection is labelled 'Moriarty's Plains', possibly referring to the district about Dunorlan, southwest of Elizabeth Town (Garrett, 1996). Elsewhere in Australia, Botrychium australe is known from a wide range of habitats from lowland forest and scrubland to subalpine grassland. It requires adequate moisture and can be found in grassy woodland, well-drained plains, near streams in subalpine regions and in mossy soils (Duncan and Isaac, 1986)</i> ".
<i>Caladenia cardiochila</i> * (Orchidaceae) - 'heartlip spider-orchid'	Recorded from a single specimen by Biggs in 1947 from Flinders Island and has not definitely been seen since. However, there is a possible sighting (known from a drawing only) from the Akaroa area near St Helens in 1993, although despite several searches, no further specimens have come to light (Hans and Annie Wapstra, pers. comm.).
<i>Cardamine tryssa</i> (Brassicaceae) - 'delicate bittercress'	Known from a single record (no date on specimen but 1800s), collected by Spicer from near Pontville. The species was only described in 2003 (Thompson, 2003), so further collections might be needed before we can declare this species to be presumed extinct in Tasmania.
<i>Chenopodium erosum</i> * (Chenopodiaceae) - 'papery goosefoot'	On the mainland this species occurs in Victoria, South Australia, Queensland and New South Wales. It is also known from New Zealand. It has been recorded once from Tasmania ' <i>on sandy hills on an island of the Kent Group, Bass Strait</i> '. Robert Brown made this collection in 1804. No other material has been collected and the holotype is held in the United Kingdom (Schahinger, 2001).
<i>Chionogentias cunninghamii</i> subsp. <i>cunninghamii</i> (Gentianaceae) - 'Cunninghams snowgentian'	Known from Tasmania through one collection, possibly by Dr John Lhotsky, probably from around the Hobart or Port Arthur area, sometime around 1836-38 (Adams, 1995).

Table 1. contd.

Name	When and where last seen and by whom
<i>Cooperookia barbata</i> * (Goodeniaceae) - 'purple native-primrose'	The original record from Tasmania by Paterson has never been confirmed, and may represent a mix-up in labelling because Paterson was in Sydney at about the same time as his collection of this specimen (the species is more widespread on the mainland and there is some doubt as to whether the species was ever present in Tasmania).
<i>Corunastylis nudiscapa</i> * (Orchidaceae) - 'dense midge-orchid'	The occurrence of this species in Tasmania is based solely on the type specimen (' <i>hill E. of Mt Wellington</i> ' collected in 1840), which is in good condition and the identity unmistakable. The nearest locality to the Tasmanian one is from the Otway Ranges in southern Victoria, and this species needs to be searched for more thoroughly in southern areas of Tasmania, especially the hills around Mt Wellington (Jones, 1998).
<i>Deyeuxia lawrencei</i> * (Poaceae) - 'Lawrences bentgrass'	Known only from the type specimen collected (in poor condition) by R.W. Lawrence c. 1831, without location, but possibly in the Launceston area (Curtis and Morris, 1994).
<i>Festuca archeri</i> (Poaceae) - 'Archers fescue'	Known only from the type specimen collected by Archer, locality unknown, which consists of the upper part of a single culm and its inflorescence (Curtis and Morris, 1994).
<i>Goodenia pinnatifida</i> (Goodeniaceae) - 'cutleaf native-primrose'	As was the case for <i>Cooperookia barbata</i> , this species was collected by Paterson from the Port Dalrymple area but there are no specimens in Australian herbaria of Tasmanian material; the species is common on the mainland and there is some doubt as to whether the species was ever present in Tasmania.
<i>Hibbertia rufa</i> * (Dilleniaceae) - 'brown guineaflower'	Only known from a single collection by Fitzgerald from the Georges Bay area, St Helens in 1892.
<i>Hovea magnibractea</i> (Fabaceae) - 'sheath purplepea'	First described in 2001, this species occurs in Victoria and Tasmania but is only known from old specimens with imprecise information. The only locality information available is a collection by Dr Story on the banks of the Swan River at The Grange (Thompson, 2001).

Table 1. contd.

