

Reinstatement of *Caladenia alpina* R.S.Rogers (Orchidaceae) as distinct from *Caladenia lyallii* Hook.f. and the description of *Caladenia cracens*, a related new species from southern Tasmania

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ABSTRACT

Caladenia alpina R.S.Rogers, from mainland south-eastern Australia and Tasmania, is found to be distinct from *C. lyallii* Hook.f. which is endemic to New Zealand. Descriptions are provided for both of these species and a related species, *C. cracens*, from southern Tasmania is described as new. All species are illustrated and a key to the complex is provided.

Introduction

Caladenia lyallii Hook.f. was described in 1853 from material collected in Otago, New Zealand. A common Australian taxon which is widespread in subalpine regions, *C. alpina* R.S.Rogers, was described in 1927 from material collected in north-eastern Victoria (Mts Bogong, Hotham and the Baw Baws) and Mt Kosciusko in south-eastern New South Wales (Rogers 1927). *Caladenia alpina* was reduced to synonymy under *C. lyallii* by Rupp & Hatch (1945) and this decision has gained general acceptance (Firth 1965, Gray 1966, Rupp 1969, Nicholls 1969, Willis 1970, Burbidge & Gray 1970, Curtis 1979, Jones 1988, Clements 1989). Rupp and Hatch did not detail their methods of investigation nor did they provide evidence to support their conclusion which was that the two species were 'entirely identical except for such slight and unimportant variation as occurs in all plant species' (Rupp & Hatch 1945). This conclusion is investigated in the light of new observations on these orchids.

Methods

This study is based on the morphological examination of fresh flowers collected from localities in Australia, a comparison of living plants of all taxa cultivated in the collection of the Australian National Botanic Gardens, examination of dissected flowers mounted on cards, also dried and spirit-preserved herbarium specimens and photographs of living flowers of all of the taxa involved. Herbarium collections (spirit and dried) were examined from AD, AK, CANB, HO, MEL and WELT. Type specimens of *Caladenia alpina* and photographs of the type of *C. lyallii* (*vide* M.Clements) have been examined. Measurements given in descriptions are from living plants or dissected flowers on cards. Notes on distribution, habitat (particularly soil and plant association) and conservation status of the Australian species were derived from my own field studies; those of *C. lyallii* from discussion with Brian Molloy, references and herbarium labels.

Discussion

During field studies in mainland south-eastern Australia and Tasmania, the author became well acquainted with the habit and morphology of the common montane and subalpine orchid known in Australia as *Caladenia lyallii*. When an unidentified slender taxon was discovered in lowland areas of southern Tasmania, it became necessary to compare specimens of this species with *C. lyallii sensu stricto* and *C. alpina* (see

Methods section for details). This study showed that the species from southern Tasmania was undescribed. It also revealed morphological differences (obvious in fresh flowers) in the labellum and column between *C. lyallii* and *C. alpina*. Thus it became apparent to the author that *C. alpina* is distinct from *C. lyallii* and needs to be reinstated. Also *C. lyallii* is endemic to New Zealand. Because the identity of these latter two taxa has been confused, both are here provided with fuller descriptions. The slender species from lowland areas of southern Tasmania is described as new.

Characters that link all three taxa and distinguish them from superficially similar taxa such as *C. gracilis* R.Br. are:

- an obovate dorsal sepal;
- a broad distinctly trilobate labellum which is usually heavily barred with red;
- the lamina calli in 2 to 6 irregular rows extending nearly to the apex of the labellum;
- the calli in the proximal two-thirds prominently stalked, uniformly shaped and regularly arranged whereas those on the mid-lobe are sessile, very irregularly arranged and variously shaped.

Taxonomic treatment

KEY TO SPECIES OF THE *CALADENIA LYALLII* COMPLEX

- 1 Marginal calli on labellum mid-lobe sessile 1. *Caladenia lyallii*
- 1: Marginal calli on labellum mid-lobe stalked 2
- 2 Leaf narrowly linear, 3 mm wide or less, scape single-flowered, lamina calli with small heads and very narrow stalks 3. *Caladenia cracens*
- 2: Leaf linear-oblong to linear-lanceolate, 7 mm wide or more, scape 1-4-flowered, lamina calli with large heads and thick stalks 2. *Caladenia alpina*

1. *Caladenia lyallii* Hook.f., *Fl. nov-zeel.* 1:247 (1853). TYPE: on grassy hills, Otago, New Zealand, Dec. 1850, *Lyall s.n.* (HOLOTYPE: K photo, *fide* M.Clements; ISOTYPES: K, K-L microfiche).

