Sowerbaea juncea

purple rushlily

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image by Mark Wapstra

Scientific name: ***Sowerbaea juncea*** Andrews, *Bot. Repos.* 2: t.81 (1800)
Common name: purple rushlily (Wapstra et al. 2005)
Group: vascular plant, dicotyledon, family **Liliaceae (**now **Laxmanniaceae)**

Status: *Threatened Species Protection Act 1995*: **vulnerable**
Environment Protection and Biodiversity Conservation Act 1999: **Not listed**

Distribution: Endemic status: **Not endemic to Tasmania**
Tasmanian NRM Region: **North**

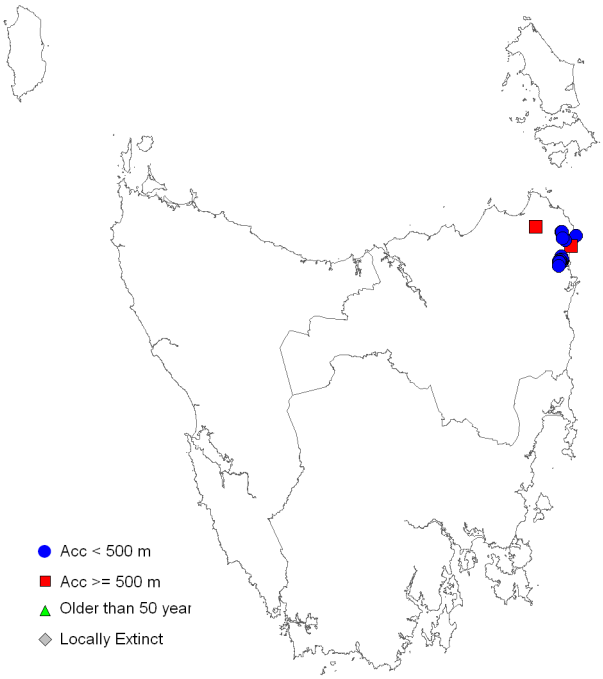

Figure 1. The distribution of *Sowerbaea juncea* within Tasmania

Plate 1. Inflorescence of *Sowerbaea juncea* at full anthesis (image by Mark Wapstra)

IDENTIFICATION AND ECOLOGY

The genus *Sowerbaea* is endemic to Australia, with five species presently recognised (Henderson 1987). Species of *Sowerbaea* are tufted herbaceous perennial herbs that generally have fibrous roots, sometimes also with tuberous roots. The leaves are linear to filiform and the flowers are clustered in terminal heads (Plate 1). S*owerbaea juncea* is the only representative of the genus in Tasmania, being first recorded from the State in 1964.

Sowerbaea juncea occurs in habitats maintained through disturbance events, allowing successional vegetation changes that create open areas suitable for colonisation and that promote flowering. Historically, such disturbance would have been through natural and indigenous burning. Non-fire disturbance events now present within some subpopulations of *Sowerbaea juncea* include stock grazing (mainly cattle) but to what extent these activities mimic fire is unknown (Wapstra in press).

Survey techniques

Surveys for *Sowerbaea juncea* must be undertaken during its peak flowering period, in spring to summer, as the species is virtually impossible to detect in the absence of the distinctive flower-heads, with the tuft of green leaves usually hidden amongst the dense grass and sedge sward typical of its habitat (Plate 2). The flowering season extends from October through to early February. Sometimes old flower-heads (pale papery-dry clusters), are found later in the flowering season but these can be difficult to detect.

Description

Plants of *Sowerbaea juncea* are 9 to 35 cm high and have fibrous roots. The leaves are blue-green, terete, up to 25 cm long, about 1 mm in diameter, and have a ligule about 4 mm long. Flowers clusters are comprised of 8 to 30 flowers, and are 15 to 35 mm in diameter. The outer bracts are ovate and acute, 4 to 7 mm long and purple. The inner bracts are shorter and white. The pedicels are 1 to 8 mm long, spreading and decurved. The perianth is pinkish-purple, the segments 6.5 to 10 mm long, and the inner segments usually longer and lighter in colour than the outer segments. The filaments are 0.75 to 1 mm long. The anthers are about 2.25 mm long and dehisce latrorsely. The staminodes are shorter than the filaments of the fertile stamens, and are ovate. The ovary is about 1.5 mm long, and the style about 2.5 mm long. The capsule is 2 to 2.5 mm long and tri-lobed. The seeds are about 2 mm long, black, and minutely and densely papillose.

