

Australian Orchid Research

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New Taxa of Australian Orchidaceae

David L Jones



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by

David L. Jones

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COVER PHOTO: A colony of *Corybas recurvus* D. Jones in the Stirling Ranges, Western Australia (photo D. L. Jones).

David L. Jones

David Lloyd Jones was born at Mont Albert in Victoria in 1944. Early days at Balwyn were spent in nearby Beckett Park and exploring the wonderful collection of native plants in the iconic Maranoa Gardens. School holidays were enjoyed with an elderly garden-loving aunt at The Basin in the Dandenong Ranges where first involvements with native orchids and bushfires were experienced. Knowledge gained at Burnley Horticultural College, where David met Barbara, the sunny lady who was to share his passion for plants and life, was expanded and diversified by a degree in agricultural science at the University of Melbourne which was supported by a cadetship gained from the Department of Agriculture.

After graduating from university in 1968, his research work at the Scoresby Horticultural Research Station in Victoria involved the introduction of fruit cultivars from overseas, introduction and establishment of miscellaneous fruit crops, including blueberries, Chinese gooseberries and feijoas, grafting and nutrition of ornamental plants and the identification and testing of alternative materials for nursery potting mixes with the late David Nicholls. In 1978 the family moved to Queensland opening Eugenia Park Nursery in the Currumbin Valley, growing hardy coastal plants and bringing many rainforest species into cultivation. This was followed by a stint as a horticultural research officer at the Australian National Botanic Gardens in Canberra and then as research scientist in the Orchid Research Group at the Centre for Plant Biodiversity Research established within CSIRO.



A challenge in his teens by a nurseryman that “native orchids are impossible to grow” stimulated him to pioneer cultivation techniques for native terrestrial orchids that are the basis of those in use today. A plentiful supply of displaced plants from Melbourne’s encroaching urban sprawl fuelled the early growing experiments and stimulated his natural botanical curiosity. Corresponding with like-minded enthusiasts in other areas revealed different morphological interpretations between species in different parts of the country. This led to a very successful research program involving a network of licensed collaborators forwarding fresh specimens and for the first time allowing direct comparison between taxa from different areas and habitats. A rewarding simple process that revealed large gaps in our knowledge of native orchids and also resulted in the recognition of numerous new species. Following his first new species, *Pterostylis aestiva* in 1972, David has described more than 370 species of native orchids that have come to his attention from his network of contacts or travels in the bush. He also prepares detailed botanical drawings of native orchids and writes prolifically, sharing his knowledge of plants through books and other publications.

In 1991, David was awarded the Victorian College of Agriculture & Horticulture medal in recognition of his outstanding contribution to the Australian ornamental horticultural industry. In 2001 he was presented with the Australian Orchid Foundation’s prestigious ‘Award of Honour’ in recognition of his enormous contribution to the study of orchids in Australia and internationally. David served as a member of The Australian Orchid Foundation, Research Committee from its inception in 1977 to 2009; and as its Chairman from 1981 to 2002. In 2004 his contribution to orchid taxonomic research, while at the Centre for Plant Biodiversity Research was recognised when he was a finalist in the Australian Museum’s esteemed Eureka Prize for Biodiversity Research.

David's contribution to orchid research and education through his many publications has been considerable. In 1988, he published *Native Orchids of Australia*: a comprehensive coverage of Australia's then known orchid flora. In 2006, he followed with the expanded *A Complete Guide to Native Orchids of Australia including the Territories* with colour photos of each species. And in 2021, David produced a third and comprehensive edition: *A Complete Guide to Native Orchids of Australia*.



NEW TAXA OF AUSTRALIAN ORCHIDACEAE

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ABSTRACT

One hundred and eight new species and two natural hybrids of Australian Orchidaceae in the genera *Acianthus* R. Br. (5 species), *Arthrochilus* F. Muell. (6 species), *Caladenia* R. Br. (31 species), *Chiloglottis* R. Br. (11 species), *Corybas* Salisb. (5 species and one natural hybrid), *Dipodium* R. Br. (4 species), *Diuris* Smith (15 species and one natural hybrid), *Gastrodia* R. Br. (5 species), *Genoplesium* (15 species) and *Prasophyllum* R. Br. (11 species) are described here.

INTRODUCTION

The Orchidaceae is a family that is generally regarded as being well studied in Australia. Certainly this has been the perception of most professional botanists, very few of whom have become involved with this family. Recent research by myself and colleagues Mark Clements, Stephen Hopper and Andrew Brown into a range of Australian orchid genera, however, have revealed the existence of major taxonomic problems. To those associated with this research and familiar with complex groups within the Australian Orchidaceae, the description of more than one hundred new species in this paper will come as no surprise.

The history of the nomenclature of Australian orchids has been in two parts. Until the turn of the century most new taxa were described by professional botanists such as Robert Brown, John Lindley and Ferdinand von Mueller. This century the majority of species have been described by enthusiasts whose involvement has been largely centred on a regional basis and their studies have often been carried out without due consideration to taxonomic procedures. Consequently the taxonomy of Australian orchids has suffered considerably, the result being many misconceptions and misapplied names which have become entrenched in the literature. The activities of these people has also largely deterred professionals from taking up studies into the family.

Early in my research I realised that the major orchid genera in Australia were badly in need of taxonomic re-appraisal. In this I am supported by the parallel activities of Stephen Hopper and Andrew Brown in Western Australia whose comprehensive research results on orchids from that region will be published shortly. Basic to much of the recent research activity is the important publication a 'Catalogue of Australian Orchidaceae' (Clements 1989), which has resulted from the studies by Mark Clements of the types of most Australian orchids.

This paper is intended as a preliminary to a treatment of certain genera for volume 47 of the 'Flora of Australia'. It follows similar publications which either describe new species (Jones &

* D. L. Jones is the sole author of this paper. Where other authors are listed for new taxa those taxa should be cited exactly as they are recorded.

Clements 1987, Jones & Clements 1988a, Gray and Jones 1989, 1989a, Jones & Lavarack 1989), or re-establish overlooked genera (Jones & Clements 1987a, Jones & Clements 1989). In all one hundred and eight new species and two natural hybrids are formally described here in ten genera. Generic introductions are brief and each species is presented in a standardised layout which conforms to that used in my previous taxonomic papers. A detailed line drawing of each new species is included to aid with identification and facilitate comparisons between related species. For genera such as *Arthrochilus* F. Muell. and *Chiloglottis* R. Br., which have complex glandular arrangements on their labella, new terms, explained in an accompanying diagram, have been coined for unique distinguishing features. Keys to the genera are not presented at this early stage (with the exception of saprophytic *Dipodium* R. Br.) but will be included in the Flora treatment.

The new taxa described here have resulted from ten years intensive study which follows on a lifetime's association with Australian orchids. The last three years have involved full time research at the Australian National Botanic Gardens. All of the novelties are in the terrestrial genera *Acianthus* R. Br., *Arthrochilus* F. Muell., *Caladenia* R. Br., *Chiloglottis* R. Br., *Corybas* Salisb., *Dipodium* R. Br., *Diuris* Smith, *Gastrodia* R. Br., *Genoplesium* R. Br. and *Prasophyllum* R. Br. Studies into the latter genus are being carried out in conjunction with Bob Bates of South Australia. Some of the species described have been well known for many years, others have been overlooked or 'lumped' into a species complex. Examples of such complexes include *Caladenia carneae* R. Br., *C. dilatata* R. Br., *Chiloglottis reflexa* (Labill.) Druce and *Dipodium punctatum* (Smith) R. Br.

METHODS

These studies have primarily been carried out on fresh material which was either obtained from my own field work or sent in by one of a network of volunteer associates from various parts of the country. Orchid taxa are much more readily identified in the living state and important characters such as degree of clubbing, attitude and arrangement of perianth parts, colour, presence of nectar and fragrance can only be obtained from fresh living flowers. By becoming familiar with taxa in the living state, it is then much easier to identify them as dried herbarium specimens rather than if the reverse process is used. The importance of *in situ* field studies cannot be over-emphasised where features such as habitat preference, soil type and geology provide supplementary details which often help when sorting out sister taxa, look-alike taxa and species complexes.

Studies of fresh material are combined with examination of dry herbarium specimens and spirit collections. The accurate application of an earlier name is always checked by reference to the Type. Fresh flowers are prepared using a system developed by the author whereby the dissected floral parts are flattened and stuck while fresh beneath magic tape on acid-free board cut to the dimensions of systems cards. This technique, which will be published elsewhere, has proved excellent for quick comparisons between taxa or collections and as a means of sampling variability within a population. In addition to the floral cards, a sample of the flowers of most collections is also placed in the spirit collections (FPA/Bang mix) and stored at the Australian National Botanic Gardens (CBG). This collection contains the most comprehensive stored representation of Australian orchids anywhere. Also close-up colour photographs of flowers of plants from known provenance are used for comparison between closely related taxa and as a supplementary source of information; they are an extremely useful adjunct when preparing the descriptions of taxa.

When using these techniques, it is surprising how easily new taxa can be recognised, especially after the significant basic features of a group are defined. This approach overcomes a problem encountered when trying to determine taxa from dried herbarium specimens where important features are often hidden or destroyed in the drying process and subsequent storage. Botanists who work exclusively on dried specimens often adopt a broad species concept and group taxa together under the one name because they have similar characters. Although this approach may be convenient in a herbarium, it is frustrating to the worker in the field where major differences between similar taxa may be readily apparent.

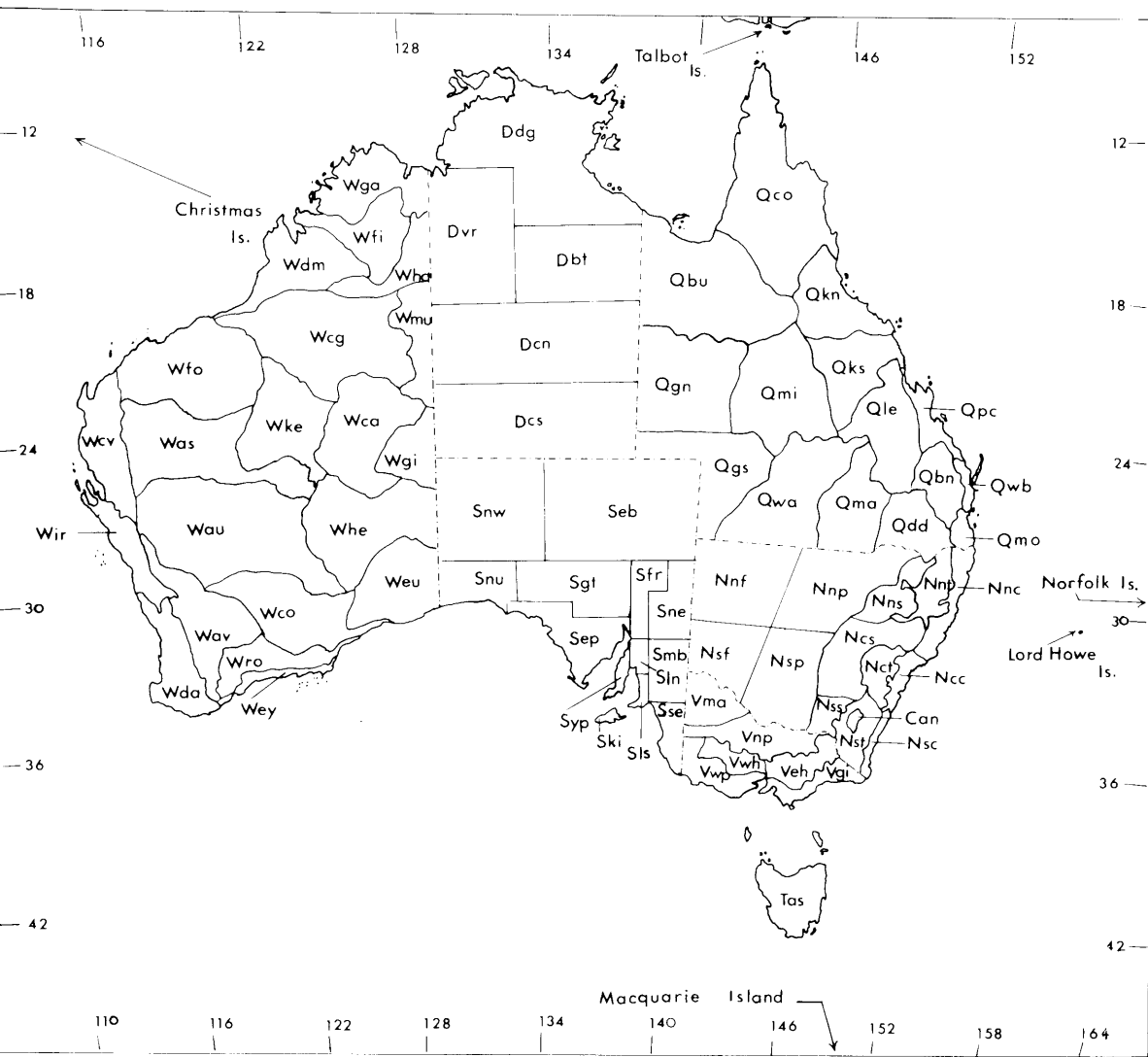
Status of taxa: In this paper all taxa are recognised at species rank. A new species becomes apparent if it possesses features distinct from a related species; these differences may be obvious and measureable or the result of a combination of subtle, yet recurrent, features. Factors such as flowering time, colour, attitude and arrangement of the perianth parts, floral fragrance, osmophores, arrangement of calli, pollination vectors and habitat preferences have all been used to identify new species. Recently the technique of enzyme analysis by electrophoresis has been adopted to provide supplementary evidence for confirming basic hypotheses about groups of species including differences between closely related taxa. Natural hybrids have only been formally named where they are striking, relatively frequent or have become well established.

Role of Pollination Vectors: The pioneering studies of Edith Coleman (1927, 1929, 1930), and more recently those of Warren Stoutamire (1974, 1975, 1983), have shown conclusively the high degree of reliance which many Australian terrestrial orchid taxa have on their pollination vectors. Indeed it has been shown convincingly on many occasions that species in genera such as *Arthrochilus*, *Chiloglottis*, *Drakaea* and *Caladenia* section *Calonema*, have evolved to the extent of having a one to one, pseudocopulatory relationship with the males of a particular species of insect. Studies of these pollination vectors can provide excellent supporting evidence for the elucidation of species complexes.

Modern studies of pollination systems have been carried out by Colin Bower of Orange, New South Wales and Bob Bates of Adelaide, South Australia. Both researchers have made many interesting discoveries and their results, which have been made available freely to me, have been incorporated in this work wherever relevant.

Future Studies: While the publication of these new taxa represents a major step forward in Australian orchidology it should by no means be regarded as the end point. The spate of new discoveries in our orchids is a reflection of the increased interest in these plants, in field work and biological studies. However, much still remains to be done before a complete understanding of Australian orchids is possible. Even as I write I know of many new taxa which cannot yet be described because of lack of suitable collections or vital pieces of data. New species are still coming to light on a regular basis and others are surely hidden away in species complexes which await unravelling. The contribution of the average orchid enthusiast can be highly significant and I encourage any person interested in becoming involved to contact me.

If time permits it is intended to publish full taxonomic revisions of many Australian orchid genera after their treatment in the Flora, by which time it is hoped that some remaining taxonomic problems will be solved. Detailed research into *Pterostylis* is well underway and the next paper in this series will describe new taxa in that genus.



Map 1. Australian Botanical Districts

ACIANTHUS R. Br

The generic limits of *Acianthus* R. Br. and *Cyrtostylis* R. Br. were recently redefined (Jones and Clements 1987), with seven species of *Acianthus* recognised in Australia. A further five species, discovered during extensive field studies and research to solve complexes surrounding *A. exsertus* R.Br. and *A. fornicatus* R.Br., are described here as new.

New Species

Acianthus apprimus D. Jones; species nova
affinis *A. fornicatus* R. Br. a qua in aestate et
autumno florens, et floribus seminutantibus
labello atrorutilo ad pullo margine valde
plicato aspectu perangusto differt.

Typus: New South Wales; Chimney House
Reserve, Mt. Wilson, Blue Mountains,
33°31'S, 150°24'E, 17 February 1990, D. L.
Jones 5655 & B. E. Jones (holo CBG, iso CBG,
NSW, MEL, BRI, AD).

Glabrous, terrestrial, tuberous herb growing in colonies. Leaf 18–40 mm x 14–35 mm, cordate, dark green above, reddish purple beneath, entire, sometimes shallowly lobed, apex acuminate to apiculate, on a stalk 4–9 cm tall. Raceme 5–20 cm tall, slender, erect, bearing two to nine flowers. Flowers 9–12 mm long, semi-nodding, translucent pinkish with reddish veins and suffusions, labellum dark purplish-red to blackish. Floral bracts 3–5 mm x 1.5–3 mm, ovate, acuminate. Ovary 6–8 mm x 1–1.5 mm, linear, curved. Dorsal sepal 9–14 mm x 4–6 mm, linear-ovate to ovate, cucullate, translucent pinkish, central band and two adjacent veins reddish, some other reddish streaks and spots present, dorsal surface irregularly papillose, apical point 2–4 mm long, linear-terete. Lateral sepals 9–12 mm x ca 1.3 mm, linear-lanceolate, projected obliquely forwards below the labellum, strongly crossed, translucent pinkish with a red central stripe, apical point 2–3 mm long, linear-terete. Petals ca 4 mm x 1 mm, linear ovate-lanceolate, acuminate, translucent pinkish with a red central stripe, projected forwards. Labellum 5.5–7 mm x 2.5–4 mm, linear-deltate becoming broadly cordate to elliptical in outline when flattened, projected forwards, dark purplish red, concave in proximal half, hardly decurved in distal half, margins strongly revolute, entire or irregularly denticulate, longacuminate. Callus occupying most of the ventral surface of the lamina, linear-deltate, dark purplish-red, thick, fleshy, densely papillose in distal half, central band ca 0.5 mm wide, transversely rugulose. Basal glands ca 1 mm long, curved, comma-shaped. Column ca 3.5 mm long, curved, green, widest at the base where ca 1.2 mm across. Anther ca 0.8 mm long, rounded. Stigma ca 0.7 mm across, elliptical. Pollinarium ca 0.8 mm across; viscidium ca 0.2 mm across; pollinia eight, clavate, falcate, yellow, waxy, four ca 0.5 mm long, four ca 0.35 long. Capsule 6–8 mm x 2–2.3 mm, linear-ovoid, straight, erect.

Selected Collections: New South Wales; Oberon Kanangra Walls Rd, 4 March 1990, A. D. Bishop J103/25–28 (CBG).

Distribution and Habitat: To date this species is known only from two localities in the Blue Mountains but it is locally common (Nct). It grows among grass, shrubs and bracken in tall open forest dominated by *Eucalyptus fastigata* and *E. oreades*. The soil is a well-structured, dark brown loam.

Flowering Period: February to April.

Notes: *A. apprimus*, although clearly related to *A. fornicatus*, can be recognised by its semi-nodding flowers which have a reddish black to black labellum which appears narrow because its margins are strongly folded back. These are actually part of the labellum lamina and their folding leaves only the callus in view. The high rainfall, montane habitat and the extremely early flowering habit of this new species are notable, with the peak flowering taking place well before plants of *A. fornicatus* are even above ground.

Conservation Status: Uncommon and not known to be conserved; suggest 2R according to Briggs & Leigh (1988).

Etymology: From the Latin '*apprimus*', first of all; in reference to the very early flowering habit.

Acianthus borealis D. Jones; species nova
affinis *A. fornicatus* R. Br. a qua floribus
minoribus, sepalo dorsali petalisque
angustioribus, et labello anguste cordato ad
oblongo vade saccato et callo papillis per-
paucioribus brevioribusque differt.

Typus: Queensland; Cook District; Moomin,
Atherton Tableland, 17°22'S, 145°25'E,
1030 m., 2 May 1988, L. Lawler 9 (holo CBG,
iso CBG, BRI).

Glabrous, terrestrial, tuberous herb growing in colonies. Leaf 15–50 mm x 15–35 mm, cordate, dark green above, reddish purple beneath, margins entire or slightly undulate, apex apiculate. Inflorescence to 25 cm tall, slender, erect, pinkish, bearing 2–20 flowers in a slender raceme. Flowers 8.5–10 mm long, spreading or slightly nodding, sepals and petals transparent with red lines and striae, labellum reddish with a green callus. Floral bracts 3–8 mm x 2–5 mm, ovate-cordate, apiculate, dark green with red veins. Ovary ca 5 mm x 1 mm, linear, curved. Dorsal sepal 9–10 mm x 3.5–4.5 mm, ovate, cucullate, three veins prominent, mid-vein projected forwards as a filiform point 2–3.5 mm long.

Lateral sepals 8–9 mm x ca 1 mm, linear to linear-elliptic, projected forwards below the labellum, remaining parallel or crossed, apical point filiform, 2–3 mm long. Petals 2.5–5 mm x ca 1 mm, lanceolate, acuminate, projected forwards or spreading. Labellum 5–6 mm x 2.5–3 mm, narrowly oblong, projected forwards, slightly decurved in apical third, long acuminate to apiculate, margins purplish, denticulate. Callus occupying most of the lamina, fleshy, densely papillate in the distal half, concave in proximal half, central band ca 0.5 mm wide, grey or mauve, transversely rugose. Basal glands ca 1 mm long, comma-shaped, curved, whitish. Column ca 3 mm long, curved, widest at the base. Anther ca 0.6 mm long, rounded. Stigma ca 0.5 mm across, elliptical. Pollinia ca 1 mm long, clavate, falcate, yellow. Capsule 11–13 mm x 2.5 mm, obovoid, red lines on ribs.

Selected Collections: (all CBG); Herberton Range, 17 June 1986, H. Richards; Tinnaroo Hills, 26 June 1987, H. Richards; Davies Ck, Atherton Tableland, 26 June 1987, H. Richards.

Distribution and Habitat: Widely distributed in tropical Queensland, from the Windsor Tableland in the north-eastern to the Blackdown Tableland in central-eastern Queensland (Qco, Qkn, Qks, Qle). This species is commonly found on sheltered slopes in open forest and woodland, growing in well-structured clay loams. On the Blackdown Tableland it occurs in protected areas near large boulders growing in sandy soil.

Flowering Period: March to May.

Notes: *A. borealis* has obvious affinities with *A. fornicatus* but can be distinguished by its smaller flowers which have a narrower dorsal sepal, narrower petals and a linear-cordate to oblong labellum which is much less deeply saccate and with fewer shorter papillae on the callus. The new species has been confused with *A. fornicatus* (Dockrill 1969), but the two are separated geographically by a distance of about 600 km.

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin '*borealis*', northern; it is the northernmost member of the *A. fornicatus* alliance in Australia.

Acianthus collinus D. Jones; species nova
affinis *A. fornicato* R. Br. a qua floribus sub-roseis translucentibus, sepalo dorsali petalisque perangustioribus, et labello anguste cordato atrorubropurpureo dimidio proximale profunde concavo et dimidio distale valde recurvo differt.

Typus: New South Wales; Conimbla National Park, 33°46'S, 148°25'E, 10 July 1988, D. L. Jones 2704 & M. A. Clements (holo CBG, iso CBG, NSW, MEL, BRI, AD).

Leaf 15–32 mm x 14–30 mm, cordate, dark green above, reddish purple beneath, entire, sometimes shallowly lobed, apex acuminate to apiculate, on a stalk

3–6 cm tall. Inflorescence 6–15 cm tall, slender, erect, bearing 2–9 flowers in a slender raceme. Flowers 8–11 mm long, nodding, translucent pinkish with reddish veins and suffusions, labellum dark purplish red to purplish maroon. Floral bracts 3–5 mm x 1.5–3 mm, ovate, acuminate. Ovary 4–8 mm x 1–1.5 mm, linear, curved. Dorsal sepal 6–8 mm x 4–5 mm, ovate, cucullate, translucent pinkish, central vein and 2 lateral veins reddish, some other reddish streaks and spots, dorsal surface irregularly papillose, apical point ca 1.5 mm long, linear-terete. Lateral sepals 7–11 mm x ca 1.3 mm, linear-lanceolate, projected obliquely forwards below the labellum, usually crossed, translucent pinkish with a red central stripe, apical point ca 1.5 mm long, linear-terete. Petals 3–5 mm x 0.5–1 mm, narrow ovate-lanceolate, acuminate, clear to pinkish with a red central stripe, spreading or recurved. Labellum 5.5–6 mm x 3–3.5 mm, linear-cordate to cordate when flattened, dark purplish red to blackish, deeply concave in proximal half, decurved in distal half, margins strongly revolute, irregularly denticulate, acuminate. Callus occupying most of the ventral surface of the lamina, dark purplish-red, thick, fleshy, densely papillose in distal half, central band ca 0.5 mm wide, transversely rugulose. Basal glands ca 1 mm long, comma-shaped, curved. Column ca 3.5 mm long, curved, green, widest at the base where ca 1.5 mm across. Anther ca 1 mm long, rounded. Stigma ca 0.7 mm across, elliptical. Pollinarium ca 0.75 mm across; viscidium ca 0.2 mm across; pollinia 8, clavate, falcate, yellow, waxy, 4 ca 0.5 mm long, 4 ca 0.35 mm long. Capsule 6–8 mm x 2–3 mm, linear-ovoid, straight or slightly curved.

Selected Collections: (All CBG); New South Wales; Mt Keira, 9 June 1988, R. G. Tunstall s.n. (D. L. Jones 2688); Crowther, 10 July 1988, D. L. Jones 2708, M. A. Clements and R. G. Tunstall; Hervey Range, 14 August 1988, D. L. Jones 2763 and M. A. Clements; Kangaroo Range, 14 August 1988, D. L. Jones 2730 and M. A. Clements; Wilton, 13 June 1988, R. G. Tunstall s.n. (D. L. Jones 2694).

Distribution and Habitat: Endemic to New South Wales where distributed from Taree to Crowther (Nnc, Ncc, Nct, Nst). It forms colonies on sheltered slopes in open forest, growing in shallow loams. In inland districts this species commonly grows in low ranges with the vegetation dominated by native pines and ironbarks.

Flowering Period: Late June to August.

Notes: *A. collinus* is closely related to *A. fornicatus* and has been previously confused with it. It can be immediately distinguished by its translucent pinkish flowers which have narrower petals, a narrower dorsal sepal and a linear-cordate, dark reddish purple labellum with a blackish callus which is deeply concave in the proximal half and strongly recurved in the distal half. The flowers of *A. fornicatus* are basically translucent green with longer petals, a longer, broader, deeply concave dorsal sepal and a pinkish labellum with a prominent green callus. *A. collinus* is commonest in isolated low ranges to the west of the dividing range but it

also extends onto ranges and tablelands adjacent to the coast. *A. fornicatus* is by contrast mainly found on coastal plains. Both species grow sympatrically in some coastal districts and sporadic putative hybrids may occur when they grow in close proximity. Electrophoretic analysis of sympatric populations shows different enzyme systems are present in each (Sharma, pers. comm.).

Conservation Status: Widely distributed and conserved in National Parks.

Etymology: From the Latin '*collinus*' pertaining to hills; indicating the preference this species shows for hilly districts, especially in areas to the west of the divide.

Acianthus exiguus D. Jones; species nova
affinis *A. fornicato* R. Br. a qua minore per-
gracile, floribus paucioribus perminoribus
autopollinatis, et labello minore oblongi-
elliptico sparse papillato differt.

Typus: New South Wales; Coolgardie Rd,
Wardell, 28°57'S, 153°28'E, 19 May 1987,
D. L. Jones 2550 & J. Moye (holo CBG, iso
CBG, NSW).

Leaf 18–30 mm x 15–20 mm, cordate, dark green above, light reddish purple beneath, entire, apiculate, on a stalk 2–5 cm tall. Inflorescence 6–10 cm tall, very slender, erect, bearing 1–5 flowers in a slender raceme. Flowers 5–7 mm long, semi-erect, translucent greenish white with a few faint red markings, labellum pinkish to pinkish mauve with a green callus. Floral bracts 3–4 mm x 2–2.5 mm, ovate, acuminate. Ovary 3–5 mm x 1–1.3 mm, linear, curved, elongating quickly during anthesis. Dorsal sepal 4–5 mm x 3–3.3 mm, ovate-elliptical, cucullate, translucent greenish white with some faint red streaks, smooth or slightly papillate, apical point ca 1.5 mm long, linear-terete, often slightly curved. Lateral sepals 6–7 mm x 0.6–0.8 mm, linear-lanceolate, projected forwards below the labellum, tips often recurved, usually parallel, translucent greenish white with a faint red central stripe, apical point ca 1.5 mm long, linear-terete. Petals ca 2–2.5 mm x 0.7–0.8 mm, linear ovate-lanceolate, acuminate, spreading or recurved, translucent greenish white. Labellum 3.5–4 mm x 1.8–2 mm, oblong-elliptical, pink to pinkish mauve, deeply concave in proximal third, projected forwards or obliquely erect, slightly decurved in distal half, margins not revolute, entire, acuminate. Callus occupying most of the ventral surface of the lamina, thick, fleshy, green, papillose in distal third, central band ca 0.5 mm wide, transversely rugulose. Basal glands ca 0.8 mm long, comma-shaped, curved. Anther ca 0.6 mm long, rounded. Stigma ca 0.5 mm across, elliptical. Pollinarium ca 0.6 mm across, viscidium vestigial; pollinia eight, clavate, falcate, yellow, waxy, four ca 0.3 mm long, four ca 0.35 mm long. Capsule 0.7–0.9 mm x 0.2–0.3 mm, obovoid, held stiffly erect.

Selected Collections: (All CBG); New South Wales; Bundagen, 17 May 1984, D. L. Jones 1570; Bungawalbyn, 10 May 1990, J. Moye (D. L. Jones 6002).

Distribution and Habitat: From Repton to Wardell in north-eastern New South Wales (Nnc). It has been found in littoral rainforest growing in grey sandy loams and tall open forest in grey clay-loams.

Flowering Period: May and June.

Notes: *A. exiguus* is related to *A. fornicatus* R. Br. but the plants are smaller, much more slender and have fewer, much smaller flowers which are self pollinating. In addition the much smaller, oblong-elliptical labellum has entire margins which are not revolute and the lamina callus is sparsely papillate in the distal third. By contrast the broadly, ovate-cordate labellum of *A. fornicatus* has irregularly toothed strongly revolute margins and the lamina callus is densely papillate.

Conservation Status: Uncommon but conserved; suggest 3RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*exiguus*' small, weak, little; all of which apply to this species.

Acianthus pusillus D. Jones; species nova
affinis *A. exserto* R. Br. a qua habitu
plerumque multum exiliore minoreque, et
floribus minoribus labello minore et minus
cordato differt.

Typus: New South Wales, Merewether Hill,
Newcastle, 32°58'S, 151°46'E, 16 May 1966,
B. Whitehead s.n. (holo CBG, iso CBG, NSW).

Leaf 12–32 mm x 10–30 mm, broadly cordate, dark green above, reddish purple or rarely greenish beneath, entire or sometimes shallowly lobed, apex acuminate to apiculate, on a stalk 3–8 cm tall. Raceme 3–18 cm tall, erect, bearing one to eighteen flowers. Flowers 8–12 mm long, porrect, translucent green or pinkish with reddish veins and spots, labellum green to reddish purple. Fertile bracts 2–4 mm x 1.5–2 mm, broadly ovate, acuminate. Ovary 3–4 mm x 0.8–1 mm, linear, curved. Dorsal sepal 6–8.5 mm x ca 2.5 mm, linear-obovate, cucullate, translucent with red lines or dots, apical point ca 1–2.5 mm long, linear-terete, often somewhat papillate. Lateral sepals 6–8 mm x ca 0.8 mm, linear to linear-oblongate, projected obliquely forwards below the labellum, parallel or crossed, translucent with reddish markings, apical point ca 1–2.3 mm long, linear-terete, smooth or papillate. Petals 2.5–3 mm x 0.8–1.3 mm, linear-ovate to ovate, reflexed back against the ovary, translucent with a red central stripe. Labellum 40–45 mm x 2–3 mm, linear-oblong-cordate in outline when flattened, green or reddish with a darker, thickened callus, shallowly concave in proximal half, slightly decurved in distal half, margins revolute, entire, apex apiculate. Callus occupying most of the ventral surface of the lamina, fleshy, green or reddish, smooth or papillose in distal third; central band ca 0.5 mm wide, transversely rugulose. Basal glands ca 0.8 mm long, curved, comma-shaped. Anther ca 0.6 mm long, rounded. Stigma ca 0.6 mm across, elliptical. Pollinarium ca 0.6 mm across, viscidium ca 0.2 mm across; pollinia eight, clavate, falcate, yellow,

waxy, four ca 0.3 mm long, four ca 0.35 mm long. Capsule 7–8 mm x 2–2.5 mm, obovoid, erect.