Illustrations: Moore and Edgar, *Flora of New Zealand*, vol. 2, fig. 22 (1970); Mark & Adams, *New Zealand Alpine Plants*, plate 228 (1973); Johns and Molloy, *Native Orchids of New Zealand*, plate 10 (1983); St George, *Wild Orchids in the far South of New Zealand*, 18-19 (1992)

Tuberous, terrestrial herb growing singly or in loose groups. *Leaf* linear-lanceolate, 6-20 cm long, 1-6 mm wide, dark green, green or reddish at the base, hirsute with patent glandular and eglandular trichomes, 0.5-1 mm long. *Inflorescence* 5-25 cm tall, slender to moderately stout, green or reddish at the base, with patent glandular and eglandular trichomes as on the leaf. *Sterile bracts* ovate-lanceolate, 12-16 mm long, 5-7 mm wide, closely sheathing, externally hirsute with short, glandular hairs. *Fertile bracts* ovate-lanceolate, 9-17 mm long, 5-6 mm wide, closely sheathing, externally hirsute with short, glandular hairs. *Flowers* 1-2(-3), 2.2-2.8 cm across, white, pale yellow or pink inside, externally white or pale brownish-pink, sparsely glandular, with a sweet odour; dorsal sepal incurved and cucullate over the column and labellum, lateral sepals porrect or deflexed, divergent, petals spreading widely, curving forwards in distal half. *Dorsal sepal* broadly ovate-elliptical to obovate, 9-15 mm long, 4-6 mm wide, internally glabrous, externally hirsute with sessile and stalked glandular trichomes, apex obtuse. *Lateral sepals* asymmetrically lanceolate, 10-16 mm long, 4-6 mm wide, slightly falcate, internally glabrous, externally as for the dorsal sepal, apex acute to acuminate. *Petals* asymmetrically lanceolate, 9-15 mm long, 3-5 mm wide, falcate, internally glabrous, externally sparsely glandular, apex acuminate. *Labellum* hinged at the base, white, usually with prominent, narrow, red transverse bars, sometimes wholly white, apex white or pale yellow, distinctly trilobate. *Lamina* broadly oblong-elliptical in out-

line when flattened, 7-9 mm long, 5-7 mm wide, porrect or slightly erect in proximal quarter, then shallowly curved forwards, apex recurved; lateral lobes c. 2.5 mm wide, erect and column-embracing, anterior margins hardly rounded, slightly irregular, distal margins with several, irregular, short teeth; mid-lobe c. 3.2 mm long, narrowly deltate, margins yellow with 4-7 pairs of sessile, irregular marginal calli near the base (rarely one pair stalked) decrescent to the apex of the mid-lobe. *Lamina calli* in 2-4 (rarely 6) irregular rows, pale-yellow-headed, extending nearly to the apex of the mid-lobe; calli stalks becoming shorter towards labellum apex, those on the mid-lobe sessile; basal calli 2 or 4, c. 1.2 mm long, head irregularly ovoid, stalk c. 0.4 mm long, much narrower than the head; longest lamina calli c. 1.1 mm long, golf-stick-shaped, stalk c. 0.4 mm long, white. *Column* 7-8 mm long, c. 2 mm wide, slightly recurved near the base, curved forwards in distal third, whitish with irregular red, transverse bars, narrowly winged, central ridge c. 0.7 mm wide. Anther c. 1.6 mm long, c. 1.2 mm wide, white to pinkish, densely papillate, with a short rostrum. *Pollinia* 4, c. 1.3 mm long, roughly boomerang-shaped, cream, flat, mealy. *Stigma* c. 1 mm wide, irregularly circular, sunken, green. *Capsules* obovoid, 10-14 mm long, 3-4.5 mm wide, with glandular trichomes. (Fig. 1)

FLOWERING PERIOD

November to February.

DISTRIBUTION AND HABITAT

Endemic to New Zealand where widely distributed in the North and South Islands, Auckland Island and Stewart Island; extending from near sea-level in the south to montane and subalpine regions in the north. It grows in beech forests, subalpine herb-field, *Dracophyllum* bog, manuka scrub and tussock grassland.

