

Caladenia dienema

windswept spider-orchid

TASMANIAN THREATENED SPECIES LISTING STATEMENT



Image by Mark Wapstra

- Scientific name:** *Caladenia dienema* D.L. Jones, *Austral. Orchid Res.* 3: 28 (1998)
- Common name:** windswept spider-orchid (Wapstra et al. 2005)
- Group:** vascular plant, monocotyledon, family **Orchidaceae**
- Name history:** *Calonemorchis dienema* (Szlachetko 2001),
Arachnorchis dienema (Jones et al. 2001), see Hopper & Brown (2004)
- 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**

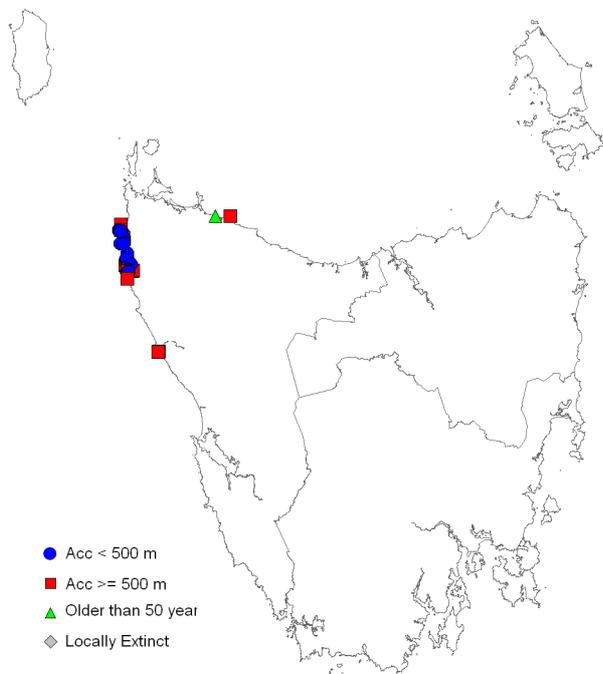


Figure 1. Distribution of *Caladenia dienema*



Plate 1. *Caladenia dienema*
(image by Mark Wapstra)

IDENTIFICATION AND ECOLOGY

Caladenia dienema is a perennating herb belonging to the large-flowered section of the genus *Caladenia*, sometimes included in the genus *Arachnorchis* literally meaning “spider-orchid” (Jones et al. 2001). 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. The wasps are attracted by scents resembling pheromones of the female wasps. These scents are produced in glands on the flowers.

All *Caladenia* species are deciduous and die back after flowering to small subterranean tubers enclosed by a fibrous sheath or tunic. Plants have a single narrow basal leaf that appears above ground in late autumn or early winter following rains. The flowers have a labellum (lip) which is hinged at the base and bears rows of conspicuous, variously shaped and coloured calli on the upper surface. The labellum margins often also bear calli or may be deeply lobed or toothed. Members of this genus have hairs on most above-ground organs.

Caladenia dienema reproduces from seed in association with mycorrhizal fungi. Plants may not flower every year, though when they do, they flower for a short period of the year (in the order of weeks) before being fertilised and withering. Above-ground parts are perhaps detectable for 1 to 3 months and may be destroyed by grazing (by native marsupials, or stock, if present), drought-stress (in periods of extreme drought only) and fire (wildfire). Even so, plants can survive into subsequent years because of the presence of underground tubers (Jones et al. 1999). However, tubers may wither and die if conditions remain unsuitable for successive years and plants 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). The habitat of *Caladenia dienema* is fire-prone and subject to relatively frequent fires to which the species

appears to respond with prolific flowering in the first few years after the fire event, especially summer fires.

Survey techniques

The flowers are used to identify *Caladenia dienema*. The flowering period was thought to consistently be late October to early November (Wapstra et al. 2008), the consistency probably due to the relatively consistent west coast climate. However, more recent surveys (e.g. ECOtas 2009) reported flowering in mid September suggesting that October may be the most suitable time for survey, depending on seasonal conditions and time since a disturbance event that promotes flowering.