Selected Collections: (all at CBG); Queensland; Many Peaks Range, 60 km northeast of Monto, 1 June 1977, M. C. Crisp 2720 & R. K. Ellyard; Green Mountains via Canungra, 12 April 1987, C. Harman s.n. New South Wales; Taralga, 25 April 1987, R. Tunstall s.n. Victoria; Black Range, 19 June 1987, C. & D. Woolcock s.n. Tasmania; Coles Bay, 6 June 1989, R. & K. Williamson.

Distribution and Habitat: Widely distributed from central-eastern Queensland, New South Wales, Victoria, Tasmania and South Australia (Qpc, Qmo, Nnc, Nnt, Ncc, Nct, Nsc, Nst, Veh, Vgi, Vwh, Vwp, Tas, Sse, Sls, Sln). This species grows in a wide range of areas from coastal scrubs to inland hills in such habitats as

heathland, woodland, sparse open forest, rainforest margins and wet sclerophyll forests. Soils include sands, sandy loams, clay loams, skeletal loams and good quality loams.

Flowering Period: March to August.

Notes: This species has commonly been confused with *A. exsertus* R. Br. It is less robust than that species usually with smaller leaves, a more slender inflorescence and smaller flowers with a much smaller and less obviously cordate labellum. Overall this species is generally weak and dull coloured when compared with the robust and often colourful flowers of *A. exsertus*.

Conservation Status: Widespread and conserved.

Etymology: From the Latin, '*pusillus*', very small, little; in reference to the small flowers and often small stature.

ARTHROCHILUS F. Muell.

Arthrochilus F. Muell. is a natural segregate genus distributed in eastern and northern Australia and New Guinea. Once considered as being congeneric with the Western Australian genera *Drakaea* Lindley and *Spiculaea* Lindley, it was reinstated and revised in 1972 (Blaxell 1972). As interpreted by Blaxell the genus consisted of three species, and a fourth was described in 1975 (Lavarack 1975).

Herbarium specimens of *Arthrochilus* are meagre probably because most species are tropical and have a brief flowering period that is closely linked with the early storms of the wet season. Inflorescences of those species related to *A. irritabilis* R. Br. are leafless, generally inconspicuous and consequently are easily overlooked and rarely collected. Additionally they are often imperfect, lacking labella, these having been removed during the frenzied pseudocopulatory activities of the pollination vectors.

Observations on the rosettes of nonflowering plants, made during field trips in various parts of northern Australia, have convinced me that a number of undescribed species masquerade under the name *A. irritabilis*. Collected plants which have flowered in glasshouses at the Australian National Botanic Gardens, Canberra, have confirmed this hypothesis which is supported by fresh collections secured from colleagues in tropical areas. Six new species resulting from these studies are described here.

Definition of Terms: The flowers of *Arthrochilus* have a complex labellum which includes a highly developed callus variously adorned with calli which may be linear or clavoid and in turn simple or branched. Descriptions by previous authors have ignored many significant labellum structures and new terms have been coined in this study to describe these features. The accompanying illustration explains the terms (Fig. 1).

New Species

Arthrochilus latipes D. Jones; species nova
affinis *A. oreophilo* D. Jones a qua perrobustiore foliis viridibus rosulatis, floribus majoribus, labello lamina majore base multalatiore et callo majore glanduloso multo magis dense et glande principale capitulo bulbosoruminato differt.

Typus: Northern Territory; Radon Gorge, Mt Brockman, 12°45'S, 132°53'E 7 December 1978, C. R. Dunlop 5044 (holo DNA, iso DNA).

Terrestrial, tuberous herb forming spreading colonies. Rosette separate; leaves two to four, 25–70 mm x 8–26 mm, lanceolate, ground-hugging, dull green, paler beneath, entire or undulate, acute to acuminate. Inflo-

rescence 10–30 cm tall, rhachis and scape fleshy, green. Sterile bracts two or three, 7–13 mm x ca 5 mm, ovate-lanceolate, subacute, closely sheathing. Flowers 3–ca 15, green with brownish glands on the labellum callus. Fertile bracts ca 7 mm x 3 mm, ovate-lanceolate, acuminate, closely sheathing. Pedicels ca 2 mm long, slender, obliquely erect close to the rhachis. Ovary ca 6 mm x 3 mm, linear-ovoid, curved. Dorsal sepal 13–15 mm x 3–4 mm, linear-obovate to spatulate, conduplicate, decurved, closely embracing the basal quarter of the column, broadly obtuse. Lateral sepals 10–11 mm x ca 3.5 mm, more or less lanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex obtuse to slightly emarginate. Petals 10–11 mm x ca 1 mm, linear, falcate, reflexed against the ovary,

distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.3 mm long; lamina ca 7.5 mm x 1.5 mm, ca 3 mm wide at base, green with a prominent dark purplish basal blotch, connate with basal stalk of callus for 4.5 mm, free cauda ca 3 mm x 1.5 mm, ligulate, recurved, pale green with a darker central vein, obtuse. Callus plus main gland ca 5 mm long, 3 mm across, 1.6 mm high, prominently insectiform, domed, central band inconspicuous, covered with short clavoid calli, lateral surfaces densely covered with shiny yellowish brown to brown, linear-clavoid calli 0.6–1 mm long; basal stalk ca 5 mm long, ca 1 mm wide at base, dilated towards apex; main gland ca 3 mm long, straight or slightly curved, basal surfaces with numerous, linear-clavoid calli similar to those on the callus, apex ca 2.2 mm across, emarginate, nearly straight, bulbous, black, shiny, irregularly ruminant. Column ca 10 mm long, at a steep angle to the ovary for the basal 2 mm then curved forwards in a semi-circle, light green, the anterior surface shortly pubescent and with a few purplish spots. Column foot ca 3.3 mm long, apex anvil-shaped, ca 2 mm across. Column wings in two pairs; proximal wings ca 4 mm x 6 mm, broadly triangular, projecting forwards, apex linear-tapered, upcurved, translucent with a few purplish spots; distal wings ca 2 mm x 0.8 mm, linear-oblong, falcate, divergent above the anther. Stigma ca 2 mm x 1.4 mm, elliptical, sunken. Anther ca 1.5 mm long, obtuse. Pollinium ca 1 mm x 1 mm, falcate, yellow, mealy. Capsule ca 10 mm x 4 mm, obovoid, erect.

Distribution and Habitat: Endemic to the Top End of the Northern Territory to the east of Darwin, particularly the western parts of Arnhem Land (Ddg). It occurs on rock outcrops and escarpments of sandstone formation, particularly on sheltered slopes under *Allosyncarpia ternata* and near streams. Soils are white or grey sands and sandy loams.

Flowering Period: October to January.

Notes: Although having affinities with *A. irritabilis*, the closest relative of *A. latipes* is *A. oreophilus*, a species from highland areas of north-eastern Queensland. *A. latipes* is readily distinguished by the very broad base of the labellum lamina, the bulbous, ruminant apex of the main gland which is black all over and the much larger callus densely covered with coarse, shiny, clavoid glands. The rosette leaves of *A. latipes* are green whereas those of *A. oreophilus* are distinctly glaucous. With its relatively thick inflorescences, large flowers and large rosette leaves, *A. latipes* is the most robust member of the *A. irritabilis* complex.

Conservation Status: *A. latipes* is widespread and conserved in National Parks.

Etymology: From the Latin '*lati*' broad, wide, '*pes*' foot; in reference to the very broad base of the labellum lamina.

Arthrochilus oreophilus D. Jones; species nova affinis *A. latipedi* D. Jones a qua rosula foliorum venetorum, labello lamina base angustiore et callo glandibus clavoideis ten-

uoribus, et *A. sabuloso* D. Jones a qua rosula foliorum venetorum, et floribus majoribus labello callo majore et glandibus clavoideis grossis differt.

Typus: Queensland; Cook District; Herberton Range, 17°24'S, 145°20'E 22 January 1988, L. Lawler 24 (holo CBG, iso CBG, BRI).

Terrestrial, tuberous herb forming spreading colonies. Rosette separate; leaves two to five, 20–40 mm x 10–18 mm, lanceolate, ground-hugging, glaucous above, paler beneath, entire or undulate, acute to acuminate. Inflorescence 8–20 cm tall, rhachis and scape fleshy, dark reddish brown. Sterile bracts one or two, 12–15 mm x ca 5 mm, ovate-lanceolate, acuminate, closely sheathing. Flowers 2–ca 15, green with dark reddish-brown glands on the labellum. Fertile bracts ca 7 mm x 3 mm, ovate-lanceolate, acuminate, closely sheathing. Pedicels ca 3 mm long, slender, obliquely erect close to the rhachis. Ovary ca 6 mm x 3 mm, linear-ovoid, curved. Dorsal sepal 9–10 mm x 2–2.5 mm, linear-obovate to spatulate, conduplicate, decurved, closely embracing the basal third of the column, obtuse. Lateral sepals 6–7 mm x ca 2 mm, lanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex unequally emarginate. Petals 6.5–7 mm x ca 1 mm linear, falcate, reflexed against the ovary, distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.5 mm long; lamina ca 6 mm x mm, ca mm wide at base, pale green with a prominent dark purple basal blotch, connate with basal stalk of callus for 4 mm, free cauda ca 2.5 mm x 0.8 mm, ligulate, recurved, pale green with a dark green central vein, subacute. Callus plus main gland ca 3.5 mm long, 2.5 mm across, 1.3 mm high, prominently insectiform, domed, central band conspicuous, beset with shortly stalked or sessile, clavoid calli, lateral surfaces densely covered with shiny red to yellowish, linear-clavoid calli 0.3–0.6 mm long; basal stalk ca 4 mm long, ca 2 mm wide at base, dilated towards apex; main gland ca 3 mm long, curved, apex deflexed, ventral surface near base with a number of slender, linear-clavoid calli similar to those on the callus, apex ca 1.8 mm across, deeply emarginate, bright green, densely beset with irregular, black, raised, plate-like papillae on dorsal surface. Column ca 7 mm long, at right angles to the ovary for the basal 1 mm then curved forwards in a semi-circle, green, the anterior surface shortly pubescent, a few purplish spots on the anterior surface. Column foot ca 3 mm long, apex irregularly swollen, ca 1.2 mm across. Column wings in two pairs; proximal wings ca 4 mm x 5 mm, broadly triangular, falcate, projecting forwards, apex upcurved, translucent with a few purple spots; distal wings ca 3 mm x 1 mm, linear, curved, divergent above the anther. Stigma ca 1.6 mm x 1 mm, elliptical, sunken. Anther ca 1 mm long, obtuse. Pollinium ca 1 mm x 0.5 mm, falcate, yellow, mealy. Capsule ca 9 mm x 4 mm, obovoid, erect.

Distribution and Habitat: Above ca 1000 metres elevation on the ranges and tablelands of north-eastern Queensland, particularly in the vicinity of the

Atherton Tableland (Qco). It grows in open forest and woodland in shallow clays and clay loams.

Flowering Period: November to February.

Notes: *A. oreophilus* is closely related to *A. latipes* and *A. sabulosus*. It can be distinguished from both by its blue-green rosette leaves and floral features. In *A. latipes* the base of the labellum lamina is much wider than the head of the main gland, whereas in the other species, both organs are of similar width. *A. oreophilus* has coarser clavoid glands on the main body of the labellum callus (finer glands on *A. sabulosus*) and the head of the main gland is densely covered with shiny, black plate-like structures (sparsely adorned and appearing spotted in *A. sabulosus*).

Conservation Status: *A. oreophilus* is locally common and conserved in National Parks.

Etymology: From the Greek '*oreophilus*', mountain-loving; in reference to the preference of this species for growing at moderate altitudes in the ranges and tablelands.

Arthrochilus prolixus D. Jones; species nova affinis *A. irritabili* E. Muell. a qua labello callo glandibus multum longioribus lineariteretibus ad lineariclavoideis differt.

Typus: New South Wales; Bellangry, northwest of Wauchope, 31°21'S, 152°37'E, 9 December 1985, D. L. Jones 2228, L. Barton & T. D. Jones (holo CBG, iso CBG, NSW, BRI).

Terrestrial, tuberous herb growing in spreading colonies. Rosette separate; leaves two to six, 4–7 cm x 7–15 mm, linear-elliptical to lanceolate, ground-hugging or obliquely erect, dull bluish green on upper surface, green and shiny beneath, acute to subacute. Inflorescence 12–32 cm tall, rhachis and scape slender, green. Sterile bracts two or three, 5–17 mm x ca 6 mm, ovate-lanceolate, subacute to acuminate, closely sheathing. Flowers three to ca twenty-two, pale green with dark red glands on the labellum callus. Fertile bracts 4–7 mm x 3–4 mm, linear-ovate, subacute, closely sheathing. Pedicels ca 4 mm long, slender, obliquely erect close to the rhachis. Ovary 4 mm x 1.5 mm, linear-ovoid, curved. Dorsal sepal 9.5–10 mm x ca 1 mm, linear-obovate to nearly spatulate, widest near apex then tapered to base, conduplicate, decurved, closely embracing the basal quarter of the column, apex obtuse with a short dorsal ridge. Lateral sepals 6–7 mm x 1.8–2 mm, lanceolate to oblanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex obtuse to slightly emarginate. Petals 6–7 mm x ca 0.8 mm, linear, falcate, reflexed against the ovary, distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.1 mm long; lamina ca 5 mm x 0.6 mm, ca 1.5 mm wide at base, pale green with a prominent, dark purple basal blotch, connate with basal stalk of callus for ca 3.5 mm, free cauda ca 2 mm x 0.7 mm, ligulate, pale green, recurved, obtuse. Callus plus main gland ca 3 mm long, 3 mm across, 1.6 mm

high, prominently insectiform, central band naked, irregularly verrucose to papillate, lateral surfaces sparsely adorned with dark red, linear to linear-clavoid calli 0.6–1.3 mm long; basal stalk ca 2 mm long, ca 0.5 mm wide at base, delated towards apex; main gland ca 1.7 mm long, curved, sometimes with a few, linear-clavoid calli similar to those on the callus, apex 1.2–1.5 mm across, broadly emarginate, black, irregularly ruminant to verrucose, shiny. Column 6.5–7 mm long, at a steep angle to the ovary for the basal 2 mm then curved forwards in a semi-circle, light green to whitish, the anterior surface shortly pubescent and with numerous purple spots. Column foot ca 4 mm long, apex anvil-shaped, ca 1.1 mm across. Column wings in two pairs; proximal wings ca 3.5 mm x 4 mm, broadly triangular, projecting forwards, apex linear-filiform, upcurved, translucent with a few purple spots; distal wings ca 3 mm x 0.5 mm, linear-tapered, slightly falcate, divergent above the anther. Stigma ca 1.3 mm x 1 mm, elliptical, sunken. Anther ca 1 mm long, obtuse. Pollinium ca 1 mm x 0.8 mm, sharply falcate, yellow, mealy. Capsule 6–8 mm x 4–5 mm, ovoid to obovoid, erect.

Selected Collections: Queensland; Carole Park, Ipswich, 6 January 1990, L. Barton (D. L. Jones 5614) (CBG); Beenleigh, 9 December 1985, D. L. Jones 2228 & T. D. Jones (CBG); New South Wales; Alum Mountain, Bulahdelah, 5 February 1988, M. A. Clements 3927 (CBG).

Distribution and Habitat: Southeastern Queensland, northern and central New South Wales (Qmo, Nnc, Ncc). It is commonly found in open forest among grass and low shrubs but also in coastal and nearcoastal scrubs. Soils include loams, clay loams and sandy loams. At Bellangry, New South Wales, the species has actively colonized heaps of decomposing sawdust at the site of an old sawmill.

Flowering Period: December to February.

Notes: *A. prolixus* has been confused with *A. irritabilis* but the flowers can be immediately distinguished by the longer and sparser lamina calli which are linear-terete to linear-clavoid in shape. Those of *A. irritabilis* are much shorter, strongly clavoid and form a dense mass on the callus. Although both *A. prolixus* and *A. irritabilis* occur in southeastern Queensland they appear to occupy different habitats. *A. prolixus* occurs on slopes and ridges whereas *A. irritabilis* grows in wallum and coastal heath.

Conservation Status: *A. prolixus* is widespread and conserved.

Etymology: From the Latin '*prolixus*', stretched out, lengthened; in reference to the long labellum calli.

Arthrochilus rosulatus D. Jones; species nova affinis *A. irritabili* E. Muell. a qua habitu minore ex centro rosulae florens, foliis minoribus venetis, et labello lamina glandibus

brevibus clavoideis caespite perdenso differt.

Typus: Queensland; Cook District; Double Barrel Pinch, Shipton's Flat Road, ca 8 k from Big Forks Junction, south of Cooktown, 15°45'S, 148°15'E 6 June 1990, L. Lawler 83 (holo CBG, iso CBG, BRI).

Rosette basal, encircling the base of the inflorescence; leaves three to four, 10–35 mm x 8–12 mm, elliptical to oblanceolate, held obliquely erect, dull bluish green above, paler and somewhat pellucid beneath, subacute. Inflorescence 7–15 cm tall, rhachis and scape very slender, green. Sterile bracts one or two, 4–12 mm x 2.5–5 mm, ovate-lanceolate, obtuse to subacute, sheathing or spreading. Flowers 2– ca 15, pale green with reddish to reddish brown glands on the labellum callus. Fertile bracts 3–4 mm x 1.5–2 mm, linear-ovate, subacute, closely sheathing. Pedicels ca 3 mm long, slender, spreading to obliquely erect, divergent from the rhachis. Ovary ca 4 mm x 1.5 mm, straight or slightly curved. Dorsal sepal 7.5–9 mm x ca 2 mm, linear-obovate when flattened, conduplicate, decurved, closely embracing the basal quarter of the column, apex obtuse with a short dorsal ridge. Lateral sepals 5.5–6.5 mm x ca 2 mm, oblonglanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex obtuse. Petals 6.5–7.5 mm x ca 1 mm, linear, falcate, reflexed against the ovary, distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.1 mm long; lamina ca 5 mm x 0.8 mm, linear, ca 1.6 mm wide at base, light green with a prominent dark purplish basal blotch, connate with basal stalk of callus for ca 1.5 mm, free cauda ca 2 mm x 0.8 mm, ligulate, shallowly recurved, pale green, obtuse. Callus plus main gland ca 3.5 mm long, 2.5 mm across, 2 mm high, prominently insectiform, central band inconspicuous, covered with sessile and shortly stalked, clavoid calli, lateral surfaces densely covered with shiny, reddish to reddish-brown, linear-clavoid calli 0.6–1.2 mm long; basal stalk ca 2 mm long, ca 0.6 mm wide at base, dilated towards apex; main gland ca 2 mm long, straight or slightly curved, base with a few linear-clavoid calli similar to those on the callus, apex ca 1.5 mm across, broadly emarginate, dark reddish brown to blackish, shiny, irregularly ruminant. Column ca 9 mm long, at a steep angle to the ovary for the basal 2 mm then curved forwards in a semi-circle, light green, the anterior surface shortly pubescent and with a few purplish spots. Column foot ca 3 mm long, apex anvil-shaped, ca 1 mm across. Column wings in two pairs; proximal wings ca 2.5 mm x 3 mm, broadly triangular, projecting forwards, apex linear-filiform, upcurved, translucent with a few purplish spots; distal wings ca 2 mm x 0.4 mm, linear-tapered, falcate, divergent above the anther. Stigma ca 1.2 mm x 1 mm, elliptical, sunken. Anther ca 1.2 mm long, obtuse. Pollinium ca 1 mm x 0.8 mm, more or less boomerang-shaped, yellow, mealy. Capsules ca 9 mm x 3 mm, obovoid, erect.

Distribution and Habitat: Known only from the vicinity of the type locality to the south of Cooktown. The new species grows on the side of a hill in open

eucalypt forest in well drained, sandy soil containing laterite nodules.

Flowering Period: May to July.

Notes: *A. rosulatus* is a very distinctive species not readily confused with any other. The emergence of the inflorescence from the centre of the rosette is a major divergence from other members of the *A. irritabilis* complex in which the rosette is produced after flowering commences and then it appears as a lateral growth from the base of the scape. *A. rosulatus* is a relatively small-growing species with small leaves of a deep blue-green colouration which are held obliquely erect in the rosette. Its flowers are amongst the smallest in the group with the clavoid glands on the labellum being densely clustered and the emarginate apex of the main gland being blackish and prominently rugose. The winter flowering time is also notable since most species of this complex flower over summer.

Conservation Status: *A. rosulatus* appears to have been largely overlooked by collectors; suggested status 2K by criteria of Briggs & Leigh (1988).

Etymology: From the Latin, '*rosulatus*', rosetted; in reference to the leaves forming a basal rosette around the inflorescence.

Arthrochilus sabulosus D. Jones; species nova affinis *A. oreophilo* D. Jones a qua pergracile foliis hebetiviridibus rosulatis, sepalis petalisque longioribus angustioribus, labello callo clavoideis glandibus angustioribus et glande principale capitulo sparse glanduloso differt.

Typus: Queensland; Horn Island, ca 4.5 km west of airstrip towards jetty, 10°35'S, 142°15'E, 9 February 1989, D. L. Jones 3558, B. Gray, P. S. Lavarack & J. R. Clarkson (holo CBG, iso CBG, BRI, NSW, MEL).

Terrestrial, tuberous herb forming spreading colonies. Rosette separate; leaves two or three, 10–35 mm x 6–15 mm, ovate-lanceolate, ground-hugging, dull green, paler and shiny beneath, entire or undulate, acute to subacute. Inflorescence 12–37 cm tall, rhachis and scape very slender, green. Sterile bracts two or three, 5–8 mm x ca 5 mm, ovate-lanceolate, subacute to acuminate, closely sheathing. Flowers 3 to ca 15, pale green with reddish to reddish brown glands on the labellum callus. Fertile bracts 4–6 mm x 2.5–3.5 mm, linear-ovate, subacute, closely sheathing. Pedicels ca 2 mm long, slender, obliquely erect close to the rhachis. Ovary ca 4 mm x 1.7 mm, linear-ovoid, curved. Dorsal sepal 10–12 mm x ca 2 mm, linear-tapered when flattened, widest near apex, conduplicate, decurved, closely embracing the basal quarter of the column, apex obtuse with a short dorsal ridge. Lateral sepals 7.5–8 mm x ca 2 mm, more or less lanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex obtuse to slightly emarginate. Petals 8–9 mm x ca 1 mm, linear,

falcate, reflexed against the ovary, distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.1 mm long; lamina ca 6 mm x 0.8 mm, ca 2.2 mm wide at base, green with a prominent dark purplish basal blotch, connate with basal stalk of callus for ca 2 mm, free cauda ca 3 mm x 0.8 mm, ligulate, recurved, pale green, obtuse. Callus plus main gland ca 4.5 mm long, 2.4 mm across, 1.5 mm high, prominently insectiform, central band inconspicuous, covered with sessile and shortly stalked, clavoid calli, lateral surfaces densely covered with shiny, reddish to reddish-brown, linear-clavoid calli 0.6–1 mm long, basal stalk ca 2 mm long, ca 0.7 mm wide at base, dilated towards apex; main gland ca 2 mm long, straight or slightly curved, base with linear-clavoid calli similar to those on the callus, apex ca 1.5 mm across, broadly emarginate, brownish with prominent, discrete black glands appearing as spots, irregularly ruminate, somewhat shiny. Column ca 9 mm long, at a steep angle to the ovary for the basal 2 mm then curved forwards in a semi-circle, light green, the anterior surface shortly pubescent and with a few purplish spots. Column foot ca 3 mm long, apex anvil-shaped, ca 1.3 mm across. Column wings in two pairs; proximal wings ca 4 mm x 5 mm, broadly triangular, projecting forwards, apex linear-filiform, upcurved, translucent with a few purplish spots; distal wings ca 2.5 mm x 0.5 mm, linear-tapered, slightly falcate, divergent above the anther. Stigma ca 1.2 mm x 1 mm, elliptical, sunken. Anther ca 1 mm long, obtuse. Pollinium ca 1 mm x 0.8 mm, more or less boomerang-shaped, yellow, mealy. Capsule ca 9 mm x 3.5 mm, obovoid, erect.

Distribution and Habitat: Northern parts of Cape York Peninsula and Horn Island in Torres Strait. It is commonly found in a vegetation type known as 'Epacrid Scrub' (dominated by *Leucopogon* spp.), which usually inhabits stabilised sand dunes, the sand being relatively coarse grained and intensely white. Less commonly the species grows among grass and on hummocks in or close to low lying swampy areas dominated by *Pandanus* species.

Flowering Period: November to February.

Notes: *A. sabulosus* is easily confused with *A. oreophilus* but the inflorescences are much more slender with slightly smaller flowers having longer, narrower perianth segments and a green rather than blue green rosette. The labellum callus has finer clavoid glands and the main gland is much less bulbous and sparsely adorned with shiny, black plates which appear as dark spots on a paler background (the whole head is blackish from overlapping plates in *A. oreophilus*). *A. latipes* is somewhat similar but is even more robust and is readily distinguished by the much broader base to the labellum lamina.

Conservation Status: *A. sabulosus* is widespread and conserved in National Parks.

Etymology: From the Latin '*sabulosus*', growing in sandy places, in reference to the abundance of this species in sandy soils.

Arthrochilus stenophyllus D. Jones; species nova affinis *A. prolixo* D. Jones a qua foliorum rosulae perbrevioribus angustioribusque, inflorescentiis perexilibus floribus minoribus, et labello callo ornato persparse callis paucioribus brevioribusque linearibus ad lineariclavoides differt.

Typus: Queensland; Sunday Ck, south of Cardwell, 18°30'S, 146°10'E, 12 December 1988, P. S. Lavarack 3624 (holo CBG, iso CBG).

Terrestrial, tuberous herb forming loose colonies. Rosette separate; leaves two to five, 10–25 mm x 3–5 mm, linear to linear-lanceolate, ground-hugging, pale green, paler and shiny beneath, entire obtuse to subacute. Inflorescence 6–25 cm tall, rhachis and scape very slender, green to brownish. Sterile bracts two or three, 5–10 mm x ca 5 mm, ovate-lanceolate, acuminate, closely sheathing. Flowers three to ca thirteen, pale green with dark red to reddish brown glands on the labellum callus. Fertile bracts 2–4 mm x 2–3 mm, linear-ovate, subacute, closely sheathing. Pedicels ca 2 mm long, slender, obliquely erect close to the rhachis. Ovary ca 2.5 mm x 1.2 mm, linear-ovoid, curved. Dorsal sepal 7–8 mm x ca 1 mm, linear-obovoid to nearly spatulate when flattened, widest near apex, conduplicate, decurved, closely embracing the basal quarter of the column, apex obtuse with a short dorsal ridge. Lateral sepals 3.5–4.5 mm x ca 1 mm more or less lanceolate, falcate, reflexed against the ovary, distal margins conduplicate, apex unequally emarginate. Petals 5–5.5 mm x ca 0.4 mm, linear, flaccid, reflexed against the ovary, distal margins conduplicate, obtuse. Labellum hinged at the base on a claw ca 0.1 mm long; lamina ca 4.5 mm x 0.6 mm, ca 1.5 mm wide at base, green with a prominent dark red basal blotch, connate with basal stalk of callus for ca 2 mm, free cauda ca 1.5 mm x 0.6 mm, ligulate, recurved, pale green, obtuse or truncate. Callus plus main gland ca 3 mm long, 2.5 mm across, 1 mm high, prominently insectiform, central band naked, irregularly verrucose, lateral surfaces very sparsely adorned with shiny, reddish to reddish-brown, linear to linear-clavoid calli 0.3–0.7 mm long, basal stalk ca 3 mm long, ca 0.7 mm wide at base, dilated towards apex; main gland ca 2 mm long, straight ventral surface near base with a few linear-clavoid calli similar to those on the callus, apex ca 1.3 mm across, deeply emarginate as plates or spots, irregularly ruminate, somewhat shiny. Column ca 7 mm long, at a steep angle to the ovary for the basal 1.5 mm then curved forwards in a semi-circle, light green, the anterior surface shortly puberulous and with a few purplish spots. Column foot ca 2 mm long, apex anvil-shaped, ca 1 mm across. Column wings in two pairs; proximal wings ca 2 mm x 1.5 mm, triangular, projecting forwards, apex linear-filiform, upcurved, translucent with a few purplish spots; distal wings ca 1.3 mm x 0.4 mm, linear-tapered, slightly falcate, divergent above the anther. Stigma ca 0.9 mm x 0.9 mm, elliptical, sunken. Anther ca 0.8 mm long, obtuse. Pol-

linium ca 0.8 mm x 0.6 mm, sharply falcate yellow, mealy. Capsule ca 6 mm x 2.5 mm, linear-ovoid, erect.

Distribution and Habitat: Known only from the area to the south of Cardwell, north-eastern Queensland but probably more widespread (Qkn). It grows among sedges and low shrubs in low, sparse woodland dominated by *Melaleuca viridiflora*. The soil is a grey sandy loam which is inundated during the wet season.

Flowering Period: December to February.

Notes: *A. stenophyllus* has as its closest relative *A. prolixus*. Both species have long, linear to linear-clavoid glands on the

labellum callus but those of *A. stenophyllus* are much fewer and shorter. It also has much smaller flowers on a very slender inflorescence. By far its most distinctive feature is the short narrow leaves which spread in a ground-hugging, stellate rosette. Plants of *A. stenophyllus* are extremely difficult to locate when in flower.

Conservation Status: *A. stenophyllus* is locally common and conserved.

Etymology: From the Greek 'stenos', narrow, 'phyllon', leaf; in reference to the very narrow leaves of the rosette.

CALADENIA R. Br.

The genus *Caladenia* R. Br. is widely distributed in southern Australia and extends to New Zealand, New Caledonia and Java.

In parts of Australia the genus seems to be rapidly speciating, as evidenced by the presence of many species complexes, sister taxa, look-alike taxa and confusing entities of apparent hybrid origin. Pollination studies of section *Calonema* (the spider orchids) show that intimate relationships exist between certain orchid taxa and species of thynnid wasps which attempt to copulate with the orchid's labellum (Stoutamire 1975). Introgression in the main seems to be restricted to disturbed sites (R. Heberle pers. comm.). Morphological studies in conjunction with pollination biology, a logical means of sorting out suitable species complexes, when combined with extensive field work, have resulted in considerable progress on the elucidation of many closely related or look-alike taxa found in southern and south-eastern Australia. Thirty new species are described here and another is raised to species rank. The new species have resulted principally from studies into three major complexes:

C. patersonii R. Br. — a complex of taxa from south-eastern Australia which has tenuous links to a parallel complex surrounding *C. longicauda* Lindley, from Western Australia. Recurrent patterns of the spatial arrangement of the tepals, floral odours and colouration in combination with morphological features relating to the labellum, column and osmophore glands have been used to resolve, in part, this complex.

C. dilatata R. Br. — a complex which has speciated principally in South Australia with links in the eastern states and Western Australia. Features of the sepalline osmophores (colour, size and shape) are of prime morphological significance but are only useful when fresh since considerable shrinkage of whole osmophores occurs on drying accompanied by changes in colour. This makes accurate identification of some herbarium specimens difficult.

C. camea R. Br. — a complex of small to tiny-flowered taxa restricted to eastern Australia. Pollination syndromes are generally simple and of limited use in elucidating this complex. Studies are sufficiently advanced to describe seven distinctive new species some of which have only tenuous links with the group and appear to have been lumped with them for convenience.

New Species

Caladenia aerochila D. Jones; species nova
affinis *C. patersonii* R. Br. a qua floribus
minoribus multum coloratis, et labello erecto
callis margine multo longioribus linearibus
differt.