NOTES

Caladenia lyallii has a generally more slender habit than *C. alpina* with a narrower leaf (1-6 mm wide) and 1 or 2 (rarely 3) generally smaller flowers (2.2-2.8 cm across). Many herbarium specimens of *C. lyallii* from WELT and AK are 8 cm tall or less and have leaves about 1 mm wide. By contrast even the smallest specimens of *C. lyallii* from Australian herbaria are much more robust than this and with a minimum leaf width of 7 mm. Florally *C. lyallii* can be distinguished from *C. alpina* by its squarer or more angular nearly oblong lateral lobes on the labellum, narrower sharply tapered labellum mid-lobe, sessile marginal calli and narrower (c. 2 mm wide), non-tapered column. *Caladenia lyallii* can be distinguished from *C. cracens* by its broader lamina calli on thicker stalks and sessile marginal calli on the labellum mid-lobe.

TYPIFICATION

This species will be lectotypified in a forthcoming publication (Molloy, Clements and Jones in prep.).

CONSERVATION STATUS

Widespread, common and conserved.

SELECTED SPECIMENS (67 examined):

NEW ZEALAND: Lake Manapouri, Jan. 1940, *Simpson* (AK); Mt Cook, 1898, *Adams* (AK); Mt Peel, above Cobb Valley, Nelson, 12 Jan. 1961, *Hynes* (AK); Nelson: Tinline, ATNB, 4 Nov. 1990, *Jenks* (CHR); Silver Peaks, Dunedin, Otago, 2 Dec. 1990, *St George* (CHR); Burnt Hill, Canterbury Plains, 14 Nov. 1990, *Molloy* (CHR); Taupo, 29 Nov. 1990, *Gibbs* (CHR); Mt Stalker, near Herbert, Otago, 9 Dec. 1990, *St George* (CHR); Arthurs Pass, Canterbury, 4 Jan. 1991, *Molloy* (CHR); Sealey Range, 1890, *Suter* (WELT); Opepe, 14 Nov. 1978, *Oliver* (WELT); Pelukit Bay, 25 Nov. 1892, *Kirk* (WELT); Kirwan Hill, near Reefton, 23 Nov. 1950, *Ardley* (WELT).

2. *Caladenia alpina* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 51: 12 (1927). SYNTYPES: Victoria: Mount Hotham and Mount Bogong, Dec. 1921, Jan. 1924, *A.J. Tadgell*; Baw Baws, 3 Jan. 1925, *W.H. Nicholls*; New South Wales: Mount Kosciusko, Jan. 1924, *G.V. Scammell* (AD).

