

# *Hardenbergia violacea*

purple coralpea

TASMANIAN THREATENED SPECIES LISTING STATEMENT



Image by Eve Lazarus

**Scientific name:** *Hardenbergia violacea* (Schneev.) Stearn, *J. Bot.* 78: 70 (1940)

**Common name:** purple coralpea (Wapstra *et al.* 2005)

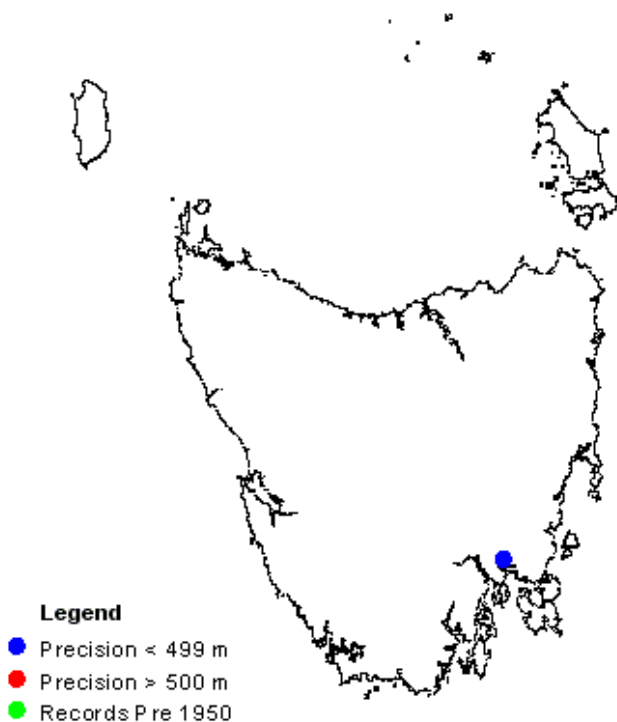
**Group:** Vascular plant, dicotyledon, family **Fabaceae**

**Status:** *Threatened Species Protection Act* 1995: **endangered**

*Environment Protection and Biodiversity Conservation Act* 1999: **Not listed**

**Distribution:** Endemic status: **Not endemic to Tasmania**

Tasmanian NRM Region: **South**



**Figure 1.** Distribution of *Hardenbergia violacea* in Tasmania.



**Plate 1** *Hardenbergia violacea* – (a) habit, and (b) leaves and flowers (Image by E. Lazarus)

## IDENTIFICATION AND ECOLOGY

In Tasmania, *Hardenbergia violacea* is a prostrate scrambling plant that is restricted to sandstone outcrops in the south. The species can be readily identified when not in flower though the presence of flowers may aid detection. Flowering is from July to late November with pods developing through December. Seeds of *Hardenbergia violacea*, as with many Fabaceae, may remain viable in the soil for many years. They germinate in response to fire or other physical disturbance, such as native animal diggings. Plants have the capacity to resprout from rootstock after mechanical damage (Lynch 1993). *Hardenbergia violacea* begins to produce seed when plants are about 4 to 7 years old (Knox & Clarke 2004). Resprouting individuals may live for over a decade under appropriate conditions (Will Fletcher, Plants of Tasmania Nursery, pers. comm).

### Description

The leaves of *Hardenbergia violacea* are leathery and are more or less oval-shaped with heart-shaped bases. They are up to 10 cm long and are arranged alternately on short stalks. Both the leaf surfaces have veins that form a strong network. The lower surface is slightly bluish-green. Leaf tips are rounded but have an extended midrib forming a narrow, hard point.

The pea-like flowers are approximately 8 mm long and are strongly violet (rarely white) in colour with a yellow flare at the base of the standard (largest petal). They are grouped in clusters of 2 to 3 on slender flower stalks. The fruit is 4 to 5 mm long and 8 mm wide. The fruit is a flattened and oblong-shaped pod with pointed ends and 6 to 8 seeds that are separated by pithy partitions.

[Description from Curtis & Morris (1975), Lynch (1990) and Cunningham *et al.* (1992)]

### Taxonomic issues

There are many varieties of *Hardenbergia violacea* from the mainland. They range in colour from white through to blue/purple and can be vigorous climbers, trailing shrubs or bushy in form. A well-known garden variety sold in most commercial nurseries is the 'happy wanderer'.

Tasmanian plants are less vigorous than cultivated garden varieties, they tend to be more prostrate and the flower colour tends to be more intense. They have been shown to be genetically differentiated from mainland forms, perhaps warranting description as a separate subspecies (Larcombe 2006).



### DISTRIBUTION AND HABITAT

**Plate 2.** *Hardenbergia violacea* plant covered with sheoak branches.

*Hardenbergia violacea* occurs in the ACT, New South Wales, Queensland, South Australia, Victoria and Tasmania where it is known from a variety of habitats, but commonly open forest/ woodland or heath.