Typus: Victoria; Lake Fyans, 37°08'S, 142°38'E,
20 October 1989, P. Branwhite s.n. (D.L. Jones
5288). (holo CBG, iso CBG, MEL, AD).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 5–10 cm x 6–8 mm, linear to linear-lanceolate, erect, dull green, base irregularly blotched

with red-purple, hirsute with patent, transparent to whitish, eglandular trichomes to 1.5 mm long. Inflorescence 16–25 cm tall, wiry, densely hirsute, with patent, eglandular trichomes similar to those on the leaf, a low proportion of these gland-tipped. Sterile bracts 18–22 mm x 5–7 mm, linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 15–18 mm x 6–8 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flowers one or two, ca 5 cm across, whitish, wholly pinkish or purplish (sometimes with red central stripes), with prominent dark caudae, labellum mid-lobe often rose pink; dorsal sepal

erect and slightly incurved, lateral sepals widely divergent, slightly drooping, petals slightly drooping. Dorsal sepal 4.3–5.5 cm x 2–3 mm, linear in proximal third, then narrowed to a linear-filiform, channelled cauda ca 0.5 mm wide, densely beset with black, sessile, clavoid to moniliform glands. Lateral sepals 4.3–5.3 mm x 3–4.5 mm, linear-lanceolate in proximal third then abruptly narrowed to a linear-filiform, glandular cauda similar to that on the dorsal sepal. Petals 3.3–3.7 cm x 2.5–3 mm, linear-lanceolate in proximal third then tapered to a linear-filiform glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 1.9 mm across, whitish or pinkish, often with a bright rose-red mid-lobe. Lamina 12–16 mm x 7–9 mm linear-ovate to ovate-cordate in outline when flattened, obscurely three-lobed, erect in proximal half then curved forwards, recurved in distal third; lateral lobes 2.5–3.5 mm across, erect, margins with seven to nine calli to 3 mm long; marginal calli linear, straight or slightly recurved, white, yellowish or pink, head asymmetrically swollen, exterior surface white; mid-lobe 6–8 mm x 4–5 mm, deltate in outline when flattened, obtuse, margins with numerous, short, dark or white-tipped, obtuse calli, decrescent towards the apex. Lamina calli in four rows, the central ones extending halfway along the mid-lobe, brownish, reddish or blackish, decrescent towards the apex; basal calli ca 1.3 mm long, stalked, erect, head linear-clavoid, ca 0.2 mm across; longest lamina calli ca 1 mm long, hockey-stick-shape, on long stalks, head flat or curved when viewed from side, linear, straight or curved from above. Column 11–13 mm x ca 5 mm, recurved in proximal two-thirds then incurved, heavily suffused with red, narrowly winged; basal glands ca 0.9 mm x 0.3 mm, linear-clavoid, shiny, yellow. Anther ca 3 mm x 2 mm, deep purplish-red, with a linear rostrum ca 0.1 mm long. Pollinia four, ca 2.8 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 2 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: Victoria; Halls Gap, 29 September 1924, C. Dalton s.n.(AD); Lake Fyans, 6 November 1978, T. B. Muir 6377 (MEL); 15 km south-west of St Arnaud, 14 September 1960, T. B. Muir 1238 (MEL); Stuart Mill Flora Reserve, 12 October 1981, A. C. Beaglehole 69207 (MEL); South Australia; south-east of Penola, 2 October 1988, R. Bates 15662 (AD).

Distribution and Habitat: South-western Victoria and south-eastern South Australia (Vwh, Sse). In Victoria this species grows within open eucalypt woodland usually in sandy loam, whereas in South Australia it has been collected from rich loam in *Eucalyptus camaldulensis* woodland.

Flowering Period: September and October.

Notes: *C. aerochila* has been placed with *C. patersonii* but it is easily recognised by its relatively small, colourful flowers (sometimes prominently striped), with the labellum being much narrower and erect for much of its length before curving forwards. Its relatively long, linear marginal calli on the labellum also suggest a relationship with *C. floribunda* D. Jones. It is possibly also

related to *C. uliginosa* George and *C. patulens* Hopper & A. P. Brown, both of which differ in having their labellum thrust well forward before recurving and with more slender lateral sepals.

Conservation Status: This species is rare but conserved in a water reserve; suggest status of 3RC by criteria of Briggs & Leigh (1988).

Etymology: From the Greek 'airo', to lift up or raise, 'cheilos', a lip; in reference to the elevated labellum.

Caladenia aestiva D. Jones; species nova
affinis *C. patersonii* R. Br. a qua florescentia multum postea, floribus flavovirentibus saepe osmophoris sepalinis terminalibus, et labello margine callis grossioribus curvis differt.

Typus: Victoria; Benambra-Wulgulmerang Rd, 36°56'S, 148°23'E, 7 January 1970, A. C. Beaglehole 33327, K. C. Rogers and E. W. Finck (holo MEL, iso MEL).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 12–20 cm x 7–10 mm, linear to linear-lanceolate, dull green, reddish spotted at the base, often withered at anthesis, hirsute with patent, transparent, eglandular trichomes to 6 mm long. Inflorescence 20–50 cm tall, wiry, densely hirsute with trichomes similar to those on the leaf. Sterile bracts 25–30 mm x 4.5–6 mm, linear-obovate, sheathing or spreading, involute, long-acuminate, externally hirsute. Fertile bracts 18–23 mm x 6–8 mm, elliptical to ovate, acuminate, closely sheathing, externally hirsute. Flowers one or two, ca 4 cm across, pale greenish yellow to pale yellow, labellum similar, often with a prominent maroon mid-lobe, sepals tapered or with swollen, greenish osmophores; dorsal sepal erect and incurved, lateral sepals divergent, spreading or drooping, petals spreading or drooping. Dorsal sepal 30–55 mm x 3–3.5 mm, linear in proximal half then abruptly tapered to a linear-filiform channelled cauda ca 0.5 mm wide, either glandular throughout with green to brown, sessile, dome-shaped to clavoid glands or thickened into a brown or green, terminal osmophore 3–14 mm x ca 1 mm with similar glands. Lateral sepals 30–55 mm x 3.5–5 mm, oblong-lanceolate to lanceolate in proximal half then abruptly narrowed to a linear-filiform, cauda (either entire or with a terminal osmophore), similar to that on the dorsal sepal. Petals 25–40 mm x 2.5–3 mm, linear-lanceolate in proximal half then tapered to a long-acuminate apex, usually glandular near the apex, sometimes with a terminal osmophore similar to those on the sepals. Labellum articulated on a short claw ca 1.8 mm x 1 mm, pale greenish yellow to pale yellow, often with a maroon mid-lobe. Lamina 13–17 mm x 8–11 mm, ovate to linear-ovate in outline when flattened, obscurely three-lobed, erect in proximal third then curved forwards, distal third strongly recurved; lateral lobes ca 4 mm across, erect, margins with five to seven calli to 2 mm long; marginal calli scimitar-shaped, green or reddish, head usually recurved, asymmetrical, exterior surface often white; mid-lobe 7–10 mm x 6–

8 mm, deltate in outline when flattened, obtuse, margins with numerous, short, tooth-like calli, decrescent towards the apex. Lamina calli in four or six rows, usually not extending far onto the mid-lobe, greenish or reddish, decrescent towards the apex; basal calli ca 2 mm long, stalked, erect, head linear-clavoid, ca 0.35 mm across; longest lamina calli ca 1.6 mm long, golf-stick-shape or curved, stalked, head flat or curved when viewed from side, linear from above. Column 11–13 mm x 4.5–5 mm, recurved in proximal half then incurved, greenish yellow, sometimes with a few reddish markings, broadly winged; basal glands ca 1.2 mm x 1 mm, broadly clavoid, shiny, yellow. Anther ca 3 mm x 3 mm, green, papillate, with a linear rostrum ca 0.5 mm long. Pollinia four, ca 3 mm long, boomerang-shaped, flat, yellow, mealy. Stigma ca 3.2 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: Victoria; western slopes of Mt. Dandenong, just above Montrose, 28 December 1947, A. B. Court s.n. (MEL); vicinity of Mt. Cobbler, January 1933, D. Mathews s.n. (MEL); Wonangatta Valley, January 1935, W. H. Nicholls s.n. (MEL); Wulgulmerang, 7 January 1988, R. Bates 13725 and J. Jeanes (AD); Cravensville, 25 December 1919, S. Braine s.n. (AD).

Distribution and Habitat: Australian Capital Territory, Victoria and possibly Tasmania (Can, Vwp, Veh, Vgi, ?Tas). This species usually occurs on sheltered ridges and slopes in open forest, growing in shallow clay loam.

Flowering Period: December and January.

Notes: This species has been confused with *C. pallida* for more than one hundred and fifty years and the distinctiveness of the two taxa has only been recognised recently following a study of the types (Clements 1989). The flowers of *C. aestivalis* are much larger than those of *C. pallida* with relatively stiffly spreading segments and large, prominent sepalline osmophores. The new species has also been linked with *C. patersonii* from which it can be distinguished by the greenish-yellow flowers, the sepalline osmophores and the coarse, almost scimitar-shaped marginal calli on the labellum. Its late flowering habit is also distinctive (both *C. patersonii* and true *C. pallida* flower in October and November). Flowering is enhanced in the year after a summer bushfire. Illustrated by plate 256 in Nicholls (1969).

Conservation Status: *C. aestivalis* is widespread and conserved.

Etymology: From the Latin 'aestivus', pertaining to summer; in reference to the summer flowering habit of this species.

Caladenia argocalla D. Jones; species nova
affinis *C. eminenti* (Domin) M. Clements et
D. Jones a qua segmentis perianthii
crassioribus, labello lobis lateralibus margine
callis multo brevioribus et lamina callis
minoribus differt.

Typus: South Australia; Kapunda Hills, near Barossa Valley, 34°45'S, 138°58'E, 16 September 1988, R. Bates 15516 (holo AD, iso AD, CBG).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 12–22 cm x 10–18 mm, broadly linear to linear-lanceolate, dull green, erect, hirsute with a mixture of patent, whitish, eglandular trichomes to 5 mm long and glandular trichomes ca 2 mm long. Inflorescence 30–60 cm tall, wiry, densely hirsute with patent, whitish glandular and eglandular trichomes similar to those on the leaf. Sterile bracts 26–30 mm x 8–9 mm, linear-obovate, spreading, involute, long-acuminate, externally hirsute. Fertile bracts 20–25 mm x 9–12 mm, ovate to obovate-lanceolate, long-acuminate, closely sheathing, externally hirsute. Flowers one or two, ca 9 cm across, white to greenish white with narrow dark central stripes (rarely with a reddish blush), and dark, glandular caudae, not perfumed; dorsal sepal incurved, lateral sepals and petals drooping. Dorsal sepal 9–13 cm x 4–4.5 mm, linear-elliptical in proximal third then narrowed to a linear-filiform, channelled cauda ca 1.5 mm wide, densely beset with blackish, shortly stalked and sessile, clavoid glands. Lateral sepals 10–15 cm x 7–10 mm, ovate-lanceolate in proximal quarter, slightly falcate, tapered to a linear-filiform, glandular cauda similar to that on the dorsal sepal, drooping, widely divergent. Petals 7.5–9.5 cm x 5–6.5 mm, linear-lanceolate in proximal third then tapered to a linear-filiform, glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 3 mm x 1.5 mm, white with some dark marginal calli. Lamina 22–25 mm x 12–14 mm, broadly ovate-cordate in outline when flattened, obscurely three-lobed, erect in proximal third then curved forwards, distal third strongly recurved or coiled; lateral lobes ca 5 mm across, erect, margins with ten to twelve calli to 3 mm long; marginal calli linear, white or purplish, straight or slightly recurved, head linear-clavoid, asymmetrical, reddish black, exterior surface white; mid-lobe 13–16 mm x 7–9 mm, broadly deltate in outline when flattened, margins with numerous, short, white or white-tipped calli, decrescent towards the apex. Lamina calli in six or eight rows, crowded, the central four rows extending nearly to the apex and becoming irregular, purplish with a white dorsal surface, decrescent towards the apex; basal calli ca 1 mm long, stalked, incurved, head linear-clavoid, often somewhat irregular, ca 0.3 mm across; longest lamina calli ca 1.8 mm long, golf-club-shape, on long slender stalks, head flat or curved when viewed from side, linear, straight or curved from above. Column 15–17 mm x 6–7 mm, recurved in proximal half then incurved, transparent with reddish stripes and suffusions, broadly winged; basal glands ca 1.5 mm x 1 mm, ovoid to globose, shiny yellow with numerous reddish glands. Anther ca 4.5 mm x 4 mm, yellow to brown, papillate, with a linear rostrum ca 0.2 mm

long. Pollinia four, ca 3.3 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 3 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; road to Spring Gully, 27 September 1948, M. A. Todd s.n. (AD); 6 km north-west of Nuriootpa, Barossa Valley, October 1981, R. Bates 1029 (AD); Tanunda, 29 September 1945, W. Riedel s.n. (AD); Inman Valley, 6 October 1918, R. S. Rogers 743 (AD); Cromer, 4 October 1985, R. Bates 6398 (AD); Skilloogalee via Sevenhill, 27 September 1988, R. Bates 15547 (AD).

Distribution and Habitat: Endemic to South Australia (SIn, ?Ssl). This species was possibly a common component of good quality, fertile soils in woodland areas of reliable rainfall. It is now much more restricted due to clearing of its habitat and occurs on hills and slopes in open forest dominated by *Allocasuarina stricta*.

Flowering Period: September and October.

Notes: *C. argocalla* has affinities with both *C. eminens* from Western Australia and *C. floribunda* from south-eastern Australia, but is geographically isolated from each, the latter by the extensive barrier of the Nullarbor Plain. *C. floribunda* is found in coastal and near-coastal forests often growing close to swamps, whereas *C. argocalla* grows in hills and valleys further inland. Its flowers are generally much larger than those of *C. floribunda* and with broader, thicker-textured perianth segments than in both species. Both *C. floribunda* and *C. eminens* have much longer marginal calli in the labellum fringe.

Conservation Status: This species is threatened by clearing of its habitat; suggest 2E by criteria of Briggs and Leigh (1988).

Etymology: From the Greek 'argos', white, 'callos', beautiful; this species is known commonly by orchid enthusiasts as 'White Beauty'.

Caladenia beaugleholei D. Jones; species nova affinis *C. aestivae* D. Jones affinis, sed habitu robustiore, tepalis rigide patentibus, osmophoribus sepalinis angustioribus paene inconspicuis, et callis marginalibus labelli linearibus, differt.

Typus: Victoria; Gorae West near Portland, 14 December 1942, A. C. Beauglehole s.n. (holo MEL, iso MEL).

Hirsute, tuberous, terrestrial herb growing singly. Leaf 16–28 cm x 8–12 mm, linear to linear-lanceolate, dull green, strongly reddish blotched at the base, often partly withered at anthesis, hirsute with patent, transparent, eglandular trichomes to 8 mm long. Inflorescence 30–60 cm tall, wiry, densely hirsute with trichomes similar to those on the leaf. Sterile bracts 25–35 mm x 5–7 mm, linear-obovate, sheathing or spreading, involute, long-acuminate, externally hirsute. Fertile bracts 12–20 mm x 6–8 mm, ovate, acuminate, closely sheathing, externally hirsute.

Flowers one or two, ca 6 cm across, pale greenish yellow with a prominent maroon mid-lobe on the labellum, sepals with scarcely thickened osmophores; dorsal sepal erect and incurved, lateral sepals divergent, obliquely drooping, petals obliquely erect or spreading. Dorsal sepal 40–55 mm x 3–4 mm, linear in proximal half then abruptly tapered to a short, linear-filiform channelled cauda ca 0.5 mm wide, then slightly thickened to a greenish, terminal osmophore 18–30 mm x ca 0.6 mm, with sessile, clavoid glands. Lateral sepals 40–55 mm x 4–5 mm, lanceolate in proximal half then abruptly narrowed to a short, linear-filiform cauda with a terminal osmophore similar to that on the dorsal sepal. Petals 30–40 mm x 3–4 mm, linear-lanceolate in the proximal half then tapered to a long-acuminate apex, sometimes slightly glandular near the apex. Labellum articulated on a short claw ca 2 mm x 1 mm, greenish yellow to pale yellow in the proximal half, maroon in the distal half. Lamina 15–23 mm x 10–12 mm, ovate to ovate-lanceolate in outline when flattened, obscurely three-lobed, erect in proximal third then curved forwards, distal third strongly recurved or coiled; lateral lobes ca 5 mm across, erect, margins with six to eight calli to 3.5 mm long; marginal calli linear, usually maroon, head linear, usually recurved, exterior surface often white; mid-lobe 8–12 mm x 7–9 mm, deltate in outline when flattened, obtuse to subacute, margins with numerous, tooth-like, white-tipped calli, decrescent towards the apex. Lamina calli in four or six rows, usually extending onto the base of the mid-lobe, greenish or reddish, decrescent towards the apex; basal calli ca 2.5 mm long, stalked, erect, head linear-clavoid, ca 0.4 mm across; longest lamina calli ca 2 mm long, golf-stick-shape or curved, stalked, head curved when viewed from the side, linear from above. Column 12–14 mm x 5–6 mm, recurved in proximal half then incurved, greenish yellow with red markings on the anterior surface, broadly winged; basal glands ca 1.5 mm x 1.2 mm, broadly clavoid, shiny, yellow. Anther ca 3.5 mm x 3.5 mm, green, with a linear rostrum ca 0.4 mm long. Pollinia four, ca 3.5 mm long, boomerang-shaped, flat, yellow, mealy. Stigma ca 3.5 mm wide, green, elliptical-ovate, sunken. Capsule not seen.

Selected Collections: (all MEL); Victoria; Portland, 12 December 1942, A. C. Beauglehole s.n.; Gorae West near Portland, 25 December 1942, A. C. Beauglehole 18802; *ibid*, 12 January 1942, A. C. Beauglehole s.n.; near Mt Richmond, 20 January 1942, A. C. Beauglehole s.n.; Lorne, 28 November 1942, Rev. C. Lang s.n.; Marlo, 10 December 1937, W. Hunter s.n.; Goongerah, 20 January 1948, N. A. Wakefield; Gorae West near Portland, 22 December 1952, A. C. Beauglehole 18660.

Distribution and Habitat: Apparently endemic to Victoria where distributed in coastal districts of the south-east and south-west (Vgi, Vwp). This species grows among shrubs in stunted coastal scrub, usually in sandy soils.

Flowering Period: December to February.

Notes: This species has been confused with both *C. pallida* and *C. aestivalis* (see text of latter species for notes on *C. pallida*). Its closest congener is *C. aestivalis* which occurs in inland mountainous regions and can be distinguished by its drooping perianth segments, prominent, often very thick sepalline osmophores and relatively broad, scimitar-shaped marginal calli on the labellum. *C. beaugleholei* is a vigorous species of coastal and near-coastal localities. It often has larger flowers than *C. aestivalis*, with stiffly spreading perianth segments, lacks prominent thickened sepalline osmophores and has narrower, linear marginal calli on the labellum. Flowering is enhanced in the year after a summer bushfire. It is illustrated by Fig. 255, a & h, in Nicholls (1969).

Conservation Status: *C. beaugleholei* is widespread and conserved in a National Park.

Etymology: Named in honour of A. Clifford Beauglehole in recognition of his considerable contribution to Australian botany.

Caladenia brumalis D. Jones; species nova affinis *C. patersonii* R. Br. a qua florescentia multum praecoci, floribus albidis, segmentis perianthii ridide patentis, et labello lamina callis angustioribus differt.

Typus: South Australia; ca 10 km north of Port Victoria, 34°10'S, 137°20'E, 27 August 1983, R. Bates 3301 (holo AD, iso AD).

Hirsute terrestrial herb. Leaf 4–8 cm x 9–11 mm, lanceolate to ovate-lanceolate, dull green, base reddish, erect, hirsute with patent, transparent, eglandular trichomes to 1.8 mm long. Inflorescence 12–20 cm tall, wiry, densely hirsute with patent, transparent, glandular trichomes ca 1.5 mm long. Sterile bracts 20–26 mm x 6–8 mm, linear, spreading, involute, long-acuminate, externally hirsute. Fertile bracts 18–24 mm x 7–9 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 7 cm across, whitish to pinkish with darker central stripes, labellum white or pinkish, floral odour slight; dorsal sepal erect and slightly incurved, lateral sepals and petals stiffly spreading, widely divergent. Dorsal sepal 5–7.5 cm x 3–4 mm, linear-lanceolate in proximal quarter then narrowed to a linear-filiform, channelled cauda ca 0.5 mm wide, densely beset with black, sessile, clavoid to moniliform glands (a few glands shortly stalked). Lateral sepals 5–6.5 mm x 3.5–6.5 mm, linear-lanceolate in proximal third then abruptly narrowed to a linear-filiform, glandular cauda similar to that on the dorsal sepal. Petals 4.5–5.5 mm x 3.5–4.5 mm, linear-lanceolate in proximal third then tapered to a linear-filiform, glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 2 mm x 1.8 mm, whitish or pinkish sometimes with red markings, obscurely three-lobed. Lamina 14–16 mm x 8–10 mm, ovate-cordate in outline when flattened,

erect in proximal third then curved forwards, distal third strongly recurved; lateral lobes ca 4 mm across, erect, margins with seven to nine calli to 2.2 mm long; marginal calli linear, white or reddish black, straight or curved forwards, head asymmetrical, reddish black, exterior surface white; mid-lobe 8–9 mm x 5.5–9 mm, deltate in outline when flattened, obtuse, margins with numerous short, white-tipped calli similar to those on the lateral lobes, decrescent towards the apex. Lamina calli in six rows, the central ones extending well onto the mid-lobe, wholly white or purplish with a white dorsal surface, decrescent towards the apex; basal calli ca 1.3 mm long, stalked, erect, head linear-clavoid, ca 0.35 mm across; longest lamina calli ca 1.3 mm long, golf-stick-shape, shortly stalked, head flat or obliquely erect when viewed from side, linear, curved, from above. Column 10–12 mm x ca 4 mm, recurved in proximal half then incurved, transparent with a few reddish striae, narrowly winged, basal glands ca 1 mm x 0.8 mm, asymmetrically clavoid, shiny, yellow. Anther ca 2 mm x 1.5 mm, yellow, with a linear rostrum ca 0.4 mm long. Pollinia four, ca 2 mm long, boomerang-shaped, flat, yellow, mealy. Stigma ca 2.5 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; coast near Maitland, 13 August 1983, R. Bates 3191 (AD); section 176, hundred of Ramsay, 23 August 1970, B. J. Blaylock 1509 (AD); Port Julia, 13 August 1988, R. Bates 15016 (AD); Wanilla Conservation Park, 31 August 1986, R. Bates 6869 (AD).

Distribution and Habitat: Central-southern areas of South Australia (Syp, ?Sln, ?Sl, ?Sse). Grows among grass and shrubs in open forest.

Flowering Period: August and September.

Notes: *C. brumalis* although related to *C. patersonii* R. Br. is distinctive for its late winter-early spring flowering habit and its smaller, whitish flowers which sometimes have stiffly spreading perianth segments and with narrower lamina calli. It forms hybrids with *C. latifolia*, *C. conferta*, *C. cardiophila*, *C. stricta* and *C. macroclavia* (R. Bates, pers. comm.).

Conservation Status: Highly localised due to loss of habitat and poorly conserved; suggest 3RC according to Briggs & Leigh (1988).

Etymology: From the Latin '*brumalis*' pertaining to winter; in reference to the late winter flowering habit.

Caladenia clarkiae D. Jones; species nova affinis *C. testaceae* R. Br. a qua habitu minore, floribus perminus trichomatibus et plerumque roseis, segmentis perianthii latoribus, et labello lobis lateralibus multum evolutis margine callis paucioribus exilioribus et medilobo longiore margine callis numerosis brevibus differt.

Typus: Victoria; Colquoun State Forest,

37°49'S, 147°59'E, 22 September 1989, R. Clark s.n. (D. L. Jones 5095) (holo CBG, iso CBG, MEL).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 4–6 cm x 1–2 mm, linear, obliquely erect, acuminate, dark green, sparsely hirsute with patent, transparent, eglandular trichomes to 1.5 mm long. Inflorescence 5–12 cm tall, very slender, wiry, sparsely beset with spreading, transparent, septate, eglandular trichomes to 1.6 mm long. Sterile bracts 8–10 mm x 2–2.5 mm, narrowly ovate-lanceolate, closely sheathing or spreading, acute to subacute, externally hirsute. Fertile bracts similar. Flowers one or two, ca 2 cm across, pink or occasionally yellowish; dorsal sepal erect and strongly incurved, lateral sepals porrect and widely divergent, petals widely divergent, curving forwards in distal half. Dorsal sepal 9–11 mm x 3–3.5 mm, linear-obovate, cucullate, internally glabrous, externally with scattered, transparent, eglandular trichomes, sessile, globose, brown glands towards the apex. Lateral sepals 11–13 mm x 3.3–4 mm, asymmetrically lanceolate, falcate, divergent, acute, internally glabrous, externally beset with sessile, globose brown glands especially in distal half. Petals 10–11 mm x ca 2 mm, linear-lanceolate, falcate, acuminate, internally glabrous, externally glandular. Labellum articulated on a short claw, pink, often with reddish spots and blotches, apex purple, distinctly three-lobed. Lamina 6–6.5 mm x 4–4.3 mm, ovate in outline when flattened, erect in proximal third then curved forwards, apex recurved; lateral lobes ca 2 mm wide, erect and column-embracing, lateral margins entire, apical margins with ca four pairs of golf-stick-shape, marginal calli ca 0.5 mm long; mid-lobe ca 2.5 mm long, recurved in distal half, with ca three pairs of marginal calli similar to those on the lateral lobes and ca ten pairs of small calli decrescent to denticulations at the apex of the mid-lobe. Lamina calli in four rows extending mid-way onto mid-lobe, the basal calli yellow, rest white; basal calli four, ca 0.6 mm long, head irregularly ovoid, papillate, stalk ca 0.1 mm long; longest lamina calli ca 1 mm long, clavoid to golf-stick shape, head papillate, stalk ca 0.6 mm long. Column 5–6 mm x ca 1.5 mm, obliquely erect, strongly gibbous in distal third, whitish green with red markings, narrowly winged, a few stalked glandular trichomes near apex; central ridge ca 0.8 mm wide. Anther ca 0.8 mm x 0.8 mm, cream, papillate, with a prominent rostrum. Pollinia four, ca 1 mm long, roughly boomerang-shaped, cream, flat. Stigma ca 0.8 mm wide, more or less circular, sunken, green. Capsule not seen.

Selected Collections: Victoria; Raymond Ck Falls, 18 km north-north-west of Orbost, 23 October 1973, A. C. Beaglehole 43392 (MEL); Mallacoota National Park, 24 October 1970, A. C. Beaglehole 34377 (MEL); Tara Range Link Rd, 7 September 1970, A. C. Beaglehole 33947 (MEL); 8 km west-south-west of Toongabbie, 10 October 1983, A. C. Beaglehole 74601 (MEL); near Genoa Ck, 2 October 1987, R. Bates 10696 (AD); New South Wales; near

Kydra Trig, ca 40 km east of Cooma, 20 October 1948, J. H. Willis (MEL).

Distribution and Habitat: Southern New South Wales and eastern Victoria (Nst, ?Nse, Veh, Vgi). It is found in open forest among grasses and low shrubs, usually growing in well-structured clay loam.

Flowering Period: September and October.

Notes: *C. clarkiae* has been confused with *C. testacea* but the two are quite distinct and are separated geographically (*C. testacea* is confined to New South Wales). *C. clarkiae* is shorter growing with smaller leaves and much less-hairy flowers which are usually of a pink colouration. The flowers have broader perianth segments, much more prominent lateral lobes on the labellum and a longer, broader mid-lobe. The marginal calli are more slender, prominently golf-stick-shaped and reduce to numerous short, blunt calli on the mid-lobe. The new species also has affinities with *C. hildae* E. E. Pescott & Nicholls (a taxon which my studies show is a distinct species), but that species, which is often much more robust, has drooping perianth segments, superficial lateral lobes on the labellum and longer marginal calli. Where the two grow together, *C. clarkiae* begins flowering two or three weeks before *C. hildae*. Illustrated by fig. e, plate 230 in Nicholls (1969).

Conservation Status: Uncertain but probably conserved; suggest 3K according to Briggs and Leigh (1988).

Etymology: It gives me much pleasure to name this species in honour of Ruth Clark of Lakes Entrance, Victoria. Ruth has been an ardent student of Victorian orchids for more than fifty years and has been of major assistance to my research for the last fifteen.

Caladenia clavula D. Jones; species nova affinis *C. dilatatae* R. Br. a qua crassiore, folio majore, osmophoris sepallinis multo minoribus, labello lamina callis congestis et medilobo margine callis numerosis, et columna multo angustiore base glandibus manifeste stipitatis differt.

Typus: South Australia; Carapee Hill Conservation Park, 33°25'S, 136°10'E, 28 September 1989, R. Bates 20626 (holo AD, iso AD).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 8–13 cm x 18–22 mm, lanceolate to ovate-oblong, erect, moderately thick, dull green, blotched red at the base, hirsute with patent, whitish, eglandular trichomes to 3 mm long. Inflorescence 10–20 cm tall, moderately stout, densely hirsute with a mixture of eglandular trichomes similar to those on the leaf and shorter, glandular trichomes. Sterile bracts 18–24 mm x 3–4 mm, linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 14–18 mm x 5–7 mm, ovate to ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Ovary 8–12 mm long, linear-obovoid, hirsute with short, dark-headed, glandular trichomes. Flower usually solitary, ca 3.5 cm across, greenish yellow to brownish with reddish central stripes and suffusions, sepalline osmophores yellowish, labellum calli and mid-

lobe maroon; dorsal sepal strongly incurved, lateral sepals obliquely deflexed, parallel or slightly divergent, petals spreading, often upcurved. Dorsal sepal 35–45 mm x 3–4 mm, linear in proximal half then narrowed to a linear-filiform, channelled section ca 0.5 mm wide, terminated by a yellowish, thickened osmophore, 5–8 mm x 0.8–1 mm, with sparse, immersed, spherical, brown glandular cells. Lateral sepals 30–40 mm x 2.5–3.5 mm, linear-lanceolate in proximal half, strongly falcate, abruptly narrowed in distal half to a linear-filiform section terminated by smaller but otherwise similar osmophore to that on the dorsal sepal. Petals 22–30 mm x 1.8–2.3 mm, linear to linear-lanceolate, slightly falcate, tapered to a long-acuminate apex. Labellum articulated on a short claw ca 3 mm across, greenish to greenish brown with maroon lamina calli and mid-lobe. Lamina 13–16 mm x 13–16.5 mm, broadly cordate in outline when flattened, prominently three-lobed, curved throughout, erect in proximal half then curved forwards, apex strongly recurved; lateral lobes ca 5 mm across, erect, proximal margins entire, distal margins with five or six, obliquely erect, obtuse to subacute, linear lobes to 5 mm long, the second in from the margin being the longest; mid-lobe ca 6–7 mm x 5–5.5 mm, deltate when flattened, margins with ca twelve pairs of more or less forward-facing, linear, obtuse calli, decrescent towards the apex. Lamina calli in four congested rows extending just onto the base of the mid-lobe, dark maroon, stalked, decrescent towards the apex; basal calli ca 2.2 mm long, erect, prominently stalked, head swollen, linear-clavoid, ca 0.4 mm across; longest lamina calli ca 1.7 mm long, stalked, golf-stick shape, head erect to curved when viewed from side, ovate-oblong from above. Column 11–13 mm x 4–5 mm, recurved in proximal third then erect and incurved, transparent with reddish striae and suffusions, narrowly winged, the wings incurved; basal glands ca 2.6 mm x 0.8 mm, asymmetrically clavoid, shiny yellow, basal stalk dark red. Anther ca 3 mm x 3 mm, yellow, with a linear rostrum ca 1 mm long. Pollinia four, ca 3.2 mm x 1.8 mm, falcate-clavate, flat, yellow, mealy. Stigma ca 3 mm wide, green, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; Hincks National Park, west of Blue Range, 12 October 1968, C. R. Alcock 2406 (AD); Lake Gillies Conservation Park, 11 October 1986, R. Bates 7382 (AD); Gawler Range, near main road from Minnipa, 24 September 1989, R. Bates 20462 (AD); Paney, Gawler Range, 26 September 1989, R. Bates 20161 (AD).

Distribution and Habitat: Inland areas of South Australia (Sfr, Snl, Smu, Sse), where it occurs in sparse woodland and mallee communities, growing in red sandy soils or terra rossa over limestone.

Flowering Period: August to October.

Notes: *C. clavula* has obvious affinities with *C. dilatata* but can be readily distinguished by its much smaller sepalline osmophores, congested lamina calli, numerous marginal calli on the mid-lobe and a much

narrower column which has prominently stalked, basal glands. Plants of *C. clavula* are usually short with a relatively large leaf and sturdy inflorescence. It is known to hybridise with *C. patersonii* sens. lat and rarely with *C. toxochila*.

Conservation Status: *C. clavula* is relatively widespread and conserved in National Parks.

Etymology: From the Latin '*clavulus*', a little club; in reference to the relatively small sepalline osmophores.

Caladenia cleistantha D. Jones; species nova

affinis *C. carneae* R. Br. affinis, sed omnino minor, floribus cleistogamis et lobo medio labelli redacto callos carenti.

Typus: Victoria; Gabo Island, 37°34'S, 149°55'E, September 1973, D. L. Jones s.n. (holo CBG, iso CBG).

