Ambuchanania leucobryoides

daisy pan moss

TASMANIAN THREATENED FLORA LISTING STATEMENT

Image by Micah Visoiu

Scientific name: ***Ambuchanania leucobryoides*** (Yamaguchi, Seppelt & Iwatsuki) Seppelt & Crum (Yamaguchi et al. 1990)

Common Name: daisy pan moss

Group: non-vascular plant, bryophyte, family **Ambuchananiaceae**

Name History: *Sphagnum leucobryoides*

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

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

Distribution: Endemic status: **Endemic to Tasmania**

Tasmanian NRM Regions: **Cradle Coast and South**

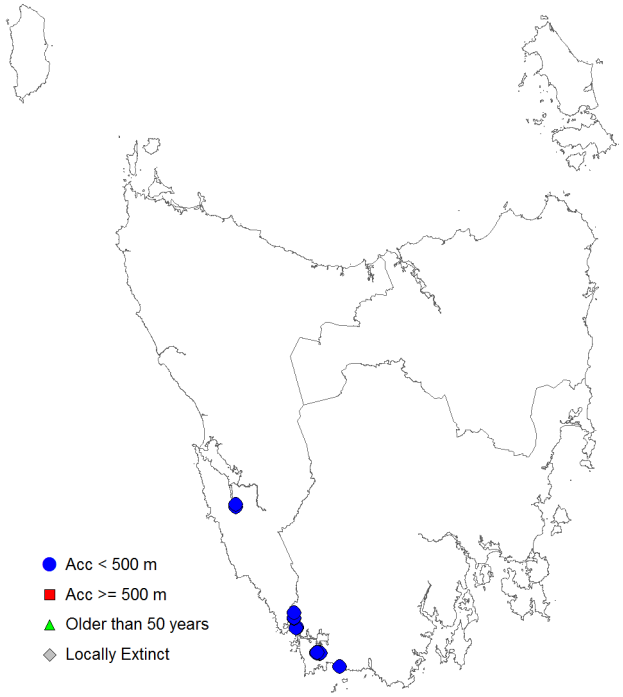

Figure 1. Distribution of *Ambuchanania leucobryoides* in Tasmania, showing Natural Resource Management regions

Plate 1. *Ambuchanania leucobryoides:* washed specimen (image by Penny Tyson)

SUMMARY: *Ambuchanania leucobryoides* is a *Sphagnum*-like moss, endemic to Tasmania's southwest. It occurs in sparsely-vegetated sandy washes where it may be locally dominant, though only its leaf tips may be visible. The species is currently known from about ten locations, typically within a few kilometres of the coast and at altitudes of less than 65 metres above sea level; numerous areas of potential habitat are yet to be surveyed. The main threat to the species would appear to be related to climate change, through changes in the local hydrology and/or fire frequencies.

IDENTIFICATION AND ECOLOGY

Ambuchanania leucobryoides is a small light brown to yellowish moss in the Ambuchananiaceae family (Shaw et al. 2010, Seppelt 2012). In its natural environment, stems of *Ambuchanania leucobryoides* are almost entirely buried in sand (Plates 2 & 3). The leaf tips are all that is visible, giving the ground a spotty appearance. Sometimes surface sand must be brushed aside to see the tips of the leaves.

Reproduction is likely to be both sexual and vegetative, with dispersal of spores via wind, water, native animals and birds.

Survey techniques

The species can be identified at any time of the year using the keys in Crum & Seppelt (1999) and Seppelt (2000).

Description

The following description is adapted from Yamaguchi et al. (1990). This reference should be consulted for additional information and diagrams on cell structure. The description below concentrates on characters that may be distinguished in field identification.

Stems of *Ambuchanania leucobryoides* are up to 2 cm long and irregularly and sparsely branched. The stem leaves are imbricate, suberect to widely spreading and broadly lanceolate 3.6 to 4.3 mm long and 1.5 to 1.7 mm wide, concave and tubular in the upper part. The stem leaves have entire or sometimes irregularly sparsely-toothed margins at the base, and are rounded-obtuse or narrowly truncate at the apex. Branches are few and dimorphic, long and short. The long branches are not in fascicles, erect and 3 to 5 mm long and the leaves are lanceolate and narrower than the stem leaves. Short branches are few, single or two in an erect fascicle about 0.3 mm long (7 to 9 mm long with the leaves), with 8 to 10 appressed and imbricate leaves. The leaves are smaller at the branch bases and much larger toward the branch tip. The upper leaves of short branches are narrowly obovate and somewhat club-shaped, to 8.6 mm long and 1.1 mm wide. They are widest at the upper part, strongly concave, obtuse at the apex and tinged with brown at the base. Capsules are produced singly and are terminal on the stems.