In Tasmania, *Hardenbergia violacea* is restricted to the Pontos Hills near Penna (Figure 1). The species has been known to occur there since the early 1800s. It is now extant in only one subpopulation (Table 1) occupying about 450 m<sup>2</sup> along a linear extent of 400 m and extending over approximately 2 ha. The site of a second subpopulation that may now be extinct is about 1.7 km to the south.

The species is associated with sandstone outcrops, where it occurs on rocky ground in grassy *Eucalyptus viminalis* (white gum) forest. Plants often occupy a northeasterly aspect, where spiny shrubs or fallen trees protect plants from animal browsing. They also occupy deep rocky crevices where animals cannot gain access. The small patch of purple in Plate 2 represents a flowering specimen of *Hardenbergia violacea* protected by a fallen sheoak.

**Table 1.** Population summary for *Hardenbergia violacea* in Tasmania.

	Subpopulation	Tenure	NRM region *	1:25 000 mapsheet	Year of census	Area of occupancy (ha)	Number of mature plants
1	<b>Northern Pontos Hills</b>	Private land, covenant pending	South	Sorell	1981 1990 2005 2009	0.045	30 <20 21 34
2	<b>Southern Pontos Hills</b>	Private land	South	Sorell	1981 1990 2005 2008	<1	8 <10 1 0

\* NRM region = Natural Resource Management region

### RESERVATION STATUS

The main subpopulation of *Hardenbergia violacea* occurs on private land in the process of being protected by a conservation covenant to be established under the *Nature Conservation Act 2002*.

### POPULATION ESTIMATE

In 1981, two subpopulations of *Hardenbergia violacea* were recorded less than 2 km<sup>2</sup> apart in the Pontos Hills. At this time, approximately 30 plants were noted from a ‘northern’ subpopulation and 8 plants from a ‘southern’ subpopulation (Table 1). Specimens from both locations are lodged with the Tasmanian Herbarium. A decline in the main subpopulation was arrested by improving fencing to exclude sheep as well as caging plants to reduce the impact of native browsers and rabbits. Numbers have improved despite severe drought and at the last census in August 2009, plants were healthy, obviously benefiting from recent rains. Recruitment was obvious at 1 site only.

By 2008, no plants had survived in the southern subpopulation with the decline attributed to grazing as soil disturbance was high and large amounts of sheep and rabbit scats were observed across the outcrop in 2005.

Counts of the number of individuals presented in Table 1 represent discrete clumps. However, some clumps may consist of more than one individual and nearby clumps may represent clones of the same individual with no obvious above ground connection (Larcombe 2006).

It is unlikely that more subpopulations of *Hardenbergia violacea* occur in Tasmania, given that it is a very distinctive plant with vivid purple flowers and a strong resemblance to the familiar garden plant ‘happy wanderer’. However, there are several north-south running ridges displaying a similar geology and altitude in the vicinity of the Pontos Hills that contain potential habitat and may warrant searching.

### CONSERVATION ASSESSMENT

*Hardenbergia violacea* was listed as endangered on the Tasmanian *Threatened Species Protection Act 1995* when the Act came into being.

### THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

*Hardenbergia violacea* is at risk in Tasmania because of its extremely restricted distribution and low numbers. It may now be confined to only one subpopulation making it susceptible to stochastic events. Tasmanian plants may also be limited by low genetic diversity. Threats are detailed below.

**Herbivore browsing and grazing:** The impact of herbivores (sheep, rabbits, native animals and insects) is a serious threat to the persistence of *Hardenbergia violacea* in Tasmania. Plants appear highly palatable, with uncaged plants surviving only where fallen branches or rock crevices have afforded them some protection. Continual browsing may limit recruitment through browsing of seedlings and by reducing seed production. It may also weaken established plants making them more susceptible to drought or insect attack.

It is likely that clearing of hills surrounding the known sites for sheep grazing has led to decline of the species in Tasmania. The Pontos Hills has a long history of sheep grazing, which continues. While no live plants were apparent in the southern subpopulation when last visited, seed may still be present in the soil seed bank. Degradation of the habitat may limit the feasibility of recovery of this subpopulation.

Persistence of the northern subpopulation can be attributed to fencing that has excluded sheep and reduced native herbivore browsing since the late 1990s. The arrest of the decline in the number of plants since increasing protection by caging is now apparent and plants are now healthy and increasing in size following recent rains despite previous severe drought.

**Inappropriate fire regime:** *Hardenbergia violacea* has hard-coated seeds that remain stored in the soil until germination after fire or mechanical disturbance. Seed is estimated to remain viable in the soil for 30 to 40 years, or more. Research on *Hardenbergia violacea* in grassy woodland in New South Wales (Knox & Clarke 2004) suggests that seedling emergence is higher following spring rather than autumn burns and in response to fires of moderate intensity. Seedling emergence was reduced by frequent, low intensity burns. The Pontos Hills region has a history of frequent burning, presumably to encourage fresh pick for stock. This may have contributed to the low population size. It may be possible to use fire to attempt to promote germination from soil stored seed to recover the southern subpopulation.