Hirsute, solitary, terrestrial, tuberous herb. Leaf 6–10 cm x 1–2 mm, linear, semi-erect, dark green, sparsely hirsute with patent, uniseriate, eglandular trichomes ca 1.5 mm long. Inflorescence 5–12 cm tall, very slender, wiry, with spreading, glandular, reddish-tipped trichomes to 0.5 mm long. Sterile bracts 3–5 mm x 1.5–2 mm, narrowly ovate-lanceolate, closely sheathing, externally hirsute with eglandular trichomes. Fertile bracts similar. Flowers one or two, ca 7 mm long, cleistogamous, externally reddish with brown glands. Dorsal sepal 6–7 mm x 2–2.5 mm, linear-elliptical, subacute, internally glabrous, externally with numerous, sessile, ovoid, reddish to brown glands and a few stalked reddish glands towards the base. Lateral sepals 6–7 mm x 2–3 mm, asymmetrically ovate-lanceolate, obtuse to subacute, internally glabrous, externally glandular, the glands similar to those on the dorsal sepal. Petals 6–7 mm x 2–2.5 mm, obliquely lanceolate, subacute to acute, internally glabrous, externally sparsely glandular, the glands similar to those on the dorsal sepal. Labellum deeply three-lobed, the lateral lobes firmly wrapped around the column, white with a few dark red, narrow, transverse bands, apex yellow. Lamina 4.5–6 mm x 5–6.5 mm, transversely ovate in outline when flattened, erect in proximal half, curved forwards in distal half, apex recurved; lateral lobes ca 2.5 mm wide, erect and column-embracing, slightly sinuous; mid-lobe ca 2.5 mm long, recurved in distal half, the margins devoid of calli and slightly irregular, apex linear-subacute. Lamina calli in two rows extending to the base of the mid-lobe; basal calli two, ca 0.8 mm long, head linear-ovoid, ca 0.4 mm across, pale yellow, papillate, stalk white; longest lamina calli ca 0.6 mm long, long-stalked, head linear-ovoid, erect or incurved, pale yellow, papillate, stalks white. Column 4.5–5.5 mm x ca 2 mm, erect or slightly recurved at base, then incurved, greenish with a few prominent, red, irregular, transverse bands, narrowly winged, externally with stalked glandular trichomes; central ridge ca 0.7 mm wide. Anther ca 1.2 mm x 1 mm, green to reddish, papillate, with a prominent rostrum. Pollinia four, ca 1.2 mm long, white, more or

less boomerang-shaped, flat. Stigma ca 0.8 mm wide, more or less circular, sunken, green. Capsule ca 8 mm x 4 mm, ovoid.

Distribution and Habitat: Southern New South Wales and eastern Victoria but probably overlooked and more widespread. (Nsc, Veh, Vgi). It grows among low shrubs in heathland and open forest, often in moss over rocks or in soils which have prominent accumulations of laterite nodules.

Flowering Period: August and September.

Notes: *C. cleistantha*, although related to *C. carnea*, can be immediately recognised by its much smaller, cleistogamous flowers in which the reduced labellum mid-lobe lacks any marginal calli. It also has some affinities with *C. minor* from New Zealand but can be distinguished from that taxon by the same characters. *C. cleistantha* often grows in small, localised colonies.

Conservation Status: *C. cleistantha* is probably conserved.

Etymology: From the Greek 'cleistos', closed, shut; 'anthos', a flower; in reference to the cleistogamous flowers.

Caladenia coactilis D. Jones; species nova affinis *C. carnea* R. Br. a qua caulibus crassis, foliis latioribus crassioribus, bracteis fertilibus sterilibusque multo majoribus, segmentis perianthii in textura crassioribus, et labello lamina callis multo majoribus stipitibus brevioribus crassioribusque differt.

Typus: South Australia; Telowie Gorge Conservation Park, 33°00'S, 138°10'E, 10 September 1989, R. Bates 20460 (holo AD, iso AD).

Hirsute, tuberous, terrestrial herb growing singly or in loose groups. Leaf 8–12 cm x 4–8 mm, broadly linear to linear-lanceolate, erect, thick-textured, dark green, shiny, with a dark reddish-purple base, densely hirsute with transparent, patent, unicellular, eglandular trichomes ca 1 mm long. Inflorescence 10–18 cm tall, relatively stout, dark green, densely pubescent with patent, glandular trichomes similar to those on the leaf. Sterile bracts 18–27 mm x 4.5–6 mm, linear to linear-obovate, erect and hardly sheathing, subacute to obtuse, externally hirsute with glandular trichomes similar to those of the stem. Fertile bracts 13–17 mm x 7–10 mm, linear-ovate to linear-obovate, obtuse, closely sheathing, externally hirsute. Ovary 8–10 mm long, linear-ovoid, densely glandular. Flowers one or two, ca 30 mm across, bright pink inside, externally brownish from dense glands, sweetly perfumed; dorsal sepal erect, slightly incurved, lateral sepals porrect, divergent, petals spreading, curved forwards from near the base. Dorsal sepal 18–22 mm x 4–5.5 mm, linear to linear-obovate or linear-lanceolate, erect, slightly incurved, subacute to obtuse, internally glabrous, externally brownish, densely covered with sessile and shortly stalked, ovoid to globular brownish glands. Lateral sepals 18–25 mm x 4–7 mm, asymmetrically oblong-

lanceolate to lanceolate, slightly falcate, porrect, widely divergent, obtuse to subacute, internally glabrous, externally densely glandular. Petals 18–23 mm x 3.5–5.5 mm, obliquely lanceolate, slightly falcate, widely spreading, curved forwards from near the base, acute to acuminate, internally glabrous, externally glandular. Labellum hinged at the base, bright pink with numerous, narrow, dark red, transverse bars, apex yellow, prominently three-lobed. Lamina 8–11 mm x 9–11 mm, transversely ovate in outline when flattened, erect in proximal third; lateral lobes ca 4.5 mm wide, erect and column-embracing, entire; mid-lobe ca 4 mm long, narrowly deltate, strongly recurved in distal half, yellow especially the apex, basal margins with three pairs of linear, forward-pointing calli ca 0.8 mm long, margins then irregularly crenate towards apex. Lamina calli in two or four rows extending onto the base of the mid-lobe, all bright yellow; basal calli four, head ovoid, ca 0.6 mm across, yellow, papillate, stalk ca 0.4 mm long, white; longest lamina calli ca 1 mm long, head ca 0.6 mm across, swollen, curved, yellow, papillate, stalk ca 0.5 mm long, white. Column 8–10 mm x ca 3.3 mm, erect, curved forwards in distal half, greenish with narrow, red, transverse, anterior bands, broadly winged, exterior surface beset with numerous glandular trichomes; central anterior ridge ca 2 mm wide. Anther ca 2 mm x 2 mm, dark purple, densely papillate, with a distinct rostrum. Pollinia four, ca 1 mm long, boomerang-shaped, flat, white. Stigma ca 1.8 mm across, more or less circular, sunken, green. Capsule not seen.

Selected Collections: South Australia; 20 km north-west of Gladstone, October 1982, R. Bates 2819 (AD); Moockra Tower, 3 October 1978, R. Bates s.n. (AD); Mt Remarkable National Park, 7 October 1974, P. Martinsen 122 (AD); Mambay Creek, 7 September 1974, P. Martinsen 50 (AD); Melrose, 5 September 1988, R. Bates 15318 (AD).

Distribution and Habitat: Endemic to the southern Flinders Ranges and Northern Lofty Ranges of South Australia (Sfr, Snl). It occurs in skeletal clay loams in sparse forests dominated by *Eucalyptus cladocalyx* and *Callitris* spp, rarely in mallee woodland.

Flowering Period: August and September.

Notes: *C. coactilis* has been erroneously placed with *C. quadrifaria* (formerly *C. carnea* var. *gigantea* R. Rogers) e.g. Jessop & Toelken 1986. It differs from that taxon, and all others in the *C. carnea* complex, in that all its parts are very thick textured with the leaf and bracts being particularly well developed and prominent. Its lamina calli are large and prominent and may be in two or four rows. Hybrids are produced sporadically with *C. deformis* where the two grow in close proximity (R. Bates, pers. comm.).

Conservation Status: *C. coactilis* is locally common and conserved in two Conservation Parks.

Etymology: From the Latin 'coactilis', made thick, thickened; in reference to the thick texture of most organs.

Caladenia colorata D. Jones; species nova affinis *C. rosellae* G. Carr a qua in colore cremea ad malvina vel haematina varianti, osmophoris sepalinis angustis sed distinctis, labello margine callis paucioribus brevioribusque et lamina callis numerosioribus brevioribusque 4– vel 6–seriatis differt.

Typus: South Australia; ca 5 km north-east of Hartley, 35°18'S, 139°02'E, 28 August 1988, R. Bates 15085 (holo AD, iso AD, CBG).

Hirsute terrestrial herb. Leaf 4–10 cm x 6–9 mm, linear to linear-elliptical, dull green, base reddish, erect, hirsute with a mixture of whitish, eglandular trichomes to 1 mm long and shorter, glandular trichomes. Inflorescence 5–30 cm tall, wiry, densely hirsute with a mixture of trichomes similar to those on the leaf. Sterile bracts 13–16 mm x 3–3.5 mm, linear to linear-obovate, often reddish, spreading, involute, long-acuminate, externally hirsute. Fertile bracts 12–14 mm x 5–6 mm, ovate to ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 5 cm across, commonly cream-green with a maroon labellum but variable including wholly blood red and mauve to pink, caudae blackish, floral fragrance musky; dorsal sepal incurved, lateral sepals porrect, drooping, divergent, petals widely spreading. Dorsal sepal 33–40 mm x 2–2.5 mm, linear in proximal half then narrowed to a short cauda before slightly expanding into a narrow, terminal osmophore 8–12 mm x ca 1 mm, densely beset with brown to blackish, sessile or stalked, clavoid glands. Lateral sepals 33–40 mm x 3.5–4 mm, linear-lanceolate in proximal half, then tapered to a linear-filiform, heavily glandular cauda, sometimes expanded into a terminal osmophore similar to that on the dorsal sepal. Petals 28–35 mm x 1.5–2 mm, linear-lanceolate in proximal half then tapered to a linear-filiform, heavily glandular cauda. Labellum articulated on a short claw ca 1.5 mm x 0.5 mm, wholly red, cream and red or mauve and red. Lamina 10–14 mm x 7–8 mm, ovate to linear-ovate in outline when flattened, very obscurely three-lobed, erect in proximal half then curved forwards, distal third strongly incurved; lateral lobes ca 3.5 mm across, erect, basal margins entire, distal margins with about six calli to 1.5 mm long; marginal calli linear, reddish, straight or the head curved forwards, head asymmetrical, clavoid; mid-lobe 5–7 mm x 4–5.5 mm, linear-deltate in outline when flattened, obtuse, margins with numerous, short, tooth-like, white-tipped calli, decrescent towards the apex. Lamina calli in four or six rows, the central ones extending well onto the mid-lobe, dark reddish purple, decrescent towards the apex; basal calli ca 1.3 mm long, shortly stalked, erect, head linear-clavoid, ca 0.3 mm across, longest lamina calli ca 1.3 mm long, golf-stick-shape, shortly stalked, head flat, domed or curved when viewed from side, linear from above. Column 11–13 mm x ca 5 mm, recurved in proximal half then incurved, transparent with reddish striae and suffusions, broadly winged; basal glands ca 1.2 mm x 0.7 mm, clavoid, shiny, yellow, with a few dark glandular tri-

chomes. Anther ca 3 mm x 2 mm, green or reddish, with a terminal rostrum ca 0.6 mm long. Pollinia four, ca 2.5 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 2 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; between Nuriootpa and Kapunda, September 1979, R. Bates 491 (AD); Monarto South, 29 August 1919, E. H. Isings n. (AD); Milang, 16 September 1989, R. Bates 20531 (AD); Hartley, September 1989, R. Bates s.n. (AD).

Distribution and Habitat: Endemic to South Australia where found in the Murray Region and along the eastern margins of the southern parts of the Mount Lofty Ranges, possibly also in the South-east (Smu, Sls, Sse). It occurs in woodland dominated by *Eucalyptus leucoxylon*, *E. fasciculosa*, *Allocasuarina stricta* and *Callitris preissii*, growing in sand over loam.

Flowering Period: August and September.

Notes: Although previously confused with *C. pater-sonii*, the closest congener of *C. colorata* is *C. rosella*. While the flowers of some specimens may be of a similar rich mauve-pink to that of *C. rosella*, most are cream-green with a maroon labellum and some are even wholly red. Morphologically *C. colorata* can be distinguished by its much fewer, shorter marginal calli on the labellum and more numerous, smaller lamina calli. It forms sporadic hybrids with *C. cardiochila* (R. Bates, pers. comm.). *C. colorata* has become extremely rare due to clearing of its habitat and is in danger of extinction.

Conservation Status: Suggest 2E by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*coloratus*', coloured; in reference to the colourful flowers of this species.

Caladenia conferta D. Jones; species nova affinis *C. toxochilae* Tate a qua sepalis petalisque horizontaliter patentibus, osmophoris sepalinis longioribus multo tumidioribus, labello distincte 3-lobato et lamina callis majoribus confertis irregulariter 6–seriatis differt.

Typus: South Australia; Port Julia-Port Vincent, 34°40'S, 137°53'E — 34°47'S, 137°51'E, 13 August 1988, R. Bates 15015 (holo AD, iso AD, CBG).

Hirsute terrestrial herb. Leaf 5–9 cm x 15–20 mm, ovate-lanceolate, erect, dull green, hirsute with patent, eglandular trichomes to 2.5 mm long. Inflorescence 12–25 cm tall, wiry, hirsute with trichomes similar to those on the leaf. Sterile bracts 12–18 mm x 4–6 mm, obovate-lanceolate, spreading, involute, acute, externally hirsute. Fertile bracts 10–18 mm x 6–8 mm, ovate, acute, closely sheathing, externally hirsute. Flower usually solitary, ca 3.5 cm across, yellowish green, tinged red, with a red central stripe or wholly reddish, osmophores small, floral fragrance undetectable; dorsal sepal erect and incurved, lateral sepals and petals

spreading horizontally. Dorsal sepal 18–26 mm x 2–2.5 mm, linear to linear-lanceolate, narrowed to a linear, involute section just before the osmophore; osmophore 3–5 mm x 0.8–1.2 mm, reddish or brown, with crowded, dark brown, ellipsoid to globular, sessile glandular cells. Lateral sepals 16–25 mm x 3–4 mm, oblong-lanceolate, falcate, narrowed to a linear, involute section then terminated by an osmophore similar to that on the dorsal sepal. Petals 15–20 mm x 2–2.5 mm, linear-lanceolate, shortly acuminate. Labellum articulated on a short claw ca 3 mm x 1 mm, dark green to yellowish green with a dark maroon mid-lobe and calli, three-lobed. Lamina 9–12 mm x 8–12 mm, cordate in outline when flattened, erect in proximal half, strongly recurved in distal third; lateral lobes 2.5–3 mm across, obliquely erect, proximal margins entire, distal margins with three to five, obliquely erect, obtuse, linear lobes ca 0.3–1 mm long; mid-lobe ca 4–5 mm x 4–5 mm, deltate when flattened, margins with seven to nine pairs of broad, forward-facing, obtuse teeth, decrescent towards apex. Lamina calli in six irregular rows, densely congested and occupying most of the upper surface of the lamina, dark maroon, stalked or sessile, decrescent towards apex; basal calli ca 3 mm long, stalked, head elongate-clavoid, ca 1 mm across, surface very irregular; longest lamina calli ca 1.5 mm long, gold-stick-shape, stalked, extremely irregular in shape when viewed from above, surface irregular. Column 11–13 mm x 5–5.5 mm, recurved in proximal third then incurved, transparent with fine reddish striae and markings, lower dorsal surface with stalked glandular hairs, broadly winged; basal glands ca 3 mm x 1 mm, asymmetrically ellipsoid, shiny yellow with red base. Anther ca 3 mm x 3 mm, yellow, with a linear rostrum ca 1 mm long. Pollinia four, ca 3 mm long, broadly boomerang-shaped, flat, yellow. Stigma ca 3 mm wide, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; Hincks Flora and Fauna Reserve, 7 October 1968, R. C. Nash s.n. (AD); 20 km east of Woods Well, September 1980, R. Bates s.n. (AD); coast near Maitland, 13 August 1983, R. Bates 3198 (AD); Curramulka, 17 July 1974, R. Bates 684 (AD).

Distribution and Habitat: Endemic to South Australia (Sse, Syp, Sep), where it is found in mallee woodland-broombush association usually growing in terra rossa soil over limestone; less commonly on granite outcrops in woodland.

Flowering Period: August and September.

Notes: *C. conferta* has affinities with *C. toxochila* but is easily distinguished by its horizontally spreading lateral sepals and petals, much more distinctly clavate sepalline osmophores and a distinctly three-lobed labellum most of the ventral surface of which is covered with six rows of irregularly-shaped, crowded calli. *C. conferta* is predominately a coastal species whereas *C. toxochila* grows mainly in inland ranges. It hybridises freely with *C. brumalis* (R, Bates, pers. comm.).

Conservation Status: Suggest 3RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*confertus*' crowded; in reference to the crowded calli on the labellum lamina.

Caladenia corynepetala D. Jones; species nova affinis *C. necrophyllae* D. Jones a qua columna latiore valde recurva, labello lamina callis confertis et medilobo margine callis numerosioribus longioribusque differt.

Typus: Tasmania; Murdunna, 42°57'S, 145°52'E, 2 January 1987, R. Bates 8764 (holo AD, iso AD).

Hirsute terrestrial herb. Leaf 6–13 cm x 6–8 mm, linear-lanceolate to lanceolate, dull green, base irregularly blotched with red purple, usually withering at anthesis, erect, hirsute with patent, whitish, eglandular trichomes to 3 mm long. Inflorescence 20–35 cm tall, wiry, densely hirsute with patent, whitish, eglandular trichomes to 3 mm long. Sterile bracts 15–20 mm x 3–4 mm, linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 13–18 mm x 5–6 mm, linear-ovate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 3 cm across, yellowish green with reddish central stripes and brown terminal osmophores on all segments; dorsal sepal erect and incurved, lateral sepals obliquely deflexed, parallel or crossed, petals decurved. Dorsal sepal 38–50 mm x 2–2.5 mm, linear-oblongate in proximal half, then narrowed to a linear-filiform, channelled section ca 0.3 mm wide, terminated by a prominent, thickened, dark-brown osmophore, 10–15 mm x ca 1 mm, with sparse, submerged, spherical, dark brown, glandular cells. Lateral sepals 38–50 mm x 3–3.5 mm, linear-lanceolate and falcate in proximal half then abruptly narrowed to a linear-filiform, channelled section ca 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 25–33 mm x 1.5–2 mm, linear-lanceolate, tapered to a long-acuminate to filiform section, terminated by a brown osmophore ca 5 mm x 0.6 mm. Labellum articulated on a short claw ca 2 mm x 1 mm, pale green with a dark maroon mid-lobe and calli. Lamina 13–17 mm x 13–17 mm, prominently three-lobed, broadly cordate in outline when flattened, erect in proximal third, middle third nearly horizontal, distal third strongly recurved; lateral lobes ca 4 mm across, erect, proximal margins entire, distal margins with four or five, obliquely erect, subacute, linear lobes 2–5 mm long, the second and third one in from the margins the longest; mid-lobe 8–11 mm x 5–8 mm, deltate when flattened, margins with ten or twelve pairs of forward-facing, obtuse, papillate calli, decrescent towards the apex. Lamina calli in four, densely crowded rows, extending onto base of mid-lobe, dark maroon, stalked, decrescent towards the apex; basal calli ca 3 mm long, stalked, head swollen, linear-clavoid to irregularly clavoid, ca 0.8 mm across; longest lamina calli ca 1.5 mm long, stalked, head prominently swollen when viewed from side, ovate-oblong from above.

Column 10–12 mm x 5.5–6 mm, strongly recurved in proximal half then erect, transparent, with prominent pink flecks and striae, broadly winged; basal glands ca 2 mm x 1 mm, ovoid, shiny yellow, with a few glandular trichomes. Anther ca 4 mm x 3 mm, yellow, with a linear rostrum ca 0.8 mm long. Pollinia four, ca 3 mm long, clavate-falcate, flat, dark yellow, mealy. Stigma ca 3 mm across, more or less circular, sunken. Capsule not seen.

Selected Collections: Tasmania; St Marys, 20 December 1936, A. C. Smith s.n. (MEL); Friendly Beach, Coles Bay, 14 December 1988, M. Thomas s.n. (CBG); Eastern Hill, Long Island, 19 November 1969, J. S. Whinray 404 & 968 (AD, MEL); Railton, 29 December 1986, R. Bates 8498 (AD); Goshen Rd, 7 November 1879, S. Simpson s.n. (AD); Victoria; 9.5 km east of Hedley, 9 December 1978, A. C. Beauglehole 62387 (MEL).

Distribution and Habitat: Tasmania and southern Victoria (Tas, Vgi). It is found in open forest and heath, particularly in near-coastal localities, growing in clay or sandy soils.

Flowering Period: November to January.

Notes: *C. corynepetala* has been passed over by collectors as *C. dilatata*. It can be distinguished from that species by its much later flowering habit, the presence of osmophores on the petals, longer marginal calli on the mid-lobe of the labellum and densely crowded lamina calli. *C. corynepetala* is most closely related to *C. necrophylla*, which also has osmophores on the petals, but the former species can be immediately distinguished by the strongly recurved, broader column.

Conservation Status: *C. corynepetala* is widespread but is not known to be conserved.

Etymology: From the Greek 'coryne', club, 'petalom', petal; in reference to the petalline osmophores.

Caladenia curtisepala D. Jones; species nova affinis *C. carneae* R. Br. a qua sepalo dorsali proportione brevi incurvo paene cucullato, et labello late expanso et lobis lateralibus perlatis differt.

Typus: New South Wales; Mount Ku-ring-gai, 33°36'S, 151°15'E, 3 September 1989, A. D. Bishop J82, 1–28 (holo CBG, iso CBG, NSW).

Hirsute, solitary, terrestrial, tuberous herb. Leaf 6–18 cm x 1.5–2 mm, linear, semi-erect to lax, dark green, sparsely hirsute with patent, uniseriate, eglandular trichomes ca 1.8 mm long. Inflorescence 5–18 cm tall, very slender, wiry, with spreading, glandular, reddish-tipped trichomes to 0.7 mm long. Sterile bracts 5–8 mm x 2–2.5 mm, narrowly ovate-lanceolate, closely sheathing, externally hirsute with eglandular trichomes. Fertile bracts similar. Flower solitary, 1.4–2.2 cm across, white to cream, externally yellowish green with brown glands; dorsal sepal erect and incurved, lateral sepals porrect, divergent, petals

curved forwards. Dorsal sepal 8–13 mm x 2.8–3.5 mm, linear-elliptical, semi-cucullate, subacute, internally glabrous, externally with numerous, sessile, ovoid, reddish to brown glands and a few stalked reddish glands towards the base. Lateral sepals 11–16 mm x 4–5 mm, asymmetrically ovate-lanceolate, obtuse to subacute, internally glabrous, externally glandular, the glands similar to those on the dorsal sepal. Petals 9–12 mm x 2.5–3 mm, obliquely lanceolate, falcate, subacute to acute, internally glabrous, externally sparsely glandular, the glands similar to those on the dorsal sepal. Labellum articulated on a short claw ca 0.6 mm long, 0.6 mm wide, deeply three-lobed, white with numerous, dark red, narrow, transverse bands, apex yellow. Lamina 6–7 mm x 7–8 mm, almost reniform in outline when flattened, erect in proximal half, curved forwards in distal half, apex recurved; lateral lobes ca 3.5 mm wide, erect but widely flared and not column-embracing, entire or slightly sinuous; mid-lobe ca 2.5 mm long, recurved in distal half, with a basal pair of stalked, yellow-topped, marginal calli and three or four pairs of yellow, sessile marginal calli, distal margins irregularly sinuous, apex linear-subacute. Lamina calli in two rows extending to the base of the mid-lobe; basal calli four, ca 1 mm long, head ovoid-clavoid, ca 0.4 mm across, yellow, papillate, stalk white; longest lamina calli ca 0.8 mm long, long-stalked, head ovoid, erect or incurved, yellow, papillate, stalks white. Column 6–7 mm x ca 3 mm, erect or slightly recurved at base, then incurved, greenish with numerous, prominent, red, irregular, transverse bands, broadly winged, upper and lower parts of wings incurved, externally with stalked glandular trichomes, especially on the upper parts; central ridge ca 1 mm wide. Anther ca 1.6 mm x 1.4 mm, cream to purplish, papillate, with a prominent rostrum. Pollinia four, ca 1.8 mm long, white, more or less boomerang-shaped, flat. Stigma ca 1.2 mm wide, more or less circular, sunken, green. Capsule not seen.

Distribution and Habitat: At present known only from a couple of Sydney suburbs and Ku-ring-gai Chase north of Sydney, but probably more widespread in the Central Coast region and overlooked due to confusion with *C. carneae* (Ncc). It grows among low shrubs in heathland and dense low shrubland on formations of Hawkesbury sandstone.

Flowering Period: August and September.

Notes: *C. curtisepala* is part of the complex of taxa surrounding *C. carneae*. It can be distinguished from all others by its dorsal sepal being shorter than the lateral sepals and being incurved or even nearly cucullate. In most other related taxa, the dorsal sepal is erect or even prominently recurved. *C. curtisepala* also has a broadly flared labellum with prominent, very wide lateral lobes.

Conservation Status: *C. curtisepala* is conserved in the Ku-ring-gai Chase National Park and probably elsewhere.

Etymology: From the Latin 'curtus', short; 'sepalum', a sepal; in reference to the proportionately short dorsal sepal.

Caladenia demissa D. Jones; species nova affinis *C. patersonii* R. Br. a qua sepalis lateralibus petalisque demissis, labello angustiore callis majoribus, et columna longiore magis recurva differt.

Typus: Victoria; Ironbark Reserve, near Stawell, 37°45'S, 143°07'E, 16 October 1989, P. Branwhite s.n. (holo CBG, iso CBG, MEL).

Hirsute solitary terrestrial herb. Leaf 5–9 cm x 6–8 mm, linear-lanceolate, erect, dull green, base irregularly blotched with red, hirsute with patent, eglandular, multicellular, transparent trichomes to 2.5 mm long. Inflorescence 18–27 cm tall, wiry, densely hirsute with patent trichomes similar to those on the leaf. Sterile bracts 18–24 mm x 5.5–7 mm, linear-obovate, long-acuminate, spreading, involute, externally hirsute. Fertile bracts 18–23 mm x 7–9 mm, ovate-lanceolate, acuminate, externally hirsute. Flower usually solitary, ca 4 cm across, whitish cream to pinkish with reddish-pink central stripes, the caudae dark and heavily glandular, labellum reddish to maroon; dorsal sepal erect and incurved, lateral sepals and petals divergent, drooping. Dorsal sepal 6–7 cm x 3.5–4 mm, linear-ovate in proximal quarter, then narrowed to a linear-tapered blackish, glandular cauda with involute margins, becoming filiform near the apex; glands dark purple, porrect, moniliform, mostly of three cells. Lateral sepals 6.5–7.5 cm x 6–7 mm, lanceolate to nearly ovate in proximal quarter, then abruptly narrowed, tapered, involute and glandular as in the dorsal sepal. Petals 5–5.8 cm x 4–4.5 mm, linear-lanceolate in proximal third then abruptly narrowed, involute, tapered and glandular as in the dorsal sepal, slightly falcate. Labellum articulated on a short claw ca 2 mm x 1 mm, pinkish to reddish, distinctly darker towards the apex. Lamina 15–18 mm x 10–12 mm, linear-ovate in outline when flattened, obscurely three-lobed, erect in basal third, then curved forwards, the distal third recurved; lateral lobes ca 4 mm across, erect, margins with six or seven pairs of obliquely erect, stalked, pale-tipped, marginal calli, golf-stick-shape, the longest near the middle (ca 2.5 mm long), decrescent towards the middle and base; mid-lobe 8–9 mm x 5–6 mm, linear-ovate in outline when flattened, obtuse, margins with nine to twelve pairs of pale-tipped, golf-stick-shape marginal calli, becoming decrescent and sessile towards the apex. Lamina calli in four to six, well-spaced rows, the central rows extending three-quarters of way to apex, dark red to purplish, stalked, linear, decrescent towards apex; basal calli four, ca 2 mm long, erect, shortly stalked, head linear-clavoid, ca 0.2 mm across; longest lamina calli ca 2.3 mm long, stalked, more or less golf-stick-shape, head obliquely erect to flat, upper surface lighter coloured, stalk ca 0.4 mm long, linear. Column 10–12 mm x 4–4.5 mm, strongly recurved in proximal two-thirds then incurved, greenish with red or pink suffusions, glandular dorsally and ventrally in the basal half; basal glands ca 1.2 mm x 0.5 mm, linear-clavoid, asymmetric, shiny, yellow. Anther ca 3 mm x 3 mm, yellow, shortly rostrate. Pollinia four, ca 2.2 mm long,

boomerang-shaped, flat, dark yellow, mealy, Stigma ca 2.6 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: Victoria; Deep Lead Flora and Fauna Reserve, 6 October 1981, A. C. Beauglehole 69071 (MEL).

Distribution and Habitat: Apparently endemic to western Victoria (Vwh), where it grows on slopes and ridges in sparse open forest dominated by ironbarks. Soils are shallow clay loams, often stony.

Flowering Period: September and October.

Notes: *C. demissa* is part of the *C. patersonii* complex but is easily distinguished by its strongly drooping lateral sepals and petals and the proportionately long, heavily glandular caudae on all segments. Additionally it can be distinguished by its narrower labellum with larger marginal teeth, larger lamina calli and a prominently recurved column.

Conservation Status: Suggest 1KC according to Briggs & Leigh (1988).

Etymology: From the Latin '*demissus*', hanging down, drooping; in reference to the drooping perianth segments.

Caladenia flaccida D. Jones; species nova affinis *C. filamentosae* R. Br. a qua segmentis perianthii demissis longioribus, et labello multo majore distincte trilabato et lamina callis majoribus differt.

Typus: New South Wales; Sims Gap, 33°52'S, 146°13'E, 14 September 1988, D. L. Jones 2855 & M. A. Clements (holo CBG, iso CBG, NSW, MEL, AD, PERTH).

Hirsute terrestrial herb. Leaf 12–18 cm x 4–6 mm, linear, dull green, erect or flaccid, hirsute with a mixture of patent, eglandular trichomes to 3 mm long and shorter, glandular trichomes. Inflorescence 12–23 cm tall, very slender, wiry, densely hirsute with a mixture of eglandular trichomes to 2.5 mm long and shorter glandular trichomes. Sterile bracts 10–16 mm x 2–3 mm, linear to linear-lanceolate, spreading, involute, acuminate, externally hirsute. Fertile bracts 8–14 mm x 4.5–6 mm, ovate, subacute, closely sheathing, externally hirsute. Flowers one to three, ca 6 cm across, cream, pinkish or red with long, dark, filamentous caudae, exterior surface darker; dorsal sepal erect or lax, lateral sepals divergent, drooping, petals drooping. Dorsal sepal 6–9 cm x 1.5–2 mm, linear in proximal fifth then abruptly narrowed to a filamentous cauda ca 0.4 mm long. Lateral sepals 6–9 cm x 2–2.5 mm, linear-lanceolate in basal fifth, slightly falcate, then abruptly narrowed to a filamentous, glandular cauda similar to that on the dorsal sepal. Petals 5.5–8 cm x 2–2.5 mm, linear-lanceolate in proximal fifth then abruptly narrowed to a filamentous, glandular cauda similar to that of the sepals. Labellum articulated on a short claw ca 1 mm across, cream with red lines and markings or wholly red. Lamina 7–10 mm x 5.5–6.5 mm, linear-cordate in outline when flattened,

distinctly three-lobed, erect in basal quarter, nearly horizontal in middle half, apical quarter sharply recurved; lateral lobes ca 2 mm across, erect, proximal margins entire, distal margins with ca five pairs of white-tipped, broad, truncate marginal calli; mid-lobe 4.5–5.5 mm x ca 3.5 mm, linear-ovate in outline when flattened, obtuse, margins with eight to eleven pairs of white-tipped, broad, truncate marginal calli decrescent to the apex. Lamina calli in two rows, crowded, extending to the base of the mid-lobe, cream, stalked, decrescent towards the apex; basal calli ca 1 mm long, erect, shortly stalked, head linear-clavoid; longest lamina calli ca 1 mm long, head obliquely erect or curved when viewed from the side, ovate-oblong from above. Column 6–8 mm x ca 3 mm, slightly recurved in proximal third then erect and incurved, cream or reddish, narrowly winged, hirsute with dark glandular trichomes especially on the central ridge. Anther ca 1.5 mm x 1.2 mm, yellow or red, obtuse. Pollinia four, ca 1.3 mm long, roughly boomerang-shaped, flat, yellow, mealy. Stigma ca 2 mm wide, more or less circular, sunken. Capsule 12–16 mm x 4–6 mm, ovoid, densely glandular.