Description

Caladenia dienema plants are 5 to 16 cm tall, occasionally taller in denser undergrowth. They have a wiry and densely hairy stem bearing 1 to 2 flowers. The leaf is narrowly lanceolate, densely hairy, with a purple-blotched base, and is 4 to 9 cm long and 3 to 7 mm wide. Flowers are about 60 to 90 mm across. They are variably coloured including shades of yellow (including almost white forms), red (from pale reds to deep reds) and purple, with darker red lines and black caudae on all segments. The labellum is wholly maroon, or white to cream, usually with a maroon apex, the calli dark reddish purple. The perianth segments are oblong-lanceolate to obovate-lanceolate in the basal quarter to half, and then tapered. The sepals are 40 to 60 mm long and 3.5 mm wide. The dorsal (upper) sepal is held erect and the lateral (lowermost) sepals are divergent, and stiffly obliquely deflexed to drooping. The petals are 35 to 60 mm long and 4 mm wide, obliquely deflexed to drooping. The labellum is ovate-lanceolate, 13 to 20 mm long and 7 to 11 mm wide, with lateral lobes held erect with 13 to 18 pairs of linear, white-tipped marginal teeth to 2 mm long. The mid-lobe of the labellum is triangular with very short, blunt marginal teeth, these becoming fused towards the apex. The lamina calli are in 4 to 6 rows extending to the base of the mid-lobe. The column is translucent with reddish markings, 12 to 14 mm long and 6.5 mm wide, with 2 ovoid-obovoid yellow basal glands.

[description from Jones 1998, Jones 2006, Jones et al. 1999. Note that the original description of the species indicated that flowers were solitary but recent surveys detected numerous 2-flowered individuals.]

Confusing species

Caladenia dienema is part of the confusing *Caladenia patersonii* species-complex. It is most similar to *Caladenia patersonii* with which it allegedly co-occurs and has undoubtedly been confused with in the past (Jones 1998). *Caladenia dienema* can be distinguished by its short sturdy habit, dark usually reddish flowers, drooping perianth segments, and thick, densely glandular blackish tepalline caudae (Jones 1998). The similar *Caladenia anthracina* has small flowers (45 to 65 mm across) and stiffly spreading segments with slender caudae (Jones 1998), and occurs in different habitat in a different part of the State, being restricted to grassy woodland in the Midlands (Jones et al. 1999). The historical records of *Caladenia caudata* from the Arthur-Pieman and Rocky Cape areas probably represent *Caladenia dienema*, indicative of a similarity between the species.



Plate 2. Typical habitat of *Caladenia dienema* near Rebecca Lagoon, showing rock exposures amongst wind-pruned coastal scrub (image by Mark Wapstra)

DISTRIBUTION AND HABITAT

Caladenia dienema is endemic to northwestern and western Tasmania, occurring in a near-coastal lowland strip from Pieman Heads to near Rocky Cape (Jones et al. 1999), although the core part of its range is in the Temma to Marrawah region (Figure 1, Table 1). The linear

range of the species is about 104 km, extent of occurrence about 3582 km² and area of occupancy of less than 10 ha. Excluding the historical sites at Rocky Cape and east of Stanley, from where the species has not been recorded for several decades, the linear range is 90 km and the extent of occurrence 345 km².

Caladenia dienema occurs in windswept low heathland among dwarfed shrubs and sedges on moist to well-drained sandy and clay loam (Jones et al. 1999). Rocky outcrops and rocky open heathy woodland are strongly associated with many occurrences of the species (ECOTas 2009) but it can extend into shrubby forests, usually dominated by *Eucalyptus obliqua*.

POPULATION ESTIMATE

The total population of *Caladenia dienema* is estimated at fewer than 250 mature individuals. Most subpopulations are represented by fewer than 20 mature individuals, which usually occur as scattered plants over a relatively small area. Locally high numbers at some sites in certain years (e.g. over 100 plants in the Rebecca Creek area in 2008) suggests some fluctuations in the total population size, although estimates of the total population in any one year have never exceeded 250.

While the species appears to have a naturally patchy distribution along the State's west coast, the presence of about 16 subpopulations spread over about 90 km, and its historical recording from the north coast, indicates a potentially much wider distribution including the whole of the northwestern tip of the State. Potential habitat (i.e. coastal heathland within 1 km of the coastline) is widespread on the west coast (Harris & Kitchener 2005), although much of the coastline remains inaccessible. There is less potential habitat remaining on the north coast primarily due to agricultural clearing and urban development. The record of the species from the Conical Rocks Point area (about 54 km south of the next nearest record), a relatively infrequently visited area, raises the possibility that more colonies remain to be found. However, despite this possibility, several targeted surveys have failed to significantly alter the range of the species.

