Image by Mark Wapstra

Caladenia tonellii

robust fingers

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Scientific name: ***Caladenia tonellii*** D.L.Jones, *Austral. Orchid Res.* 3: 41 (1998)

Common Name: robust fingers (Wapstra et al. 2005)

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

Name History: Recent taxonomic revisions re-classified many *Caladenia* species as *Petalochilus* (including *Caladenia tonellii*) but this has not gained wide acceptance.

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: **Cradle Coast, North**

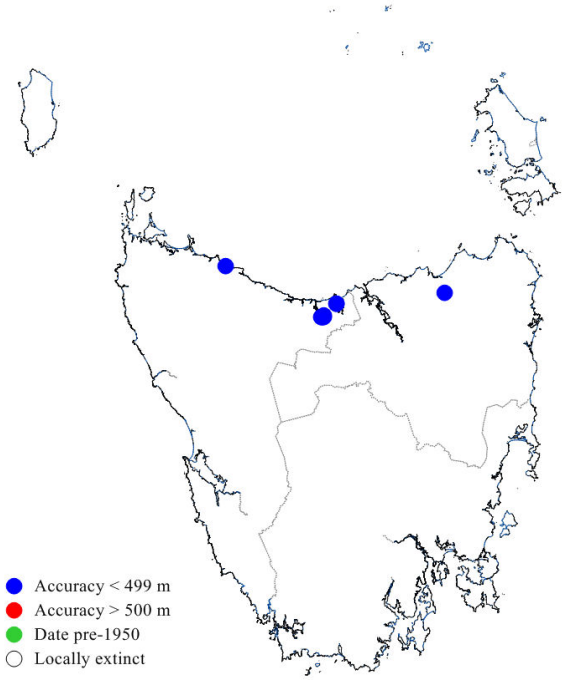

Figure 1. The distribution of *Caladenia tonellii*

Plate 1. (LHS) *Caladenia tonellii* from the type location. Note the stature of the plant relative to the hand-held GPS unit.
Plate 2. (RHS) Typical multi-flowered inflorescence with distinctive arrangement of flowers
(images by Mark Wapstra)

IDENTIFICATION AND ECOLOGY

Caladenia tonellii belongs to one of the small-flowered sections of the genus *Caladenia*, sometimes included in the genus *Petalochilus* (Jones et al. 2001). This group of *Caladenia* species is distinguished morphologically from other sections by the labellum calli being separate from each other (not on a plate-like structure) and usually arranged in two rows. The heads of individual calli are enlarged and the basal calli are larger than and usually of a different colour to the other labellum calli. The labellum and column are usually ornamented with prominent red transverse bars (Jones et al. 2001).

Plants grow singly or in loose groups. Flowering plants usually have a single narrow hairy dark green basal leaf, a thin wiry hairy flower stem (although in *Caladenia tonellii* the leaf is longer and wider and the scape distinctly stiffer than in other species in the section) and 1 to 5 flowers that are usually white or pink. The perianth segments are all of a similar size although the dorsal sepal can be shorter in some species. The dorsal sepal is erect or recurved away from the column and labellum. The lateral sepals and petals project forward or spread like the fingers of a hand. The labellum is hinged and 3-lobed with erect lateral lobes and a projecting or recurved mid-lobe that is ornamented with short marginal teeth. The calli are stalked and clubbed, often with yellow to orange heads and usually arranged on 2 rows, sometimes 4 in some species (Jones 2006).

All *Caladenia* species are deciduous and die back after flowering to small subterranean tubers enclosed by a fibrous sheath or tunic. The basal leaf appears above ground in late autumn or early winter following rains. The larger-flowered species in the *Petalochilus* group of species are pollinated by small native bees and the smaller-flowers species are mostly self-pollinating, sometimes without opening (Jones 2006). *Caladenia tonellii* is one of the larger-flowered species (the largest small-flowered *Caladenia* in Tasmania) and is almost certainly insect-pollinated.

The flowering period of *Caladenia tonellii* is late October to early December but most records are from late November (Wapstra et al. 2008). The species may be identifiable prior to anthesis from the distinctive long leaves, and after anthesis because of the stature of fertilised plants and the structure of the inflorescence (Wapstra et al. 2008).