Distribution and Habitat: South-eastern Queensland, New South Wales, South Australia and possibly northern Victoria (Qmo, Nnt, Nct, Nss, Sfr, Sln, Vma). It is found on ridges and slopes in open forest and woodland, often growing with *Callitris* species. Soils are commonly sandy but the species also grows in clay loams.

Flowering Period: August to October.

Notes: *C. flaccida* has obvious relationships with *C. filamentosa* but can be distinguished by its drooping segments (especially the petals), and its larger labellum which is distinctly three-lobed and with larger lamina calli.

Conservation Status: *C. flaccida* is widespread (but sporadic) and conserved in National Parks.

Etymology: From the Latin '*flaccidus*', weak, drooping; in reference to the drooping perianth segments.

Caladenia floribunda D. Jones; species nova affinis *C. patersonii* R. Br. a qua floribus majoribus albis, sepalis lateralibus petalisque demissis, et labello margine callis multo longioribus linearibus, et *C. eminenti* (Domin) M. Clements et D. Jones a qua labello margine callis multo brevioribus differt.

Typus: Victoria; ca 1 mile north-west of Anglesea, 38°25'S, 144°11'E, 9 October 1969, T. B. Muir 4723 (holo MEL).

Hirsute terrestrial herb. Leaf 10–18 cm x 8–12 mm, linear-lanceolate, dull green to grey-green, base sometimes mottled reddish, erect, hirsute with patent, transparent to whitish, eglandular trichomes to 3.5 mm long. Inflorescence 20–80 cm tall, wiry, densely hirsute with trichomes similar to those on the leaf. Sterile bracts 15–23 mm x 4–5 mm, linear-obovate, spreading, acuminate, externally hirsute. Fertile bracts 15–22 mm x 4.5–7 mm, ovate to

ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flowers one or two, ca 8 cm across, white with pinkish central stripes and dark glandular caudae, labellum sometimes pinkish, marginal calli dark; dorsal sepal erect, recurved or incurved, lateral sepals and petals drooping. Dorsal sepal 6–9 cm x 2–3.5 mm, linear to linear-elliptical in proximal third then narrowed to a linear-filiform, channelled cauda ca 1 mm wide, densely beset with dark, clavoid to moniliform (sometimes branched) glands. Lateral sepals 6–10 cm x 4.5–7.5 mm, linear-lanceolate to lanceolate in proximal third, slightly falcate, abruptly narrowed to a linear-filiform, glandular cauda similar to that on the dorsal sepal. Petals 5–8 cm x 2–6 mm, linear-lanceolate in proximal third then tapered to a linear-filiform, glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 2 mm x 1 mm, white, less commonly pinkish, with prominent dark marginal calli, obscurely three-lobed. Lamina 16–23 mm x 10–14 mm, broadly ovate to ovate-cordate in outline when flattened, erect in proximal third then curved forwards, distal third strongly recurved; lateral lobes ca 5 mm across, erect, margins with nine to thirteen calli to 3.5 mm long; marginal calli linear, dark reddish black, straight or slightly recurved, head linear-clavoid, asymmetrical, reddish black, exterior surface white; mid-lobe 8–13 mm x 7–9 mm, broadly deltate in outline when flattened, margins with numerous, short, white-tipped, forward-pointing calli, decrescent towards the apex. Lamina calli in four or six rows, the central ones extending well onto the mid-lobe, sometimes nearly to the apex, purplish with a white dorsal surface, decrescent towards the apex; basal calli ca 1.5 mm long, wholly white, stalked, erect, head linear-clavoid, ca 0.4 mm across; longest lamina calli ca 1.4 mm long, hockey-stick-shape, on long, slender, papillate stalks, head flat or curved when viewed from side, linear, straight or curved from above. Column 11–15 mm x 5–5.5 mm, recurved in proximal half then incurved, transparent with reddish longitudinal striae, narrowly winged; basal glands ca 1.3 mm x 0.6 mm, ovoid, shiny yellow with a few reddish glands. Anther ca 3 mm x 2 mm, yellow, with a linear rostrum ca 0.5 mm long. Pollinia four, ca 3 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 2.5 mm wide, green, more or less elliptical, sunken. Capsule 14–18 mm x 6–8 mm, ovoid to obovoid, glandular.

Selected Collections: South Australia; Big Heath National Park, 2 November 1969, E. N. S. Jackson 1596 (AD); south-east of Penola, 2 October 1988, R. Bates 15661 (AD); The Springs, 16 km west Mt. Gambier, 20 October 1934, E. H. Ising s.n. (AD); Victoria; Gorae West, 23 October 1942, A. C. Beaglehole s.n. (MEL); Roses Ck. Rd., The Grampians, 10 October 1971, T. B. Muir 4995 (MEL); Ocean Grove, 13 October 1931, W. H. Nicholls s.n. (MEL).

Distribution and Habitat: Western Victoria and south-eastern South Australia (Vwp, Vwh, Sse, 2Ssl). It is a common orchid of coastal and near-coastal localities, growing on ridges and slopes in open forest in both clay loams and sandy loams and also frequently in low-lying

areas adjacent to swamps. It commonly flowers in profusion after summer fires.

Flowering Period: September to November.

Notes: *C. floribunda* has long been regarded as the large white form of *C. patersonii*. Examination of the type of the latter species, however, shows clearly that the two are distinct and in fact with its white flowers and linear marginal teeth in the labellum fringe, *C. floribunda* is better placed as a relative of the group of large western species which include *C. eminens* (Domin) M. Clements & D. Jones and *C. longicauda* Lindley. It can be distinguished from these species by its much shorter marginal calli on the labellum. The western species are separated by the significant geographical barrier of the Nullarbor Plain. *C. floribunda* forms sporadic hybrids with various species in the *C. dilatata/tentaculata* alliance. Illustrated by fig. a, plate 259 in Nicholls (1969).

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin '*floribundus*', flowering profusely, in reference to its stimulation by summer fires.

Caladenia haemantha D. Jones; nova affinis

C. concolori Fitzg. a qua floribus haematina, segmentis perianthii caudis dense glandulosi, et labello per totam longitudinem marginis callis multo numerosioribus differt.

Typus: South Australia; Mt Scott Conservation Park, 36°45'S, 140°10'E, 2 October 1988, R. Bates 21043 (holo AD, iso AD).

Hirsute terrestrial herb. Leaf 8–14 cm x 9–12 mm, lanceolate, dull green, erect, hirsute with a mixture of patent, transparent to whitish, eglandular trichomes to 4 mm long and glandular trichomes ca 1 mm long. Inflorescence 20–60 cm tall, wiry, densely hirsute with hairs similar to those on the leaf. Sterile bracts 18–26 mm x 3–5 mm, linear to linear-obovate, spreading or closely sheathing, involute, long-acuminate, externally hirsute. Fertile bracts 18–26 mm x 5–9 mm, obovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 5 cm across, bright pinkish red to blood red, sometimes with yellowish suffusions, labellum reddish black towards apex; dorsal sepal erect and incurved, lateral sepals and petals spreading stiffly or slightly drooping. Dorsal sepal 4.5–7 cm x 2–3 mm, linear in proximal third then narrowed to a densely glandular, linear-filiform, channelled cauda ca 0.5 mm wide; glands blackish, moniliform, crowded, porrect. Lateral sepals 5–7 cm x 4.5–6 mm, asymmetrically lanceolate in proximal third then abruptly narrowed to a linear-filiform, glandular cauda similar to that on the dorsal sepal, porrect, widely divergent. Petals 4–6 cm x 3–4 mm, linear-lanceolate in proximal third then tapered to a linear-filiform, glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 2 mm x 1 mm, blood red but sometimes whitish towards the base, apex often blackish red, very obscurely three-lobed. Lamina 16–

20 mm x 9–11 mm, ovate-cordate in outline when flattened, erect in proximal quarter then curved forwards, distal half strongly recurved or coiled; lateral lobes ca 4 mm across, erect, margins with ten to twelve calli to 2 mm long; marginal calli linear, reddish black, head straight or curved forwards, asymmetrical, linear-clavoid, reddish black; mid-lobe 8–11 mm x 6–8 mm, deltate in outline when flattened, obtuse, margins with numerous, short calli, decrescent towards the apex. Lamina calli in six rows, the central ones extending well onto the mid-lobe and often nearly to the apex, dark reddish black, decrescent towards the apex; basal calli ca 1 mm long, stalked, erect or incurved, head linear-clavoid, ca 0.2 mm across; longest lamina calli ca 1.5 mm long, golf-stick-shape, shortly stalked, head flat or curved when viewed from side, linear and slightly curved from above. Column 14–16 mm x 4.5–5 mm, recurved in proximal half then incurved, dark red, narrowly winged; basal glands ca 1.2 mm x 7 mm, oblong-clavoid, shiny, yellow, red at base. Anther ca 3 mm x 2 mm, yellowish to red, densely papillate, with a very short, obtuse rostrum. Pollinia four, ca 2.6 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 3.2 mm wide, green to red, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; Mc Elroys Property, Coonawarra, 2 October 1988, R. Bates 15659 (AD); Victoria; Mooralla, north of Cavendish, October 1945, L. & L. Tucker (A. C. Beauglehole 4932) (MEL).

Distribution and Habitat: South-eastern South Australia and south-western Victoria (Sse, Vwp). Commonly occurs in open woodland under eucalypts and casuarinas in sandy soil, but also recorded from limestone hillocks (e.g. R. Bates 21043).

Flowering Period: September and October.

Notes: *C. haemantha* has been previously misidentified as *C. concolor* (Jessop & Toelken 1986). Although superficially similar, *C. haemantha* is a distinct species readily recognised by its brighter red flowers with heavily glandular caudae on the perianth segments and the margins of the labellum adorned with calli for their whole length.

Conservation Status: *C. haemantha* appears to be uncommon and is not known to be conserved; suggest 3R according to Briggs & Leigh (1988).

Etymology: From the Greek '*haema*', blood or blood red, '*anthos*', a flower; in reference to the blood red flowers.

Caladenia helvina D. Jones; species nova

affinis *C. pallidiae* Lindley and *C. aestivalae* D. Jones a quibus floribus multo majoribus, segmentis perianthii longis filamentosis demissis sine osmophoris terminalibus differt.

Typus: Tasmania; Fingal, 41°38'S, 147°58'E, 14 December 1988, L. Rubenach s.n. (D.L. Jones 3449) (holo CBG, iso CBG).

Hirsute, terrestrial herb. Leaf 10–16 cm x 5–20 mm, linear to lanceolate, dull green, base reddish, hirsute

with patent, transparent, eglandular trichomes to 2.5 mm long. Inflorescence 20–50 cm tall, wiry, densely hirsute with a mixture of transparent, eglandular trichomes to 2 mm long and short glandular trichomes. Sterile bracts 15–35 mm x 4–8 mm, linear to linear-obovate, spreading, involute, long-acuminate, externally hirsute. Fertile bracts 15–30 mm x 7–10 mm, ovate, long-acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 5 cm across, greenish yellow to tawny yellow or pale yellow, with long, dark, filamentous glandular caudae; dorsal sepal erect, incurved or lax, lateral sepals drooping, divergent, petals drooping. Dorsal sepal 5.5–8.5 cm x 3–4 mm, linear in proximal quarter then abruptly narrowed to a linear-filiform, channelled cauda ca 0.8 mm wide, densely beset with purple, sessile and stalked, ovoid glands. Lateral sepals 5.5–8.5 cm x 3.5–6 mm, lanceolate in proximal quarter then abruptly narrowed to a filamentous, glandular cauda similar to that on the dorsal sepal. Petals 4.3–6 cm x 2–2.5 mm, linear in proximal third then tapered to a linear-filiform, glandular cauda similar to that on the sepals. Labellum articulated on a short claw ca 1.5 mm x 0.5 mm, greenish yellow or dull yellow with yellow or reddish-purple calli, obscurely three-lobed. Lamina 15–19 mm x 8–10 mm, ovate to ovate-cordate in outline when flattened, erect in proximal half then curved forwards, apex incoiled; lateral lobes ca 4 mm across, erect, margins with five to seven calli to 2 mm long; marginal calli linear, yellow or reddish purple, straight or recurved, head asymmetrical, linear-clavoid, exterior surface often white; mid-lobe 9–12 mm x 6–7 mm, linear-deltate in outline when flattened, obtuse, margins with numerous, short, linear and tooth-like marginal calli, decrescent towards the apex. Lamina calli in four or six rows, the central ones extending onto the base of the mid-lobe, wholly yellowish or purplish with a yellow or white dorsal surface, decrescent towards the apex; basal calli ca 2 mm long, stalked, erect, head linear-clavoid, ca 0.3 mm across; longest lamina calli ca 2 mm long, golf-stick or hockey-stick-shape, stalked, head flat or curved when viewed from side, linear from above. Column 11–13 mm x 6–7 mm, recurved in proximal third then incurved, yellowish, very broadly winged; basal glands ca 1.3 mm x 1 mm, ovoid, shiny yellow. Anther ca 2.5 mm x 2.5 mm, yellow, with a linear rostrum ca 0.4 mm long. Pollinia four, ca 3 mm long, clavate, flat, yellow, mealy. Stigma ca 3 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Distribution and Habitat: Apparently endemic to northern Tasmania, this species occurs among shrubs in tall open forest, growing in shallow clay loam.

Flowering Period: December and January.

Notes: *C. helvina* has been confused with *C. pallida* and also has some affinities with *C. aestiva*. It can be distinguished from both by its much longer perianth segments with strongly drooping, heavily glandular filamentous caudae.

Conservation Status: Uncommon and not known to be conserved; suggest 2R by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*helvinus*', yellowish, pale yellow; in reference to the flower colour.

Caladenia leptoclavia D. Jones; species nova
affinis *C. atroclaviae* D. Jones et M. Clements
a qua floribus majoribus, segmentis omnibus
perianthii osmophoris longioribus
exilioribusque, labello saccato magis pro-
fundo, et columna multo longiore differt.

Typus: New South Wales, ca 6 km north of Bethungra, 34°45'S, 147°51'E, 27 September 1989, D. L. Jones 5110 and M. A. Clements (holo CBG).

Hirsute terrestrial herb. Leaf 8–14 cm x 8–11 mm, linear to linear-lanceolate, dull green, base reddish, erect, hirsute with a mixture of patent, transparent, eglandular trichomes to 2 mm long and glandular trichomes ca 1 mm long. Inflorescence 20–60 cm tall, wiry, densely hirsute with trichomes similar to those on the leaf. Sterile bracts 23–26 mm x 3–3.5 mm, linear to linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 17–22 mm x 6–8 mm, ovate to obovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 7 cm across, cream to greenish with dark reddish central stripes and long, slender, black osmophores, labellum maroon; dorsal sepal erect and incurved, lateral sepals porrect, widely divergent, petals slightly drooping. Dorsal sepal 5–6.5 cm x 3.5–4 mm, linear-lanceolate in proximal half then narrowed to a linear-filiform, channelled cauda ca 0.5 mm wide, terminated by a slightly thickened, linear, black osmophore ca 20 mm x 1 mm, densely beset with sessile, black, clavoid glandular cells. Lateral sepals 5–6.5 cm x 3.5–4 mm, lanceolate in proximal half then tapered to a linear-filiform cauda and terminal osmophore similar to that on the lateral sepals. Petals 4.5 cm x 3 mm, linear-lanceolate in proximal third then tapered to a linear-filiform cauda and terminal osmophore similar to that on the lateral sepals but shorter. Labellum articulated on a short claw ca 3 mm x 1 mm, wholly red or whitish at base and with a dark maroon mid-lobe, obscurely three-lobed. Lamina 16–19 mm x 10–12 mm, ovate to linear-cordate in outline when flattened, erect in proximal third then curved forwards, distal third strongly recurved; lateral lobes ca 5 mm across, erect, margins with eight to ten calli to 1.5 mm long; marginal calli linear, reddish black, spreading, head asymmetrical; mid-lobe 10–12 mm x ca 8 mm, linear-deltate to deltate in outline when flattened, apex with a short glandular cauda, margins with numerous, short dark red, tooth-like calli, decrescent towards the apex. Lamina calli in four rows, the central ones extending well onto the mid-lobe, dark red, decrescent towards the apex, basal calli ca 2 mm long, stalked, erect, head irregularly clavoid; longest lamina calli 1.5 mm long, golf-stick-shape, on long stalks, head flat or obliquely erect when viewed

from the side, linear, slightly curved from above. Column 12–14 mm x ca 5 mm, recurved in proximal half then incurved, transparent with reddish striae and suffusions, narrowly winged; basal glands ca 1.4 mm x 1 mm, asymmetrically globose, shiny, yellow, with scattered, dark, glandular trichomes. Anther ca 3.5 mm x 3 mm, dark red, with a linear rostrum ca 0.8 mm long. Pollinia four, ca 3 mm long, broadly boomerang-shaped, flat, yellow, mealy. Stigma ca 3.3 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Distribution and Habitat: Known only from the vicinity of the type locality (Nst). It occurs among low shrubs in open forest dominated by ironbarks, growing in brown, sandy, clay loam.

Flowering Period: September and October.

Notes: *C. leptoclavia* has affinities with *C. atroclavia* but can be distinguished by its larger flowers which have longer, very slender, black osmophores on all perianth segments. In addition the lateral lobes of the labellum are much more erect, imparting a deeply saccate appearance quite different from the flattish labellum of *C. atroclavia*. The latter species has a short column (ca 10 mm long) whereas that of *C. leptoclavia* is much longer (ca 13 mm). The two species are separated geographically by a gap of ca 1000 km. *C. leptoclavia* grows sympatrically with *C. concolor* Fitzg. and putative hybrids between the two are known.

Conservation Status: *C. leptoclavia* is known only from a single locality which has no security of tenure; suggested status of 1E by criteria of Briggs & Leigh (1988).

Etymology: From the Greek '*leptos*' thin, slender and Latin '*clavus*', club; in reference to the long, slender osmophores.

Caladenia macroclavia D. Jones; species nova affinis *C. dilatatae* R. Br. a qua osmophoris sepalinis permajoribus, labello perlongiore quam lato, et columna longiore et alis proportione angustioribus et base glandibus stipitatis irregulariter claviformis differt.

Typus: South Australia; ca 15 km east of Minlaton, 34°46'S, 137°36'E, 10 September 1988, R. Bates 15432 (holo AD, iso AD, CBG).

Hirsute terrestrial herb. Leaf 8–14 cm x 10–13 mm, ovate-lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 2.5 mm long. Inflorescence 15–28 cm tall, wiry, hirsute, with patent, eglandular trichomes to 2.5 mm long. Sterile bracts 16–22 mm x 5–6 mm, obovate-lanceolate, spreading, involute, acuminate, externally hirsute. Fertile bracts 15–20 mm x 7–9 mm, ovate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 5.5 cm across, green to yellowish green with a prominent dark red central band, prominent dark brownish osmophores, floral fragrance undetectable; dorsal sepal erect and incurved, lateral sepals spreading, divergent, petals

obliquely decurved. Dorsal sepal 45–57 mm x 2–3 mm, linear to linear-lanceolate at base then narrowed to a linear channelled section ca 0.3 mm wide, terminated by a prominent, thickened, laterally flattened, brown, bayonet-shaped osmophore 12–16 mm x 1.5–2 mm, consisting of minute, densely packed, dark brown, globular, sessile, glandular cells. Lateral sepals 45–52 mm x 3.5–4 mm, linear-lanceolate, falcate, abruptly narrowed in distal half to a linear channelled section ca 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 30–35 mm x ca 1.5–2 mm, linear-lanceolate, long-acuminate, sometimes wholly reddish. Labellum articulated on a short claw ca 2.5 mm x 1.5 mm, green to yellowish green with a dark maroon mid-lobe and calli, prominently three-lobed. Lamina 18–22 mm x 14–18 mm, elongated-cordate in outline when flattened, curved throughout, erect in proximal third, strongly recurved in distal third; lateral lobes ca 5 mm across, erect, proximal margins entire, distal margins with six or seven obliquely erect, obtuse to subacute, linear lobes 1.3–5 mm long, middle ones longest; mid-lobe 8–12 mm x 7–8 mm, linear-deltate in outline when flattened, margins with ca twelve to sixteen pairs of broad, forward-facing, obtuse teeth, decrescent towards apex. Lamina calli in four, congested rows extending two-thirds of way to apex, dark maroon, stalked, decrescent towards apex; basal calli ca 2.5 mm long, stalked, head elongate-clavoid, ca 0.5 mm across, surface irregular; longest lamina calli ca 1.8 mm long, stalked, head domed when viewed from side, surface very irregular, orbicular to oblong-elliptical from above. Column 15–18 mm x 5–6 mm, recurved in proximal half then incurved, transparent to greenish with some fine, reddish markings, narrowly winged; basal glands ca 2.2 mm x 1 mm, asymmetrically clavoid, shiny, yellow with red, stalked base. Anther ca 3.5 mm x 3 mm, yellow, with a linear rostrum ca 1 mm long. Pollinia four, ca 4 mm long, boomerang-shaped, flat, yellow. Stigma ca 3 mm wide, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; Mona Railway Yard, 31 August 1966, B. Copley 567 (AD); Warooka, 14 September 1953, H. Goldsack s.n. (AD); Tumby Bay, September 1942, M. Morgan 142, (AD); Lincoln Conservation Park, 7 September 1985, R. Bates 6059 (AD); ca 6 k West Nantawarra, 24 August 1978, P. B. Copley 296 (AD).

Distribution and Habitat: Endemic to South Australia (Syp, Snl, Sep), this species grows in mallee woodland in sandy loam over limestone.

Flowering Period: August to October.

Notes: *C. macroclavia* is closely related to *C. dilatata* but is readily distinguished by the much larger, brown sepalline osmophores which are laterally flattened and bayonet-shaped and the labellum which is much longer than wide (in most members of this complex the labellum is about as wide as long). It also has a much longer column with relatively narrow column wings and prominently stalked, irregularly clavoid column

glands. Forms sporadic hybrids with *C. brumalis* and *C. fragrantissima* (R. Bates, pers. comm).

Conservation Status: Widespread but poorly conserved; suggest 3RC according to the criteria of Briggs & Leigh (1988).

Etymology: From the Greek 'macro', large, great, and the Latin 'clavus', club; in reference to the large sepaline osmophores.

Caladenia necrophylla D. Jones; species nova affinis *C. dilatatae* R. Br. a qua postea florentae, folio angustiore et omnino marcido ante anthesin, sepalis osmophoris brunneis sparse glandiferis immersis atrobrunneis, et petalis osmophoris terminalibus differt.
Typus: South Australia; ca 10 km north-east of Robe, 37°10'S, 139°45'E, 20 November 1988, R. Bates 16181 (holo AD, iso AD).

Hirsute terrestrial herb. Leaf completely senescent at anthesis, 6–15 cm x 6–8 mm, linear lanceolate to lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 2 mm long. Inflorescence 10–20 cm tall, wiry, densely hirsute with patent, eglandular trichomes to 3 mm long. Sterile bracts 12–22 mm x 3–4 mm, linear-lanceolate, spreading, involute, acuminate, externally hirsute. Fertile bracts 12–17 mm x 5–8 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 3.5 cm across, yellowish green with a prominent dark red central band, prominent light brown osmophores on all segments, floral fragrance petrochemical, strong; dorsal sepal erect and incurved, lateral sepals divergent, obliquely spreading to nearly drooping, petals similar. Dorsal sepal 37–58 mm x 1.5–2.5 mm, linear-lanceolate at base then narrowed to a linear, channelled section ca 0.3 mm wide, terminated by a prominent, thickened, light yellow-brown osmophore 15–20 mm x ca 2.3 mm, with sparse, immersed, spherical, dark brown, glandular cells. Lateral sepals 32–55 mm x 2–4 mm, linear-lanceolate, strongly falcate, divergent, abruptly narrowed in distal half to a linear, channelled section ca 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 25–38 mm x 1–2 mm, linear-lanceolate, linear-filiform in distal half, terminated by an osmophore ca 5–7 mm x 1–1.2 mm. Labellum articulated on a short claw ca 3 mm x 1 mm, green to yellowish green with a dark maroon mid-lobe and calli, prominently three-lobed. Lamina 13–18 mm x 14–18 mm, broadly cordate in outline when flattened, curved throughout, erect in proximal third, middle third nearly horizontal, distal third strongly recurved; lateral lobes ca 4 mm across, erect, proximal margins entire, distal margins with four or five, obliquely erect, subacute, linear lobes ca 2–5 mm long, the third one in from the margin the longest; mid-lobe 8–10 mm x 6–7 mm, deltate in outline when flattened, margins with ca six pairs of more or less forward-facing, obtuse teeth, decrescent towards apex. Lamina calli in four congested

rows extending two-thirds of way to apex, dark maroon, stalked, decrescent towards apex; basal calli ca 3 mm long, stalked, head swollen, linear-clavoid, ca 0.6 mm across; longest lamina calli ca 1.4 mm long, stalked, head slightly domed when viewed from side, ovate-oblong from above. Column 14–16 mm x 4.5–5 mm, recurved in proximal half then incurved, transparent, with prominent pink striae, narrowly winged; basal glands ca 2 mm x 0.9 mm, asymmetrically clavoid, shiny yellow. Anther ca 4 mm x 4 mm, yellow, with a linear rostrum ca 0.8 mm long. Pollinia four, ca 4.5 mm long, roughly boomerang-shaped, flat, dark yellow. Stigma ca 4 mm wide, green, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; Desert Camp Conservation Park, 20 November 1988, R. Bates 16125 (AD); Mt Burr Forest Reserve, 11 November 1959, P. Wilson 1102 (AD).

Distribution and Habitat: Eastern South Australia (Sse, Smb). Grows in open forest or heathy woodland in grey or yellow sand over limestone.

Flowering Period: November and December.

Notes: *C. necrophylla* is the last of the *C. dilatata* group to flower in South Australia. It can be readily distinguished from others of this group by the terminal osmophores on the petals and the narrow leaf which is completely senescent long before anthesis (in fact often before the inflorescence emerges). It has much larger osmophores than *C. dilatata* and these are yellow-brown and sparsely studded with immersed, dark brown glands. Probably its closest congener is *C. corynepetala* which also has osmophores on the petals but that species usually has a declining but extant leaf present at flowering time and a strongly recurved, broader column.

Conservation Status: *C. necrophylla* is widespread but is poorly conserved; suggest 3RC according to the criteria of Briggs and Leigh (1988).

Etymology: From the Greek 'necro', dead, 'phyllon', leaf; in reference to the leaf being senescent long before flowering.

Caladenia phaeoclavia D. Jones; species nova affinis *C. dilatatae* R. Br. a qua brevior, floribus minoribus, osmophoris sepalinis brunneis, labello base callis manifeste clavicipitibus, et columna alis angustioribus et base glandibus angustioribus differt.
Typus: New South Wales; Wambool Nature Reserve, 33°27'S, 149°49'E, 30 October 1988, C. Bower (D. L. Jones 3423) (holo CBG, iso CBG, NSW, MEL).

Hirsute terrestrial herb. Leaf 6–13 cm x 5–9 mm, linear-lanceolate to lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 3 mm long. Inflorescence 10–25 cm tall, wiry, hirsute with patent, eglandular trichomes to 3 mm long. Sterile bracts 14–20 mm x 3–3.5 mm, linear, spreading, involute,

acuminate, externally hirsute. Fertile bracts 12–16 mm x 4.5–5 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 3.5 cm across, light green to dark green with prominent dark red central bands and moderately prominent, brown sepalline osmophores; dorsal sepal erect and incurved, lateral sepals divergent, obliquely spreading, petals obliquely spreading. Dorsal sepal 30–42 mm x 1.5–2 mm, linear-lanceolate at base then narrowed to a linear-filiform, involute section ca 0.3 mm wide, terminated by a thickened, brown osmophore ca 10 mm x 1 mm, consisting of fairly closely packed, brown, globular, sessile, glandular cells. Lateral sepals 30–42 mm x 2.5–3 mm, linear-lanceolate, falcate, abruptly narrowed in distal half to a linear-filiform, involute section ca 0.3 mm wide, terminated by an osmophore similar to that of the dorsal sepal. Petals 20–26 mm x ca 1.8 mm, linear-lanceolate, long-acuminate. Labellum articulated on a short claw ca 1.5 mm x 2 mm, green with a dark maroon mid-lobe and calli, prominently three-lobed. Lamina 15–17 mm x 14–18 mm, broadly cordate in outline when flattened, curved throughout, erect in proximal third, strongly recurved in distal third; lateral lobes ca 5 mm across, upcurved, proximal margins entire, distal margins with five or six, obliquely erect, obtuse, linear lobes 2–3.5 mm long, decrescent towards mid-lobe; mid-lobe ca 6 mm x 3 mm, deltate when flattened, margins with ca four pairs of fairly broad, forward-facing, obtuse teeth, decrescent towards apex. Lamina calli in four fairly crowded rows extending between half and two-thirds of way to apex, dark maroon, stalked, decrescent towards apex; basal calli ca 2.8 mm long, long-stalked, head swollen, clavoid, ca 0.8 mm across; longest lamina calli ca 1.8 mm long, stalked, head flat to domed when viewed from side, linear-elliptical from above. Column 12–14 mm x 4–4.5 mm, recurved in proximal half then incurved, transparent to greenish, narrowly winged; basal glands ca 2 mm x 0.6 mm, asymmetrically clavoid, linear-elliptical, shiny yellow with a red base. Anther ca 2 mm x 3 mm, yellow with a linear rostrum ca 1 mm long. Pollinia four, ca 3 mm long, broadly boomerang-shaped, yellow, flat. Stigma ca 2.4 mm wide, green, more or less circular, sunken. Capsule not seen.

Distribution and Habitat: New South Wales, Australian Capital Territory and possibly also Victoria (Ncs, Nct, Nst, Can, ?Veh). Commonly grows on slopes and ridges under eucalypt woodland in higher montane areas. Plants occur in open sites among grass or rocks, less commonly in sparse heath.

Flowering Period: October and November.

Notes: *C. phaeoclavia* is very closely related to *C. dilatata* and it is not uncommon for both species to be found growing together. Where this occurs *C. phaeoclavia* usually begins flowering as *C. dilatata* is in decline. *C. phaeoclavia* is generally shorter growing with smaller flowers which have brown osmophores (yellow in *C. dilatata*), basal calli with prominently clavoid, rounded heads, narrower column wings and narrower basal glands on the

column. Baiting experiments carried out by Colin Bower show that the two taxa have different pollination vectors. *C. phaeoclavia* is exclusively pollinated by *Lophocheilus anilitatus* whereas *C. dilatata* in the same locality can be pollinated by any of four *Thynnoides* species (C. Bower, pers. comm.).

Conservation Status: *C. phaeoclavia* is widespread and conserved in nature reserves.

Etymology: From the Greek 'phaeo', brown, and the Latin 'clavus', a club; in reference to the brown sepalline osmophores.

Caladenia prolata D. Jones; species nova
affinis *C. cameae* R. Br. a qua floribus minoribus autogamis, ovario multo longiore in alabastro manifeste tumido, et columna minore anguste alata differt.

Typus: South Australia; Meningie Airfield, 35°40'S, 139°15'E, 7 October 1989, R. Bates 21045 (holo AD, iso AD, CBG).