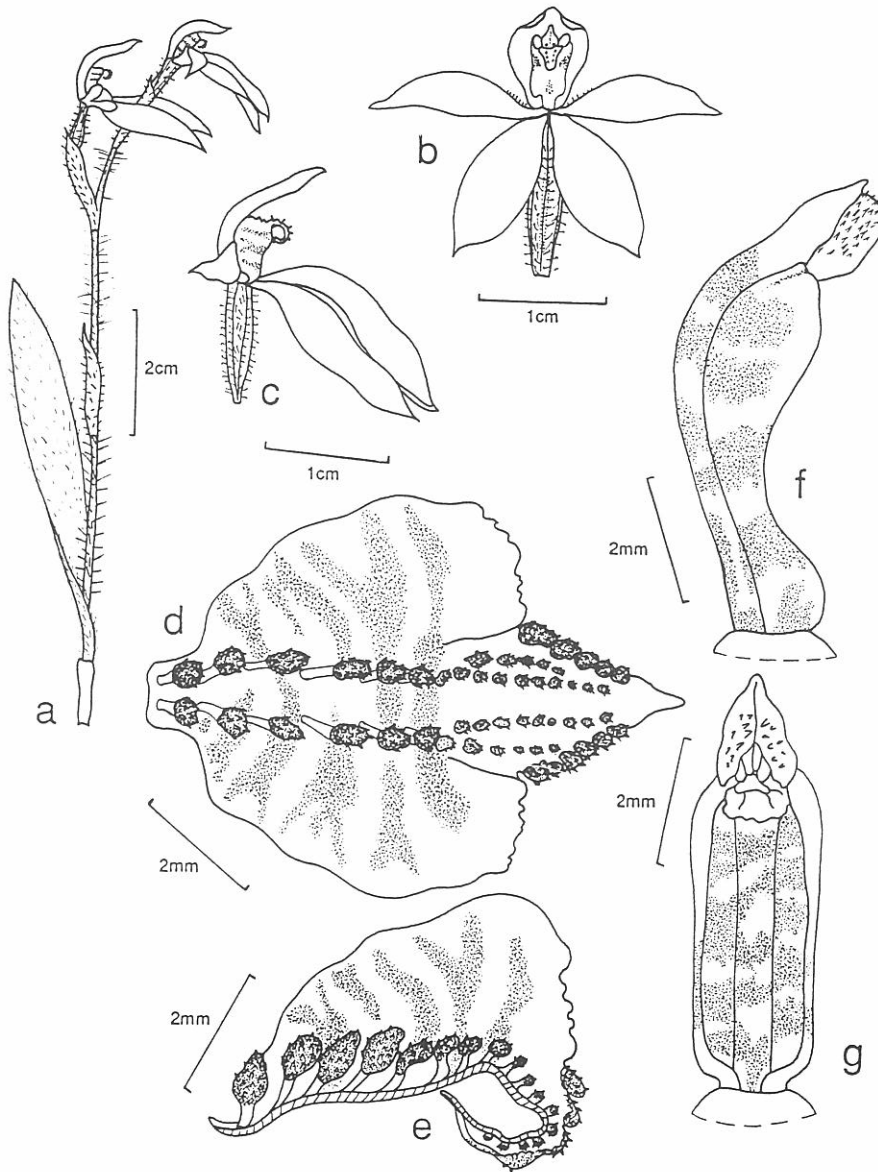


Fig. 1. *Caladenia lyallii* Hook.f. a - plant habit. b - flower from front. c - flower from side. d - labellum from above, flattened out. e - longitudinal section of labellum. f - column from side. g - column from front. All drawn from Molloy (CBG).

Illustrations: (all as *C. lyallii*) W.H. Nicholls, *Orchids of Australia*, complete ed., plate 226 (1969); C.E. Gray, *Victorian Native Orchids*, vol. 1, 12 (1966); E.R. Rotherham *et al.*, *Flowers & Plants of New South Wales & Southern Queensland*, plate 363 (1975); A.B. Costin *et al.*, *Kosciusko Alpine Flora*, plate 144 (1979); P. Bernhardt, In Hardin, *Flora of New South Wales* vol. 4, 205 (1993); T.J. Entwisle, In Walsh and Entwisle, *Flora of Victoria* vol. 2, fig. 152j-k (1994).

Tuberous terrestrial herb growing singly or in loose groups. *Leaf* linear-oblong to linear-lanceolate, erect, 12-22 cm long, 7-15 mm wide, dark green, red at the base, densely hirsute with patent glandular and eglandular trichomes 0.5-1 mm long. *Inflorescence* 15-30 cm tall, stout, reddish at the base, with patent glandular and eglandular trichomes as on the leaf. *Sterile bracts* ovate-lanceolate, 18-40 mm long, 8-12 mm wide, closely sheathing to spreading, externally hirsute with short, glandular hairs. *Fertile bracts* ovate-lanceolate, 5-15 mm long, 6-8 mm wide, closely sheathing, externally hirsute with short, glandular hairs. *Flowers* 1-4, 3-3.5 cm across, white inside, externally pinkish or sometimes dark red, sparsely to densely glandular, with a faint musky odour; dorsal sepal incurved and broadly cucullate over the column and labellum, lateral sepals porrect or slightly erect, parallel or slightly divergent, petals spreading widely, curving forwards in distal half. *Dorsal sepal* broadly obovate, 9-13 mm long, 5-8 mm wide, internally glabrous, externally hirsute with sessile and stalked glandular trichomes, apex obtuse to slightly apiculate. *Lateral sepals* asymmetrically oblanceolate, 9-15 mm long, 4-6 mm wide, slightly falcate, internally glabrous, externally as for the dorsal sepal, apex subacute. *Petals* asymmetrically lanceolate, 9-13 mm long, 3-5 mm wide, falcate, internally glabrous, externally sparsely glandular, apex acuminate. *Labellum* hinged at the base, white with prominent, narrow, red transverse bars, apex yellow, distinctly trilobate. *Lamina* broadly ovate-elliptical in outline when flattened, 5-8 mm long, 4-6.5 mm wide, erect in proximal third then curved forwards, apex recurved; lateral lobes c. 2.3 mm wide, erect and column-embracing, anterior margins rounded, slightly irregular, distal margins with 1-4 short, linear, somewhat irregular calli; mid-lobe c. 2.6 mm long, deltate, margins yellow, apex recurved with c. 3-5 pairs of stalked, linear, marginal calli near the base, decrescent, sessile and irregular to the apex of the mid-lobe. *Lamina calli* in 4-6 irregular rows, yellow-headed, extending nearly to the apex of the mid-lobe; calli stalks becoming shorter towards labellum apex, those on mid-lobe sessile; basal calli 4, c. 1.3 mm long, head irregularly ovoid, stalk c. 0.4 mm long, much narrower than head; longest lamina calli c. 1.2 mm long, golf-stick-shaped, stalk c. 0.5 mm long, white. *Column* 7-8 mm long, c. 2.8 mm wide, slightly recurved near the base, curved forwards in distal third, whitish with irregular, red transverse bars, narrowly winged, central ridge c. 1.5 mm wide. *Anther* c. 2 mm long, c. 1.6 mm wide, white to pink, densely papillate with a prominent rostrum. *Pollinia* 4, c. 1.2 mm long, roughly boomerang-shaped, cream, flat, mealy. *Stigma* c. 1.5 mm wide, more or less circular, sunken, green. *Capsules* ovoid to obovoid, 15-17 mm long, 6-7 mm wide, glandular. (Fig. 2)