[description based on Curtis & Morris 1994]

Confusing species

When in flower, *Sowerbaea juncea* is very distinctive and would be difficult to confuse with any other species.

Plate 2. Flowering clumps of *Sowerbaea juncea* growing amongst dense sedgy heathland habitat (image by Mark Wapstra)

DISTRIBUTION AND HABITAT

Sowerbaea juncea occurs in Victoria, New South Wales, Queensland and Tasmania. Within Tasmania, the species is restricted to the near-coastal parts of the east and northeast between The Gardens and Eddystone Point. It occurs from close to the coast (as at Eddystone Point and Ansons Bay) and up to about 7 km inland west of The Gardens and about 12 km inland

along Eddystone Road (Figure 1). Elevation ranges between near sea level to about 120 m above sea level.

Using all available records, the extent of occurrence for *Sowerbaea juncea* in Tasmania is approximately 162 km^2 with a maximum linear extent of 23 km (in a north-south direction, and 13 km in an east-west direction). Using only sites where *Sowerbaea juncea* was confirmed from recent surveys (Wapstra in press), the extent of occurrence is reduced to 90 km^2, with a maximum linear extent of 22km (in a north-south direction, and 6 km in an east-west direction). The area of occupancy is probably in the order of less than 20 ha (Wapstra in press).

Sowerbaea juncea is most commonly associated with sandy to peaty, moderately- to poorly-drained soils derived from Devonian granites and granodiorites, Ordovician-Devonian turbidite sequences (Mathinna series) and Quaternary sediments. It occurs in a range of heathy to sedgy vegetation types (classification from Harris & Kitchener (2005): 'coastal heathland' (SCH), 'wet heathland' (SHW), '*Eucalyptus amygdalina* coastal forest and woodland' (DAC) and '*Eucalyptus ovata* heathy woodland' (DOW).

Most sites supporting *Sowerbaea juncea* are associated with low-lying relatively poorly-drained heathland and sedgy heathland patches between forested low rises. The species often occurs on the fringes of these often dense heathland swathes (Plate 3) but can also be sporadic in the heart of the heathland. Open heathy/sedgy woodland (usually dominated by *Eucalyptus amygdalina* but also occasionally *Eucalyptus ovata*) also supports several subpopulations. In such habitats, *Sowerbaea juncea* is often most prevalent in the patches of light canopy with open understorey, often created by a combination of low intensity fires and cattle grazing (Wapstra in press).

Many sites recorded in recent years (Wapstra in press) occur on the fringes of remnant patches of light eucalypt woodland and intensively managed pasture, sometimes growing in patches dominated by pasture grass species such as *Holcus lanatus*.

Plate 3. Habitat of *Sowerbaea juncea* at Eddystone Road junction (image by Mark Wapstra)

POPULATION ESTIMATE

Sowerbaea juncea usually occurs as discrete patches (localised clumps of individuals) separated from each other by various distances of only metres through to 10s or even 100s of metres, all of which can be treated as a single subpopulation. However, defining a subpopulation of *Sowerbaea juncea* is problematical in the often fragmented habitat it occupies i.e. forest remnants amongst a broad expanse of pasture. Wapstra (in press) took a pragmatic approach, defining the limits of subpopulations based on a combination of degree of fragmentation, land tenure and distribution of vegetation types (Table 1).

The total number of mature individuals is difficult to estimate because of scant demographic information associated with many records but is probably between 500 to 1000 in any particular year, depending on seasonal conditions and disturbance events which observations suggest are the cause of fluctuations in numbers Wapstra (in press).

Recent searches for *Sowerbaea juncea* in the vicinity of the site of the original collection (subpopulation 4 in Table 1) were unsuccessful (Wapstra in press) though the area has long been developed for grazing with only patches of heathland and heathy woodland remaining amidst a sea of pasture. Surveys between 2005 and 2009 resulted in numerous additional sites being detected (Wapstra in press).