Hirsute, solitary terrestrial herb. Leaf 12–20 cm x 3–4.5 mm, linear, erect or semi-erect, dark green, with a reddish or purplish base, sparsely hirsute with transparent, patent, multicellular eglandular trichomes to 2 mm long. Inflorescence 12–24 cm tall, slender, wiry, brownish green, with patent, glandular trichomes ca 0.5 mm mixed with eglandular trichomes similar to those on the leaf. Sterile bracts 9–16 mm x 3–4 mm, linear-oblong, obtuse, erect and hardly sheathing, acuminate, externally hirsute with trichomes similar to those of the stem. Fertile bracts 5–10 mm x 2–3.5 mm, linear-oblong, obtuse, closely sheathing, externally hirsute. Ovary 10–14 mm long, linear-obovoid, densely glandular. Flowers one or two, ca 15 mm across, dull white inside, externally greenish from dense glands, a dark red, central stripe prominent on each segment, floral odour undetectable; dorsal sepal erect and incurved, lateral sepals porrect, hardly divergent, petals widely spreading, curving forwards slightly in distal half. Dorsal sepal 11–14 mm x 2.5–3.5 mm, linear-oblong, cucullate, subacute to acuminate, internally glabrous, externally densely covered with sessile and shortly stalked, ovoid to globular, brownish glands. Lateral sepals 11–14 mm x 3–3.5 mm, asymmetrically linear-lanceolate, slightly falcate, subacute, internally glabrous, externally glandular. Petals 10–13 mm x 3–3.5 mm, obliquely lanceolate, falcate, curved slightly forwards in distal half, subacute, internally glabrous, externally glandular. Labellum articulated on a short claw ca 0.4 mm long x 0.6 mm wide, dull pink with narrow, dark red transverse bars, three-lobed. Lamina 5–6 mm x 5.5–6.5 mm, transversely ovate in outline when flattened, erect in proximal third, curved forwards in distal two-thirds, apex porrect or slightly recurved; lateral lobes ca 3 mm wide, erect and column-embracing, entire except for two or three pairs of marginal calli on extreme distal margin near base of mid-lobe; mid-lobe ca 2.3 mm long, deltate, porrect or slightly recurved in distal half, margins yellow, basal

margins with three or four pairs of blunt marginal calli ca 0.3 mm long, decrescent and becoming irregularly crenulate-undulate towards the apex. Lamina calli in two rows extending onto the base of the mid-lobe, basal calli yellow, rest white; basal calli two, head ovoid, ca 0.4 mm across, yellow, papillate, stalk ca 0.3 mm long, white; longest lamina calli ca 0.8 mm long, head ca 0.5 mm across, swollen, flat or curved, papillate, white, stalk ca 0.3 mm long, white. Column 5.5–6.5 mm x ca 2.5 mm, recurved in proximal two-thirds then strongly incurved, greenish with broad, red, transverse anterior bands, narrowly winged, a patch of stalked glandular trichomes on dorsal surface near base of anther; central anterior ridge ca 1.4 mm wide. Anther ca 1.5 mm x 1.8 mm, pinkish, densely papillate, with a prominent rostrum. Pollinia four, ca 1.2 mm long, boomerang-shaped, flat, pale yellow, mealy, incoherent. Stigma ca 1.5 mm wide, more or less circular, sunken, green. Capsule 12–16 mm x 3–4 mm, obovoid, densely glandular.

Selected Collections: South Australia; Belair, 29 September 1929, H. A. Gunter s.n. (AD); Cape Hart Rd., Kangaroo Island, September 1984, A. Lashmar s.n. (AD); Sandhills from Robe, north along coast, October 1983, R. Bates 3460 (AD); Comaum Pine Forest Reserve, 10 October 1965, Hj Eichler 18329 (AD); adjacent to western side Glenelg National Park, 24 October 1982, J. Z. Weber 7779 (AD).

Distribution and Habitat: South-eastern South Australia, possibly also extending to south-western Victoria (Ssl, Ski, Sse, ?Vwp). It grows in open forest and light coastal scrub, usually under low shrubs in sandy loams and clay loams.

Flowering Period: September and October.

Notes: *C. prolata* is a distinctive, easily recognised member of the *C. carneae* complex. It is a relatively tall-growing species with proportionately long leaves and small, dull greenish-white, heavily glandular flowers on unusually long ovaries which are long and prominently swollen even when in bud. This species is similar in many of its features (including its incurved dorsal sepal) to *C. vulgaris* D. Jones. That species, however, is sparsely glandular with narrower stems and leaves and pink flowers on shorter, much less prominent ovaries.

Conservation Status: *C. prolata* is moderately widespread and well conserved.

Etymology: From the Latin '*prolatus*' elongated; chosen in reference to the long ovary.

Caladenia quadrifaria D. Jones, nom. et stat. nov. *Caladenia carneae* R. Br. var. *gigantea* R. Rogers, Trans. & Proc. Roy. Soc. South Australia 51: 13 (1927). **Type:** Smiths Lake, Bulahdelah, New South Wales, September 1924, H. M. R. Rupp s.n. (holo AD).

Distribution and Habitat: Northern New South Wales (Nnt, Nnc, ?Ncc), growing on slopes and ridges in open forest in either sandy loams or shallow clay loams. This species often grows under casuarinas in scattered groups.

Flowering Period: September and October.

Notes: This, the largest flowered member of the *C. carneae* complex, is distinguished by its very large, almost rhomboid labellum with angular lateral lobes, numerous, long marginal calli on the mid-lobe and large lamina calli usually in four rows. Sporadic large-flowered specimens of *C. carneae* have given rise to erroneous records of this species from other states (e.g. Willis 1962). Closely related taxa have also been confused with it (see for example *C. coactilis* D. Jones). Although this species frequently grows large the epithet '*gigantea*' was considered inappropriate at species rank, especially in view of the large dimensions attained by many of the spider orchids.

Conservation Status: *C. quadrifaria* is widespread and conserved.

Etymology: From the Latin '*quadri*', four, '*fariam*', in rows or ranks; in reference to the labellum calli which are usually in four rows.

Caladenia richardsiorum D. Jones; species nova affinis *C. hastatae* (Nicholls) Rupp a qua folio multo majore, floribus flavovirentibus, sepalis petalisque latioribus, osmophoris sepalinis glandibus longioribus, et petalis sine osmophoribus differt.

Typus: South Australia; Nora Creina Sandhills, 37°20'S, 139°58'E, 3 October 1988, R. Bates 15668 (holo AD, iso CBG).

Hirsute terrestrial herb. Leaf 16–22 cm x 13–15 mm, linear-lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 2 mm long. Inflorescence 20–40 cm tall, wiry, densely hirsute, with patent, eglandular trichomes to 2 mm long. Sterile bracts 25–30 mm x 7–7.5 mm, linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 20–25 mm x 10–13 mm, broadly ovate, acute, closely sheathing, externally hirsute. Ovary 10–12 mm long, obovoid, covered densely with short, purplish-topped, glandular trichomes. Flower usually solitary, ca 4 cm across, segments stiffly spreading, drooping at tips, strongly yellowish-green with prominent blackish osmophores on the sepals, no floral odour. Dorsal sepal 33–40 mm x 3–3.5 mm, linear to linear-oblong in proximal half then narrowed to a linear, channelled section ca 0.3 mm wide, terminated by a prominent, thick, blackish osmophore 8–10 mm x ca 1 mm, densely beset with ellipsoidal, blackish-brown glandular cells. Lateral sepals 35–42 mm x 5.5–7.5 mm, ovate-lanceolate in proximal half, slightly falcate, divergent, narrowed suddenly near middle to a linear, channelled section ca 0.5 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 23–27 mm x 3–4 mm, asymmetrically lanceolate, tapered to a long-acuminate apex, lacking an osmophore. Labellum articulated on a short claw ca 2.5 mm x 2 mm, greenish-cream with dark reddish calli and marginal teeth, sometimes a reddish area near the apex, obscurely three-lobed.

Lamina 12–15 mm x 10–12 mm, broadly ovate-cordate in outline when flattened, curved throughout, erect in proximal half, distal half recurved; lateral lobes 4–5 mm across, erect, proximal margins entire, distal margins with seven or eight calli ca 2 mm long; marginal calli linear, obliquely erect, forward pointing, cream-margined, obtuse; mid-lobe ca 6–7 mm x 4–6.5 mm, linear-ovate in outline when flattened, margins with numerous, reddish, cream-tipped, obtuse teeth, decrescent towards apex. Lamina calli in six, fairly well-spaced rows extending three-quarters of way to apex, reddish with cream tips, stalked, crowded, decrescent towards apex; basal calli ca 0.8 mm long, stalked, erect, pale yellow, head linear-clavoid, ca 0.3 mm across; longest lamina calli ca 1 mm long, stalked, curved, head flat or slightly domed when viewed from the side, linear, slightly falcate from above. Column 14–16 mm x 4.5–5 mm, recurved in proximal half then incurved, transparent with numerous, longitudinal red blotches and striae, broadly winged; basal glands ca 2.2 mm x 4 mm, asymmetrically clavoid, shiny yellow. Anther ca 2 mm x 2 mm, green and yellow, with a linear rostrum ca 0.3 mm long. Pollinia four, ca 3 mm long, clavate, flat, yellow, mealy. Stigma ca 3 mm across, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; Lake St Clair, 5 November 1987, R. Bates 11501 (AD); Little Dip, 21 October 1989, R. Bates 21273 (AD).

Distribution and Habitat: Apparently endemic to south-eastern South Australia (Sse). It occurs in closed forest and low coastal scrub in leaf litter, growing in grey calcareous sands.

Flowering Period: Late September to early November.

Notes: *C. richardsiorum* has affinities with *C. hastata* but can be immediately distinguished by its much larger leaf and its greenish-yellow flowers with much broader sepals and petals, shorter sepalline osmophores with longer, ellipsoid glands and the absence of osmophores on the petals.

Conservation Status: Highly localised and poorly conserved; suggest 2VC according to Briggs & Leigh (1988).

Etymology: It gives me great pleasure to name this lovely orchid after Helen and Barry Richards who have been of major assistance with my botanical research over many years, providing hospitality, transport and growing plants on my behalf for study.

Caladenia rigens D. Jones; species nova affinis *C. dilatatae* R. Br. a qua floribus minoribus, segmentis perianthii rigide patentibus, osmophoris prominentioribus coloratis lactioribus, et callis laminae majoribus dense aggregatis differt.

Typus: New South Wales; ca 33 km north of Griffith on road to Rankin Springs, 34°01'S, 146°06'E, 27 September 1988, D. L. Jones 2846 and M. A. Clements (holo CBG, iso CBG, NSW, MEL, AD, PERTH, BRI).

Hirsute terrestrial herb. Leaf 6–14 cm x 5–10 mm, linear-lanceolate to lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 2.5 mm long. Inflorescence 15–30 cm tall, wiry, hirsute with patent, eglandular trichomes to 2.5 mm long. Sterile bracts ca 20–25 mm x 4–5 mm, linear to linear-lanceolate, spreading, involute, acuminate, externally hirsute. Fertile bracts 15–20 mm x 6–8 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 4 cm across, dark green with a prominent dark red central band, prominent yellow-green osmophores, floral fragrance undetectable; dorsal sepal erect and incurved, lateral sepals divergent, obliquely spreading. Dorsal sepal 35–45 mm x 1.5–2 mm, linear-lanceolate at base then narrowed to a linear, channelled section ca 0.5 mm wide, terminated by a prominent, thickened, greenish yellow osmophore ca 11 mm x 1 mm, consisting of minute, densely packed, yellow-green, globular, sessile glandular cells. Lateral sepals 30–45 mm x 3–4 mm, linear-lanceolate, falcate, abruptly narrowed in distal half to a linear channelled section ca 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 23–26 mm x 1.5 mm, linear-lanceolate, long-acuminate. Labellum articulated on a short claw ca 1.5 mm x 1.5 mm, green with a dark maroon mid-lobe and calli, prominently three-lobed. Lamina 13–15 mm x 13–15 mm broadly cordate in outline when flattened, curved throughout, erect in proximal third, strongly recurved in distal third; lateral lobes ca 5 mm across, erect, proximal margins entire, distal margins with four to six, obliquely erect, subacute lobes 1–4.5 mm long, decrescent towards mid-lobe; mid-lobe ca 7 mm x 3 mm, deltate when flattened, margins with ca five pairs of broad, forward-facing, obtuse calli, decrescent towards apex. Lamina calli in four densely congested rows extending two-thirds of way to apex, dark maroon, stalked, decrescent towards apex; basal calli ca 4 mm long, stalked, head swollen, clavoid, ca 1.3 mm across; longest lamina calli ca 3 mm long, stalked, head flat to domes when viewed from side, orbicular to unequally elliptical from above. Column 13–16 mm x 4.7–5 mm, recurved in proximal half then incurved, transparent to greenish, broadly winged; basal glands ca 1.5 mm x 0.8 mm, asymmetrically clavoid, shiny yellow with red base. Anther ca 3 mm x 3 mm, yellow, with a linear rostrum ca 1 mm long. Pollinia four, ca 3 mm long, boomerang-shaped, flat, yellow. Stigma ca 2.8 mm wide, green, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; railway line north of Tintinara, October 1989, R. Bates 20921 (AD); 20 km north of Bordertown, 21 October 1989, R. Bates 21361 (AD); 6.5 km north of Cooke Plains, 20 September 1960, M. C. Sharrad 850 (AD); Tailum Bend Forest Reserve, 7 September 1988, R. Bates 15394 (AD); Minlaton Scrub, 28 September 1986, R. Bates 7230 (AD).

Distribution and Habitat: Southern New South Wales and South Australia where an extremely common species (Nsp, Smb, Sse, Ssl, Syp, Snl, ?Sep). It grows in

mallee woodland in red or yellow sandy loams and red sandy clay loams.

Flowering Period: September and October.

Notes: *C. rigens* is a species which has a stiff, almost rigid bearing. It is closest to *C. dilatata* but can be distinguished by its generally smaller flowers and densely crowded, larger lamina calli. Both species have yellow-green osmophores terminating the sepals but those of *C. rigens* are noticeably brighter coloured than in *C. dilatata* and appear more prominent. Its predilection for mallee habitats is interesting. Forms sporadic hybrids with species of the *C. patersonii* alliance.

Conservation Status: *C. rigens* is widespread and well conserved, at least in South Australia.

Etymology: From the Latin '*rigens*', stiff, rigid; in reference to the stiff bearing of the whole plant.

Caladenia septuosa D. Jones; species nova affinis *C. dilatatae* R. Br. a qua osmophoris sepalinis brunneis, labello obscure 3-lobato (deltato quam complanato) et margine basi dentibus paucioribus linearibusque differt.

Typus: South Australia; ridge running south from Mt Olympus, 33°30'E, 136°50'E, 29 September 1989, R. Bates 20632, (holo AD, iso AD).

Hirsute terrestrial herb. Leaf 6–8 cm x 7–9 mm, linear, erect, dull green, sparsely hirsute with patent, eglandular trichomes to 3.5 mm long. Inflorescence 15–20 cm tall, wiry, hirsute with patent, eglandular trichomes similar to those on the leaf. Sterile bracts 13–16 mm x 4–5 mm, linear-ovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 12–14 mm x 7–8 mm, ovate, subacute, closely sheathing, externally hirsute. Ovary 15–17 mm long, obovoid, hirsute with short, dark-headed glandular trichomes. Flower usually solitary, cream-green with red central stripes, brown sepalline osmophores and a green and white labellum with a maroon mid-lobe and maroon calli, floral odour undetectable; dorsal sepal erect and incurved, lateral sepals obliquely decurved, divergent, petals decurved. Dorsal sepals 28–36 mm x 2–2.5 mm, linear to linear-lanceolate in proximal half then narrowed to a linear-filiform section ca 0.4 mm wide, terminated by a thickened, brown osmophore 5–7 mm x ca 1 mm, with sparse to dense, immersed, spherical, dark brown, glandular cells. Lateral sepals 23–30 mm x 4–5 mm, lanceolate, in proximal half, strongly falcate, abruptly narrowed in distal half to a linear-filiform section ca 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 20–23 mm x 2.5–3 mm, linear-lanceolate, long-acuminate or somewhat ensiform. Labellum articulated on a short claw ca 2 mm across, yellowish green with a white central patch and dark maroon mid-lobe, obscurely three-lobed. Lamina 14–16 mm x 14–16 mm, broadly

deltate in outline when flattened, shallowly curved throughout, apex recurved; lateral lobes ca 4.5 mm across, erect, proximal margins entire, distal margins with three or four, obliquely erect, obtuse, linear lobes to 3 mm long, all of similar length; mid-lobe 8–10 mm x 7–8 mm, deltate when flattened, margins with three to six pairs of short, obtuse, marginal calli, becoming decrescent and irregular towards the apex. Lamina calli in four or six irregular rows, the central ones extending well onto the base of the mid-lobe, dark maroon, stalked, decrescent towards the apex; basal calli ca 3 mm long, erect, prominently stalked, head swollen, clavoid, ca 0.8 mm across; longest lamina calli ca 1.5 mm long, stalked, golf-stick-shape to clavoid when viewed from the side, ovate-oblong from above. Column 13–15 mm x 5.5–6 mm, recurved in proximal third, then incurved, transparent with prominent red striae on the central ridge, narrowly winged; basal glands ca 2 mm x 0.8 mm, asymmetrically clavoid, shiny yellow, basal stalk reddish. Anther ca 3 mm x 3 mm, yellowish to reddish, with a linear rostrum ca 0.5 mm long. Pollinia four, ca 3.5 mm long, roughly boomerang-shaped, flat, yellow, mealy. Stigma ca 4 mm wide, green, more or less circular, sunken. Capsule not seen.

Selected Collections: South Australia; Darke Peak Range, 28 September 1989, R. Bates 30619 (AD); Sandy Valley north of Cleve on Mangalo Rd., 29 September 1989, R. Bates 20634 (AD); Carrappee Hill Conservation Park, 28 September 1989, R. Bates 20727 (AD); 20 km north Coolanie, 29 September 1989, R. Bates 20731 (AD).

Distribution and Habitat: Endemic to the Eyre Peninsula of South Australia (Sep) where it grows in shallow sandy soil in sparse woodland.

Flowering Period: September and October.

Notes: *C. septuosa* has obvious affinities with *C. dilatata* but can be readily distinguished by its brown sepalline osmophores and very poorly developed lateral lobes on the labellum. This lack of development is obvious when this organ is flattened. The relatively few linear lobes (three or four) on the basal margins of the labellum are also distinctive.

Conservation Status: *C. septuosa* is locally common and well conserved.

Etymology: From the Latin '*septuosus*', obscure; in reference to the poorly developed lateral lobes on the labellum.

Caladenia stellata D. Jones; species nova affinis *C. atroclaviae* D. Jones et M. Clements a qua floribus minoribus, osmophoris brevioribus minus glanduliferis, labello cordato distincte three-lobato callis basalis linearibus et laminae breviter stipitatis differt.

Typus: New South Wales; Sims Gap, 33°52'S, 146°13'E, 12 September 1988, D. L. Jones

2856 & M. A. Clements (holo CBG, iso CBG, NSW, MEL, AD, PERTH, BRI).

Hirsute terrestrial herb. Leaf 6–15 cm x 5–10 mm, linear-lanceolate to linear-elliptical, dull green, base irregularly blotched with red-purple, erect, hirsute with patent, eglandular trichomes to 3 mm long. Inflorescence 12–30 cm tall, wiry, hirsute with spreading, eglandular trichomes to 3 mm long. Sterile bracts 14–16 mm x 3–5 mm, linear-lanceolate, involute, acuminate, spreading, externally hirsute. Fertile bracts 12–16 mm x 5–7 mm, ovate-lanceolate, acute to subacute, closely sheathing, externally hirsute, often reddish. Ovary 7–14 mm long, narrow-ovoid, hirsute with glandular, dark purple-headed trichomes. Flower usually solitary, ca 4 cm across, pale greenish cream with red suffusions and central stripes, the sepals with prominently thickened, blackish osmophores, floral fragrance not strong; dorsal sepal erect and incurved, lateral sepals and petals spreading stiffly or drooping in distal third, sepals divergent. Dorsal sepal 25–38 mm x 1.5–2.3 mm, linear-lanceolate in proximal half then abruptly narrowed to a linear-filiform, involute section ca 0.3 mm wide, terminated by a thickened, blackish osmophore 5–10 mm x 0.8 mm, consisting of minute, densely packed, reddish purple, globular, sessile glandular cells. Lateral sepals 26–40 mm x 2.5–3.5 mm, linear-lanceolate in proximal half, slightly falcate, abruptly narrowed in distal half to a linear-filiform, involute section ca 0.3 mm wide, terminated by an osmophore similar to that of the dorsal sepal. Petals 20–28 mm x 1.5–2 mm, linear-lanceolate then tapered to a long-acuminate apex. Labellum articulated on a short claw ca 1.5 mm x 2 mm, greenish cream with a dark maroon mid-lobe. Lamina 12–18 mm x 7–13 mm, linear-cordate to cordate in outline when flattened, erect in proximal third, more or less horizontal in middle third, recurved in distal third; lateral lobes ca 4 mm across, erect, proximal margins entire, distal margins with six to eight, linear, spreading, somewhat clavate calli to 1 mm long; mid-lobe 6–7 mm x 5–6 mm, deltate in outline when flattened, basal margins with broad, forward-facing, obtuse calli, decrescent apically. Lamina calli in four rows extending about half way to apex, dark maroon, congested at labellum base, stalked, decrescent towards apex and becoming sessile; basal calli ca 1 mm long, stalked, head linear-clavoid, ca 0.2 mm across; longest lamina calli ca 1.2 mm long, shortly stalked, flat-topped, linear-clavoid when viewed from above. Column 9–12 mm x 4.5–5 mm, recurved in proximal half then incurved, pale green, broadly winged; basal glands ca 1.2 mm x 0.8 mm, asymmetrically clavoid, shiny, yellow. Anther ca 2.5 mm x 2 mm, green, with a linear rostrum ca 0.5 mm long. Pollinia four, ca 2.7 mm long, boomerang-shaped, flat, yellow. Stigma ca 2 mm wide, green, more or less circular. Capsules 1.2–1.5 mm x 0.6–0.9 mm, ovoid, densely glandular.

Selected Collections: South Australia; Bangham Forest Reserve, September 1988, R. Bates s.n. (AD); 15 km north-east of Strathalbyn, 3 September 1989,

R. Bates 20419 (AD); Wirrabarra, 5 September 1988, R. Bates 15382 (AD); 10 km west of Laura, September 1983, R. Bates 3452 (AD).

Distribution and Habitat: Southern New South Wales, eastern South Australia, possibly extending into northern Victoria. (Ncs, Nss, Nsp, Smb, Sfr, ?Vnp). Usually occurs in woodland dominated by native pines (*Callitris* spp.), growing in grey gravelly soils and red sandy loams.

Flowering Period: Late August to early October.

Notes: *C. stellata* has close affinities with *C. atroclavia*. It however has smaller flowers with smaller, much less densely glandular osmophores and a much more distinctly cordate labellum (ovate-cordate in *C. atroclavia*) with prominent lateral lobes (hardly distinguishable in *C. atroclavia*), linear-clavoid basal calli (swollen in *C. atroclavia*) and shortly stalked lamina calli (long-stalked in *C. atroclavia*).

Conservation Status: *C. stellata* is widespread and conserved in National Parks.

Etymology: From the Latin '*stellaris*', starry; the spreading perianth segments impart a starry appearance to the flowers.

Caladenia vulgaris D. Jones; species nova affinis *C. cameae* R. Br. a qua relative excelsa tenuique, foliis inflorescentiam paene aequantibus, et floribus multo minoribus autogamis viridi-albis differt.

Typus: South Australia; Honans Scrub via Glencoe, 37°37'S, 140°10'E, 20 November 1988, R. Bates 16103 (holo AD, iso AD, CBG).

Sparsely hirsute, solitary, terrestrial herb. Leaf 15–27 cm x 2–3 mm, linear, semi-erect to lax, dark green, red at the base, sparsely hirsute with patent, glandular trichomes ca 0.5 mm long, subacute. Inflorescence 15–36 cm tall, very slender, wiry, with patent, glandular trichomes ca 1 mm long. Sterile bracts 14–18 mm x 3–3.5 mm, linear-obovate, closely sheathing, obtuse, externally hirsute with short, glandular hairs. Fertile bracts 10–12 mm x 3.5–4.5 mm, linear-obovate, obtuse, externally hirsute with short, glandular hairs. Flowers one or two, ca 12 mm across, dull pink inside, brownish central bands on the exterior, floral odour undetectable; dorsal sepal obliquely erect, incurved, lateral sepals porrect, parallel or slightly divergent, petals spreading, curving forwards in distal half. Dorsal sepal 10–15 mm x 2.5–4 mm, linear-oblongate, internally glabrous, externally greenish with numerous sessile and stalked glandular trichomes, obtuse to subacute. Lateral sepals 10–18 mm x 3.5–7 mm, asymmetrically lanceolate, slightly falcate, internally glabrous, externally the same as the dorsal sepal. Petals 10–17 mm x 3–6 mm, asymmetrically ovate-lanceolate, internally glabrous, externally sparsely glandular. Labellum hinged at the base, white or pink with prominent, narrow, red, transverse bars, apex yellow, prominently three-lobed. Lamina 5–7 mm x 5.5–

7.5 mm, transversely-ovate in outline when flattened, erect in proximal third, then curved forwards, apex recurved; lateral lobes ca 2.7 mm wide, erect and column-embracing, entire; mid-lobe ca 2.3 mm long, deltate, apex yellow, recurved, with ca five pairs of marginal calli, basal ones stalked, decrescent to the apex of the mid-lobe. Lamina calli in two rows, yellow to orange, extending nearly to base of mid-lobe; basal calli four, ca 0.7 mm long, head irregularly ovoid, stalk ca 0.3 mm long, much narrower than head, white; longest lamina calli ca 0.6 mm long, golf-stick-shape, stalk ca 0.4 mm long, white. Column 5–7 mm x ca 2.2 mm, curved forwards from the ovary, whitish green with dark red transverse bands, narrowly winged, a few stalked glandular trichomes near apex, central ridge ca 0.8 mm wide. Anther ca 1 mm x 1 mm, bright pink, densely papillate, with a prominent rostrum. Pollinia four, ca 1 mm long, roughly boomerang-shaped, cream, flat, mealy. Stigma ca 1 mm wide, more or less circular, sunken, green. Capsules 12–15 mm x 3–4 mm, ovoid to obovoid, sparsely glandular.

Selected Collections: South Australia; Big Heath National Park, 3 November 1969, E. N. S. Jackson 1606 (AD); 15 km west of Penola, 18 October 1982, J. Z. Weber 7698 (AD).

Distribution and Habitat: South Australia, where occurring in damp sandy heathland in the lower South-east, probably also extending into south-western Victoria (Sse, ? Vwh).

Flowering Period: November and December.

Notes: A very distinctive and obviously overlooked species with rather tenuous relationships to *C. carneae*. It is easily recognised by its tall, slender habit with proportionately long leaves (often nearly as long as the scape), and the relatively small dull pink flowers. These are autogamous and a proportion of the plants also appear to be cleistogamous.

Conservation Status: Suggest 3RC according to the criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*vulgaris*', common, general, ordinary, all of which apply to this species.

Caladenia woolcockiorum D. Jones; species nova affinis *C. behrii* Schldl. a qua floribus cremeis ad flavovirentibus, segmentis perianthii cernuis, et medilobo labelli roseo ad frontem horizontaliter protrudenti differt.

Typus: South Australia; Devils Ledge, Upper Mambray Creek Gorge, Flinders Ranges, 32°48'S, 138°10'E, 3 September 1988, R. Bates 15319 (holo AD, iso AD, CBG).

Hirsute terrestrial herb. Leaf 6–15 cm x 10–13 mm, lanceolate, erect, dull green, base irregularly blotched with red-purple, hirsute with patent, eglandular trichomes to 2.5 mm long. Inflorescence 20–35 cm tall, wiry, densely hirsute, with patent, eglandular trichomes to 2 mm long. Sterile bracts 20–35 mm x 4–5 mm, linear-lanceolate, spreading, involute, acuminate, externally

hirsute. Fertile bracts 15–22 mm x 4–5 mm, ovate-lanceolate, acuminate, closely sheathing, externally hirsute. Flower usually solitary, ca 3.5 cm across, cream to greenish yellow with prominent blackish osmophores on all segments, labellum reddish, floral fragrance musky, strong; dorsal sepal erect and incurved, lateral sepals and petals drooping. Dorsal sepal 30–35 mm x 3–4 mm, linear-lanceolate in proximal half then narrowed to a linear, channelled section ca 0.5 mm wide, terminated by a slightly thickened, blackish osmophore 8–10 mm x 1 mm, beset with sparse, spherical, dark brown glandular cells. Lateral sepals 30–35 mm x 3–3.5 mm, linear-lanceolate, falcate, divergent, narrowed gradually in distal third to a linear, channelled section ca 1 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals 28–30 mm x ca 2.5 mm, linear-lanceolate, slightly falcate, tapered, terminated by an osmophore ca 5 mm x 0.7 mm. Labellum articulated on a short claw ca 2 mm x 1 mm, yellowish-green with a rosy red mid-lobe, distinctly three-lobed. Lamina 16–18 mm x 8.5–9.5 mm, linear-cordate in outline when flattened, erect in basal quarter, middle half nearly horizontal, distal third strongly recurved; lateral lobes ca 4 mm across, erect, proximal margins entire, distal margins with seven or eight, marginal calli to 2.2 mm long; marginal calli linear, obliquely erect, subacute to obtuse; mid-lobe 8–10 mm x 6–6.5 mm, linear-deltate when flattened, margins nearly entire or with irregular, whitish, truncate lobes ca 1 mm long. Lamina calli in four, well-spaced rows extending three-quarters of way to apex, dark red, stalked, linear, decrescent towards apex; basal calli ca 1.5 mm long, stalked, erect, head linear-clavoid, ca 0.4 mm across; longest lamina calli ca 1.2 mm long, stalked, head slightly domed when viewed from side, linear, slightly falcate from above. Column 11–12 mm x 4.5–5 mm, recurved in proximal half then incurved, transparent, sometimes with a few reddish striae, broadly winged; basal glands ca 1.5 mm x 1 mm, asymmetrically clavoid, shiny, yellow. Anther ca 2 mm x 2.5 mm, yellow with a linear rostrum ca 0.2 mm long. Pollinia four, ca 2.5 mm long, boomerang-shaped, flat, dark yellow, mealy. Stigma ca 3 mm wide, green, more or less elliptical, sunken. Capsule not seen.

Selected Collections: South Australia; Mt. Remarkable National Park, 12 September 1986, R. Bates 6996 (AD); Mt. Remarkable, September 1964, H. M. Cooper s.n. (AD).

Distribution and Habitat: Endemic to the Southern Flinders Ranges of South Australia (Sfr). It grows in sparse forests on rock ledges of difficult access and rocky slopes in shallow soil.

Flowering Period: August and September.

Notes: *C. woolcockiorum* is a very distinctive species easily recognized by its drooping segments with prominent dark osmophores and its three-lobed labellum with the prominent rosy-red mid-lobe protruding forwards like a landing platform and with entire or slightly irregular margins. Its closest congener is the poorly known *C. behrii*, the flowers of which are of similar col-

ouration but much larger. *C. woolcockiorum* is a sister taxon to *C. behrii* but the two are geographically isolated and grow in different habitats. It forms sporadic hybrids with *C. stellata* (R. Bates, pers. comm.).

Conservation Status: Of restricted occurrence but conserved; suggest 2RC according to the criteria of Briggs & Leigh (1988).

Etymology: It gives me great pleasure to name this attractive species after Collin and Dorothy Woolcock of Portland, Victoria; they have devoted their lives to a study of Australian plants, in particular terrestrial orchids, and have been of major assistance to my research for over twenty years.

Caladenia xantholeuca D. Jones; species nova affinis *C. coactili* D. Jones a qua in textura tenuiore in omnibus partibus, floribus minoribus albis, labello lamina callis minoribus differt.

Typus: South Australia; Telowie Gorge, Flinders Ranges, 33°01'S, 138°07'E, 16 September 1986, R. Bates 7181 (holo AD, iso CBG).

Hirsute solitary, terrestrial herb. Leaf 15–24 cm x 5–7 mm, linear, bright green, erect to lax, hirsute with a mixture of glandular and eglandular, patent transparent trichomes to ca 2 mm long. Inflorescence 15–25 cm tall, relatively thick, wiry, densely hirsute with glandular trichomes ca 1.5 mm long. Sterile bracts 16–20 mm x 4–5 mm, linear to linear-obovate, spreading, involute, acuminate, externally hirsute. Fertile bracts 9–14 mm x 3–4.5 mm, linear-ovate, acute to acuminate, closely sheathing, externally hirsute. Ovary 8–13 mm, linear-obovoid, dull green, densely glandular with trichomes ca 0.8 mm long. Flower one to four, ca 25 mm across, white with yellow lamina and marginal calli, exterior of perianth segments greenish, floral odour undetectable; dorsal sepal erect and incurved, lateral sepals porrect, divergent, petals widely spreading. Dorsal sepal 12–16 mm x 3–4 mm, linear-elliptical, obtuse, distal margins often involute, internally glabrous, externally with sessile glands. Lateral sepals 17–21 mm x 5–6 mm, lanceolate, obtuse to subacute, porrect, divergent, internally glabrous, externally glandular. Petals 16–18 mm x 3.5–4 mm, lanceolate, slightly falcate, widely spreading, acute to subacute, internally glabrous, externally glandular. Labellum hinged at the base, white with yellow

calli, prominently three-lobed. Lamina 6.5–7.5 mm x 6–7 mm, transversely ovate in outline when flattened, erect in basal third then curved forwards, apex recurved; lateral lobes ca 2.5 mm wide broadly rounded, entire, erect and column-embracing; mid-lobe 3–3.5 mm x ca 2.3 mm, narrowly deltate in outline when flattened, obtuse, basal margins with three or four pairs of blunt, yellow calli, those towards apex irregular, coalescent and decrescent. Lamina calli in two rows extending to the base of the mid-lobe, yellow, crowded; basal calli two, ca 1.3 mm long, erect, stalk slender, papillate, head ca 0.5 mm across, clavoid, papillate; longest lamina calli ca 0.8 mm long, erect, stalk slender, head clavoid, inclined forwards. Column 6–7.5 mm x ca 3 mm, slightly recurved in proximal third then curved forwards, greenish, broadly winged, densely glandular on the exterior dorsal surface; central anterior ridge ca 2 mm wide. Anther ca 2 mm x 1.5 mm, cream densely papillate, with a linear rostrum ca 0.5 mm long. Pollinia four, ca 1.5 mm long, boomerang-shaped, flat, white mealy. Stigma ca 1.5 mm wide, green, more or less sunken. Capsule not seen.