The response of species of *Caladenia* to fire varies but most species respond vigorously to high intensity fires during the preceding summer (Jones et al. 1999). The precise response of *Caladenia tonellii* to fire is unknown but its habitat is generally considered to be fire-prone. *Caladenia tonellii* occurs in heathy/shrubby forest, and while fire is probably not critical to its flowering, a long period without fire such that the understorey becomes densely shrubby (and shady) may be detrimental to the persistence of the species. *Caladenia tonellii* all but disappeared from the type location near Railton but a broadscale ecological burn stimulated a massive flowering response in following seasons.

Description

Plants are 20 to 35 cm tall, making *Caladenia tonellii* the tallest of the small-flowered *Caladenia* species in Tasmania. The scape is relatively thick (about 1.5 mm diameter) and sparsely hairy. The leaf is narrowly linear, dark green with a reddish purple base, sparsely hairy, and is 17 to 25 cm long and 2.5 to 3.5 mm wide. The leaf characteristically extends through the multi-flowered (1 to 3) inflorescence.

Flowers are 25 to 40 mm across. The flowers are bright to pale pink internally and brownish pink externally. The labellum is white to pink with reddish bars, a yellowish to orange mid-lobe, cream to yellow calli on the labellum, and a green column with broad red bars. The dorsal (upper) sepal is narrowly ovate-oblong, erect, incurved or recurved, and 12 to 17 mm long and 3.5 to 4.5 mm wide. The lateral (lowermost) sepals are narrowly ovate-lanceolate, porrect and slightly divergent, and 15 to 20 mm long and 3.5 to 6 mm wide.

The petals are narrowly lanceolate, spreading to incurved, and 10 to 16 mm long and 3 to 4.5 mm wide. The labellum is broadly ovate, and 7 to 10 mm long and 7 to 9.5 mm wide. The

lateral lobes are large, erect and embrace the column. The margins of the lateral lobes are entire. The mid-lobe is triangular with 3 or 4 basal pairs of slender yellow marginal calli to 0.5 mm long, then a further 3 pairs of broad, blunt calli. The lamina calli are in 2 somewhat irregular rows and extend to the base of the mid-lobe. The column is 6.5 to 7.5 mm long and 3.5 to 4.5 mm wide.

[description from Jones 1998, Jones et al. 1999, Jones 2006]

Confusing Species

Caladenia tonellii is a member of the *Caladenia carnea* complex (Jones 1998). A combination of characters including the long, wide, dark green leaf that projects through the inflorescence (rather than being short, narrow and barely reaching the flowers), the often very stiff scape (rather than a thin and wiry scape), the large flowers with almost drooping, broad segments (rather than usually small flowers with stiffly spreading and narrower segments) and some features of the labellum (particularly the shape of the lateral lobes) distinguish the species. However, it should be noted that where *Caladenia tonellii* grows sympatrically with *Caladenia fuscata* and *Caladenia carnea*, a virtual continuum exists and allocating individuals to a particular taxon can be problematic. The variation amongst members of this complex in northern Tasmania may partially explain the contemporary distribution of *Caladenia tonellii* (Figure 1, Table 1).

It is recommended that specialist opinion be sought on any collections suspected to be *Caladenia tonellii*, especially for sites outside the predicted distribution and habitat.

DISTRIBUTION AND HABITAT

Caladenia tonellii is endemic to Tasmania and is known from a limited number of sites in lowland near-coastal parts of the north coast, extending inland by a few kilometres in the Railton-Latrobe area (Table 1).

The species occurs in *Eucalyptus amygdalina* dominated forest with a shrubby understorey on shallow clay loam and shallow gravelly loam over clay (Plate 2). Topography varies from flats to slopes up to about 80 m elevation.

Plate 2. Habitat of *Caladenia tonellii* at the Henry Somerset Orchid Conservation Area about 3 years after the ecological burn (image by Mark Wapstra)

POPULATION ESTIMATE

The total population of *Caladenia tonellii* is probably less than 250 mature individuals. Virtually all sites are represented by very low numbers, although the subpopulation in the Henry Somerset Orchid Conservation Area may support around 100 plants.