Name	When and where last seen and by whom
<i>Hutchinsia tasmanica</i> (Brassicaceae) - 'highland purse'	There is a single Tasmanian collection from 'hut at <i>Bacons Run</i> ' near Arthurs Lake from 1848. The specimens held at HO are very young and cannot be assigned to genus with certainty, and may even represent specimens of <i>Capsella bursa-pastoris</i> , a weed species.
<i>Lepilaena australis</i> * (Zannichelliaceae)	Known only from a single incomplete specimen collected by Leonard Rodway at Campbell Town in 1893.
<i>Levenhookia dubia</i> * (Stylidiaceae) - 'hairy stylewort'	The single collection at HO is of dubious provenance collected by Archer, and it is possible that this species never occurred in Tasmania.
<i>Myriophyllum glomeratum</i> * (Haloragaceae) - 'clustered watermilfoil'	On the mainland this species occurs in Victoria, New South Wales and South Australia. In Tasmania, it has been apparently recorded only once (in the Cressy region in 1842) from damp places and in stagnant water in the north of the State (Hughes and Davis, 1989), although there are not currently any collections at HO.
<i>Ozothamnus selaginoides</i> * (Asteraceae) - 'Table Mountain everlastingbush'	There is a single record, apparently from Table Mountain west of Bothwell, collected by Stuart in the 1800s. However, despite quite extensive searching of the Table Mountain area, no further specimens have been located, and it is odd that there are no other Stuart collections for the area for the same period, as he usually collected several species from places he visited.
<i>Podotheca angustifolia</i> * (Asteraceae) - 'sticky longheads'	Represented by a single collection from the northwest coast of dubious status (location, date of collection and collector unknown).
<i>Prostanthera cuneata</i> * (Lamiaceae) - 'alpine mintbush'	Two collections from Tasmania only, one by Stuart from the South Esk River in 1851 and the other by Simson from the Perth area in 1890. Apparent flood debris in the specimens might be indicative of potential habitat in flood-prone river systems in northern Tasmania.

Table 1. contd.

Name	When and where last seen and by whom
<i>Punctelia subflava</i> (Parmeliaceae) - a lichen	Not recorded in Tasmanian since the collection of the type specimen by an unknown collector from an unspecified location. In mainland Australia, this species can be found in coastal habitats such as mangroves, and it is possible that in Tasmania it once occurred in swampy <i>Melaleuca</i> -dominated, coastal forests that have since been extensively cleared (Kantvilas <i>et al.</i> , 2002).
<i>Senecio macrocarpus</i> * (Asteraceae) - 'largefruit fireweed'	There are only old records from northern Tasmania, with imprecise collection details. In south-eastern mainland Australia the species occurs in low-lying areas on basalt-derived soils in grassland, sedgeland and woodland (Thompson, 2004).
<i>Senecio psilocarpus</i> (Asteraceae) - 'swamp fireweed'	Known from only two records in Tasmania, from Flinders Island and a swamp near Cressy, the latter record from 1943. The species grows in swamps (Thompson, 2004).
<i>Senecio tasmanicus</i> (Asteraceae) - 'Tasmanian fireweed'	Known from two collections, one by Archer (date and precise locality unknown) and the other by Gunn from 'Formosa' near Cressy (date also unknown). This species was described by Thompson (2004) and has probably been overlooked, although its apparent habitat of lowland plains near swamps has been extensively cleared.
<i>Taraxacum cygnorum</i> (Asteraceae) - 'coast dandelion'	This coastal species occurs in Western Australia, Victoria and Tasmania. In Tasmania, it has only been recorded from the Bass Strait islands (Prime Seal Island in 1845, 1945 and 1947; Flinders Island in 1947; and King Island in 1887). Despite numerous surveys of the islands (e.g. Harris <i>et al.</i> , 2001), the species appears to be extinct. In Victoria, the species occurs on coastal limestone, a rock type also present on some of the Bass Strait islands. It should be noted that the taxonomy of <i>Taraxacum</i> is under review and this might result in better information on this species.
<i>Thesium australe</i> * (Santalaceae) - 'southern toadflax'	There is a single Tasmanian specimen collected by Robert Brown in the Derwent River catchment, but it has not been seen since 1803, despite some quite extensive searching in potentially suitable habitat.

Table 1. contd.

Name	When and where last seen and by whom
<i>Veronica notabilis</i> * (Scrophulariaceae) - 'forest speedwell'	This species has an uncertain status in Tasmania with one possible collection by Gunn in the 1830s or 1840s from the St Patricks River area.
<i>Vittadinia megacephala</i> * (Asteraceae) - 'giant New-Holland-daisy'	No specimens are held at HO, and the most recent information suggests that the species is considered to have been recorded in error from the State (Gray and Rozefelds, 2005).
<i>Wurmbea latifolia</i> (Liliaceae) - 'broadleaf early nancy'	Known only from a single collection from 'sea sand near Woolnorth' by R.C. Gunn between 1836 and 1838.

