Caladenia caudata

tailed spider-orchid

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image by Mark Wapstra

Scientific name: ***Caladenia caudata*** Nicholls, *Vict. Nat.* 64: 231 (1948)
Common name: tailed spider-orchid
Name history: *Calonemorchis caudata, Arachnorchis caudata*
Group: vascular plant, monocotyledon, family **Orchidaceae**

Status: *Threatened Species Protection Act 1995*: **vulnerable**
Environment Protection and Biodiversity Conservation Act 1999: **Vulnerable**

Distribution: Endemic status: **endemic to Tasmania**
Tasmanian NRM Regions: **Cradle Coast, North, South**

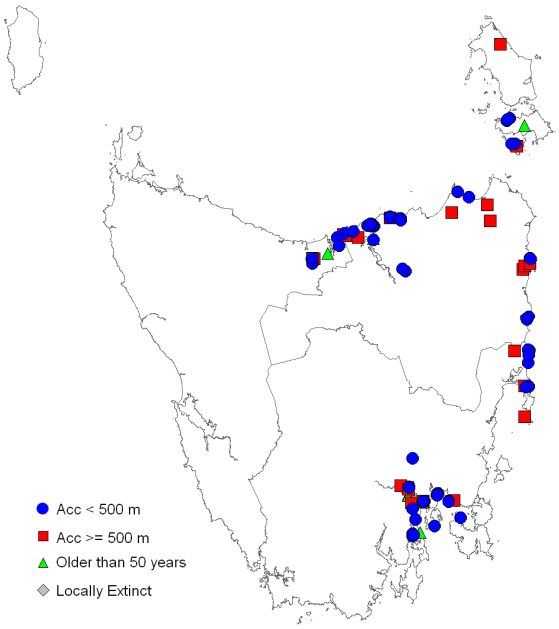

Figure 1. Distribution of *Caladenia caudata*, showing NRM regions

Plate 1. *Caladenia caudata* from Railton (LHS) and Waverley Flora Park (RHS) (images by Mark Wapstra)

SUMMARY: *Caladenia caudata* (tailed spider-orchid) is a terrestrial orchid, found mainly in dry heathland and heathy woodland habitats, in lowland areas of northern, eastern and southeastern Tasmania. While over 40 subpopulations have been recorded, the majority have either not been observed for decades or support a low number of individuals. The data suggest that the total population in Tasmania has fewer than 10,000 individuals and is likely to occupy less than 6 km^2. Much of the habitat of the species would have been lost through historical clearing and is at continued risk of inadvertent losses as the precise site of many subpopulations is unknown. The species is also cryptic, avoiding detection as it tends to flower and be identifiable infrequently, often only flowering in response to disturbance such as fire. The most important needs of the species are to prevent the destruction and degradation of known and potential habitat, and to promote recruitment through burning and/or slashing habitat

IDENTIFICATION AND ECOLOGY

Caladenia caudata belongs to the large-flowered section of the genus *Caladenia*, sometimes included in the genus *Arachnorchis* (Jones et al. 2001) or *Calonemorchis* (Szlachetko 2001), the latter nomenclature receiving little acceptance (Hopper & Brown 2004). Spider-orchids generally have large flowers with long tapered or filamentous segments. They are often pollinated by male thynnine wasps that attempt to mate with the labellum (Plate 2). The wasps are attracted by scents resembling pheromones of the female wasps. These scents are produced in glands on the flowers.

Caladenia caudata reproduces from seed in association with mycorrhizal fungi. 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. Above-ground parts may be destroyed by grazing, drought-stress and fire. Even so, plants can survive into subsequent years because of the presence of the tubers (Jones et al. 1999). However, plants may die if conditions remain unsuitable for successive years and they are unable to emerge and replenish their tubers, for example, if the vegetation becomes overgrown or during periods of prolonged drought.

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). Fire frequency in areas where *Caladenia caudata* occurs is moderate to high (Jones et al. 1999), and flowering is enhanced by summer fires (Jones 2006). For example, in the Beechford area, a broad-scale high intensity summer wildfire stimulated the flowering of 100s of individuals of *Caladenia caudata* in the following 3 years but virtually no flowers were seen after this time. However, the species is known to flower relatively regularly at some sites in the absence of disturbance.

Plate 2. Thynnine wasp on flower of *Caladenia caudata* at Waverley Flora Park (image by H. & A. Wapstra)

The taxonomy of *Caladenia caudata* requires resolution. Orchid enthusiasts and specialists

have been long aware of the differences in southern and northern subpopulations in terms of flowering time (later in the north), flower colour (deeper red in the north), number of flowers (1 to 3, often 2 but up to 4, in the north; usually 1, rarely 2, in the south), and various other differences. Subpopulations from the north have been informally referred to as *Caladenia* aff. *reticulata*, *Caladenia reticulata* being a mainland species.

