

Thelymitra inflata

inflated sun-orchid

TASMANIAN THREATENED SPECIES NOTESHEET



Thelymitra inflata from Adelaide Hills, South Australia (image by Robert Bates)

Scientific name: *Thelymitra inflata* Jeanes, *Muelleria* 19: 71 (2004)

Common name: inflated sun-orchid

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

Status: *Threatened Species Protection Act 1995*: listing under consideration
Environment Protection and Biodiversity Conservation Act 1999: Not listed

Distribution: Endemic status: **not endemic to Tasmania**
Tasmanian Natural Resource Management regions: **South**

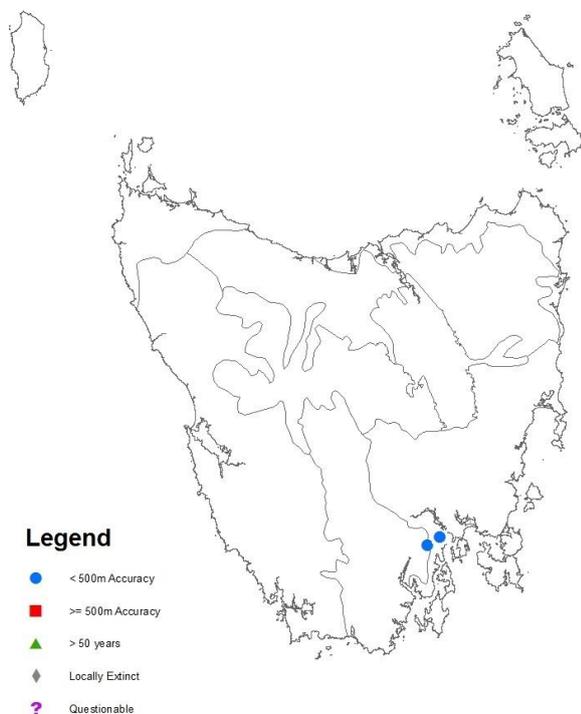


Figure 1. Distribution of *Thelymitra inflata* in Tasmania, showing IBRA bioregions



Plate 1. *Thelymitra inflata* from Kuitpo, Christmas Tree Hill Road, South Australia (image by Robert Bates)

SUMMARY: *Thelymitra inflata* (inflated sun-orchid) is a deciduous terrestrial orchid known in Tasmania from two locations near Hobart, with only two records, both made in the early 1990s, despite numerous surveys in potential habitat and a search of the Ridgeway site almost every year since it was discovered in 1992. While abundance data is scarce, it is likely that the species occupies less than 1 ha and consists of fewer than 250 individuals in total, putting the species at a high risk of local extinctions. The species grows in areas of slightly impeded drainage in open forest and woodland on clay-loam soils. Likely threats include inadvertent losses through vegetation clearance or land management changes, inappropriate fire regimes, and climate change.

IDENTIFICATION AND ECOLOGY

Species of *Thelymitra* are commonly called sun-orchids because the flowers of most species open only in warm to hot weather, particularly on bright, sunny days. *Thelymitra* species are terrestrial orchids that die back after flowering to fleshy subterranean tubers. They are all spring or summer flowering. Most species have a single narrow basal leaf. Unlike most orchids, the labellum (lip) of the flower is generally similar in shape and size to the petals. Features of the column in the centre of the flower are important in identification. In all species the column has two arm-like projections that flank the anther (pollen-holding structure).

Flowers of *Thelymitra* species are thought to mimic native irises and lilies, thus attracting a similar suite of pollinating insects, such as small native bees, that attempt to collect pollen and often bring about pollination (Jones et al. 1999). Jones (2006) notes that *Thelymitra inflata* has self-pollinating flowers that open tardily on hot days. The family Orchidaceae is characterised by a high speciation rate, particularly when self-pollination is involved, largely accounting for their often restricted distributions. There are currently 212 species in the family native to Tasmania, with *Thelymitra inflata* being one of 38 *Thelymitra* species (de Salas & Baker 2017). Hybrids with *Thelymitra inflata* have been recorded (Backhouse et al. 2016).

The flowering of many sun-orchids is promoted by disturbance (Jones 2006) with the Ridgeway site being recently burnt at the time of discovery (Mark Wapstra pers. comm.). Orchids rely on associations with mycorrhizal fungi for germination and growth with disturbance affecting the species directly or indirectly by impacting on their mycorrhizal fungi (Jasinge et al. 2018).

Survey techniques

Surveys for *Thelymitra inflata* should be undertaken during its peak flowering period, late September to early December, ideally in hot weather when its flowers are most likely to be open (Jeanes 2004, Jones 2006, Wapstra 2018). Flowers are short lived with most plants completing flowering in a few days (Department for Environment and Heritage 2008). The two Tasmanian observations were made in late November and mid-December.