Selected Collections: South Australia; Mambray Creek, 25 September 1974, P. Martinsen 92 (AD); Alligator Creek — Mambray Creek junction, 25 September 1974, P. Martinsen 99 (AD); Telowie Gorge Conservation Park, 3 September 1985, R. Bates 6066 (AD).

Distribution and Habitat: Endemic to the Flinders Ranges and the Northern Lofty Ranges of South Australia (Sfr, Snl). It grows in moss pockets on shaded rock ledges under *Callitris columellaris*, the predominant soils being red-brown loams.

Flowering Period: September and October.

Notes: *C. xantholeuca* has some relationships with *C. carnea* R. Br. but is closer to *C. coactilis* D. Jones. It is much thinner-textured in all its parts than this species and is readily recognised by its white flowers which have yellow calli on the labellum lamina and margins. This species was erroneously recorded from South Australia as *C. carnea* var. *alba* (R. Br.) Benth. (Weber & Bates 1978).

Conservation Status: Very rare but conserved, suggest 2EC by criteria of Briggs & Leigh (1988).

Etymology: From the Greek 'xantho', yellow, 'leuco', white; in reference to the white flowers with yellow labellum calli.

CHILOGLOTTIS R. Br.

Chiloglottis R. Br., a small genus of terrestrial orchids endemic to Australasia, is currently considered to contain nine species and a natural hybrid (Clements 1989). Pollination studies into the genus show that intimate relationships exist between the orchid taxa and species of thynnid wasps which attempt to copulate with the orchid's labellum (Stoutamire 1975). These studies also revealed taxonomic problems within *Chiloglottis*. The prominent ant-like, shiny glands on the labellum play a major role in pollination but the taxonomic importance of their shape,

configuration and colouration has largely been overlooked by botanists, as also has the significance of fleshy apical processes on the sepals (actually sepaline osmophores). Extensive studies into *Chiloglottis* by the author have redefined named taxa and have identified many new species, eleven of which are described here.

Definition of Terms: Because of the complex nature of the labellum callus of many species of *Chiloglottis*, explanatory terms are needed and the opportunity is taken here to present the terms coined in this study; these are explained in the accompanying drawing (Fig. 1).

New Species

Chiloglottis anaticeps D. Jones; species nova affinis *C. reflexae* (Labill.) Druce sed floribus viridibus, glande principale stipitata labelli cum forma capitis anatis, et columna late alata differt.

Typus: New South Wales; ca 2 km south-east of Forbes River crossing, Hastings Forest Way, west of Wauchope, 31°09'S, 152°22'E, 9 December 1985, D. L. Jones 2229, L. Barton and T. D. Jones (holo CBG, iso CBG, NSW).

Terrestrial tuberous herb forming sparse colonies. Tuberoids to 15 mm x 10 mm, ovoid to obovoid, brown, fleshy. Leaves 3–4 cm x 14–18 mm, elliptical to ovate, sessile, initially erect, becoming ground-hugging, dark green on the upper surface, paler beneath with prominent veins, margins entire or undulate to crispate; petioles 10–25 mm long. Peduncle 3–6 cm x 2 mm, pale green. Fertile bracts 18–20 mm x 4–5 mm, lanceolate, closely sheathing, acuminate. Pedicel 6–10 mm long, slender, erect. Flower solitary, 28–32 mm long, verdant green. Dorsal sepal 14–16 mm x 3–4 mm, erect, not column embracing, narrow in basal third then broadly expanded; osmophore ca 4 mm long, linear-terete, green. Lateral sepals 16–18 mm x 0.8 mm, linear, curved, free at the base, erect in the proximal 5 mm, then decurved, flat; osmophore 5–7 mm long, linear-terete, green. Petals 10–12 mm x 3–3.5 mm, obliquely lanceolate, reflexed against the ovary. Labellum articulated on a very short claw ca 1 mm long, erect in distal third then decurved towards apex; lamina 9–11 mm x 5–6 mm, obovate in outline when flattened, anterior margins downcurved, distal margins irregularly crenate. Lamina callus dark green, shiny, occupying most of the adaxial surface area of the lamina; major proximal stalked gland ca 2 mm long, resembling a duck's head in shape, the base flanked by a few prominent stalked clavoid glands ca 1 mm long; major sessile gland ca 2 mm x 1.5 mm, more or less circular, distally a series of dark green stalkless glands in a narrow line to the apex, these flanked by a mass of pale green, rounded, stalkless glands which extend nearly to the margins; labellum base with two short, thick glands. Column 8–9 mm x ca 3 mm, curved, with numerous small red spots on the anterior surface, dorsal surface with a few prominent raised bumps and appearing almost almost verrucose; central ridge ca 1 mm across; wings extremely broad, concave, just extending above the anther, the tips irregularly lobed. Anther cap ca 2 mm x 2 mm, smooth, with a short rostrum. Pollinia ca 2 mm long, banana-shaped,

bright yellow, mealy. Stigma ca 2 mm across, cordate, concave. Capsule not seen.

Distribution and Habitat: Endemic to northern New South Wales where known only from high country to the west of Wauchope (Nnc). It forms sparse colonies, growing in tall open forest often along the margins streams or around the fringes of low sandstone outcrops; soils are grey gravelly loams.

Flowering Period: December to February.

Notes: *C. anaticeps* has some affinities with *C. reflexa* but can at once be distinguished by its verdant green flowers, and very different lamina callus, particularly the main stalked gland which bears a striking resemblance to a duck's head in shape. Differences are also found in the column, particularly the very broad column wings which have an irregular, almost verrucose dorsal surface.

Conservation Status: Rare but conserved in a National Park; suggest 2KC by the criteria of Briggs & Leigh (1988).

Etymology: The specific epithet refers to the prominent stalked labellum gland which is shaped like a duck's head.

Chiloglottis chlorantha D. Jones; species nova affinis *C. gunnii* Lindley a qua foliis minoribus, pedunculo brevior exiliore, et floribus minoribus flavovirentibus pallidis et lamina callis dispositis dissimiliter differt.

Typus: New South Wales; Jamberoo Mountain south-west of Wollongong, 34°38'S, 150°44'E, October 1988, R. G. Tunstall s.n. (holo CBG, iso CBG, NSW, MEL).

Terrestrial tuberous herb forming loose colonies. Leaves 27–40 mm x 10–18 mm, elliptical, dark green above, paler beneath, with prominent veins, entire, apiculate; petioles 3–6 mm long. Peduncle 20–35 mm x ca 1.8 mm, green, fleshy. Fertile bracts 15–18 mm x 8–10 mm, ovate-lanceolate, acuminate, closely sheathing. Pedicel 15–20 mm long, very slender. Ovary ca 10 mm long, green. Flower solitary, ca 28 mm across, green to yellowish green, held stiffly erect. Dorsal sepal 17–20 mm x 6–9 mm, obovate, erect, incurved; osmophore ca 1 mm long, linear-terete, tapered. Lateral sepals 14–16 mm x ca 2 mm, broadest near the base then tapered to apex, erect in proximal half then curved forwards, parallel or divergent, green; osmophore ca

1 mm long, linear-filiform, green. Petals 13–15 mm x 4.5–6 mm, lanceolate, falcate, subacute, widely divergent. Labellum articulated on a short claw ca 0.7 mm long; lamina 12–13 mm x 9–12 mm, broadly ovate-cordate in outline, green, entire. Lamina callus occupying the central two-thirds of the ventral surface area, the glands reddish, yellowish or bright green; major central gland ca 3.5 mm long, linear-terete, obtuse, erect or curved, apex dark green or reddish; lateral to this are ca five pairs of short linear-terete yellowish or reddish glands; distal gland ca 1.2 mm across, sessile, bright green, shiny; surface distal to this often somewhat glandular. Column 11–12 mm x ca 5 mm, strongly curved, green with reddish flecks and irregular markings on the anterior surface; wings broad, extending above the anther, subacute. Anther ca 1.8 mm x 1.8 mm, smooth, with a short rostrum, yellow. Pollinia ca 2.8 mm long, boomerang-shaped, yellow, mealy. Stigma ca 2 mm across, elliptical. Capsule ca 12 mm x 6 mm, obovoid, on a swollen pedicel ca 15 cm long.

Selected Collections: New South Wales; Jambaroo Mountain, 27 September 1959, L. Cady 276 (AD); Penrose State Forest, November 1988, R. G. Tunstall s.n. (CBG); Knights Hill, October 1987, R. G. Tunstall 36A (CBG). Victoria; Moorooduc, 11 October 1989, P. Branwhite s.n. (CBG).

Distribution and Habitat: Endemic to central New South Wales and eastern Victoria (Ncc, Vch). This species grows under low shrubs in moist areas of tall open forest. Soils may be grey gravelly loams or somewhat peaty.

Flowering Period: September to November.

Notes: *C. chlorantha* has affinities with *C. valida* but is smaller in all its parts and has distinctive green to yellowish green flowers with widely spreading petals. Its lamina calli are in a different arrangement being more numerous and those which flank the main gland are often crowded. *C. chlorantha* could also be confused with *C. cornuta* but that species is distinctive with its triangular labellum. The new species hybridises with *C. trapeziformis* where the two grow in close proximity (P. Branwhite, pers. comm.). Illustrated by plate 1396 in Fairley and Moore (1989).

Conservation Status: Widely distributed and conserved.

Etymology: From the Greek '*chloranthus*', green flowered; in reference to the flower colour.

Chiloglottis longiclavata D. Jones; species nova affinis *C. diphyllae* R. Br. a qua osmophoris sepalinis longioribus (praesertim sepali dorsalis), et labello apice apiculato ad caudato saepe recurvo et columna alis angustioribus differt.

Typus: Queensland; Cook District; SFR 194, Parish of Western, Herberton Range, 17°20'S,

145°25'E, 100 m, 26 April 1987, B. Gray 4455, (holo CBG, iso CBG).

Leaves 25–60 mm x 9–20 mm, elliptical, mid-green to dark green above, paler and somewhat pellucid beneath, margins undulate to crisped; petioles 3–5 mm long. Peduncle 5–7 cm x ca 1 mm, pinkish, fleshy. Floral bracts 15–18 mm x 5–6 mm, ovate-lanceolate, long-acuminate, closely sheathing. Pedicel 20–25 mm long, slender. Flower solitary, ca 25 mm long, pinkish green with prominent yellowish sepalline osmophores. Dorsal sepal 15–18 mm x ca 2.5 mm, incurved, pinkish, narrow in proximal half then dilated into an ovate-elliptical part before the osmophore; osmophore 4–9 mm long, linear-terete, yellowish. Lateral sepals 16–21 mm x 0.5–0.7 mm, linear, pinkish, connate at the very base, projected forwards and divergent in the proximal quarter then recurved; osmophores 10–14 mm long, linear-terete, thicker than rest of sepals, yellowish. Petals 7–8 mm x ca 2.3 mm, oblong-lanceolate, slightly falcate, reflexed against the ovary, acute to sub-acuminate. Labellum articulated on a very short claw ca 0.3 mm long; lamina 7–8 mm x 4–5 mm, narrow in proximal 3 mm (ca 1 mm across) then expanded and broadly obovate-rhomboid, the distal margins curved, somewhat irregular, lateral margins slightly recurved, apex apiculate to caudate, sometimes recurved. Lamina callus insectiform, dark blackish red, occupying nearly all of the ventral surface area of the lamina; major stalked gland ca 1.4 mm long, obliquely erect or incurved, apex broadly emarginate, dull green to blackish, smooth, apex ca 1.2 mm across; major sessile gland ca 1.5 mm across, black, shiny, flat, irregular in shape; intermediate glands consisting of a cluster of coarse, black clavoid glands; distal and lateral to the main sessile gland are numerous, small, sessile reddish glands which extend to the margins and apex; basal glands ca 0.5 mm long, swollen, reddish. Column ca 6 mm x 2.5 mm, incurved, pale green with purple flecks on the anterior surface; central ridge ca 1 mm across; wings narrow, nearly as long as the anther, apex obtuse. Anther ca 1.5 mm x 1.5 mm, smooth with a short rostrum. Pollinia ca 2 mm long, clavate, falcate, yellow, mealy. Stigma ca 2 mm across, elliptical to orbicular, sunken. Capsule not seen.

Selected Collections: Queensland; Herberton Range, 13 June 1990, cult. H. Richards ex L. Lawler s.n., (CBG).

Distribution and Habitat: Endemic to the higher ranges of the Atherton Tableland, north-eastern Queensland (Qco). This species grows in small colonies on sheltered slopes and gullies in tall open forest. Soils are grey, gravelly loams.

Flowering Period: April to June.

Notes: *C. longiclavata* has affinities with *C. diphylla* but can be distinguished by the very long sepalline osmophores (especially that of the dorsal sepal), the apiculate-caudate tip on the labellum which is often recurved and the narrowly winged column. The northernmost occurrence of *C. diphylla* seems to be on the

Blackdown Tableland, about 800 km south of the known localities of *C. longiclavata*.

Conservation Status: Uncommon and not conserved; suggest 2R according to Briggs and Leigh (1988).

Etymology: From the Latin '*longus*' long, '*clavus*', a club; in reference to the long sepalline osmophores or clubs.

Chiloglottis palachila D. Jones et M. Clements; species nova affinis *C. formiciferae* Fitzg. sed cum basi labelli longa attenuata, callo in parte labelli proximali formiciformo parvo, et clavalis parvis ad apices sepalorum lateralium basaliter conjunctorum.

Typus: New South Wales; Barrington Tops, 31°59'S, 151°58'E, 8 December 1985, D. L. Jones 2208, L. Barton and T. D. Jones (holo CBG, iso CBG, NSW, BRI, MEL).

Terrestrial tuberous herb forming extensive colonies. Tuberoids to 15 mm x 10 mm, ovoid to obovoid, brown, fleshy. Leaves 3–7 cm x 1.2–1.5 cm, elliptical, ground-hugging or slightly erect, dark green on the upper surface, pellucid beneath with prominent veins, margins undulate to crispate; petioles 10–30 mm long, slender. Peduncle 10–14 cm x 2 mm, fleshy, pinkish-purple. Floral bracts 12–16 mm x 3–5 mm, lanceolate, closely sheathing. Pedicel 20–30 mm long, slender, erect. Flower solitary, 20–22 mm long, greenish pink with a darker lamina callus, occasionally all green. Dorsal sepal 12–18 mm x 3–3.5 mm, curved, column-embracing, narrow in proximal third then abruptly dilated before narrowing into the osmophore; osmophore ca 2 mm long, attenuate. Lateral sepals 12–15 mm x ca 1 mm, linear-tapered, conjoined at the very base, erect for the basal 5 mm, then decurved, divergent, flat; osmophore ca 2 mm long swollen and club-like, brown. Petals 10–12 mm x 2–3 mm, asymmetrically oblong, reflexed against the ovary. Labellum articulated on a slender, verrucose claw 1–2 mm long; lamina 5–6 mm x 5–7 mm, obovate to spade-shaped, lateral and apical margins recurved. Lamina callus ca 3 mm long, black, ant-like, occupying distal part of claw and proximal part of the lamina, the main basal gland prominently stalked. Column 7–9 mm x ca 3 mm, strongly incurved, with prominent reddish irregular transverse striations on the anterior surface; central ridge ca 1.2 mm across; wings broad (expanded distally), extending much higher than the anther, subacute. Anther cap ca 2 mm x 2 mm, smooth, with a short rostrum. Pollinia ca 2 mm long, banana-shaped, yellow, mealy. Stigma ca 2 mm across, more or less circular, concave. Capsule not seen.

Selected Collections: New South Wales; 2 km south-east of Polblue Swamp, Barrington Tops, 23 November 1987, R. Bates 12862 (AD); Barrington Tops, 8 November 1954, A. W. Dockrill s.n. (AD); Mt Kaputar National Park, 17 October 1986, R. G. Tunstall 147 (CBG).

Distribution and Habitat: At present known only from the Barrington Tops and Mount Kaputar, northern New

South Wales, but possibly also present on the higher parts of the New England Tableland. At the Barrington Tops it is found in the interzone between rainforest and open forest at about 1500 metres altitude, the rainforest often fringing streams; at Mt Kaputar it grows under low shrubs on exposed peaks. The soils are grey to brown gravelly loams derived from basalt.

Flowering Period: December to February.

Notes: *C. palachila* is a very distinctive species with superficial relationships to any other member of the genus. It can be distinguished by its spade-shaped labellum with a long-attenuate base, its much abbreviated, ant-shaped callus restricted to the proximal third of the lamina, and the short, swollen dark osmophores on the tips of the lateral sepals. It is remarkable that such a distinctive species should pass unnoticed in an orchid haunt as well collected as the Barrington Tops.

Conservation Status: Uncommon but well conserved in two National Parks; suggest 3RC according to Briggs & Leigh (1988).

Etymology: From the Latin '*palachilus*' spade-shaped; in reference to the shape of the labellum lamina.

Chiloglottis platyptera D. Jones; species nova affinis *C. formiciferae* Fitzg. a qua labello lamina prope horizontali, et labello callo magis extenso et paginam ventralem pro parte maxima tegenti et columna alis multum latoribus profunde concavis differt.

Typus: New South Wales; north of Dingo Gate, Barrington Tops, 31°55'S, 151°21'E, 26 September 1989, C. Bower s.n. (D.L.Jones 5093) (holo CBG, iso CBG, NSW).

Terrestrial tuberous herb forming extensive colonies. Tuberoids to 14 mm x 9 mm, ovoid, brown, fleshy. Leaves 4–7.5 cm x 14–22 mm, elliptical to oblong-elliptical, ground-hugging, dark green on the upper surface, paler beneath with numerous fine longitudinal veins, margins undulate to crispate; petioles 3–8 mm long. Peduncle 3–7 cm x ca 1.5 mm, green to reddish, fleshy. Floral bracts 14–18 mm x 4–6 mm, ovate-lanceolate, acuminate, closely sheathing. Pedicel 20–30 mm long, very slender, erect, green or reddish. Flower solitary, 10–12 mm long, greenish brown with a prominent black labellum callus. Dorsal sepal 12.5–13.5 mm x 3–3.2 mm, erect and incurved, more or less spatulate, narrow and tapered in basal three-quarters, then expanded into an ovate-elliptical section before narrowing to an obtuse apex; apical osmophore ca 0.5 mm long. Lateral sepals 9–10 mm x ca 1 mm, linear, connate at the very base, erect in the basal half then recurved and widely divergent, flat, tapered to osmophore; osmophore 0.6–0.8 mm long, dark red to blackish, narrower than lamina. Petals 9.5–10.5 mm x ca 3 mm, asymmetrically linear-oblongate, slightly falcate, reflexed against the ovary. Labellum articulated on a very short claw ca 0.1 mm long, obliquely erect in basal third then nearly horizontal, apex sharply recurved; lamina 9–10 mm x 8–8.5 mm, broadly obtrullate, basal

narrow part ca 3.5 mm x 2 mm, tapered to base, margins purplish, main part of lamina greenish brown, lateral margins not level with obtuse apex when flattened although appearing so because of recurved apex. Lamina callus black, shiny, occupying most of the adaxial surface area of the lamina; major proximal stalked gland ca 1.5 mm long, obliquely erect, apex ca 2 mm wide, handlebar-like, the stalk on the distal side of the gland with clustered, shiny black, sessile calli; major sessile gland ca 2 mm across, more or less semi-circular in shape, distally a broad mass of crowded, sessile calli extending to apex; a few shortly stalked, reddish, clavoid calli to 0.5 mm long flank the major glands; calli vestigial on narrowed base of labellum. Column 8.5–9.5 mm x 5.5–6 mm, erect, sharply incurved above the middle, pale green with purple flecks on the anterior surface; central ridge ca 2 mm across; wings extremely broad, concave, extending much higher than the anther. Anther ca 1.5 mm x 1.5 mm, smooth, with a short rostrum, yellow. Pollinia ca 2 mm long, boomerang-shaped, yellow, mealy. Stigma ca 1.5 mm across, transversely elliptical. Capsule not seen.

Selected Collections: New South Wales; along Dingo Fence, Barrington Tops, 23 November 1987, R. Bates 12870 (AD).

Distribution and Habitat: Known only from the Barrington Tops, northern New South Wales (Nnc), where locally common, but doubtless more widespread than this and overlooked due to confusion with other species. Plants grow in a grassy understorey under tall open forest in brown loamy soils of basalt origin.

Flowering Period: September to November.

Notes: *C. platyptera* has affinities with *C. formicifera* but can be immediately distinguished by the much broader column wings which form a concave hood behind the labellum. Other differences include a more extensive lamina callus and the horizontal attitude of the labellum lamina (obliquely erect to nearly vertical in *C. formicifera*). Baiting experiments show that both species have different pollination vectors (*C. Bower*, pers. comm.).

Conservation Status: Poorly known but conserved; suggest 2KC according to Briggs & Leigh (1988).

Etymology: From the Greek 'platys', broad, wide, 'pteron', wing; in reference to the distinctive, broad column wings.

Chiloglottis pluricallata D. Jones; species nova affinis *C. valida* D. Jones a qua petalis multo magis divergentibus, et lamina callis plus numerosis dispositis dissimiliter differt.

Typus: New South Wales; Point Lookout, New England National Park, 30°29'S, 152°25'E, 7 December 1989, D. L. Jones 5538 & C. Broers (holo CBG, iso CBG, NSW, MEL, BRI).

Leaves 50–80 mm x 18–30 mm, linear elliptical to broadly elliptical, dark green above, paler beneath with

prominent longitudinal veins, entire; petioles 10–18 mm long. Peduncle ca 40–60 mm x ca 1.2 mm, green to purplish, fleshy. Floral bracts 16–20 mm x 10–12 mm, broadly obovate, acuminate, closely sheathing. Pedicel 10–25 mm long, slender. Ovary ca 8 mm long, greenish purple. Flower solitary, ca 25 mm across, green to greenish purple or reddish, held stiffly erect. Dorsal sepal 19–21 mm x 7–9 mm, broadly obovate-spathulate, erect, incurved; osmophore 2–3 mm long, linear-terete. Lateral sepals 15–18 mm x ca 2.5 mm, reddish-brown, broadest near the base then tapered to apex, erect in basal half then recurved, divergent or parallel; osmophore ca 1 mm long, linear terete, brownish. Petals 15–18 mm x 4–4.5 mm, lanceolate, falcate, greenish to brownish, widely divergent, apical third upcurved, acuminate. Labellum articulated on a claw ca 1 mm long, tapered; lamina 11–12.5 mm x 9–12 mm, broadly ovate-cordate, brownish with a narrow green marginal band, veins slightly darker, lateral surface somewhat rugulose; callus occupying the central two-thirds of the lamina, the calli reddish to blackish, on a slightly raised, somewhat rugulose plate; main central gland 3–4 mm long, erect, linear-terete, apex darker; lateral glands four to six pairs, irregularly linear, basal pair longest; apical gland 1.5–2 mm across, flattened, irregular. Column 13–15 mm x ca 5 mm, erect and incurved, strongly curved away from the ovary in basal third, greenish brown with darker anterior markings; wings narrow, incurved in the distal third, as long as or longer than the anther, subacute. Anther ca 2.5 mm x 2.5 mm, smooth, entire, pale yellow. Pollinia ca 3 mm long, boomerang-shaped, yellow, mealy. Stigma ca 3 mm across, elliptical, sunken. Capsule ca 15 mm x 6 mm, obovoid, on a thickened pedicel 10–20 cm long.

Selected Collections: New South Wales; Polblue Swamp, Barrington Tops, 28 December 1984, R. Bates 5035 (AD); Dorrigo, 23 November 1987, R. Bates 12890 (AD).

Distribution and Habitat: Endemic to New South Wales (Nnt, Nnc, Ncc, Nct), where widespread and locally common in open forest at moderately high elevations (1200–1500 m), often growing among *Poa* tussocks.

Flowering Period: November to January.

Notes: *C. pluricallata* has affinities with *C. valida* and has also been confused with *C. gummii*. It can be readily distinguished from the latter by its robustness and more slender labellum glands and from the former by the more numerous calli on the labellum and the much more widely divergent petals (erect and incurved in *C. valida*). Both species have different pollination vectors (*C. Bower*, pers. comm), and hybrids have not been found where they grow sympatrically.

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin 'pluri' many, 'callata', glands; in reference to the numerous labellum glands.

Chiloglottis seminuda D. Jones; species nova affinis *C. reflexae* (Labill.) Druce a qua habitu minore, floribus pro parte maxima virellis, osmophoris sepalinis multum exilioribus, et labello pagina ventrali nuda 1/3 ad 1/2 distaliter differt.

Typus: New South Wales; Penrose State Forest, 34°40'S, 150°13'E, 14 March 1990, D. L. Jones 5745 and C. H. Broers (holo CBG, iso CBG, NSW, MEL, AD, BRI).

Terrestrial, tuberous herb forming extensive colonies. Tuberoïds to 15 mm x 10 mm, ovoid to obovoid, brown, fleshy. Leaves 2.5–8.5 cm x 10–18 mm, elliptical to ovate-oblong, initially erect, becoming ground-hugging, dark green on the upper surface, paler beneath with prominent veins, margins entire, undulate to crispate; petioles 5–20 mm long. Peduncle 3–5 cm x 3 mm, green to reddish. Fertile bracts 10–20 mm x 4–5 mm, ovate-lanceolate, closely sheathing, long-acuminate. Pedicel 13–20 mm long, slender, erect. Flower solitary, 10–14 mm long, green or less commonly reddish-pink. Dorsal sepal 10–15 mm x 2.5–3 mm, erect and incurved, column-embracing, more or less spatulate, narrow and tapered in proximal three-quarters, then expanded into an ovate section before narrowing; osmophore 2–2.5 mm long, linear-terete. Lateral sepals 13–18 mm x ca 0.8 mm, linear, connate at the very base, erect in basal half then recurved and divergent, flat, tapered to osmophore; osmophore 3–7 mm long, linear-terete, green to reddish, narrower than lamina. Petals 8–11 mm x 2–3 mm, linear-oblong, slightly falcate, reflexed against the ovary. Labellum articulated on a very short claw ca 0.1 mm long, obliquely erect in proximal third, then nearly horizontal; lamina 8–10 mm x 5–6.5 mm, broadly rhomboid-trullate, basal narrow part ca 3 mm x 1.5 mm, slightly tapered to base, margins reddish, main part of lamina green or reddish, lateral margins obtuse, not level with obtuse to apiculate apex when flattened. Lamina callus black, shiny, usually subtended by pink to red clavoid calli, occupying the basal half to two-thirds of the lamina, the rest naked; major stalked gland ca 1.8 mm long, obliquely erect, apex ca 1.3 mm wide, emarginate, distally a cluster of irregular, coarse, black, shiny calli; major sessile gland ca 1.5 mm across, irregularly rectangular, black, shiny, distally a few small green or reddish calli in an irregular arrangement; numerous, long-stalked, pink or reddish, clavoid calli to 1.5 mm long flank the area between the major sessile gland and the stalked gland; calli on narrowed base of labellum vestigial, although basal pair often prominent. Column 6.5–7.5 mm x 2.4–2.8 mm, erect, incurved, pale green with prominent dark purple spots and flecks on the anterior surface; central ridge ca 1 mm across; wings narrow, slightly higher than the anther, obtuse. Anther ca 1.5 mm x 1.7 mm, smooth, yellow, with a short rostrum. Pollinia ca 2 mm long, boomerang-shaped, bright yellow, mealy. Stigma ca 1.5 mm across, transversely oblong, sunken. Capsule 11–13 mm x 4–6 mm, obovoid, on a swollen, reddish pedicel 14–20 cm long.

Selected Collections: (all CBG); New South Wales; Brimstone Mine, Oakdale, 25 February 1990, J. Riley s.n.; 1 km west of Bilpin, 22 March 1990, C. Bower s.n.; Springwood, 19 March 1990, R. Angus s.n.; 6.5 km east-north-east of Mt Werong, 22 March 1990, C. Bower s.n.; Fitzroy Falls, 14 March 1990, D. L. Jones 5722; French's Forest, 9 March 1990, R. Angus s.n.

Distribution and Habitat: Widespread and common in the Sydney basin extending west to the Blue Mountains and south at least as far as the Penrose State Forest (Ncc, Nct, Nst). Grows in a variety of situations but frequently in moist forests adjacent to streams and on escarpments.

Flowering Period: January to April.

Notes: *C. seminuda* is part of the *C. reflexa* complex but can be immediately distinguished by the naked apical third to half of the labellum (*C. reflexa* is glandular to the apex). In addition *C. seminuda* has shorter peduncles and pedicels, smaller flowers which are usually greenish and very slender sepalline osmophores. The new species also has affinities with *C. sylvestris* which has much smaller flowers, distinctly rounded labellum margins and much shorter sepalline osmophores. In various localities, *C. seminuda* grows sympatrically with *C. trilabra*, *C. sylvestris* and *C. diphylla* but hybrids are unknown. Baiting experiments with *C. seminuda* and *C. trilabra* show that each has a different pollinator (*C. Bower, pers. comm.*). Illustrated by plate 1394 in Fairley and Moore (1989).

Conservation Status: Widespread, common and conserved.

Etymology: From the Latin 'semi', half, 'nudus', bare, naked; in reference to the callus not occupying all of the ventral surface of the labellum and leaving the apical third naked.

Chiloglottis sphyrnoides D. Jones; species nova affinis *C. seminudae* D. Jones a qua floribus majoribus, et labello majore et callo glande principali stipitate capitulo late divergenti et columna multum latiori pagina antica distincte maculata purpurea differt.

Typus: Queensland; Pat's Bluff, Lamington National Park, 28°16'S, 153°07'E, 1 April 1988, C. Harman 3, (holo CBG, iso CBG, BRI, NSW).

Terrestrial tuberous herb forming extensive colonies. Tuberoïds to 16 mm x 10 mm, ovoid to obovoid, brown, fleshy. Leaves 3.5–8.5 cm x 1.5–2.3 cm, elliptical to ovate-oblong, initially erect, becoming ground-hugging, dark green on the upper surface, paler beneath with prominent veins, margins entire; petioles 5–15 mm long. Peduncle 4–7 cm x 2.5 mm, green to pinkish, fleshy. Floral bracts 14–20 mm x 6–7 mm, obovate, long-acuminate, closely sheathing. Pedicel 14–20 mm long, slender, erect. Flower solitary, 18–22 mm long, green or reddish pink with a darker labellum callus. Dorsal sepal 16–18 mm x 3–4 mm,

erect and incurved, column-embracing, more or less spathulate, narrow and tapered in proximal half then expanded into an ovate section before narrowing; osmophore 2–2.5 mm long, linear-terete. Lateral sepals 13–17 mm x ca 0.8 mm, linear, connate at the very base, obliquely erect in proximal half then recurved and divergent, tapered to osmophore; osmophore 4–6 mm long, linear-terete, green to reddish, narrower than lamina. Petals 11–13 mm x 3.5–4 mm, linear-oblong, slightly falcate, reflexed against the ovary. Labellum articulated on a very short claw ca 0.3 mm long, obliquely erect in proximal quarter, then nearly horizontal; lamina 10–12 mm x 7–8.5 mm, broadly spathulate, basal narrow part ca 3 mm x 2 mm, tapered to base, margins reddish, main part of lamina green or pinkish, lateral margins broadly rounded, not level with obtuse apex when flattened. Lamina callus black, shiny, subtended by red, clavoid calli, occupying the basal half to two-thirds of the lamina, the rest naked; major stalked gland ca 2.5 mm long, obliquely erect, apex ca 2 mm wide, the lobes broadly divergent, surface irregularly rugose, distally a cluster of irregular, coarse, black shiny calli; major sessile gland ca 2 mm across, irregularly rectangular, black, shiny, distally a few, small reddish calli in an irregular arrangement; numerous, long-stalked, reddish clavoid calli to 2.5 mm long flank the area between the two major glands; calli on narrowed base of labellum much reduced, reddish. Column 9–10 mm x 3.8–4 mm, erect, incurved, green with prominent purple-black blotches on the anterior surface; central ridge ca 1 mm across; wings narrow, much shorter than the anther, obtuse. Anther ca 2.5 mm x 2 mm, smooth, yellow, with a short rostrum. Pollinia ca 2.2 mm long, boomerang-shaped, bright yellow, mealy. Stigma ca 2 mm across, transversely oblong, sunken. Capsule 12–15 mm x 4–6 mm, obovoid, on a swollen, reddish pedicel 15–25 cm long.