Survey techniques

The flowers are used to identify *Caladenia caudata* though the flowering time of the species is somewhat complex (Wapstra et al. 2010, 2012). In southern Tasmania (e.g. as at Waverley Flora Park), the species can flower as early as mid-August with most flowering complete by end September. However, at other southern sites (e.g. Ridgeway and Coningham), flowering starts in late September. In northern Tasmania, the peak in flowering occurs in mid to late October (e.g, Railton area) but can be as late as mid to late November (e.g. East Tamar, Beechford area). Detection of this species is likely to be most successful when flowers are fully open. They are rarely present for more than a week or so but the finished flowers are also distinctive, allowing the window of survey opportunity to be extended for 1 to 2 weeks, depending on seasonal and local conditions.

Description

Plants of *Caladenia caudata* are 8 to 15 cm tall, with a densely hairy scape bearing 1 to 4 flowers. The densely hairy leaf is broadly linear, 10 to 16 cm long and 7 to 10 mm wide, with a reddish purple base. Flowers are 40 to 50 mm across, usually pinkish to reddish, but sometimes paler and fawn. The perianth segments (petals and sepals) are usually darker and heavily glandular towards the tips. They are oblong-lanceolate to obovate-lanceolate in the basal quarter to half, then tapered. The dorsal (upper) sepal is 50 to 60 mm long and 2.5 mm wide, and incurved over the column. The lateral (lowermost) sepals are 35 to 45 mm long and 3.5 mm wide, divergent, and the tips slightly drooping. The labellum is cream to red with a reddish black apex. It is cordate, 15 to 18 mm long and 8 to 10 mm wide, with lateral lobes that are prominent, erect or spreading, with 7 to 9 pairs of narrow linear marginal teeth to 2 mm long. The mid-lobe of the labellum is sharply recurved with numerous short marginal teeth. The apex of the labellum is tailed, being long-acuminate to caudate, 4 to 10 mm long, and glandular. The calli of the lamina of the labellum are dark red and occur in 4 to 6 irregular rows extending to the base of the mid-lobe. The reddish column is 11 to 13 mm long and 5 to 6 mm wide, with 2 ovoid red-stalked yellow basal glands.

[description based on Nichols 1948, Jones 2006, Jones et al. 1999]

Confusing species

The distinction between *Caladenia caudata* and *Caladenia dienema* (both part of the *Caladenia patersonii* species-complex) is not clear. Historical records of *Caladenia caudata* from the Arthur-Pieman and Rocky Cape areas have been attributed to *Caladenia dienema*. It appears that *Caladenia caudata* can hybridise with other spider-orchids (e.g. in the Milford area), making the identification of individuals difficult.

DISTRIBUTION AND HABITAT

Caladenia caudata is endemic to Tasmania, where it is widespread but localised in coastal and near-coastal areas up to about 250 m elevation in the southeast, east, northeast (including islands of the Furneaux group) and north (Table 1, Figure 1). Records of the species from the Rocky Cape and Arthur River area (Jones 1998, Jones et al. 1999) are considered to represent *Caladenia dienema* and are not included in Table 1 or Figure 1.

Caladenia caudata occurs in heathy and grassy open eucalypt forest and woodland (Plates 3 & 4), often with sheoaks (*Allocasuarina* species), and heathland on sandy and loamy soils (Jones et al. 1999). The species is often found on sunny, north-facing, highly insolated sites. There does not seem to be an affinity for a particular substrate with sites on granite, sandstone and dolerite.

Plate 3. Habitat of *Caladenia caudata* at Waverley Flora Park (image by Mark Wapstra)

Plate 4. Habitat of *Caladenia caudata* at Henry Somerset Private Reserve (image by Mark Wapstra)

POPULATION PARAMETERS

Caladenia caudata is represented by over 40 subpopulations (Table 1), but there is very little information available on the size of most subpopulations, and many have not been recorded for several decades. While a small number of subpopulations are known to support a large number of individuals in the order of 100s, most are much smaller with usually fewer than 100 individuals and often fewer than 20. It is estimated that there are fewer than 10,000 mature individuals overall. As flowering is often stimulated by disturbance such as fire, one-off estimates of the number of flowers may not be a reliable indication of the size of subpopulations.

The extent of occurrence is about 34,800 km^2, with the linear extent about 363 km. The total area occupied by the species probably does not exceed 6 km^2, a likely overestimate as this figure is weighted heavily by the two largest subpopulations yet most subpopulations appear to occupy less than 0.05 km^2.

