Solanum opacum

greenberry nightshade

TASMANIAN THREATENED FLORA LISTING STATEMENT

Image © David E. Symon

Scientific name: ***Solanum opacum*** A.Braun & Bouché, *Ind. Sem. Hort. Berol. App.* 8: 18 no.38 (1853)

Common name: greenberry nightshade (Wapstra et al. 2005)

Group: vascular plant, dicotyledon, family **Solanaceae**

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: **North, Cradle Coast**

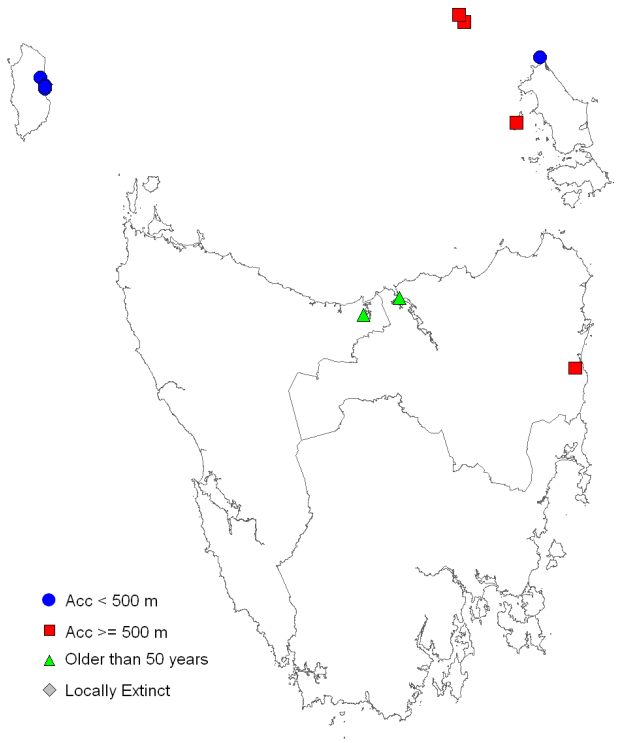

Figure 1. Distribution of *Solanum opacum* in Tasmania

Plate 1. *Solanum opacum*: fruit detail (top) and habit (bottom) (photo © David E. Symon, line drawing © M. Szent Ivany; both with permission of the Board of the Botanic Gardens & State Herbarium (Adelaide))

SUMMARY: *Solanum opacum* (greenberry nightshade) is a sprawling annual or short-lived herb, predominantly associated with poorly-drained swamp forests and riparian areas. The species is known from 9 sites across northern Tasmania and the Bass Strait islands with historical land clearing likely contributing to its very disjunct distribution. The data suggest that the total population in Tasmania is small, and likely to number fewer than 250 plants and occupy well less than 1 ha in total, placing it at risk from chance events, the risk exacerbated as plants may not be seen or only persist in low numbers in between disturbance events. Plants could be accidentally removed as they are similar to the weed *Solanum nigrum* (black nightshade). The most important needs of *Solanum opacum* are periodic disturbance for recruitment, and to prevent overgrazing by stock, competition from weeds, and destruction of known and potential habitat by clearing or degradation.

IDENTIFICATION AND ECOLOGY

Species of *Solanum* respond rapidly to disturbance events such as clearing and fire, colonising disturbed sites in a weed-like manner. It is likely that *Solanum opacum* responds similarly, although it does tend to be associated with more protected habitats (e.g. sheltered creek lines and swamp forests) than for other species. When the Sea Elephant River subpopulation on King Island was found in 2009, the site had been burnt about 2 years prior and was subject to understorey disturbance through post-fire windthrow of tall paperbarks (Wapstra et al. 2009). Combined with the short-lived nature of plants, it is likely that subpopulations only exist temporarily above ground, with seed persisting in the soil seed bank in between disturbance events. While some species of *Solanum* are poisonous, the berries of *Solanum opacum* are reported as edible, tasting like sweet cherry tomatoes. This may promote wider dispersal by birds or other animals which eat the fruit and drop viable seed. The species flowers mostly in spring and summer, with fruit ripening through summer and into autumn.

Some authorities consider *Solanum opacum* to be exotic to Australia, although collections by Banks and Solander from Botany Bay in 1770, and by Robert Brown in the early 1800s from Sydney and from Broad Sound in Queensland, would seem to strongly suggest a native status.

Survey techniques

Opportunistic rather than targeted surveys, particularly in recently disturbed areas, are likely to be the most fruitful method of detection for this disjunctly distributed and short-lived species. A combination of growth habit and mature berries is required for identification so late spring through to early autumn is the most suitable survey period.