FLOWERING PERIOD

November to February.

DISTRIBUTION AND HABITAT

South-eastern Australia, south from the Brindabella Ranges (A.C.T.) and Snowy Mountains in south-eastern New South Wales, eastern Victoria, south-western Victoria (isolated, disjunct western occurrences on high peaks in the Grampians) and Tasmania. It grows in higher montane and subalpine zones, particularly in snowgum woodland but also in subalpine herbfield and on the margins of small streams and bogs.

TYPIFICATION

Clements (1989) chose the following specimen in AD as a lectotype: Mt Feathertop, Dec. 1921, *A. J. Tadgell in herb. R. Rogers 2106*. This collection was not listed in the protologue by Rogers and a new lectotype is chosen here. Victoria. Mount Hotham and Mount Bogong, Dec. 1921, Jan. 1924, *A.J. Tadgell* (LECTOTYPE: **here chosen**, AD).

NOTES

Caladenia alpina has been included with *C. lyallii* since the treatment by Rupp and Hatch (1945). *Caladenia alpina* has a generally more robust habit than *C. lyallii* with broader leaves (7-15 mm wide) and 1-4 larger flowers (3-3.5 cm across). Florally *Caladenia alpina* can be distinguished from *C. lyallii* by its distinctly rounded lateral lobes on the labellum, broader less-tapered labellum mid-lobe, prominently stalked marginal calli on the mid-lobe and broader (c. 2.8 mm wide) distinctly tapered column. *Caladenia cracens* is much less robust than *C. alpina* and has leaves less than 3 mm wide, a single-flowered scape and lamina calli with small heads and very narrow stalks.

Specimens of *C. alpina* from mountain peaks in southern Tasmania commonly have a dense vestiture of dark red glands on the exterior of the perianth segments, but are otherwise similar to plants from northern Tasmania and mainland south-eastern Australia.

CONSERVATION STATUS

Widespread, locally common and well conserved in National Parks and reserves.

SELECTED COLLECTIONS (81 examined)

AUSTRALIAN CAPITAL TERRITORY: Mt Ginini, 30 Nov. 1990, *Jones 7247* (CBG); junction of Moonlight Hollow and Bendor Dam Roads, 24 Nov. 1991, *Jones 8558* (CBG).

NEW SOUTH WALES: northern slopes of Mt Clarke, Kosciusko National Park, summer 1957, *Costin* (NSW, CANB); near Cabramurra, 20 Dec. 1960, *Moore 3200* (CANB).

VICTORIA: summit of Mt Stirling, 18 Nov. 1961, *Filson 3993* (MEL); Mt Rosea, Grampians, Nov. 1931, *Nicholls* (MEL); Razorback, Mt Feathertop, Dec. 1921, *Tadgell* (MEL).

TASMANIA: Meetus Falls, Eastern Tiers, 22 Nov. 1986, *Collier 1933* (HO); near Mt Arrowsmith, 2 Dec. 1989, *Collier 4468* (HO); Mt St John, 13 Dec. 1988, *Collier 3784* (HO); Ben Lomond, 28 Dec. 1978, *Noble 28043* (HO); White Rock, Mt Wellington, Dec. 1929, *Rodway* (HO); Franklin River, 15 Dec. 1986, *Collier 1874* (HO).

3. *Caladenia cracens* D.L.Jones sp. nov.

affinis *Caladenia alpinae* R.S.Rogers a qua foliis minoribus angustioribus, scapis tenuioribus, floribus solitaris minoribus roseis usque rubris et segmentis glandulosus valde et callis laminae pertenuioribus et columna solida relative lata differt.