The widespread distribution of *Caladenia caudata*, combined with its apparent relative wide habitat preferences, suggests that the species will be detected at further sites. Discovery is likely to be serendipitous rather than as a result of targeted surveys because of the often highly localised occurrences and cryptic nature of the species. However, given the considerable survey effort of orchid enthusiasts for spider orchids, the likelihood of additional subpopulations of *Caladenia caudata* being discovered outside its known extent of occurrence is considered to be low.

RESERVATION STATUS

Caladenia caudata is known from Freycinet National Park, Coles Bay Conservation Area, Coningham Nature Recreation Area, Humbug Point Nature Recreation Area, Lime Bay State Reserve, Narawntapu National Park, South Arm Nature Recreation Area, Waterhouse Conservation Area, Foochow Conservation Area, and possibly Briggs Regional Reserve and Warrawee Forest Reserve.

CONSERVATION ASSESSMENT

Caladenia caudata was first listed as rare on schedules of the *Threatened Species Protection Act 1995* in 2001. The species was uplisted to vulnerable in 2007, meeting criterion C: total population estimated to number fewer than 10,000 mature individuals and a continuing decline, observed, projected or inferred in numbers of mature individuals, with no subpopulation estimated to contain more than 1,000 mature individuals.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Limited information on some subpopulations of *Caladenia caudata* makes it difficult to assess specific threats and develop management strategies. However, the threats to the species are similar to those faced by many threatened

orchid species with widespread and fragmented distributions and (usually) low population numbers. Risks to the species are exacerbated by the dependence on mycorrhizal fungi which may make the species susceptible to additional factors e.g. fertilisers.

Land clearing: Much of the preferred near-coastal habitat of *Caladenia caudata* is likely to have been lost through urban development and agriculture, especially in areas such as the greater Hobart region where the species now occurs in remnant patches of suitable habitat. Inadvertent loss of habitat is ongoing, due in large part to the cryptic nature of the species, often only emerging in the 2 or 3 seasons following fire, as well as imprecise location details for many recorded sites. The threat of conversion for timber plantation is no longer current.

Inappropriate disturbance: Orchid species such as *Caladenia caudata* may be out-competed as their heathy/grassy habitat becomes dense over time in the absence of disturbance such as fire. While the species possesses tubers, and might therefore be expected to persist in a dormant state during unfavourable conditions, the longer the period without flowering and fresh seed production, the less likely must be the long-term persistence of the species in an area (Jones et al. 1999). The flowering of *Caladenia caudata* is strongly enhanced by summer fires (Jones et al. 1999). Fire management in potential habitat for *Caladenia caudata* is usually directed towards preventing the type of high intensity broad-scale fires considered ideal to stimulate flowering. A more frequent lower intensity fuel reduction fire regime is unlikely to benefit the species and in the long term may reduce habitat quality. While many subpopulations have been recorded in formal reserves, a lack of active management suggests that the disturbance regime may not be appropriate for the persistence of the species in these areas in the long term.

Road maintenance works: Removal of topsoil in association with road maintenance works has the potential to eliminate roadside occurrences. For example recent road upgrading is reported to have eliminated the highly localised subpopulation at Mt Stewart near Lime Bay.

Weed invasion: Several subpopulations of *Caladenia caudata* (e.g. Waverley Flora Park, Henry Somerset, Parnella, Austins Ferry) occur in native forest and woodland presently supporting woody, herbaceous and grassy weed species. Without active management of weeds, especially after prolific seasonal growth due to good winter-spring rains, competition may significantly reduce the quality of habitat for the species. This is especially pronounced at Waverley Flora Park where slashing and burning of habitat was followed by a couple of years of prolific weedy grass growth.

Stochastic risk: The smaller highly localised subpopulations of *Caladenia caudata* would be subject to local extinctions by inadvertent or chance events.

Climate change: It is possible that even minor shifts in average seasonal conditions may have an adverse impact on *Caladenia caudata,* especially if other ecological factors such as an appropriate fire/disturbance regime are absent.

***Phytophthora cinnamomi*:** No subpopulations of *Caladenia caudata* are currently known to be affected by *Phytophthora cinnamomi* and there are no records of directs effects of the pathogen on orchids. However, activities at some sites (e.g. heathy woodlands in the Beechford, Freycinet and St Helens areas) have the potential to introduce and/or spread the pathogen further. This may affect the species indirectly through modification of habitat, especially in the understorey.

