

Thynninorchis nothofagicola

myrtle elbow orchid

TASMANIAN THREATENED FLORA LISTING STATEMENT



Image by Les Rubenach

Scientific name: *Thynninorchis nothofagicola* (D.L.Jones) D.L.Jones & M.A.Clem., *Orchadian* 13(10): 457 (2002)

Common name: myrtle elbow orchid (Wapstra et al. 2005)

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

Name History: *Arthrochilus huntianus* subsp. *nothofagicola*

Status: *Threatened Species Protection Act 1995*: **endangered**
Environment Protection and Biodiversity Conservation Act 1999: **Critically Endangered**

Distribution: Endemic status: **Endemic to Tasmania**
Tasmanian NRM Region: **South**

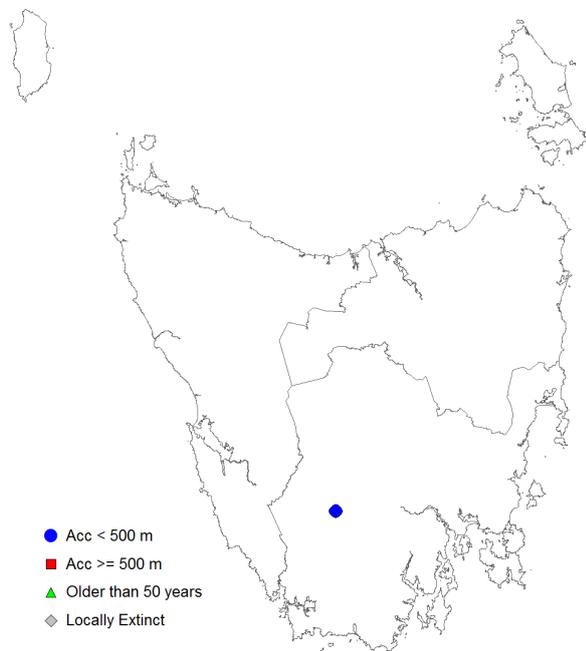


Figure 1. Distribution of *Thynninorchis nothofagicola*, showing Natural Resource Management regions.



Plate 1. *Thynninorchis nothofagicola* flower (image by Les Rubenach, 1995)

IDENTIFICATION AND ECOLOGY

Myrtle elbow orchid is so named because the labellum is jointed and elbow-like, and the species grows in mixed forest where myrtle (*Nothofagus cunninghamii*) is the dominant understorey species. Both species of *Thynninorchis* in Tasmania, *Thynninorchis nothofagicola* and *Thynninorchis huntianus*, are leafless saprophytes that reproduce only from seed (Jones et al. 1999). The tiny irregular tubers are dormant during late winter and spring, with flowering occurring in late summer. The species is cryptic and may not emerge each year. The inconspicuous flowers have an insect-shaped labellum (lip) supported on a hinged stalk. Male thynnine wasps — which give rise to the generic name — are attracted to the flowers by a scent resembling that released by their flightless females, and attempt to carry off the labellum for mating. In doing so the labellum pivots on its hinged stalk, and the insect picks up or deposits pollen. However, the flowers of *Thynninorchis nothofagicola* may be self-pollinating, as the labellum hinge is only partially functional.

Survey techniques

Surveys for the species should be undertaken during its core flowering period, February (Wapstra et al. 2010).

Description

Thynninorchis nothofagicola has inflorescences with two to four flowers on an extremely thin, wiry, reddish stem to 10 cm tall, and with two to four sheathing bracts at the base. The insect-like, reddish green flowers are about 8 mm long and 1 mm wide. The sepals and petals are reflexed against the ovary, the dorsal sepal to 3 mm long and 1.2 mm wide, the two lateral sepals to 4 mm long and 1.2 mm wide and the two petals to 3 mm long and 0.8 mm wide. The labellum is at the end of two hinged stalks each to about 6 mm long. The labellum is about 4 mm long and is fringed with long purple or reddish glandular hairs. The outer end has paired glandular tails that project forward and the inner end has two short glands ending in shiny black clubs with an irregularly rounded purple gland at their base. The column has two pairs of slender wings.