Description

Solanum opacum is a sprawling or almost prostrate annual or non-rhizomatous perennial herb that grows to about 1 m across and about 0.5 m tall. The plant is mostly green, with minute glandular and simple hairs and no prickles. The leaves are ovate-lanceolate and mostly 3 to 7 cm long and 1 to 4 cm wide, with the apex acute or acuminate, the base cuneate to attenuate, the margins usually shallowly lobed with 1 to 4 lobes, and the surfaces the same colour on both sides and sparsely pubescent to glabrescent. The petiole is 1 to 4 cm long. The inflorescence is simple, and 2 to 5 flowered. The peduncle is 1.5 to 2 cm long, and deflexed from the base in fruit. The flowers are on pedicels that are 7 to 10 mm long. The calyx is 2 to 3 mm long, the lobes rounded to broad-triangular, 0.5 to 1 mm long, and slightly enlarged in fruit. The corolla is stellate, 8 to 12 mm in diameter and white, with the lobes ovate to oblong. The anthers are 1.5 to 2 mm long. The berry is globose, 8 to 10 mm diameter, and dull green and often streaked when ripe. The fawn and green seeds are 1.8 to 2.2 mm long. Usually 2 stone-cell granules are present. They are about 0.8 mm long.

[description based on Henderson 1976, Symon 1981, Purdie et al. 1982, Jeanes 1999, Bean 2006]

Table 1. Population summary for *Solanum opacum* in Tasmania

	Subpopulation	Tenure	NRM region	1:25 000 mapsheet	Year observed	Area of occupancy	Number of plants
1	**Harford, on Solomons Hill***	unknown	Cradle Coast	Harford	1932	unknown	unknown
2	**near Sea Elephant River, King Island**	private land with covenant	Cradle Coast	Saltwater	2009	2 x 3 m	unknown
3	**vicinity of Blowhole Creek, King Island****	private land	Cradle Coast	Sea Elephant	1997	unknown	"uncommon" (recorded from 5 of 60 quadrats)
4	**Point Effingham, near Bell Bay**	unknown	North	Bell Bay	1843	unknown	unknown
5	**Prime Seal Island**	Crown land (leased)	North	Wybalenna	1988	unknown	unknown
6	**Inner Sister Island** (just inland from E end of Home Beach)	Sister Islands Conservation Area	North	Sister	2010	small patch	5
7	**St Marys Pass**	unknown	North	Ironhouse	1980	unknown	1
8	**Freestone Bay, Deal Island** (lighthouse)	Kent Group National Park	North	-	1971	unknown	unknown
9	**Erith Island** (S most hill)	Kent Group National Park	North	-	1974	unknown	unknown

NRM = Natural Resource Management Region; * the location of Solomons Hill is not known;
** unpublished report by Ecology Australia (1997) of surveys of proposed titanium mine site, Sea Elephant River catchment

Confusing species

Solanum opacum is part of the *Solanum nigrum* or black nightshade group of species, which are often regarded as cosmopolitan weeds, thought to have originated in the Americas. They are characterised by their lack of prickles and stellate hairs, white flowers and green or black fruits arranged in an umbelliform fashion. The species can be difficult to distinguish and over the years many purported Tasmanian specimens of *Solanum opacum* have been redetermined either to or from the introduced *Solanum nigrum*. *Solanum opacum* has a distinctive sprawling-spreading growth habit (most others are erect) and it is the only species with ripe fruit that is green (most others are black).

DISTRIBUTION AND HABITAT

Solanum opacum occurs in New Guinea, Victoria, South Australia, Queensland, New South Wales and Tasmania (Jeanes 1999). Within Tasmania, the species is known from scattered locations along the north coast and the Bass Strait islands (Figure 1, Table 1).

On the mainland, *Solanum opacum* is reported from mesic habitats such as wetter tall open forests (Jeanes 1999), along creeks and in rainforest clearings, usually in red earths and shales (Purdie et al. 1982).

Plate 2. Burnt *Melaleuca ericifolia* swamp forest, habitat of *Solanum opacum* on King Island (image by Mark Wapstra)

In Tasmania, *Solanum opacum* is known from a variety of habitats. On King Island, the species occurs in poorly-drained tall *Melaleuca ericifolia* swamp forest (Plate 2). Similarly, on Inner

Sister Island, it occurs in *Melaleuca ericifolia /Leptospermum laevigatum* scrub on sandy loams in a small gully associated with an ephemeral stream (Harris and Reid 2011). On Prime Seal Island, the species was recorded from open shrubberies on granite outcrops. The habitat of the site from Harford is simply reported as a "rocky hilltop".