Forestry activities: Large areas of potential habitat of *Caladenia caudata* occur within potential wood production forests, although most sites suitable for the species are unlikely to be highly suitable for commercial forestry and are likely to be excluded informally from forestry operations.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the management of *Caladenia caudata* in Tasmania are to identify the precise location of recorded subpopulations through survey and to prevent the loss or degradation of known subpopulations.

What has been done?

Recovery planning: *Caladenia caudata* was formally included in the *Flora Recovery Plan: Threatened Tasmanian Orchids 2006–2010* (TSU 2006). It had been formally included in its own recovery plan (Ziegeler 1997a, b).

Management: The Henry Somerset Private Reserve is managed primarily for its orchid values. The subpopulation in a patch of urban bushland that had been used for recreational purposes at Austins Ferry was subject to active management in the early 2000s. Long-term protection of the subpopulation located was to be achieved through fencing, weed removal, raised community awareness, and the production of a management plan for the area.

Disturbance regime: Subpopulations within Freycinet National Park are included within planned burn units under existing fire management plans. The Waverley Flora Park site and the Henry Somerset Private Reserve have been subject to planned burns over the past decade. Some slashing has also been undertaken at the Waverley Flora Park site.

What is needed?

- identify the precise location of recorded sites and if found document their size, threats and management needs;
- where possible, undertake ecological burns at known sites where the vegetation has become overgrown;
- 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 of *Caladenia caudata*;
- develop management agreements with private landowners and public land managers, and ensure that current priorities for the species are incorporated into the Private Land Conservation Program's (DPIPWE) reservation strategies;
- incorporate the management requirements of the species into relevant reserve management plans and fire management plans;
- undertake extension surveys based on known sites, radiating out into potential habitat;
- undertake regular non-destructive demographic monitoring at a selection of known sites, including continuation of demographic monitoring being undertaken at the Henry Somerset Private Reserve near Railton by Wildcare's Threatened Plants Tasmania group;
- implement actions for the species in the threatened Tasmanian orchid Recovery Plan and update for the species in any revision of the plan;
- collect seed for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical.

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Prepared in August 2011 under the provisions of the Tasmanian *Threatened Species Protection Act 1995*. Approved by the Secretary and published in April 2014

Cite as: Threatened Species and Marine Section (2014). *Listing Statement for* Caladenia caudata *(tailed spider-orchid)*. Department of Primary Industries, Parks, Water and Environment, Tasmania.

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

Table 1. Population summary for *Caladenia caudata*

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of individuals
1a	Coningham – east of Shepherds Hill above Peartree Bay	Coningham Nature Recreation Area	South	Barnes Bay	1979	unknown	unknown
1b	Coningham – Snug Point	Coningham Nature Recreation Area	South	Barnes Bay	2013 (1996)	0.03	5 (8)
1c	Coningham – east of Coningham Beach	Coningham Nature Recreation Area	South	Barnes Bay	2009	0.0001	1
2	East of Dennes Point	private land	South	Barnes Bay	1938	unknown	unknown
3	Boronia Hill	Kingborough Council reserve	South	Taroona	2008 (1992)	0.1	5 (10)
4	Ridgeway	Hobart City Council reserve	South	Taroona	2009 (2003)	0.01	29
5	Mornington Hill (Waverley Flora Park)	Clarence City Council reserve	South	Hobart	2011 (1929)	c. 3	143
6	Pottery Road, Lenah Valley	unknown	South	Hobart	2013 1970	0.0001	1
7	Rosetta	unknown	South	Hobart	1956	unknown	unknown
8a	Austins Ferry	Private land/Glenorchy City Council	South	Richmond	2009 (1991)	unknown	20 (80-100)
8b	Austins Ferry/Claremont	unknown	South	Richmond	1971 (1953)	unknown	unknown
9	Limestone Hill (above Granton)	unknown	South	New Norfolk	1986	unknown	unknown
10a	Pittwater Bluff	private land?	South	Carlton	1984	unknown	small pop.
10b	Pittwater Road	private land	South	Carlton	2011 (1984)	1	c. 12
11a	Parnella Road, Park Beach	Clarence City Council reserve	South	Carlton	2009 (2007)	0.01	20
11b	China Tier (above Park Beach)	unknown	South	Carlton	1972	unknown	unknown
12	Goat Bluff	South Arm Nature Recreation Area	South	Blackmans Bay	1992	0.0001	1
13	Mt Stewart, near Lime Bay	Lime Bay State Reserve	South	Cremorne	1994	0.01	3
14	Devils Backbone	private land	South	Bains	1980	unknown	unknown
15	Schouten Island	Freycinet National Park	South	Schouten	1970	unknown	unknown
16a	Freycinet Peninsula, Saltwater Creek	Coles Bay Conservation Area	South	Coles Bay	1970	unknown	unknown
16b	Freycinet Peninsula, behind Muirs Beach	Coles Bay Conservation Area	South	Coles Bay	1996 (1992)	unknown	unknown
16c	Freycinet Peninsula, opposite old caravan park	Coles Bay Conservation Area	South	Coles Bay	1990	unknown	unknown