Description

Thelymitra inflata has a leaf that is 13 to 30 cm long and 4 to 10 mm wide. The leaf is linear, fleshy, and channelled. The green to purplish flower stems are 20 to 65 cm tall. The inflorescence usually consists of 1 to 6 flowers, which are 16 to 27 mm across, and dark blue to purplish. The often shortly pointed sepals and petals are 6 to 13 mm long and 4 to 8 mm wide. The column is 5 to 6 mm long and 2.5 to 3.5 mm wide, and is blue to pinkish. The post-anther lobe (hooding the anthers) is 3 to 4 mm long, and 1.9 to 2.6 mm wide, tubular and prominently inflated, the apex being deeply split into two more or less parallel lobes that are 1.5 to 2.5 mm long. It is pinkish brown, brown or sometimes black with a narrow purplish collar and yellow apex and is usually covered with a waxy, often glistening bloom. The column arms are upcurved and 1.5 to 2 mm long, with a toothbrush-like tuft of white, cream or yellow hairs that are 1.2 to 1.6 mm long.

[description based on Jeanes 2004, Jones 2006]

Confusing species

Thelymitra inflata is one of three *Thelymitra* species with the post-anther lobe often covered

Table 1. Population summary for *Thelymitra inflata* in Tasmania

	Subpopulation	Tenure	NRM region	1:25000 mapsheet	Year seen	Area occupied (ha)	Number of individuals
1	Ridgeway Park	Council reserve	South	Taroona	1992	c. 0.5	c. 50-100
2	Leslie Hill, near Longley	private land	South	Longley	1991	unknown	'common'

with a waxy or glistening bloom, the other species being *Thelymitra mucida* and *Thelymitra lucida*. It can be distinguished from *Thelymitra mucida* whose post-anther lobe shape is broadly v-notched and is narrowest at the base and widest towards the apex, and whose column arms have fewer, sparser and generally thicker, longer bright yellow hairs. It can be distinguished from *Thelymitra lucida* whose post-anther lobe is less inflated, not as deeply notched and with a less obvious sparkling bloom, and whose column arms are shorter with generally shorter, white or creamy yellow hairs. It also usually grows in wetter habitats and often flowers later than *Thelymitra inflata* (Jeanes 2004).

DISTRIBUTION AND HABITAT



Figure 2. Distribution of *Thelymitra inflata* (Atlas of Living Australia, downloaded 28/8/2018)

On mainland Australia, *Thelymitra inflata* occurs in Victoria where it is listed on their Advisory List as vulnerable, and South Australia where it is listed as vulnerable (Figure 2). In Tasmania, the species has been recorded from two locations near Hobart, at Leslie Hill and Ridgeway (Figure 1, Table 1).

Thelymitra inflata usually grows in dry to moist woodlands and open forests, often in disturbed, winter-wet sites on clay loam soils, 10 to 350 m in altitude (Jeanes 2004). The Ridgeway site has slightly impeded drainage and occurs at an altitude of 330 to 350 m in the saddle between Chimney Pot Hill and the hill above Ridgeway Reservoir in sedgy-heathy *Eucalyptus pulchella* forest and woodland on clay loam soils derived from Jurassic dolerite. The site near Longley was recorded from a saddle, northeast of Leslie Hill, at an altitude of 240 m in heathy-sedgy-grassy *Eucalyptus pulchella* open stands.

POPULATION PARAMETERS

Estimates of relevant parameters used for the application of extinction risk criteria for *Thelymitra inflata* in Tasmania are shown below followed by justification of the estimates:

Number of subpopulations < 5 (2 known)

Number of locations < 5 (2 known)

Extent of occurrence < 1 km² (9 x 0.1 km)

Area of occupancy < 1 ha

Area of occupancy (as per IUCN criteria) = 8 km²

Number of mature individuals < 250

Jeanes (2004) noted that *Thelymitra inflata* is seldom collected (in Victoria and Tasmania at least), perhaps a result of its highly localised distribution, tardiness in opening its flowers and short flowering period. Also, it may be that the species relies on an exacting set of circumstances such as disturbance at a specific time of year combined with adequate moisture levels to emerge and flower (see Jasinge et al. 2018). This presumption is based on follow-up surveys almost every year since the species was discovered at Ridgeway in 1992 failing to detect the species despite seemingly favourable conditions (Mark Wapstra pers. comm.).

Whilst *Thelymitra inflata* was only relatively recently described when the *Thelymitra pauciflora*

complex was revised (Jeanes 2004), this is unlikely to have contributed to the paucity of records given that *Thelymitra inflata* was split from *Thelymitra mucida*, a species of interest given its listing as rare on State legislation since 1995. Also *Thelymitra inflata* is distinctive because of its waxy or glistening bloom on an inflated post-anther lobe and as such is unlikely to have been overlooked. Numerous surveys in potential habitat by orchid enthusiasts and impact assessment consultants have not resulted in the detection of new locations of *Thelymitra inflata* despite the detection of new locations, often significantly increasing the known range of many other *Thelymitra* species in recent decades.