Plate 2. *Ambuchanania leucobryoides* is recognised by a spotty appearance on the sand – example of dense distribution (image by Jennie Whinam)

Plate 3. *Ambuchanania leucobryoides:* the thin layer of surface sand has been wiped aside (image by Micah Visoiu)

Taxonomic Issues

Ambuchanania leucobryoides was described originally as *Sphagnum leucobryoides* (Yamaguchi et al. 1990). It was placed in the genus *Ambuchanania* by Crum & Seppelt (1999), at which time it was considered the only representative of the family Ambuchananiaceae; a second genus, *Eosphagnum*, known from Bolivia and Chile, has since been attributed to the family (Shaw et al. 2010).

Confusing Species

Ambuchanania leucobryoides is distinguished from species of *Sphagnum* by the following (Crum & Seppelt 1999):

- notable whitish colour and glossy when dry;
- branches of two types, mostly short and single (or rarely paired) and others, perhaps representing secondary stems, are somewhat longer;
- leaves unusually large: stem leaves up to 4.3 mm long and those at the ends of the short branches up to 8.6 mm long;
- capsules produced singly in the terminal position (at the ends) of the stems.

DISTRIBUTION AND HABITAT

Ambuchanania leucobryoides is endemic to south-western Tasmania, extending from Birchs Inlet in the north to Louisa Bay on the south coast (Figure 1). The species grows in sparsely vegetated almost flat sandy washes or 'daisy pans' (Plate 4); these are alluvial deposits at the base of slopes that consist almost entirely of white, fine-grained sand derived from Precambrian quartzites of extremely low nutrient status (Yamaguchi et al. 1990).

Associated flora may include the graminoids *Chordifex hookeri, Leptocarpus tenax, Winifredia sola* and *Xyris* sp., the herbs *Actinotus suffocata, Celmisia asteliifolia, Drosera* spp. and *Helichrysum pumilum,* the shrubs *Boronia elisabethiae, Melaleuca squamea* and *Sprengelia incarnata,* the fern *Gleichenia dicarpa,* and the mosses *Dicranoloma billardieri* and/or *Dicranoloma eucamptodontoides* (Johnson et al. 2008). Filamentous algae typically grow on the wet surface of the sand (Yamaguchi et al. 1990); the pH of these sands has been recorded in the range 5.5 to 6, higher than would be expected in the surrounding peatlands (low 4s) and higher than would be expected of habitat for related *Sphagnum* species (Schahinger 2015).

The vegetation at the known sites has affinities with the buttongrass moorland communities 'daisy pans' and 'mossy sand' (Jarman et al. 1988). The vegetation surrounding the sandy washes is a 'standard blanket moor' community on peaty soil (Jarman et al. 1988). All known sites are within 5 km of the coast and occur at altitudes less than 65 m above sea level. The mean annual rainfall across the species' range varies from c. 1300 mm to more than 2000 mm.

Plate 4. *Ambuchanania leucobryoides* habitat: sandy washes southwest of Melaleuca, with the Bathurst Range beyond (image by Tim Rudman)

Table 1. Population summary for *Ambuchanania leucobryoides*

	Location	Tenure	NRM Region *	1:25000 mapsheet	Year last (first) seen	Area occupied (ha)	Number of stems
1	Birchs Inlet (north)	Franklin-Gordon Wild Rivers National Park	Cradle Coast	Hibbs	2008	unknown	unknown
2	Birchs Inlet (south)	Franklin-Gordon Wild Rivers National Park	Cradle Coast	Hibbs	2008	unknown	unknown
3	Gunfight Creek	Southwest National Park	South	Settlement	2014	several sites in 0.15 ha	unknown
4	Fitzroy Point	Southwest National Park	South	Settlement	2014	numerous sites in 2.5 ha	unknown
5	Coffin Bay	Southwest National Park	South	Breaksea	2008	2 sites 100 m apart	unknown
6	Wallaby Bay	Southwest National Park	South	Breaksea	2014 (1987)	spread over 1 ha (dense)	unknown
7	Melaleuca	Southwest National Park	South	Melaleuca	2016	local	unknown
8	Melaleuca (southwest)	Southwest National Park	South	Melaleuca	2014	16 sites in 2 ha	unknown
9	Melaleuca (south)	Southwest National Park	South	Melaleuca	2014	11 sites in 8 ha	unknown
10	Swallow Creek	Southwest National Park	South	Louisa	2008	unknown	unknown
11	Louisa Bay	Southwest National Park	South	Louisa	2016	local	unknown