Table 1. Population summary for *Caladenia dienema*

	Subpopulation	Tenure	NRM region	1:25 000 mapsheet	Year last (first) seen	Area of occupancy (ha)	Number of plants
1	Green Point	private property	Cradle Coast	Marawah	2001	unknown	“locally frequent”
2	Nettley Bay	West Point State Reserve	Cradle Coast	Marawah	1994	unknown	unknown
3	West Point Road	West Point State Reserve, Arthur-Pieman Conservation Area	Cradle Coast	Marawah	2008 (1988)	each patch about 0.1 ha (over 25 ha)	30–50
4	South Downs	Arthur-Pieman Conservation Area, Crown land	Cradle Coast	Marawah	1995	unknown	unknown
5	Black Bull Scrub	Arthur-Pieman Conservation Area, Crown land	Cradle Coast	Marawah	1997 (1982)	0.01 (1994)	2 (1994)
6	Near Callaghans Scrub, Bluff Hill Road junction	Arthur-Pieman Conservation Area, Crown land	Cradle Coast	Bluff	2009 (1997)	each patch about 0.1 ha (over 11 ha)	“several” (2009) 2 (2008)
7	Bluff Hill, 1 km east	Arthur-Pieman Conservation Area	Cradle Coast	Bluff	2008	each patch <0.001 ha (over 0.5 ha)	3
8	Temma Road near Alert Creek	Arthur-Pieman Conservation Area	Cradle Coast	Bluff	2008		7
9	Bottle Creek – Bottle Flat – Little Sundown River	Arthur-Pieman Conservation Area	Cradle Coast	Sundown	2008 (1988)	6 sites over c. 72 ha but each patch <0.1 ha	<10
10	Nelson River area	Arthur-Pieman Conservation Area	Cradle Coast	Sundown	2008 (1989)	4 sites 0.02	<20
11	Temma Road near Heemskirk and Couta Rocks Road	Arthur-Pieman Conservation Area	Cradle Coast	Temma	2010 (2007)	3 sites	15
12	Heemskirk Road	Arthur-Pieman Conservation Area	Cradle Coast	Temma	1994 (1990)	unknown	unknown
13	Rebecca Creek area	Arthur-Pieman Conservation Area	Cradle Coast	Temma	2009 (1988)	35 records over 36 ha, each patch <0.1 ha	100+ (2008)
14	Temma	unallocated Crown land	Cradle Coast	Temma	1982	unknown	unknown
15	Behind Conical Rocks Point	unallocated Crown land	Cradle Coast	Hardwicke	1983	unknown	unknown
16	Between Detention and Black River	unknown	Cradle Coast	Rocky Cape	1841	unknown	unknown
17 ¹	Rocky Cape	unknown	Cradle Coast	Rocky Cape	1974	unknown	unknown

¹This subpopulation was originally recorded as *Caladenia caudata* but has been re-determined as more likely to be *Caladenia dienema*, based on the distribution of the two species

RESERVATION STATUS

Caladenia dienema occurs within the West Point State Reserve, the Arthur-Pieman Conservation Area, and on parcels of Crown land recommended as reserves (CLAC 2005). The unconfirmed Rocky Cape record is possibly from within Rocky Cape National Park.

CONSERVATION STATUS

Caladenia dienema was originally listed in 2001 as vulnerable on schedules of the Tasmanian *Threatened Species Protection Act 1995*. It was up-listed to endangered in early 2008, meeting the following criteria: (C) total population estimated to number fewer than 2,500 mature individuals with no subpopulation with more than 250 individuals, and a continuing decline inferred in the area, extent and/or quality of habitat; and (D) total population estimated to number fewer than 250 mature individuals.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Historically, the key threat to *Caladenia dienema* has probably been clearance of habitat in the near-coastal parts of the west and northwest coasts. More recently, the key threat is likely to be an inappropriate disturbance regime, in particular an inappropriate fire regime, resulting in changes to vegetation supporting the species. Specific threats to some sites cannot be ascertained due to imprecise locality details.

Land clearance: Much of the coastal heathland habitat of *Caladenia dienema* on the north coast of mainland Tasmania has been destroyed or degraded by agricultural and coastal development. Land clearing for pasture development on private property in the northwest, where undiscovered subpopulations may occur, is an ongoing threat. Few sites on private property are known, possibly reflecting survey bias rather than genuine absence. The Temma subpopulation, now possibly extinct, is known from a single imprecise 1982 record that falls within an area now excluded from the Arthur-Pieman Conservation Area because of the presence of private shacks (PWS 2002).

Development on public land: Many subpopulations of *Caladenia dienema* are within

the Arthur-Pieman Conservation Area. A management plan for the conservation area (PWS 2002) identifies the potential for various commercial and recreational activities to either continue or be further developed. These include wind electricity generation, mineral prospecting and camping. Similar commercial activities are also likely to be undertaken in the vicinity of subpopulations outside the Arthur-Pieman Conservation Area. Without appropriate mitigation measures, any of these activities have the potential to impact on subpopulations at a localised scale.