The current status of both of the known sub-populations of *Thelymitra inflata* is uncertain suggesting that the species may be subject to a continuing decline. However, more data may be required to invoke a continuing decline for the formal assessment of extinction risk of the species. The record of the Leslie Hill subpopulation has a position accuracy of 100 m, falling on private land that has been subject to ongoing subdivision and occupation, evidenced by aerial photography showing vegetation clearing, conversion and several house sites in the vicinity of the record. The failure to detect the species at the Ridgeway site since its discovery in 1992 despite seemingly favourable conditions is also suggestive of a decline, perhaps through attrition of underground tubers associated with successive seasons of non-emergence. As a result and considering the highly localised occurrences typical of the species, the total population is estimated to number fewer than 250 mature individuals and occupy less than 1 ha.

RESERVATION STATUS

While the species occurs in an informal reserve managed by the Hobart City Council, *Thelymitra inflata* is not known from a formal reserve in Tasmania (Table 1).

CONSERVATION ASSESSMENT

Thelymitra inflata is under consideration for listing as endangered on Schedules of the

Tasmanian *Threatened Species Protection Act 1995*, meeting the following criteria:

D: Total population extremely small or area of occupancy restricted, and

1. total population estimated to number fewer than 250 mature individuals;
2. total population with an area of occupancy less than 1 ha and typically in five or fewer locations that provide an uncertain future due to the effects of human activities or stochastic events, and thus capable of becoming extinct in a very short time period.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Within Tasmania, *Thelymitra inflata* has been recorded from just two sites and has not been recorded since 1992, making the species vulnerable to inadvertent destruction and stochastic events. This is exacerbated by the reliance of the species on mycorrhizal fungi which also have their own requirements and tolerances. The main threats to *Thelymitra inflata* are discussed below:

Land clearing or changed management:

The Leslie Hill record falls on private land subject to ongoing subdivision. The subpopulation may have been cleared as evidenced by aerial imagery in the vicinity of the record. The species may be impacted by changed management such as stock grazing and pasture seed and fertiliser applications as well as an associated increased risk of introducing and spreading weeds, pests and disease. The apparently highly localised occurrences and short and spasmodic detection periods of *Thelymitra inflata* increase the risk of clearing or changed management practices in as yet undetected subpopulations and potential habitat.

Inappropriate disturbance: *Thelymitra* species may be out-competed as their habitat becomes dense over time in the absence of disturbance, preventing emergence, flowering and seed-set necessary for the replenishment of their underground tubers and recruitment from seed. Attrition of tubers may be expected following long periods in a dormant state during unfavourable conditions, compromising

the long-term persistence of a species in an area (Jones et al. 1999). The Ridgeway subpopulation was discovered in an area that had been recently burnt and although regular fuel reduction burns are conducted in Ridgeway Park, seemingly an appropriate disturbance regime, *Thelymitra inflata* has not been detected despite targeted surveys nearly every year since its discovery in 1992. This may be the result of the vegetation at the site becoming denser since discovery (Mark Wapstra pers. comm.) or the timing and intensity of the burns being unfavourable to the species, perhaps via a deleterious impact on its mycorrhizal fungi (see Jasinge et al. 2018). The results of Jasinge et al. (2018) suggest that it may be prudent to restrict planned burns to dry periods in the absence of emergence of the species in order to lessen the impact on associated mycorrhizal fungi. If the species emerges it would be prudent to time burns to immediately following seed release, though if climatic conditions are too dangerous for burning, slashing may be a preferable disturbance to reduce competition.

Climate change: The potential impact of climate change on *Thelymitra inflata* is difficult to quantify but it is likely that even minor shifts in average seasonal conditions may have an adverse impact on such a locally restricted species, especially if other ecological factors such as appropriate fire or disturbance regimes are absent. The risk is exacerbated by impacts to the mycorrhizal fungi upon which the species relies.

Stochastic events: The small and highly localised occurrences of the species mean that the risk of inadvertent destruction due to chance events is high, particularly for as yet undetected sites given the short and apparently spasmodic detection periods.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the recovery of *Thelymitra inflata* are to relocate the species, prevent the loss or degradation of known subpopulations and potential habitat in their immediate vicinity, and increase the number of known subpopulations through survey.

What has been done?

Surveys of the Ridgeway site have been conducted almost every year since it was discovered in 1992 (Mark Wapstra pers. comm.).

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):

- provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of known subpopulations and potential habitat,
- determine the status of the Leslie Hill site, including monitoring potential habitat in the immediate vicinity of the record,
- continue to monitor the Ridgeway site for emergence,
- conduct extension surveys radiating out from known sites,
- where possible, confirm the species identification of records of *Thelymitra mucida* and *Thelymitra holmesii* as some may belong to the more recently described *Thelymitra inflata*,
- monitor known sites regularly for emergence and threats,
- in the absence of emergence of the species, implement burns or slash to reduce competition if sites become overgrown, or when fuel reduction burns are needed, restrict any planned burns to dry periods,
- if the species has emerged, restrict planned fuel reduction burns to immediately following seed release, or slash when plants have died down to reduce fuel loads or reduce competition if needed,
- if listed, include the species in the next revision of the Recovery Plan for threatened Tasmanian orchids (Threatened Species Section 2017),

- collect seed for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens.

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