ACKNOWLEDGEMENTS

Ian Thompson confirmed the identity of *Senecio campylocarpus* for Mark Wapstra. Lorilee Yeates made useful comments on the draft manuscript, as did Hans and Annie Wapstra, who also provided information on orchid species presumed to be extinct. Andrew North kindly provided comments on the tale of *Myosurus australis*.

REFERENCES

- Adams, L.G., 1995. *Chionogentias* (Gentianaceae), a new generic name for the Australian 'snow-gentians', and a revision of the Australian species. *Australian Systematic Botany* **8**: 935-1101.
- Barker, P., 1996a. *Selecting Viable Populations of Threatened Plants for Conservation Management*. Forestry Tasmania and Australian Nature Conservation Agency.
- Barker, P., 1996b. *Extension Surveys and Long Term Monitoring Plots for Selected Species Threatened by Phytophthora cinnamomi in Tasmania*. Forestry Tasmania and Australian Nature Conservation Agency.
- Bonham, K.J., 1997. Native land snails of King Island and the Hunter Group. *The Tasmanian Naturalist* **119**: 10-22.
- Brown, M.J., Bayly-Stark, H.J., Duncan, F. and Gibson, N., 1986. *Tetratheca gunnii* Hook.f. on serpentine soils near Beaconsfield, Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* **120**: 33-38.
- Brown, M.J., Kirkpatrick, J.B. and Moscal, A., 1983. *An Atlas of Tasmania's Endemic Flora*. Tasmanian Conservation Trust, Hobart.
- Buchanan, A.M., 1998. The presumed extinct *Argentipallium spiceri* (Asteraceae) rediscovered in Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* **132**: 71-73.

- Buchanan, A.M. and Schahinger, R.B., 2005. A new endemic species of *Hibbertia* (Dilleniaceae) from Tasmania. *Muelleria* **22**: 105-109.
- Buchanan, A.M., 2005. *A Census of the Vascular Plants of Tasmania and Index to The Student's Flora of Tasmania*. Fourth Edition. Tasmanian Herbarium Occasional Publication No. 7, Hobart.
- Burbidge, N.T., 1982. A revision of *Vittadinia* A.Rich. (Compositae) together with reinstatement of *Eurybiopsis* DC. and description of a new genus, *Campactra*. *Brunonia* **5**: 1-72.
- Coates, F., 1991. *The Conservation Ecology and Management of Five Rare Species in the Rhamnaceae Family*. Wildlife Scientific Report 91/3. Dept of Parks, Wildlife and Heritage, Hobart.
- Conn, B.J., 1999. Lamiaceae. In: *Flora of Victoria Volume 4 Dicotyledons Cornaceae to Asteraceae*. (N.G. Walsh and T.J. Entwisle, editors). Inkata Press, Melbourne.
- Curtis, W.M., 1956. *The Student's Flora of Tasmania Part 1. Gymnospermae Angiospermae: Ranunculaceae to Myrtaceae*. Government Printer, Hobart.
- Curtis, W.M., 1963. *The Student's Flora of Tasmania Part 2. Angiospermae: Lythraceae to Epacridaceae*. Government Printer, Hobart.
- Curtis, W.M., 1967. *The Student's Flora of Tasmania Part 3. Angiospermae: Plumbaginaceae to Salicaceae*. Government Printer, Hobart.
- Curtis, W.M. and Morris, D.I., 1994. *The Student's Flora of Tasmania Part 4B. Angiospermae: Alismataceae to Burmanniaceae*. St. David's Park Publishing, Hobart.
- Duncan, B.D. and Isaac, G., 1986. *Ferns and Allied Plants of Victoria, Tasmania and South Australia*. Melbourne University Press, Melbourne.
- Garrett, M., 1996. *The Ferns of Tasmania: Their Ecology and Distribution*. Tasmanian Forest Research Council, Inc., Hobart.
- Gibson, N., Brown, M.J., Williams, K. and Brown, A.V., 1992. Flora and vegetation of ultramafic areas in Tasmania. *Australian Journal of Ecology* **17**: 297-303
- Glazik, R., 2000. Native gypsywort (*Lycopus australis*): a recent rediscovery in Tasmania. *The Tasmanian Conservationist* **April 2000**: 9.
- Gray, A.M. and Rozefelds, A.C., 2005. A revision of the species of *Vittadinia* (Asteraceae) in Tasmania. *Kanunnah* **1**: 1-16.
- Harris, S., Buchanan, A. and Connolly, A., 2001. *One Hundred Islands: The Flora of the Outer Furneaux*. Department of Primary Industries, Water and Environment, Hobart.
- Hewson, H.J., 1982. Brassicaceae. In *Flora of Australia Vol 8 Lecythidales to*