Table 1. Population summary for *Sowerbaea juncea* within Tasmania

	Subpopulation	Tenure	NRM region	1:25 000 Mapsheet	Years seen	Number of flower-heads (Area of occupancy)
1	Last River (upper catchment)	Doctors Peak Forest Reserve	North	Blue Tier	1970s, 1980s, 1990s 2009	Jan. 2009: 8 (c. 5 x 5 m) Dec 2009: c. 40 (c. 1 ha)
2	Last River-Joe Peppers Creek-Thomas Creek-Teagardens Creek catchments	private property (28 patches), State forest in informal reserve (1 site)	North	The Gardens, Spurrs Rivulet	2003 2005 2006 2010	2010: c. 1 to >100 in each patch (29 patches varying from 1 x 1 m to c. 1 ha) <500 (3 ha) in total
3	Sampsons Creek	private property	North	The Gardens	2006	4 (3 patches within 1 ha)
4[1]	Ansons Bay behind Policemans Point (Yacca Creek catchment)	private property	North	Ansons Bay	1964	many (several acres)
5	Junction of Eddystone Road and North Ansons Road (Icena Creek catchment)	Mount William National Park	North	Ansons Bay	1983 2002 2005 2006 2007	1983: common 2002: scattered 2005: c. 50 (1-3 ha) 2006: 1 2007: 1
6	2 km SW of Eddystone Point	Mount William National Park	North	Eddystone	1983	rare
7	Headwaters of Telegraph Creek	private property	North	Eddystone	2007	localised
8a	Eddystone Road	private property	North	Gladstone	1965 1971	quite common (at different sites over c. 10 km of road verge)
8b	Tonys Creek on Eddystone Road (west side)	private property	North	Gladstone	2007	c. 10 (in two 3 x 3 m patches)
9[2]	Sugarloaf Park Estate	private property	North		1979	

NRM region = Natural Resource Management region; [1]Site of first collection of *Sowerbaea juncea* in Tasmania
[2] The location of "Sugarloaf Park Estate" is not known but is assumed to be between Gladstone and Ansons Bay along Eddystone Road, and is possibly part of subpopulation 8

Within its range, *Sowerbaea juncea* does not appear to occupy all potentially suitable sites. Given the distinctiveness of the species and its apparent ability to persist in small native remnants amongst pasture, it seems unlikely that the species is significantly more widespread than presently understood. However, range infillings are likely with additional targeted surveys because there are numerous heathy/sedgy areas of low-lying vegetation between lightly wooded rises between Binalong Bay and Mount William National Park that are superficially suitable for the species.

Sowerbaea juncea is apparently absent from other parts of near-coastal northeastern Tasmania (including the Furneaux Group) and further south along the East Coast (e.g. Freycinet Peninsula), despite large areas of superficially suitable habitat, and the fact that the species occurs along much of the eastern mainland Australian coastline.

RESERVATION STATUS

Sowerbaea juncea occurs in the Mount William National Park, Doctors Peak Forest Reserve, and in State forest in an area coded as "informal reserve" on Forestry Tasmania's Management Decision Classification system (Orr & Gerrand 1998), forming part of the State-wide reserve system.

CONSERVATION STATUS

Sowerbaea juncea was listed as rare in 1995 on schedules of the Tasmanian *Threatened Species Protection Act 1995*. The species was uplisted to vulnerable in March 2011, meeting criterion C (fewer than 10,000 mature individuals), specifically, C2a (a continuing decline in numbers inferred and fewer than 1,000 mature individuals in any subpopulation).

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

The principal threat to *Sowerbaea juncea* is inappropriate management of actual and potential habitat within and adjacent to subpopulations, leading to habitat degradation and eventual loss of subpopulations. Threats and associated issues are detailed below.

Inappropriate disturbance regime: Based on the characteristics of sites presently supporting *Sowerbaea juncea* (Wapstra in press), the species appears to benefit from periodic and relatively frequent gap-forming disturbance. For example, in the Eddystone Road-North Ansons Road junction subpopulation, low numbers occur in the now densely shrubby/sedgy heathland and higher numbers on the fringes of the dense heathland in more open heathy woodland. Similarly, when first reported several decades ago from the Last River catchment, *Sowerbaea juncea* was present on both sides of a gravelled road in open marshy habitat but it now occurs in relatively low numbers on one side of the road in the more open marsh, with the marsh on the other side now very dense and overgrown. Some subpopulations on private land that occur in remnants of native vegetation amongst pasture are locally dense, with the species occurring most frequently in the disturbed fringes of the woodland or heathland remnants in sites subject to relatively frequent fuel reduction burning and stock activity (shelter and grazing). Given that the majority of subpopulations of *Sowerbaea juncea* occur on private property, fencing remnants and excluding the disturbance factors that create ideal habitat may be detrimental for the species. Wapstra (in press) recommended the relatively simple option of managing the species by excluding stock from remnants during the flowering season (or perhaps rotating which remnants get used in any particular year) and avoiding feeding stock silage and hay within the remnants (to avoid infestations with competitive pasture grasses).