**Limited genetic diversity:** Lynch (1993) suggested that the genetic diversity of *Hardenbergia violacea* is likely to be restricted as the number of plants contributing to surviving plants and the soil stored seed crop is likely to have been very low. For example the southern subpopulation had been observed to consist of less than 10 individuals for at least 20 years. Low genetic diversity may lead to inbreeding depression and lower adaptive potential. Molecular studies have confirmed low genetic diversity in the Tasmanian population compared to the mainland subpopulations tested and seed set and reproductive output in

the Tasmanian population was very low perhaps indicating inbreeding depression (Larcombe 2006).

**Stochastic risk:** *Hardenbergia violacea* has a very restricted distribution and low numbers in Tasmania, putting it at risk from stochastic events. Chance events, such as inappropriate fire, severe drought or landslide may lead to decline or local extinction. Purported climatic trends of warmer temperatures and lower annual rainfall in the region may exacerbate the risk. The potential to reduce stochastic risk is high by managing the extant subpopulation to increase plant numbers. While funds to fence and recover the southern subpopulation have not been able to be sourced, genotypes from this subpopulation are available, having been propagated for sale by a native plant nursery. It may be possible to use this material to establish an *ex situ* holding at a more suitable site should recovery efforts at the site of the southern subpopulation fail.

**Weeds:** Introduced African boxthorn (*Lycium ferocissimum*) threatens all native species at the site of the northern subpopulation posing on-going management requirements. Boneseed (*Chrysanthemoides monilifera*) is invading the southern site and may limit the feasibility of recovering this subpopulation.

**Drought:** Drought is probably the most serious threat the extant population. Drought stress reduces plant health, seed set, recruitment and the ability to produce leaf defensive chemicals (making the plants more susceptible to browsing), compete with drought tolerant weed species and resprout after fire. Therefore drought compounds the affect of all other known threatening processes. Indeed observations during a prolonged drought between 2005 and 2008 showed that several large plants died, plant size and health declined dramatically, browsing of uncaged plants was extreme (total leaf removal in some cases), seed-set was critically low (with only 1% of flowers producing fruit), and no recruitment was observed in the population. In times of extreme, prolonged drought, supplementary watering maybe required to prevent the extinction of *Hardenbergia violacea* in Tasmania..

## MANAGEMENT STRATEGIES

The main objectives for recovery of *Hardenbergia violacea* are to arrest the decline in the species, maintain genetic diversity and increase the overall number and diversity of individuals in the Pontos Hills.

### **What has been done?**

In the early 1990s, cuttings and seeds were collected from the southern subpopulation and propagated for sale at The Plants of Tasmania Nursery. An *ex situ* holding of this material and material from the northern subpopulation are being maintained at the Royal Tasmanian Botanical Gardens. All plants of mainland cultivars have been removed from the vicinity of the *ex situ* holdings in order to prevent contamination of seed by foreign pollen. Seed from *ex situ* holdings is being held for long term conservation storage at the Tasmanian Seed Conservation Centre based at the Gardens.

The northern subpopulation was fenced in the late 1990s as part of the North Facing Slopes Project initiated by the now Department of Primary Industries, Parks, Water and Environment. Beginning in 2005, most plants have been caged to further reduce browsing pressure from native animals and rabbits as well as sheep which occasionally manage to enter the fenced area.

A University of Tasmania Honours research project has determined that *Hardenbergia violacea* is native to Tasmania and is genetically distinct from mainland forms (Larcombe 2006).

A conservation covenant to be established under the *Nature Conservation Act 2002* has been negotiated and is currently being finalised.

### **What is needed?**

The following actions are proposed for the recovery and management of *Hardenbergia violacea*:

- attempt to recover the southern subpopulation either *in situ* or by establishing an *ex situ* planting using material sourced from the southern site;

- fence to exclude stock and cage individual plants where possible to reduce browsing pressure from native herbivores and rabbits;
- monitor plants during drought conditions and provide supplementary water if extinction as a result of drought is considered likely;
- identify and maintain sites suitable for the establishment of *ex situ* subpopulations;
- provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies and the local community on the locality, significance and management of known sites;
- survey for new subpopulations in suitable habitat within the region;
- pursue formal description as a taxon endemic to Tasmania;
- pursue listing under national threatened species legislation;
- supplement the long term conservation holdings of seed representing both subpopulations separately.

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**View:** <http://www.dpipwe.tas.gov.au/threatenedspecieslists>

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**Permit:** It is an offence to collect, disturb, damage or destroy this species unless under permit.