- Batales* (A.S. George, editor). Australian Government Publishing Service, Canberra.
- Hooker, J.D., 1859. *Flora Tasmaniae (Botany of the Antarctic voyage: volume 3)*. Lovell Reeve, London.
- Hughes, J.M.R. and Davis, G.L., 1989. *Aquatic Plants of Tasmania*. University of Melbourne Press, Melbourne.
- Jones, D.L., 1998. Contributions to Tasmanian orchidology – 5: a taxonomic review of *Genoplesium* R.Br. in Tasmania. *Australian Orchid Research* **3**: 86-93.
- Jones, W.G., Hill, K.D. and Allen, J.M., 1995. *Wollemia nobilis*, a new living Australian genus and species in the Araucariaceae. *Telopea* **6**: 173-176.
- Kantvilas, G., Elix, J.A. and Jarman, S.J., 2002. *Tasmanian Lichens: Identification, Distribution and Conservation Status. I. Parmeliaceae*. Flora of Australia Supplementary Series No. 15, The Australian Biological Resources Study and the Tasmanian Herbarium, Hobart.
- Keith, D., 1998. *Recovery Plan: Tasmanian Forest Epacrids: 1999-2004*. Tasmanian Parks and Wildlife Service, Hobart.
- Kirkpatrick, J.B., 1999. The characteristics and management problems of the vegetation and flora of the Huntingfield area, southern Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* **133(1)**: 103-113.
- Kirkpatrick, J.B., Gilfedder, L. and Fensham, R.J., 1988 *City Parks and Cemeteries: Tasmania's remnant grasslands and grassy woodlands*. Tasmanian Conservation Trust, Hobart.
- Kirkpatrick J.B. and Harwood C.E., 1983a. Conservation of Tasmanian wetland macrophytic vegetation. *Papers and Proceedings of the Royal Society of Tasmania* **117**: 5-19.
- Kirkpatrick J.B. and Harwood C.E., 1983b. Plant communities of Tasmanian wetlands. *Australian Journal of Botany* **31**: 437-451.
- Leeson, K.E. and Rozefelds, A.C., 2003. A new endemic *Ozothamnus* species (Asteraceae) from Tasmania, Australia. *Australian Systematic Botany* **16**: 317-322.
- Lynch, A.J.J., 1993. *Conservation Biology and Management of 16 Rare or Threatened Fabaceae Species in Tasmania*. Parks and Wildlife Service, Hobart.
- Mueller, F., 1878. *Helichrysum Spicerii*. *Fragmenta Phytographiae Australiae* **11**: 47-48.
- Rodway, L., 1903. *The Tasmanian Flora*. Government Printer, Hobart.
- Schahinger, R.B.S., 2001. *Chenopodium erosum*. Unpublished report to the

- Threatened Species Unit, Department of Primary Industries, Water and Environment, Hobart.
- Schahinger R., 2002. *Near-coastal grasslands of northwestern Tasmania: community description, distribution and conservation status with management recommendations*. Nature Conservation Branch Report 02/10, Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.
- Simson, A., 1880. On recent additions to the flora of Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* **1879**: 43.
- Spicer, W.W., 1878. *A Handbook of the Plants of Tasmania*. J. Walch and Sons, Hobart.
- Stockton, J., 1982. Fires by the seaside: historic vegetation changes in northwestern Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* **103**: 53-66.
- Thompson, I.R., 2001. Morphometric analysis and revision of eastern Australian *Hovea* (Brongniartieae-Fabaceae). *Australian Systematic Botany* **14**: 1-99.
- Thompson, I.R., 2003. A new species of *Cardamine* (Brassicaceae) from south-eastern Australia and a key to *Cardamine* in Australia. *Muelleria* **18**: 27-32.
- Thompson, I.R., 2004. Taxonomic studies of Australian *Senecio* (Asteraceae): 1. the disciform species. *Muelleria* **19**: 101-214.
- Thompson, J., 1976. A revision of the genus *Tetralthea* (Tremandraceae). *Telopea* **1(3)**: 139-215.
- Whinray, J., 1974. Coast banksia in Tasmania. *The Launceston Naturalist* **7(5)**: 2-4.
- Wilson, P.G., 1992. The classification of some Australian species currently included in *Helipterum* and *Helichrysum* (Asteraceae: Gnaphalieae): Part 3 *Anemocarpa* and *Argentipallium*, two new genera from Australia. *Nuytsia* **8(3)**: 447-460.
- Ziegeler, D., 1994. *Prasophyllum concinnum* *Flora Recovery Plan – Management Phase*. Wildlife Report 94/11, Parks and Wildlife Service, Tasmania.