Inappropriate fire regime: Most sites supporting the species have been subject to summer wildfires and/or controlled fuel reduction burns suggesting that *Caladenia dienema* responds to fire and the species appears to flower in greater abundance at sites subject to higher intensity summer fires (ECOTas 2009). The often low subpopulation numbers (generally scattered individuals) may be indicative of an inappropriate fire regime, which may become a problem within the Arthur-Pieman Conservation Area as fire is being used less frequently as a management tool. The more controlled broadscale ecological burns conducted in autumn may be unsuitable for maintaining ideal conditions for *Caladenia dienema*. The species does occur in sites that are long unburnt suggesting that fire is not critical for the species, though in less exposed sites, the species may become extinct due to atrophy of the tubers if the vegetation is allowed to thicken and remain undisturbed for many years.

Recreational activities: Many subpopulations lie within the Arthur-Pieman Conservation Area. A management plan for the conservation area (PWS 2002) identifies the potential for various recreational activities to either continue or be further developed. These include camping, horse riding, recreational driving, hunting, angling and bushwalking. Similar recreational activities are also likely to be undertaken in the vicinity of subpopulations outside the Arthur-Pieman Conservation Area. If not appropriately managed, any of these activities have the potential to impact on subpopulations at a localised scale.

Cattle agistment: The Arthur-Pieman Conservation Area is subject to cattle grazing

(through agistment licences). This activity has the potential to impact on subpopulations at a local scale through direct grazing, trampling, damage to the soil and plants from vehicles, enrichment of the soil from cow pats (disrupting mycorrhizal fungal associations) and possible shifting of the understorey to include competitive weeds and pasture grasses. This is especially prevalent in the subpopulation immediately south of Rebecca Creek bridge near a cattle loading yard where there has been damage by trampling and tractors.

Phytophthora cinnamomi: No subpopulations of *Caladenia dienema* are currently affected by *Phytophthora cinnamomi* and there are no records of direct effects of the pathogen on orchids. However, activities at some sites, especially recreational activities such as 4 wheel driving within the Arthur-Pieman Conservation Area, have the potential to introduce and/or spread the pathogen further through the conservation area (PWS 2000). This may affect the species indirectly through modification of habitat, especially the understorey.

Stochastic risk: With fewer than 250 mature individuals from fewer than 20 subpopulations and most individuals in 3 subpopulations, as well as a naturally patchy distribution, the species is in consequence considered to be at risk from extinction due to chance events.

MANAGEMENT STRATEGY

What has been done?

Recovery planning: *Caladenia dienema* was included in the *Flora Recovery Plan: Tasmanian Threatened Orchids 2006–2010* (TSU 2006) with a high priority for further survey effort, baseline surveys for important subpopulations and site management guidelines noted.

Targeted surveys and monitoring: Extension surveys were undertaken in October/November 2008 between Marrawah and Temma, mainly on public land (ECOtas 2009), resulting in minor range infillings. The area around the Conical Rocks Point subpopulation was assessed in November 2008, with no plants detected. Potential habitat in the northern part of the Arthur-Pieman Conservation Area was

assessed in November 2007 with 7 new sites detected. Potential habitat in the southern part of the Arthur-Pieman Conservation Area to the mouth of the Pieman River was assessed (when assessing 4 wheel drive tracks) during November 2006, though no plants were detected. The species has also been surveyed informally by orchid enthusiasts, resulting in minor range extensions, infillings and a better understanding of the impact of controlled burning.

Management planning: The management plan for the Arthur-Pieman Conservation Area (PWS 2002) specifically identified the need for ecological burning to manage biological values. A subsequent fire management plan (PWS 2003) identifies several ecological burn units, several of which include subpopulations of *Caladenia dienema*.

Management objectives

The main objectives for the management of *Caladenia dienema* are to maintain the viability of known subpopulations, to promote conditions for its successful recruitment and to increase the known distribution and population size through survey.

What is needed?

- undertake extension surveys, especially in the 54 km gap in contemporary distribution between Conical Rocks Point and Temma, and the historical distribution area from Marrawah to the Rocky Cape area;
- monitor selected subpopulations to determine the response of the species to ecological burns and unplanned wildfires;
- implement the fire management plan for the Arthur-Pieman Conservation Area (PWS 2003) and use the results from demographic monitoring to inform any revision of the plan;
- support the Private Land Conservation Program (DPIPWE) with the establishment of conservation covenants for private land supporting *Caladenia dienema*, and ensure that current priorities for the species are incorporated into the program's reservation strategies;

- 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;
- 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
- Contact details:** Threatened Species Section, Department of Primary Industries, Parks, Water and Environment, GPO Box 44, Hobart, Tasmania, Australia, 7001. Phone (03) 6233 6556; fax (03) 6233 3477.
- Permit:** It is an offence to collect, disturb, damage or destroy this species unless under permit.