Since the formal recognition of *Caladenia tonellii* in 1998 (based on first collections in 1994), at which time the species was only known from the Latrobe area, 2 confirmed subpopulations have been discovered, both of which extended the range of the species significantly to the east and west. The possible occurrence of the species in the Port Sorell area requires verification. Based on the extent of potential habitat and an apparently wide distribution in northern Tasmania, the discovery of additional subpopulations seems likely. However, it seems unlikely that subpopulations of *Caladenia tonellii* large enough to influence its conservation status will be discovered in the future.

RESERVATION STATUS

Caladenia tonellii occurs in the Henry Somerset Orchid Conservation Area, a private sanctuary. It also occurs nearby in Warrawee Forest Reserve.

Table 1. Population summary for *Caladenia tonellii*

	Subpopulation	Tenure	NRM Region *	1:25000 Mapsheet	Year last seen	Area occupied (ha)	Number of mature plants
1	Henry Somerset Orchid Conservation Area	Private sanctuary	Cradle Coast	Latrobe	2007 2008	 1-2	100+ 10s
2	North of Dinsdales Hill	Warrawee Forest Reserve	Cradle Coast	Latrobe	2000	Unknown	c. 50
3	Old Deloraine Road	State forest	Cradle Coast	Latrobe	1996	Unknown	c. 3
4*[1]	Rubicon Sanctuary near Port Sorell*[1]	Private land with conservation covenant	Cradle Coast	Port Sorell	2004	Unknown	Unknown
5*[2]	Appleby Creek near Port Sorell Road*[2]	Private property	Cradle Coast	Port Sorell	2007	0.0001	1
6	Sisters Beach Road near Lake Llewellyn	Rocky Cape National Park	Cradle Coast	Rocky Cape	2000	Unknown	"little colony"
7	Shanty Road, west of Scottsdale	*[3]	North	Scottsdale	1998	Unknown	c. 5

*NRM region = Natural Resource Management region.

*[1], *[2]These records require verification because although the observers are reliable, the images available of the plant indicate that identification as a robust *Caladenia carnea* may be more appropriate (similar comments may apply to a subpopulation discussed in Larcombe (2008) from the Wynyard area);

*[3]The database record falls north of Shanty Road on private property but the collection site is apparently on the southern side of the road, which is labelled as Crown land on older maps but is now private property.

CONSERVATION ASSESSMENT

Caladenia tonellii was listed in 2001 as endangered on schedules of the Tasmanian *Threatened Species Protection Act 1995*. It meets criteria B, C and D because it occupies less than 5 ha, occurs in fewer than 5 confirmed locations, the distribution is severely fragmented and there are fewer than 250 mature individuals.

THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

Caladenia tonellii occurs in highly localised sites. Because of its localised distribution, stochastic events can lead to extinction. In addition, the small population sizes may lead to inbreeding problems possibly in combination with insufficient maintenance of populations of pollinating insects and associated mycorrhizal fungi.

Land clearing and habitat fragmentation: Historical land clearing has probably resulted in substantial areas of potential habitat in the State's north being eliminated. In particular, substantial areas immediately adjacent to the key subpopulation at the Henry Somerset Orchid Conservation Area have been developed as softwood and hardwood plantations, agricultural land and mined (for cement production). Substantial areas of potential habitat in the Scottsdale area have suffered a similar fate. It is unknown whether *Caladenia tonellii* was ever more widespread because there are no herbarium specimens that were collected prior to 1994.

Further clearing at the known sites is a continuing threat, but at a different scale to the broadscale historical clearing of potential habitat. For example, development and/or maintenance of walking tracks in the Henry Somerset Orchid Conservation Area could locally affect individuals. Road maintenance activities have the potential to further disturb the site at Sisters Beach. The site within the Warrawee Forest Reserve is close to a council works building so further unplanned clearing is a risk.

Forestry activities: At least one subpopulation occurs on State Forest (Old Deloraine Road). Threatened flora sites are taken into account during the planning and implementation of

forestry operations through a consultative mechanism between the proponent, the Forest Practices Authority and the Department of Primary Industries, Parks, Water and Environment.

Inappropriate fire regime: The ecological requirements of *Caladenia tonellii*, especially in relation to the frequency, timing and intensity of fires at known sites and surrounding potential habitat, should be incorporated into land management plans for sites supporting the species.