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of individuals
17	Butlers Point	private land	South	Lodi	1980	unknown	unknown
18	Round Top, south of Bicheno	Freycinet National Park	South	Lodi or Bicheno	1988	unknown	unknown
19	Whalers Lookout, Bicheno	public reserve	South	Bicheno	1988	unknown	unknown
20	Waubs Bay, Bicheno	unknown	South	Bicheno	1988	unknown	unknown
21	Hunters Marsh, S of Apsley River	State forest*	South	Henry	1972	unknown	unknown
22	Chain of Lagoons	private land	North	Piccaninny	1988 (1980)	unknown	1
23	Elephant Pass Road	private land	North	Piccaninny	1992	unknown	3
24	St Helens	Unknown	North	St Helens	1974	unknown	1
25	Humbug Point	Humbug Point Nature Recreation Area	North	Binalong	1985	unknown	unknown
26	Humbug Hill	Humbug Point Nature Recreation Area	North	Binalong	1992 (1985)	unknown	20
27	Gladstone Road area	unknown	North	Lanka	1970s	unknown	unknown
28	Waterhouse Road, Hardwickes Creek area	unknown	North	Monarch	1974	unknown	unknown
29	Tomahawk Recreation Ground	Council?	North	Tomahawk	2007	0.01	3
30	Waterhouse Point	Waterhouse Conservation Area	North	Waterhouse	1991	unknown	unknown
31	Old Waterhouse Road	private land?	North	Oxberry	1992	unknown	unknown
32	Clarke Island	Aboriginal Land Council Of Tasmania	North	Preservation	1994 (1970)	unknown	two colonies
33a	Cape Barren Island (eastern side of Big Hill Runs gully)	unknown	North	Anderson	2007	10 x 5 m	c. 24
33b	Cape Barren Island (SW slope Big Hill)	unknown	North	Anderson	2007	11 x 6 m	20
33c	Cape Barren Island (ridge N Ariel Gully)	unknown	North	Anderson	2009	2 x 8 m	14
33d	Cape Barren Island	Aboriginal Land Council Of Tasmania	North	unknown	1923	unknown	unknown
34	Flinders Island	Foochow Conservation Area	North	Wingaroo	2003 (1946)	unknown	unknown
35a	Bellingham	Crown land*	North	Weymouth	2008 (1982)	unknown	50+ 2 colonies
35b	Bellingham Road	private land	North	Weymouth	2009	0.001	1
36	Lulworth	unallocated Crown land	North	Tam O'Shanter	1992 (1974)	unknown	unknown
37	Beechford	private land	North	Low Head	2004 (1994)	400–500	200+

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of individuals
38a	East Tamar Highway, Williams Creek	private land	North	Bell Bay	2010 (2008)	0.001	2
38b	East Tamar Highway	unknown	North	Bell Bay	1961	unknown	unknown
39a	Prossers Forest (east)	private land	North	Dilston	1988	unknown	10
39b	Prossers Forest (west)	private land	North	Dilston	1990	unknown	unknown
40	Clarence Point	unknown	North	Bell Bay	1982	unknown	unknown
41	Greens Beach Road	Beaconsfield Council	North	Low Head	1992 (1986)	unknown	30
42a	Badger Head Road – south of road	State forest*?	North	Port Sorell	1975	unknown	unknown
42b	Badger Head Road – west of road	Briggs Regional Reserve?	North	Port Sorell	1970	unknown	unknown
42c	Badger Head Road – north of road	private land	North	Port Sorell	1980	0.8	50
43	Archers Knob	Narawntapu National Park	Cradle Coast	Port Sorell	1980	unknown	6
44	Sheepwash Hills	State forest*	Cradle Coast	Harford	1990	unknown	unknown
45	Harford	private land?	Cradle Coast	Harford	1932	unknown	unknown
46	Dinsdales Hill	Warrawee Forest Reserve	Cradle Coast	Latrobe	1975	unknown	unknown
47	Latrobe Road	Henry Somerset Private Reserve	Cradle Coast	Latrobe	2010 (1980)	75–80	c. 1000
48	Dulverton Hill	private land	Cradle Coast	Raillton	1994	unknown	unknown

NRM region = Natural Resource Management region
* proposed for reservation under the *Tasmanian Forests Agreement 2013*