(description from Jones et al. 1999)

CONFUSING SPECIES

There are no confusing species within similar habitat in Tasmania. *Thynninorchis nothofagicola* can be distinguished from the allied *Thynninorchis huntianus* by its labellum hinge which is only partially functional, and its fewer and smaller flowers with a much reduced labellum callus with fewer shorter bristles (Jones et al. 1999). *Thynninorchis huntianus* is known in Tasmania from a single site on Flinders Island in the State's northeast, though it is now presumed extinct (Jones et al. 1999).

DISTRIBUTION AND HABITAT

Thynninorchis nothofagicola is endemic to Tasmania, being known from a solitary site in the State's southwest (Figure 1). Vegetation at the site consists of tall mixed forest, with *Eucalyptus delegatensis* over an understorey of *Nothofagus cunninghamii*, *Phyllocladus aspleniifolius* and *Dicksonia antarctica* (Plate 2). Other species include *Acacia melanoxylon*, *Nematolepis squamea*, *Pittosporum bicolor*, *Trochocarpa gunnii*, *Cenarrhenes nitida*, *Coprosma quadrifida*, *Blechnum watsii*, *Drymophila cyanocarpa* and *Grammitis billardierei*. The altitude of the site is 470 metres above sea level, and the annual mean rainfall c. 1500 mm.

There are large areas of *Eucalyptus delegatensis* mixed forest in Tasmania, with about 13,600 hectares mapped within a 20 km radius of the known site (Tasveg 3.0).



Plate 2. Habitat of *Thynninorchis nothofagicola* (image by Richard Schahinger, 2015)

Table 1. Population summary for *Thyynninorchis nothofagicola*

	Subpopulation	Tenure	NRM region *	1:25 000 mapsheet	Year last (first) seen	Area of occupancy (ha)	Number of mature plants
1	Gordon River Road	Southwest National Park	South	Adamsfield	2003 1995 (1994)	0.0001	3 2 c. 10

* NRM region = Natural Resource Management region

POPULATION PARAMETERS

Thyynninorchis nothofagicola is known from a single subpopulation with fewer than 10 plants (Table 1). The site was discovered in 1994, with plants being observed again in 1995 and 2003 in an area of just a few square metres. The species has not been seen since, despite targeted annual surveys of the known site. The species' diminutive stature and the low light conditions of its mixed forest habitat mean that the chances of finding new subpopulations are inherently low. Surveys are predicted to be most successful in years when plants at the known site are flowering.

RESERVATION STATUS

The only known site is in Southwest National Park, and also within the Tasmanian Wilderness World Heritage Area.

CONSERVATION ASSESSMENT

Thyynninorchis nothofagicola qualifies for listing as endangered on the Tasmanian *Threatened Species Protection Act 1995* under criterion D1 and D2:

- D1. Total population estimated to number fewer than 250 mature individuals;
- D2. Total population with an area of occupancy less than one hectare, 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 within a very short time period.

THREATS AND LIMITING FACTORS

Origin and recruitment issues: Both *Thyynninorchis nothofagicola* and *Thyynninorchis huntiana* have only been recorded from single populations in Tasmania. Their distribution is suggestive of a long-term decline and

contraction in the range of the genus. It is likely that *Thyynninorchis nothofagicola* has evolved on mainland Tasmania due to isolation from the broader distribution of *Thyynninorchis*. Although difficult to show through empirical studies, it is possible that *Thyynninorchis nothofagicola* is self-pollinating as the labellum hinge is only partially operational (Jones et al. 1999). This would offer a mechanism for reproductive isolation that may have operated in concert with increasing physical isolation, to result in the evolution of *Thyynninorchis nothofagicola* from *Thyynninorchis huntiana* or a closely related extinct species.