TYPE: Tasmania, Lenah Valley, near Hobart, 29 Oct. 1990, *D. L. Jones 6833* & *C. H. Broers* (HOLOTYPE: CBG; ISOTYPES: CBG, HO, MEL, NSW).

Tuberous terrestrial herb growing singly or in loose groups. *Leaf* narrowly linear, 5-12 cm long, 1-3 mm wide, dark green, purplish-red at the base, sparsely hirsute with patent, eglandular trichomes c. 2 mm long. *Inflorescence* 8-15 cm tall, slender, wiry, dark purplish-red at the base, sparsely hirsute with patent glandular and eglandular trichomes. *Sterile bracts* narrowly obovate, 12-16 mm long, 2-3 mm wide, closely sheathing, externally hirsute with short, glandular hairs. *Fertile bracts* elliptical-obovate, 7-11 mm long, 3-4.5 mm wide, closely sheathing, externally hirsute with short, glandular hairs. *Flower* solitary, 2-2.5 cm across, pale pink to dark pink, densely glandular, with a sweet odour; dorsal sepal incurved and cucullate over the column and labellum, lateral sepals porrect, divergent, petals spreading widely, curving forwards in distal half. *Dorsal sepal* obovate-spathulate, 8-12 mm long, 3-6 mm wide, internally glabrous, externally densely glandular with sessile, ovoid, red trichomes, apex broadly obtuse. *Lateral sepals* asymmetrically oblanceolate, 8-13 mm long, 3-5 mm wide, slightly falcate, internally glabrous, externally as for the dorsal sepal, apex subacute to obtuse. *Petals* asymmetrically lanceolate, 8-12 mm long, 3-5 mm wide, falcate, internally glabrous, externally as for the dorsal sepal, apex acuminate. *Labellum* hinged at the base, heavily suffused and barred with red, apex with cream margins, distinctly trilobate. *Lamina* broadly ovate-elliptical in outline when flattened, 7-8 mm long, 4.5-6 mm wide, erect in proximal third, then shallowly curved forwards, apex recurved; lateral lobes c. 2.2 mm wide, erect and column-embracing, anterior margins rounded, distal margins irregular, with 1 or 2 pairs of linear, stalked calli towards the sinus with the mid-lobe; mid-lobe c.