* NRM region = Natural Resource Management region

POPULATION PARAMETERS

Ambuchanania leucobryoides is currently known in Tasmania from eleven locations, each location representing a discrete subcatchment and being separated by at least 900 metres (Table 1).

The linear range of the species is 127 km and the extent of occurrence 850 km^2 (which includes large areas of unsuitable habitat); reliable estimates for plant numbers and the area of occupancy are not available. The species occurs within sandy washes in patches of varying size and density, the washes ranging in size from 10 m^2 to perhaps 1000 m^2. Johnson et al. (2008) estimated there to be 50 to 160 stems per 100 cm^2, so the total number of stems may well number in the 100s of thousands.

Numerous sandy washes remain to be surveyed in the vicinity of the known sites, anecdotal reports suggesting that the species is relatively common in such habitat close to Melaleuca (L. Cave 2016, pers. comm.). Based on the success of surveys undertaken in 2014 and 2016 it is considered highly likely that additional sites will be uncovered in Tasmania's southwest given a targeted survey effort.

RESERVATION STATUS

The species occurs in Franklin-Gordon Wild Rivers National Park and Southwest National Park. Both reserves are part of the Tasmanian Wilderness World Heritage Area.

CONSERVATION ASSESSMENT

Ambuchanania leucobryoides was listed as rare on the Tasmanian *Threatened Species Protection Act 1995* in 2004. At the time it was deemed to satisfy criterion (B): 'Only two populations known, subject to stochastic risk'. [Plants at one of these two populations, Jane River, were subsequently determined to be *Sphagnum novozelandicum* (Johnson et al. 2008).]

THREATS AND LIMITING FACTORS

Fire regimes and climate change: A loss of habitat for *Ambuchanania leucobryoides* from changed fire regimes and/or climate change may be a potential issue if alluvial sands cease to accumulate, the bare sands dry out for prolonged periods, or the pans are colonised by denser buttongrass moorland vegetation or scrub.

Ambuchanania leucobryoides was thought to be the only representative of the Ambuchananiaceae family at the time of its listing on the TSP Act in 2004, and as such triggered considerable international scientific interest. Over-collecting was identified initially as a potential threat to the known sites (Seppelt 2002), though the discovery of additional sites in the interim means that this is no longer considered a realistic threat.

MANAGEMENT STRATEGY

The main objectives for the recovery of *Ambuchanania leucobryoides* are to prevent the loss or degradation of known subpopulations, and identify new subpopulations within its notional range.

What has been done?

Targeted surveys: Surveys for the species were undertaken in March 2008 as part of the Tasmanian Wilderness World Heritage Area Program (Johnson et al. 2008). The species' type locality near Wallaby Bay was relocated and a new site discovered to the northwest of Louisa Bay. Wildcare volunteers located the species near Birchs Inlet in the same month, and also just south of Melaleuca in early 2014 (Tyson 2014). Surveys of sandy washes in the area between Melaleuca and the Davey River were undertaken in November and December 2014, with several additional sites located and potential habitat flagged for future surveys (Schahinger 2015). An additional site northeast of Louisa Bay was located in February 2016 during targeted Bush Blitz surveys by personnel with the Tasmanian Herbarium.

Phylogenetic studies: A small number of stems were sent to researchers at the University of London in 2008 for axenic culturing and subsequent phylogenetic studies (Shaw et al. 2010). These cultures will be made available to scientists worldwide, including specimens for cryopreservation in the Millennium Seed Bank at Kew Gardens.

What is needed?

- targeted extension surveys of fine sandy washes between Birchs Inlet and Louisa Bay; surveys should be carried out by personnel experienced in field identification of the species;
- provide information and extension support to relevant Natural Resource Management Committees, local councils, government agencies, development proponents and the local community on the locality, significance and management of the known subpopulations and potential habitat.

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