Lyrebirds: *Thyynninorchis nothofagicola* is considered to be at risk from the activities of the introduced superb lyrebird (*Menura novaehollandiae*) which occurs in high numbers in the vicinity of the only known site. Lyrebirds turn over leaf litter to a depth of perhaps 15 cm in search of food (Tassell 2014), and have been observed eating orchid tubers on mainland Australia. Thus it is reasonable to assume that the shallow tubers of *Thyynninorchis nothofagicola* would be targets for this exotic pest species. Lyrebirds may also limit recruitment from seed, as aggressive foraging in the leaf litter would destroy newly established seedlings.

Fire: The occurrence of *Thyynninorchis nothofagicola* in mixed forest suggests a negative fire response, as mixed forests are burnt infrequently (in the order of hundreds of years between fires) and the species' small shallow tubers are unlikely to survive a fire. The only known subpopulation is likely to become extinct if its habitat were burnt.

Forestry activities: Areas of potential *Thyynninorchis nothofagicola* habitat in western Tasmania may be subject to forestry operations. Timber harvesting practices could destroy unknown subpopulations through physical disturbance or the use of fire. The non-

emergence of the species in some years, its diminutive character and narrow identification window makes it difficult to adequately survey potential habitat and prevent or mitigate unfavourable disturbance. At the time of the species' listing on the TSP Act the known site was within State Forest, but is now within Southwest National Park, while large areas of suitable habitat are protected in nearby formal reserves.

Climate Change: Present climate change trends could exacerbate the decline of *Thyminorchis nothofagicola*, particularly if predicted longer droughts prevent emergence, flowering and therefore recruitment from seed. At the very least, extended periods of dormancy (failure to emerge for several years) would prevent population expansion as *Thyminorchis* seem to recruit exclusively from seed (Wapstra pers. comm.). This being the case, it is not clear exactly what direct effects climate change would have on the habitat or the dormancy and recruitment of *Thyminorchis nothofagicola*. However, a species struggling to survive extant conditions is unlikely to respond well to rapid environmental change (Westoby & Burgman 2006). This is perhaps most significant for species in which environmental and ecological requirements are poorly understood, as they are for *Thyminorchis nothofagicola*.

MANAGEMENT STRATEGY

What has been done?

Fencing: A fence was erected around the known site in 2001 to protect the few known plants from disturbance from lyrebird activity. As plants were detected growing directly beside the fence in 2003, the fence was extended in 2007 to protect more habitat (a 5 metre by 4 metre area), as recommended in the *Threatened Tasmanian Orchid Flora Recovery Plan 2006–2010* (Threatened Species Unit 2006). The species has been included in a draft revision of the Tasmanian Orchid Recovery Plan (Threatened Species Section 2017).

Surveys: Surveys of the known site have been undertaken annually since the mid-2000s without success; targeted surveys of potential habitat in the broader area were undertaken in February 2015 by volunteers with the Wildcare

group Threatened Plants Tasmania, though no plants were found.

What is needed?

Recovery actions necessary to decrease the extinction risk to *Thyminorchis nothofagicola* are:

- long-term monitoring of the only known population, including monitoring the need to reduce competition from woody understorey species;
- long-term monitoring of indicators of climate change, such as average rainfall and temperature, on a local or regional scale to relate to flowering and recruitment patterns on an extended time scale (i.e., decades).
- extension surveys in suitable habitat in surrounding wet forests with rainforest understoreys. Because of the species' cryptic nature and noted sporadic flowering, these surveys should be conducted when the Gordon River Road population is flowering;
- research into ecological processes relating to population dynamics to ensure that appropriate management regimes are being implemented for the species. In particular, the species' recruitment mechanisms require investigation. This research may lead to assisted pollination trials, similar to those that have proven successful for increasing plant numbers for orchids in other Australian States.

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