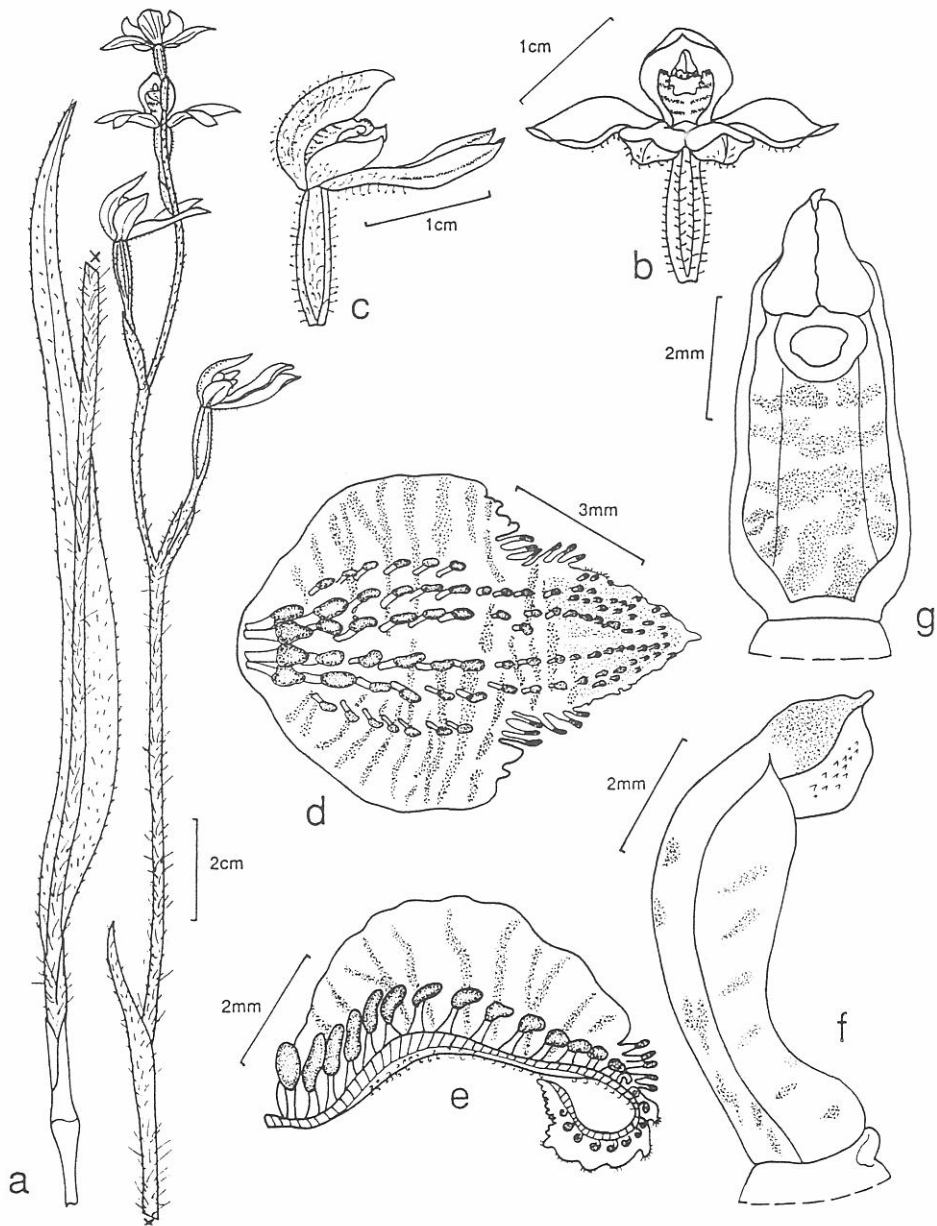


Fig. 2. *Caladenia alpina* R.S.Rogers. a - plant habit. b - flower from front. c - flower from side. d - labellum from above, flattened out. e - longitudinal section of labellum. f - column from side. g - column from front. All drawn from Jones 7247 (CBG).

2.7 mm long, broadly deltate, margins cream, with 5-8 pairs of linear marginal calli, decrescent to the apex of the mid-lobe. *Lamina* calli in 2-4 irregular rows, very slender, cream or yellow-headed, extending nearly to the apex of the mid-lobe; calli stalks becoming shorter towards the labellum apex, those on the mid-lobe sessile; basal calli 2, c. 0.9 mm long, head irregularly ovoid, stalk c. 0.4 mm long, much narrower than head; longest lamina calli c. 1 mm long, clavoid, stalk 0.6 mm long, white. *Column* 6-6.5 mm long, c. 2.5 mm wide, recurved near the base, curved forwards in distal third, green to whitish with red suffusions and irregular red transverse bars, narrowly winged, central ridge c. 1.2 mm wide. *Anther* c. 1.8 mm long, c. 1.2 mm wide, cream to pinkish, papillate, with a short rostrum. *Pollinia* 4, c. 1.2 mm long, roughly boomerang-shaped, cream, flat, mealy. *Stigma* c. 1.3 mm wide, irregularly circular, sunken, green. *Capsules* obovoid, 10-12 mm long, 4-5 mm wide, with glandular trichomes. (Fig. 3)

FLOWERING PERIOD

October and November.

ETYMOLOGY

Derived from the Latin, *cracens*, neat, graceful, thin, all of which apply to this elegant species.

DISTRIBUTION AND HABITAT

Endemic to southern Tasmania where distributed from near sea level to the foothills at low altitudes. It grows in open forest which has a sparse to densely shrubby understorey, less commonly in heath. Soils are clay loams, skeletal loams developed on mudstone and sandy loam.

NOTES

Caladenia cracens has gone unrecognised within the *C. lyallii* complex. It can be distinguished from *C. lyallii* by the stalked marginal glands on the labellum mid-lobe and smaller lamina calli on narrower stalks. From *C. alpina* it differs by its much more slender habit, narrower leaves (1-3 mm wide) and generally smaller (2-2.5 cm across), pink to reddish flowers with heavily glandular segments, much thinner lamina calli and a short, relatively broad (2.5 mm wide) column. *Caladenia cracens* occupies different habitats, grows at lower altitudes and flowers earlier than *C. alpina* in Tasmania.

CONSERVATION STATUS

Relatively widespread, common and conserved.