POPULATION PARAMETERS

Solanum opacum has been recorded from nine defined locations in Tasmania between 1843 and 2010, with another two Tasmanian collections from the late 1800s/early1900s lacking specific locality details. The small size of the three subpopulations with population information (Table 1) and the relative lack of collections suggest that the total number of mature individuals would number fewer than 250 and the area occupied by the species would be less than 1 ha.

Given the localised nature of known sites, the likely temporary nature of subpopulations above-ground and the collection history of the species, there is a reasonable likelihood of additional subpopulations being detected during opportunistic surveys in Tasmania, especially along the north coast and other Bass Strait islands, which is likely to be the southern limit of the range of the species. However, it is possible that the species has not been detected during some surveys because of confusion with the introduced *Solanum nigrum*.

RESERVATION STATUS

Solanum opacum is reserved in the Sister Islands Conservation Area, in the Kent Group National Park and on private property on King Island subject to a conservation covenant under the Tasmanian *Nature Conservation Act 2002* (Table 1). The St Marys Pass site is likely to occur in the St Marys Pass State Reserve or the adjacent St Patricks Head State Reserve.

CONSERVATION ASSESSMENT

Solanum opacum was listed as endangered on schedules of the Tasmanian *Threatened Species Protection Act 1995* when the Act came into being meeting criterion D for endangered as the total population was thought to be extremely small (fewer than 250 mature individuals) and the area of occupancy very restricted (less than 1 ha). While additional collections have been recognised and 2 new subpopulations have been detected since 1995, further information on threats and status of subpopulations may be required for a reassessment of the conservation status.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

It is possible that land clearance has contributed to the current fragmented distribution of *Solanum opacum*. The absence of plants or presence in very low numbers in between recruitment events increases the potential for losses of this disturbance dependent species through development or chance events. This is exacerbated by imprecise location details for older recordings of the species, difficulties confirming the identification of herbarium specimens, and difficulties in differentiating the species from the weed *Solanum nigrum*. Additional threats associated with small fragmented subpopulations that are likely to exist within the range of the species include over-grazing by stock and weed invasion, though the degree of threat posed by these activities is unknown.

Land clearance: Historically, significant areas of potential habitat have been cleared, primarily for agriculture and urban expansion, within the potential range of *Solanum opacum*. Any clearing of potential habitat may disturb and/or eliminate as yet undetected subpopulations or those for which the precise location is unknown. The King Island subpopulation in the vicinity of Blowhole Creek was detected as a result of mining proposal making mining a potential threat to unknown habitat where the species may only be represented in the soil seed store or by few plants that may avoid detection.

Inappropriate disturbance regime: *Solanum opacum* is a short-lived species likely to be dependent on disturbance for population renewal and persistence in the soil seed store. As such, it is likely to benefit from periodic disturbance such as fire, and long periods

without disturbance may be deleterious especially for localised subpopulations.

Stochastic events: The likely small size of the subpopulations of *Solanum opacum* exposes them to a high risk of extinction due to chance events. Similarities to the introduced *Solanum nigrum* (black nightshade) may result in accidental removal when managing weeds.

MANAGEMENT STRATEGY

What has been done?

There have been no targeted survey or recovery actions for *Solanum opacum* in Tasmania. David Symon confirmed the identity of Tasmanian specimens held at the Adelaide Herbarium in August 2011.

Management objectives

The main objectives for the recovery of *Solanum opacum* are to prevent the loss or degradation of known subpopulations, identify new subpopulations within the range of the species, and gain a better understanding of the ecological requirements of the species.

What is needed?

Agencies, groups or individuals may assist with some or all of the following recovery actions. Coordinated efforts may achieve the best and most efficient results.

- undertake extension surveys at or in the vicinity of recorded sites to determine the status of the subpopulations, and, if detected, determine their size, extent and current threats (caretakers may be able to search for the species on Deal Island);
- confirm the identity of purported Tasmanian specimens or observations of *Solanum opacum* by field verification;
- monitor at least one subpopulation to determine longevity and response to disturbance;
- support the Private Land Conservation Program (DPIPWE) with the establishment of conservation covenants for private land supporting known sites and potential habitat, and ensure that current priorities for the species are incorporated into the program's reservation strategies;
- provide information and extension support to weed management groups, relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of known sites and potential habitat;
- collect seed for long-term conservation storage at the Tasmanian Seed Conservation Centre.

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