Land clearing: It is likely that significant areas of potential habitat for *Sowerbaea juncea* have been cleared for development of agricultural land since the mid 1960s (Wapstra in press). While it is difficult to determine if *Sowerbaea juncea* once had a wider distribution in Tasmania, it almost certainly had a greater area of occupancy within its presently known extent of occurrence (Wapstra in press). Land clearing proposals within the range of *Sowerbaea juncea* are likely to require surveys.

Hardwood plantations: Since about 2005, much of the pasture on the fringes of heathy forest remnants on private land near Eddystone Road has been redeveloped as hardwood plantation, with the majority of forest/woodland remnants being retained. While *Sowerbaea juncea* appears to persist on the forest/pasture margin (even in the presence of intensive grazing), the long-term viability of subpopulations adjacent to hardwood plantations is unknown. The plantations were established after broadscale herbicide spraying of the pasture and will grow into dense stands of trees likely to shade out adjacent forest patches and alter the local water table.

Climate change: The trend towards a warmer climate may increase the frequency of and exacerbate the effects of drought and wildfire on the habitat of *Sowerbaea juncea*. A warmer climate may also result in unfavourable alterations to the poorly-drained low elevation habitats inhabited by the species (e.g. lower water table, increased weed infestations, altered grazing regimes altering soil conditions).

Stochastic risk: The small size and localised nature of the subpopulations of *Sowerbaea juncea* exposes the species to a stochastic risk of extinction in Tasmania. This is exacerbated by fluctuations in the numbers of plants in response to disturbance events so that even targeted surveys (often conducted for impact assessments) may fail to detect the species when temporarily absent above ground or when present in very low numbers.

MANAGEMENT STRATEGY

What has been done?

The majority of surveys for *Sowerbaea juncea* have been informal private surveys conducted by naturalists, although there have been a limited number of targeted impact assessment surveys for proposals such as clearing for agriculture, or for forestry activities. Wapstra (in press) examined the distribution, habitat characteristics and conservation status of the species.

Management objectives

- prevent the loss or degradation of known subpopulations;
- identify new subpopulations;
- promote site conditions suitable for successful recruitment and persistence of subpopulations;
- improve the reservation status of the species.

What is needed?

- ensure an appropriate disturbance regime on the fringes between pasture and remnant vegetation supporting *Sowerbaea juncea* to allow persistence of the species (e.g. by removing stock during the flowering and fruiting season or by rotating which remnants get used in any particular year);
- avoid feeding stock silage and hay within remnant vegetation supporting *Sowerbaea juncea* to avoid infestations with competitive pasture grasses;
- identify potential habitat and undertake extension surveys;
- monitor sites for disturbance levels and threats to determine management needs;
- undertake demographic monitoring to determine the response of the species to disturbance (e.g. stock grazing, fires, establishment of hardwood plantations) and climatic conditions;
- include known subpopulations on public land (Mount William National Park, Doctors Peak Forest Reserve and nearby areas) in fire management programs and include pre- and post-burning monitoring;
- include the Kates Marsh site on State forest (part of subpopulation 2 in Table 1) and an appropriate buffer in a Special Management Zone (SMZ) under Forestry Tasmania's Management Decision Classification planning system (Orr & Gerrand 1998);
- support the Private Land Conservation Program (DPIPWE) with the establishment of conservation covenants and management agreements for private land supporting the species, and ensure that current priorities for the species are incorporated into the program's reservation strategies;
- collect seed for long-term conservation storage at the Tasmanian Seed Conservation Centre;
- provide information and extension support to the relevant Natural Resource Management committees, local councils, government agencies, development proponents and the local community on the locality, significance and management of known subpopulations and potential habitat.

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