SELECTED COLLECTIONS (23 examined)

TASMANIA: Mountain Park Reserve, near Hobart, 29 Oct. 1990, *Jones 6796 & Broers* (CBG); south of Ferntree, 29 Oct. 1990, *Jones 6844 & Broers* (CBG); Lighthouse Rd, Bruny Island, 22 Oct. 1993, *Wapstra (Jones 12521)* (CBG); Huon Rd, Ferntree, 24 Oct. 1993, *Wapstra (Jones 12525)* (CBG); Little Lagoon Beach, Southport, 1 Dec. 1986, *Collier 1781* (HO); Huon Highway, Hobart, 2 Dec. 1986, *Collier 1805* (HO); Safety Cove, south of Port Arthur, 5 Dec. 1986, *Collier 1706* (HO); Longley, 13 Oct. 1984, *Moscal 8626* (HO); Badgers Range, Sheffield, 30 Oct. 1988, *Collier 3697* (HO); Snug, Oct. 1928, *Giblin 932* (HO); Blackmans Bay, Oct. 1927, *Rodway* (HO).

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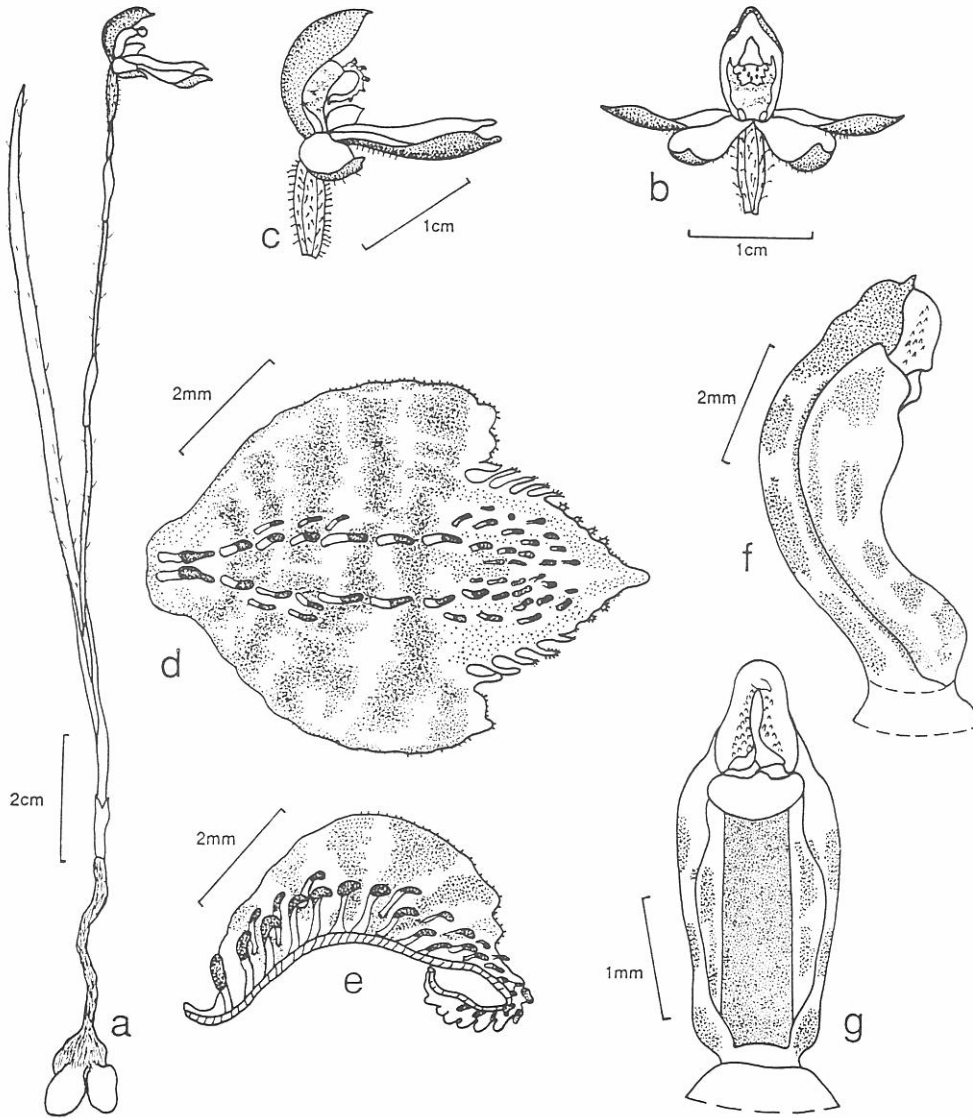


Fig. 3. *Caladenia cracens* D.L.Jones. a - plant habit. b - flower from front. c - flower from side. d - labellum from above, flattened out. e - longitudinal section of labellum. f - column from side. g - column from front. All drawn from Ziegeler (CBG).

provided valuable technical assistance throughout the project. Marion Garratt prepared the illustrations from my sketches.

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