Ziegeler (1997) noted that frequent low intensity burns may be detrimental to *Caladenia tonellii* and that autumn (dormant period of orchid) burning of habitat on a 10 to 20 year cycle should be undertaken. A relatively intense fire in April 2005 that affected much of the understorey vegetation in the Henry Somerset Orchid Conservation Area appears to have successfully stimulated flowering of *Caladenia tonellii*.

Competition with weeds: Disturbance of the understorey and soil around known sites of *Caladenia tonellii* has the potential to allow invasive woody and herbaceous weeds to establish and become locally dense, which in turn may affect the flowering of *Caladenia tonellii*. Presently, no subpopulations are directly associated with weed infestations but potentially invasive species are present close to several of the known sites, suggesting a "watching brief" on this potential threat is warranted.

Climate change: Changes in the rainfall pattern may lead to the habitat becoming unsuitable for the species and associated pollinators and mycorrhizal fungi.

Stochastic events: While stochastic events are by definition unpredictable, in this case, such events are most likely to be associated with events such as unintended fires (e.g. arson, lightning strikes). In addition, the bushland patches supporting *Caladenia tonellii* are frequented by many people and deliberate or inadvertent picking of flowers (e.g. for the purpose of identification) is a genuine risk to a large and attractive species with often low population numbers.

MANAGEMENT STRATEGY

What has been done?

Informal monitoring of the subpopulation of *Caladenia tonellii* in the Henry Somerset Orchid Conservation Area by orchid specialists and enthusiasts has been undertaken since the formal recognition of the species. In November 2008 a more formal demographic monitoring program was established at this site by local orchid specialists and Wildcare's Threatened Plants Tasmania volunteer group. This monitoring program aims to improve understanding of *Caladenia tonellii* population dynamics, in particular factors important in growth and decline of subpopulations.

In the past, the Henry Somerset Orchid Conservation Area has been subject to burns under the supervision of the landowners and the Tarleton Fire Brigade (local) under the guidance of a local orchid specialist. An ecological burn of virtually the entire Henry Somerset Orchid Conservation Area reserve was undertaken in April 2005 after concerns that the understorey was becoming densely shrubby and several species were no longer evident (or in much reduced numbers).

In November 2008 seed and mycorrhizal fungi were collected for long-term storage as part of the Tasmanian Seed Safe project set up under the Millennium Seed Bank project being conducted under the auspices of the Royal Botanic Gardens Kew (joint partners in Tasmania include The Department of Primary Industries, Parks, Water and Environment, the Royal Tasmanian Botanical Gardens and the Tasmanian Herbarium).

Caladenia tonellii was included in the *Flora Recovery Plan: Threatened Tasmanian Orchids 2006–2010* (TSU 2006), with several subpopulations noted as having a priority for requiring baseline surveys.

Management objectives

The main objective for the management of *Caladenia tonellii* is to ensure that there is no decline in the known subpopulations.

What is needed?

- undertake additional surveys at known sites to determine the precise extent, condition and management needs of subpopulations;
- collect detailed demographic information on the subpopulation in the Henry Somerset Orchid Conservation Area to detect effects of fire regime on the species in order to inform future management;
- confirm the identity of plants from the Port Sorell locations;
- prepare a formal management plan for the Henry Somerset Orchid Conservation Area that takes into account the ecological requirements of *Caladenia tonellii* (and several other threatened species) to guide future management;
- prepare and implement a fire management plan for the Henry Somerset Orchid Conservation Area to ensure maintenance of the subpopulation of *Caladenia tonellii* (and other threatened species in the reserve including *Caladenia caudata*);
- research the taxonomy, morphology and pollination biology of the *Caladenia tonellii*–*Caladenia carnea*–*Caladenia fuscata* complex in northern Tasmania to elucidate differences between these entities and to determine the conservation status and management requirements of the different taxa;
- if required, supplement declining subpopulations *in situ* or establish *ex situ* holdings with seedlings;
- establish Special Management Zones (Orr & Gerrand 1998) for any existing or new sites in State forest;
- should forestry activities or other developments be proposed within 5 km of known sites, survey potential habitat for *Caladenia tonellii* during the flowering season, in order to prevent impacts to presently undetected sites;
- 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 subpopulations and potential habitat;
- implement the threatened orchid recovery plan (TSU 2006) and include the species in any revision of the plan.

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View:
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.