Distribution and Habitat: Known only from the vicinity of the type locality and also Nowendoc in northern New South Wales, but doubtless more widespread and overlooked due to confusion with other species (Qmo, Nnc). It grows in tall moist forests adjacent to streams and escarpments, usually in well-structured basalt loams.

Flowering Period: December to April.

Notes: *C. sphyrnoides* differs from other members of the *C. reflexa* complex by its much larger flowers and the very broadly emarginate apex to the major stalked gland. It is closest to *C. seminuda* but in addition to the gland shape has larger flowers with a much larger labellum and a broader column which has large, dark purple blotches on the anterior surface. At the type locality, *C. sphyrnoides* and *C. sylvestris* grow sympatrically but hybrids are unknown.

Conservation Status: Widespread, conserved in a National Park but poorly known; suggest 3KC according to Briggs and Leigh (1988).

Etymology: Adapted from *Sphyrna*, the generic name for Hammerhead sharks and the Greek 'oides', alike,

resembling; the shape of the main stalked gland on the labellum resembles the head of these creatures.

Chiloglottis trullata D. Jones; species nova affinis *C. formiciferae* Fitzg. a qua floribus minoribus, et *C. truncatae* D. Jones et M. Clements osmophoris sepalinis fuscatis, et labello trullato lamina supra tecta pro parte maxima callo magis complexo differt.

Typus: Queensland; Rainbow Falls, Blackdown Tableland, 23°39'S, 149°04'E, 18 July 1989, E. Pederson s.n. (D.L.Jones 4552) (holo CBG, iso BRI).

Terrestrial tuberous herb forming colonies. Tuberooids to 14 mm x 9 mm, ovoid, creamy brown, fleshy. Leaves 5–8 cm x 16–24 mm, elliptical to oblong-elliptical, ground-hugging, dark green on the upper surface with prominent reticulate veins, grey-green beneath, the margins undulate to nearly crisped; petioles 3–5 mm long. Peduncle 3–5.5 cm x ca 2 mm, green to purplish, fleshy. Floral bracts 12–16 mm x 4–6 mm, obovate, acuminate, closely sheathing. Pedicel 18–23 mm long, very slender, erect, green or reddish. Flower solitary, 8–10 mm long, green or pinkish. Dorsal sepal 10–11 mm x 2–2.5 mm, erect and incurved, more or less spathulate, narrow and tapered in basal three-quarters, then expanded into an ovate section before narrowing to an obtuse apex; osmophore ca 1 mm long, terete. Lateral sepals 9–10 mm x ca 1 mm, linear, connate at the very base, erect in basal half then recurved and divergent, flat, tapered to osmophore; osmophore 0.8–1.2 mm long, dark red, terete, narrower than lamina. Petals 8–9 mm x ca 2.5 mm, asymmetrically linear-oblongate, slightly falcate, reflexed against the ovary. Labellum articulated on a very short claw ca 0.1 mm long, obliquely erect in basal third then nearly horizontal, apex sharply recurved; lamina 7–8 mm x 5–6 mm, broadly trullate, basal narrow part ca 3 mm x 1.3 mm, slightly tapered to base, margins purplish, main part of lamina whitish with a purple marginal band, lateral margins not level with obtuse apex when flattened, although appearing so because of recurved apex. Lamina callus dark reddish black, shiny, occupying most of the adaxial surface area of the lamina; major proximal stalked gland ca 1.5 mm long, obliquely erect, apex ca 2 mm wide, handlebar-like, the stalk on the distal side of the gland with laterally clustered, sessile calli ca 1.2 mm wide; major sessile gland ca 1.5 mm across, irregularly rounded, distally a broad mass of crowded, sessile calli extending to apex and nearly to lateral margins; numerous, long-stalked, reddish, clavoid glands to 0.6 mm long flank the major proximal stalked gland; calli on narrowed base of labellum vestigial. Column 7–8 mm x 2.5–3 mm, curved, pale green with a few purple spots on the lower anterior surface; central ridge ca 1 mm across; wings narrow, extending above the anther, obtuse. Pollina ca 2 mm long, boomerang-shaped, bright yellow, mealy. Stigma ca 2 mm across, oblong, sunken. Capsule not seen.

Distribution and Habitat: Endemic to the Blackdown Tableland of central-eastern Queensland (Qle), but probably more widespread and overlooked. It occurs in moist sandy soils in the lee of large sandstone boulders in sparse open forest.

Flowering Period: July and August.

Notes: *C. trullata* has affinities with both *C. truncata* and *C. formicifera*. From the latter it can be distinguished by its much smaller flowers and from *C. truncata* by its dark sepaline osmophores and trullate labellum, the ventral surface of which is densely covered with glands from the base to the apex in a strongly insectiform arrangement.

Conservation Status: Poorly known; suggest 2K according to Briggs & Leigh (1988).

Etymology: From the Latin '*trullatus*', like a bricklayer's trowel; in reference to the labellum shape.

Chiloglottis turfosa D. Jones; species nova
affinis *C. gummii* Lindley a qua foliis proportione latioribus, pedunculo brevioribus, floribus minoribus, et labello lamina glandibus densis et columna alis plus minusve incurvatis differt.

Typus: New South Wales; ca 7 km along Tantangara Dam Rd., Kosciusko National Park, 35°52'S, 148°38'E, ca 1000 m., 16 December 1989, D. L. Jones 5571, B. E. Jones & T. D. Jones, (holo CBG, iso CBG).

Terrestrial tuberous herb growing in small, sparse colonies. Leaves 25–60 mm x 16–30 mm, broadly elliptical to nearly orbicular, dark green above, paler beneath with prominent longitudinal veins, entire; petioles 4–12 mm long. Peduncle 18–25 mm long, greenish to reddish, fleshy. Floral bracts 12–15 mm x 8–10 mm, broadly obovate, acuminate, closely sheathing. Pedicel 3–8 mm long, slender. Ovary ca 7 mm long, green. Flower solitary, ca 20 mm across, greenish to reddish brown, held stiffly erect. Dorsal sepal 18–22 mm x 6–8 mm, linear-obovate to linear spatulate, erect, incurved; osmophore 2–3 mm long, linear-terete. Lateral sepals 16–18 mm x 3–4 mm, reddish-brown, broadest near the base then tapered to apex, erect in basal third to half then bent at right angles or recurved, divergent; osmophore ca 2 mm long, linear-terete, reddish. Petals ca 12–13 mm x 5–6 mm, ovate-lanceolate, falcate, greenish to reddish, divergent, upcurved close to the labellum. Labellum articulated on a claw ca 1 mm long, tapered; lamina 12–13 mm x 11–12 mm, broadly ovate-cordate, reddish brown, veins slightly darker; callus occupying the central two-thirds of the lamina, the calli dark reddish, shiny, on a slightly raised plate; main central gland ca 3 mm long, erect, curved, linear-terete, apex darker; lateral glands ten to fourteen crowded pairs, mostly more or less linear, sometimes laterally flattened, basal pair longest; apical gland ca 1.2 mm across, flattened, irregular. Column 12–13 mm x ca 5 mm, erect and incurved, slightly curved away

from the ovary in basal third, greenish brown with darker anterior markings; wings relatively broad, incurved in the distal third, as long as or longer than the anther, subacute. Anther ca 2.5 mm x 2.5 mm, smooth, entire, pale yellow. Pollinia ca 2.3 mm long, boomerang-shaped, yellow, mealy. Stigma ca 3 mm across, elliptical, sunken. Capsule not seen.

Selected Collections: New South Wales; Tantangara Dam, 30 November 1987, R. Bates 12996 (AD); Cave Ck., 29 November 1987, R. Bates (AD).

Distribution and Habitat: Known only from the vicinity of the type locality but doubtless more widespread and overlooked due to confusion with related species. It grows under low shrubs, grass and sedges in moist to wet black peaty soil.

Flowering Period: November and December.

Notes: *C. turfosa* has affinities with *C. valida* but can be immediately distinguished by its smaller flowers on a shorter peduncle and with densely clustered lamina calli on the labellum. The lamina calli are somewhat suggestive of *C. comuta* but that species has green flowers and a triangular labellum. The leaves of *C. turfosa* appear to be distinctive being proportionately broad for their length, some nearly orbicular. This species is difficult to find in the dense low vegetation where it grows. The habitat is unusual for *Chiloglottis* particularly the wet, peaty soil. *C. valida* and *C. comuta* both grow occasionally in sphagnum hummocks but not in the black, peaty soils of the bogs. The type locality of the new species is only a few metres from that of *Genoplesium turfosum* D. Jones.

Conservation Status: Rare but conserved within a National Park; suggest 2KC according to criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*turfosus*' a peat bog; in reference to the habitat.

Chiloglottis valida D. Jones; species nova
affinis *C. gummii* Lindley affinis, sed habitu robustiore, pedunculo longiore, floribus majoribus, callis laminae longioribus angustioribus dispositione dissimili et alis columnae multo latiore, differt; etiam *C. phuricallatum* D. Jones affinis, sed callis laminae labelli paucioribus dispositione dissimili et petalis incurvis, differt.

Typus: Australian Capital Territory; track from Ginini Flats to Stockyard Arboretum, 35°32'S, 148°47'E, 3 December 1989, D. L. Jones 5453 and B. E. Jones (holo CBG, iso CBG, NSW, MEL).

Leaves 5–10 cm x 20–40 mm, broadly elliptical, dark green above paler beneath with prominent longitudinal veins, entire; petioles 10–30 mm long. Peduncle 40–70 mm x ca 2 mm, green to purplish, fleshy. Floral bracts 18–35 mm x 10–15 mm, broadly obovate, acuminate, closely sheathing. Pedicel 10–20 mm long, slender. Ovary ca 9 mm long, green to purplish red. Flower

solitary, ca 35 mm across, greenish purple to purplish brown, held stiffly erect. Dorsal sepal 19–30 mm x 14–17 mm, broadly obovate-spathulate, erect, incurved; osmophore 1–2.5 mm long, linear-terete. Lateral sepals 17–25 mm x ca 4 mm, reddish brown to purplish, broadest near the base then tapered to apex, erect in basal half then recurved, divergent or parallel; osmophore ca 1 mm long, linear-terete, brownish. Petals 17–23 mm x 8–11 mm, asymmetrically ovate-lanceolate, falcate, reddish brown, incurved or slightly divergent, subacute. Labellum articulated on a short claw ca 1 mm long, tapered; lamina 14–18.5 mm x 12–16 mm, broadly ovate-cordate, brownish with a narrow brown or green marginal band, veins slightly darker, lateral surfaces somewhat rugulose; callus occupying the central, proximal two-thirds of the lamina, the calli reddish to blackish, on a slightly raised, somewhat rugulose plate; main central gland 3–4 mm long, erect or curved forwards, linear-terete, apex swollen, blackish; lateral glands absent or one to three pairs, basal ones stalked, rest sessile, blackish; apical gland ca 1.5 mm across, irregularly rounded, sessile. Column 13–17 mm X ca 8 mm, erect and incurved, strongly curved away from the ovary in the basal third, reddish brown with darker anterior markings; wings very broad, incurved in the distal third, as long as or longer than the anther, subacute. Anther ca 3 mm x 2.5 mm, smooth, entire, pale yellow to greenish. Pollinia ca 3.3 mm long,

boomerang-shaped, yellow, mealy. Stigma ca 3 mm across, elliptical, sunken. Capsule ca 25 mm x 15 mm, obovoid, on a thickened pedicel 10–25 cm long.

Distribution and Habitat: Widely distributed from the Central Tablelands of New South Wales through to Victoria to Tasmania (Nst, ACT, Vgi, Veh, Vwh, Vwp, Tas). This common species grows in a range of moist habitats from the lowlands to montane situations.

Flowering Period: October to February.

Notes: *C. valida* has been commonly confused with *C. gunnii*, a Tasmanian endemic of restricted distribution. *C. valida* is a much more robust species than *C. gunnii* with longer peduncles, larger flowers, narrower lamina calli in a generally sparse arrangement which is different to *C. gunnii* and with much broader column wings. *C. valida* also has affinities with *C. phuricallata* but that species has more numerous lamina calli in a different arrangement and widely spreading petals. The latter two species may grow sympatrically but have different pollination vectors (*C. Bower*, pers. comm.) and hybrids are unknown. Illustrated by plate 434 in Cochrane et al (1968).

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin '*validus*', strong, robust; this is the most vigorous species in the genus.

CORYBAS Salisb.

This is the fifth paper by the present author describing new taxa in *Corybas*, toward a revision of the genus in Australia (see also Jones 1973, Jones & Nash 1976, Jones & Clements 1988, 1988a). The six new species and one natural hybrid described here are all from South Australia and Western Australia.

New Species

Corybas abditus D. Jones; species nova affinis *C. unguiculatum* R. Br. affinis, sed floribus minoribus horizontalibus, lobo medio labelli brevi angusto, callo labelli leviter evoluto ex turba una glandorum acicularium prope lobum medium consistenti, et columna brevior, differt.

Typus: Western Australia; Bakers Junction, 7 October 1985, D. L. Jones 2125 and B. E. Jones (holo CBG, iso CBG, PERTH).

Glabrous, tuberous, terrestrial herb. Leaf 6–20 mm x 7–12 mm, cordate, bluish green above with three whitish veins, underside greenish purple, pellucid, shortly apiculate. Peduncle 3–6 mm x ca 1 mm, greenish brown. Floral bract 3.5–5 mm x 3–4 mm, broadly ovate, acuminate to apiculate, closely sheathing. Ovary 4–6 mm x ca 1.5 mm, linear, curved.

Flower solitary, 9–11 mm long, held horizontally, reddish to reddish purple. Dorsal sepal 9–11 mm x 5–6 mm when flattened, reddish purple, the narrow basal stalk to 4 mm x 1 mm, curved, gradually expanded into an ovate, strongly concave lamina, apex obtuse to truncate. Lateral sepals ca 8 mm x 0.4 mm, linear, subacute to acuminate, white, porrect beneath the ventral surface of the labellum. Petals ca 6 mm x 0.4 mm, linear, subacute to acuminate, white, curved around anterior margins of the labellum. Labellum 10–11 mm x ca 12 mm when flattened, reddish, tubular, dorsal margins connate, about as long as the dorsal sepal, three-lobed; lateral lobes ca 4 mm across, more or less rectangular, falcate; mid-lobe ca 2 mm across, protruding as a lip, broadly obtuse to truncate. Labellum callus central, smooth or with a few short acicular calli in the proximal 6 mm, a densely packed mass of red, acicular, moniliform calli to 1 mm long near the apex, whole mass ca

2 mm across, surface around orifice with scattered, dark red, short teeth. Labellum orifice ca 4 mm across, laterally curved upwards to the apex, margins darker and with a few, short irregular teeth. Labellum auricles ca 2 mm long, white and reddish, obliquely deflexed, opening ca 1 mm wide, column auricles not protruding through. Column ca 2.5 mm long, curved in distal half; basal auricles ca 1 mm long, curved. Anther cap ca 1 mm long, pale yellow, more or less papillate, opening widely. Stigma ca 1 mm across, cordate, sunken. Pollinarium ca 1 mm x 0.8 mm; pollinia ca 1 mm long, linear-oblong, yellow, mealy; viscidium ca 0.5 mm long, elliptical. Capsule not seen.

Distribution and Habitat: Endemic to south-western Western Australia where distributed from east of Esperance to west of Walpole. This species grows on small hummocks amongst dense low vegetation in winter-wet swamps. Plants are usually found in small groups around the base of myrtaceous shrubs. Soils are black and peaty.

Flowering Period: September to November.

Notes: This species has been confused with *C. unguiculatus* since its discovery in 1963. Despite superficial similarities the two are easily distinguished. *C. abditus* is smaller in most of its floral parts, has horizontal flowers (strongly nodding in *C. unguiculatus*), and a much reduced lamina callus which consists mainly of a single dense cluster of acicular glands situated near the base of the mid-lobe. The two species are separated by a distance of about 1600 km. *C. abditus* is difficult to locate growing as it does in dense swamps, a habitat which tiger snakes also relish. Illustrated on page 336 in Hoffman & Brown (1984).

Conservation Status: Widespread but disjunct and poorly conserved; suggest 3RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*abditus*', hidden, concealed; in reference to the cryptic nature of this species and the dense habitat where it grows.

Corybas dentatus D. Jones; species nova
affinis *C. incurvo* D. Jones et M. Clements
a qua sepalis lateralibus petalisque latioribus,
labello margine dentibus multo majoribus
numerosioribus et umbone inconspicuo
purpureo integro plano differt.

Typus: South Australia: Sandy Creek Conservation Park, 5 August 1990, R. Bates 23251 (holo AD, iso AD, CBG).

Terrestrial herb forming colonies. Leaf 25–45 mm x 30–42 mm, broadly ovate to cordate or orbicular, sometimes shallowly lobed, green above, whitish and pellucid beneath. Flower 18–25 mm long, dark purple, dominated by the dorsal sepal and labellum, on a peduncle ca 2 mm long. Ovary 4–5 mm long, curved, subtended by an ovate, acute bract ca 3 mm x 3.5 mm. Dorsal sepal 20–22 mm x 9–11 mm obovate to spatulate-oblong in outline when flattened, pinkish-grey with dark purple spots and striations, cucullate, ending

in line with the labellum margins. Lateral sepals ca 5 mm x 0.8 mm, linear-lanceolate, acuminate, connate at the expanded base, upcurved or spreading obliquely, whitish, acuminate. Petals ca 3 mm x 1 mm, lanceolate, falcate, acuminate, auriculate on the base of the column. Labellum conspicuous, dark purplish throughout; labellum-tube ca 6 mm long, erect then curving gently through 180 degrees and expanding into the lamina; lamina 12–13 mm x 12–13 mm, broadly ovate with spreading or incurved, coarsely dentate margins, marginal teeth ca thirty; central boss flat, hardly mounded, dark purplish and not conspicuous; callus thickened, with groups of flattened calli in an irregular, tessellated arrangement near the apex of the labellum tube; auricles short, directed downwards, with openings ca 1.5 mm across. Column ca 4 mm long, erect, broadest just below the middle, prominently winged. Stigma ca 1.5 mm across, oblong, concave. Anther ca 1.5 mm long, obtuse, entire. Pollinarium ca 1.3 mm x 1.3 mm; pollinia four, ca 1.1 mm long, oblong, yellow, mealy; viscidium ca 0.5 mm across, oblong. Capsule not seen.

Distribution and Habitat: Apparently endemic to the Mt Lofty Ranges of South Australia but the exact distribution uncertain due to confusion with *C. incurvus*. It grows in open forest under low shrubs and bracken, in grey sandy loam.

Flowering Period: July and August.

Notes: *C. dentatus* has as its closest congener *C. incurvus* but it can be immediately distinguished by the more numerous, much longer and coarser teeth on the margins of the labellum and the inconspicuous, purplish central boss on the labellum which is not notched on the upper margin. In *C. incurvus* the labellum margins are denticulate or sometimes nearly entire and the labellum boss is white and conspicuous with the upper margin deeply notched. *C. dentatus* has broader lateral sepals and petals than *C. incurvus* and the plants tend to be more robust with slightly larger flowers and much larger leaves.

Conservation Status: Poorly conserved and threatened by weed invasion of its habitat; suggest 2VC by criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*dentatus*' toothed; in reference to the prominent, sharp, outward-pointing teeth on the margins of the labellum.

Corybas expansus D. Jones; species nova
affinis *C. despectanti* D. Jones et R. Nash a qua
floribus multo majoribus, labello umbone albo
prominenti et margine serraturis numerosioribus
longioribus et fauce interiori callis
appressis vel papillis et auriculis orificiis
majoribus et columna alis prominentioribus
differt.

Typus: South Australia; Warrenben Conservation Park, 8 August 1985, R. Bates 5844 (holo AD).

Terrestrial, tuberous herb forming small colonies. Leaf 15–30 mm x 18–30 mm, cordate to orbicular, occasionally lobed, apiculate, bright green on the upper surface, paler and pellucid beneath. Flower 12–15 mm long, reddish purple with transparent areas, dominated by the lamina of the labellum, sessile or almost so. Ovary 4–6 mm long, narrow-ovate, subtended by an ovate bract ca 3 mm x 2 mm. Dorsal sepal 12–16 mm x 5–7 mm, oblong-spathulate in outline when flattened, transparent with reddish-purple striations, concave, carinate, erect in proximal half then curving gently through about 60 degrees, mucronate. Lateral sepals ca 5 mm x 1 mm, linear-tapered, acuminate, connate at the very base, projecting forwards behind labellum lamina. Petals ca 3 mm x 0.8 mm, slightly falcate, auriculate at the base where they join the column then tapering to filiform points, whitish. Labellum longer than dorsal sepal; labellum tube 4–5 mm long, shorter than the lamina, erect throughout then decurved through 180 degrees and greatly expanded into a nearly circular lamina; lamina 13–15 mm x 11–13 mm, upper margins reddish-purple, centre and lower margins transparent or whitish, venation conspicuous, margins coarsely denticulate to dentate, the teeth to 1.5 mm long; central boss flat, almost non-existent, hardly thickened in longitudinal section; callus consisting of numerous papillae and appressed calli extending along the sides of the labellum tube. Auricles ca 1 mm across, opening widely, directed obliquely downwards. Column ca 3 mm long, of nearly equal width throughout, minutely winged. Stigma ca 1 mm in diameter, more or less rectangular, concave. Anther 1–1.3 mm long, minutely papillate. Pollinarium ca 1.0 mm x 0.8 mm; pollinia four, linear, mealy, pale yellow; viscidium 0.5 mm long, reniform. Capsule not seen.

Selected Collections: (all AD); Innes National Park, 8 August 1985, R. Bates 5889; sandhills on road from Bales Bay to Seal Bay, Kangaroo Island, 3 August 1989, G. Jackson 2009; Warrenben Conservation Park, 2 August 1987, R. Bates 10067.

Distribution and Habitat: Apparently endemic to South Australia where common on the southern parts of Yorke and Eyre Peninsulas and Kangaroo Island. It grows under low scrub and mallee in calcareous sand.

Flowering Period: July and August.

Notes: *C. expansus* has affinities with *C. despectans* and has been confused with that species. It can be distinguished by the larger flowers with a broadly flared labellum which is white in the centre and has more numerous, deeper marginal teeth (to 1.5 mm long) and a longer, prominently spathulate dorsal sepal. The labellum callus consists of numerous papillae and appressed triangular calli which are widespread over the central parts of the labellum lamina and tube. Its labellum auricles open widely (nearly closed in *C. despectans*) and the column is more prominently winged. The flowers of *C. despectans* are usually autog-

amous whereas *C. expansus* apparently relies on insects for its pollination.

Conservation Status: Widespread and conserved.

Etymology: From the Latin '*expansus*', expanded, spread out; in reference to the prominently flared labellum.

Corybas limpidus D. Jones; species nova
affinis *C. incurvo* D. Jones et M. Clements
a qua floribus multum dilutis, sepalis dorsali
angustiore translucens, labello lamina sine
trichomatibus hispidis et umbone centrali con-
spicuo et margine dentibus perpaucioribus
infirmis definitis differt.

Typus: Western Australia; Ledge Beach,
Albany, 35°00'S, 117°52'E, 30 August 1986,
D. L. Jones 2424 & T. D. Jones (holo CBG, iso
CBG, PERTH).

Terrestrial tuberous herb forming large colonies. Leaf 18–35 mm x 20–35 mm, broadly cordate to orbicular, entire or lobed, thin-textured, green on both surfaces, paler and pellucid beneath, apiculate. Flower 12–15 mm long, transparent, heavily blotched with dark red, dominated by the dorsal sepal and labellum, on a pedicel 1–1.5 mm long. Ovary 4–5.5 mm long, narrow, recurved, subtended by an ovate bract ca 1 mm long. Dorsal sepal 16–18 mm x 5–7 mm, spathulate in outline when flattened, transparent with dark red markings, concave, erect in the proximal half then curved forwards at about 80 degrees, protruding over the labellum lamina, broadly obtuse. Lateral sepals ca 5 mm x 0.5 mm, linear-tapered, acute to acuminate, greenish, connate at the base, projected forwards and erect against the base of the labellum tube. Petals ca 3.5 mm x 0.5 mm, falcate, auriculate at the base where they join the column, then tapered to a filiform point. Labellum shorter than the dorsal sepal; labellum tube 4.5–5 mm long, shorter than the lamina, erect throughout then abruptly decurved through 180 degrees and greatly expanded into a nearly ovate lamina; lamina 8–11 mm x 7–9 mm, dark red with transparent areas, veins darkest, margins with four to seven pairs of short, blunt irregular teeth ca 0.5 mm long, surface appearing smooth but with a few small, appressed acicular calli; boss mounded, more or less oblong, hardly prominent, slightly darker than rest of lamina, thickened in longitudinal section: callus consisting of a series of small, flat, irregular, inward-sloping calli. Auricles ca 1 mm across, widely opening, directed downwards, the orifice partly hidden by the base of the petals. Column ca 3 mm long, slightly recurved, broadest at base, minutely winged. Stigma ca 1 mm across, elliptical, concave. Anther ca 1.5 mm long, blunt. Pollinarium ca 1 mm x 1 mm; pollinia four, ca 1 mm long, linear-oblong, pale yellow, mealy; viscidium ca 0.5 mm long, ovate to rectangular. Capsule not seen.

Distribution and Habitat: South-western Western Australia (Albany to Esperance) and possibly

extending into South Australia at Mt Crawford. It grows in coastal vegetation on stabilised dunes.

Flowering Period: August and September.

Notes: *C. limpidus* is a distinctive species with some similarities to *C. incurvus*. Its flowers are paler than that species (predominantly greenish) with a shorter, transparent dorsal sepal, the margins of the labellum less toothed and hardly incurved, the labellum boss inconspicuous and the lamina callus consisting of flat inward-sloping calli which impart a granular appearance. Illustrated on page 47 in Hopper et al (1990).

Conservation Status: Widespread but not known to be conserved.

Etymology: From the Latin '*limpidus*', clear or transparent; in reference to the transparent dorsal sepal and parts of the labellum.

Corybas X miscellus D. Jones; hybrida nova
labello late expanso grosse dentato valde
venato ut in *C. diemenico* (Lindley) H. G.
Reichb. et labello margine incurvo et umbone
centrali prominenti albo ut in *C. incurvo*
D. Jones et M. Clements.

Typus: South Australia; Barossa Reservoir,
34°39'S, 138°51'E, 14 August 1987, R. Bates
10095 (holo AD, iso AD, CBG).

Terrestrial tuberous herb forming colonies. Leaf 18–40 mm x 20–40 mm, ovate-cordate to nearly orbicular, green on both surfaces, paler and pellucid beneath, apiculate. Flower 13–15 mm long, reddish-purple, obliquely erect or somewhat recurved, dominated by the dorsal sepal and labellum, on a pedicel 2–3 mm long. Ovary 5–6 mm long, narrow, curved, subtended by an ovate bract ca 1.5 mm long. Dorsal sepal 20–23 mm x 11–13 mm, obovate-spathulate in outline when flattened, transparent grey with reddish-purple striations, concave, erect in the proximal half then curved forwards through about 90 degrees, protruding over the labellum lamina, apex decurved, apiculate. Lateral sepals ca 3 mm x 0.5 mm, linear-tapered, whitish, connate at the base, projected forwards under the labellum lamina, apex entire or unequally lobed. Petals ca 2.5 mm x 0.5 mm, falcate, whitish, auriculate at the base where they join the column then tapering to a filiform point, entire or unequally lobed near the apex. Labellum longer than dorsal sepal; labellum tube 5–6 mm long, shorter than the lamina, dorsal margins in close contact but not conjoined, erect throughout then recurved through 180 degrees, greatly expanded into an almost circular or oblate lamina; lamina 10–14 mm x 14–18 mm, reddish with darker venation, its margins projected forwards or expanding, bearing numerous coarse teeth to 1.3 mm long, the surface adorned with short, red, (and some white) erect teeth especially prominent around the boss; boss prominent, mounded, white, occupying most of the ventral surface of the lamina, notched where it enters the labellum tube, thickened in longitudinal section; callus con-

sisting of a series of irregular transverse plates with numerous, short, blunt, inward-sloping teeth. Auricles about 1.5 mm across, widely opening, directed downwards, the elliptical opening partly hidden by the base of the petals. Column ca 3 mm long, narrowly tapered, of nearly equal width throughout, minutely winged. Stigma ca 1.3 mm across, plus or minus rectangular, concave. Anther ca 1.2 mm long, blunt. Pollinarium ca 1 mm x 0.8 mm, consisting of four yellow, mealy pollinia in two unequal pairs, attached directly to a reniform viscidium ca 0.4 mm long. Capsule not seen.

Selected Collections: ca 5 km south of Williamstown in Pine Plantation, 12 August 1986, R. Bates s.n. (AD).

Distribution and Habitat: Endemic to South Australia where it inhabits plantations of *Pinus radiata* growing in grey clay loam.

Flowering Period: August and September.

Notes: *C. X miscellus* is a natural hybrid between *C. diemenicus* and *C. incurvus* and forms clonal colonies by means of vegetative reproduction. It is reported to be common but whether the hybrids themselves reproduce sexually or spread is limited to vegetative increase is unclear. Certainly the sex organs appear to be functional, with the pollinarium readily extractable and the stigma sticky. Natural hybrids are rare in Australian species of *Corybas* and the local abundance of this cross may be the result of disturbance created during the establishment phase of the pine plantations. *C. X miscellus* has obvious affinities with both its parents. Significant distinguishing features include upward-facing flowers of a bright reddish colouration, upper labellum margins being flared and the lower margins somewhat incurved and the upper part of the labellum boss being notched.

Conservation Status: Not known to be conserved.

Etymology: From the Latin '*miscellus*', mixed or of hybrid origin.

Corybas recurvus D. Jones; species nova
affinis *C. diemenico* (Lindley) H. G. Reichb.
a qua floribus fuscioribus valde recurvis,
labello umbone perminus prominenti et fauce
dentibus grossis retrorsis.

Typus: Western Australia; Toolbrunup, Stirling Ranges, 34°01'S 117°50'E, 31 August 1986, D. L. Jones 2441 and T. D. Jones (holo CBG, iso CBG, PERTH).

Terrestrial tuberous herb forming extensive colonies. Leaf 15–40 mm x 15–44 mm, broadly cordate to orbicular, rarely lobed, thin-textured, green on both surfaces, paler and pellucid beneath, apiculate. Flower 15–25 mm long, dark reddish purple to purplish-black, strongly recurved and often nearly parallel to the ground, dominated by the dorsal sepal and labellum, on a peduncle 2–3 mm long. Ovary 5–6 mm long, narrow, recurved, subtended by a small, ovate bract. Dorsal sepal 23–34 mm x 12–20 mm, obovate-spathulate in outline when flattened, narrow proximal part greyish

with dark purple striations, distal expanded part wholly purplish-black, concave, erect in the proximal half then curved forwards at about 90 degrees, protruding over the labellum lamina, broadly obtuse. Lateral sepals ca 5 mm x 0.5 mm, linear-tapered, acute to acuminate, whitish, connate at the base, projected forwards and erect in front of the base of the labellum tube, apex entire or unequally lobed. Petals ca 3.5 mm x 0.5 mm, falcate, whitish, auriculate at the base where they join the column, then tapering to a filiform point, sometimes unequally lobed. Labellum conspicuous, labellum tube 6–7.5 mm long, longer than the lamina, erect throughout then abruptly decurved through 180 degrees and greatly expanded into a circular or oblate lamina; lamina 14–20 mm x 9–11 mm, whitish in the centre the rest dark reddish purple to purplish-black, veins darkest, margins adorned with numerous, broad, blunt, irregular teeth to 1 mm long, much of the surface covered with short black, erect or appressed teeth especially prominent around the boss; boss mounded, fairly prominent, reddish-white, thickened in longitudinal section; callus consisting of a series of coarse, irregular inward-sloping, transverse plates. Auricles about 1 mm across, widely opening, directed downwards, the opening partly hidden by the base of the petals. Column ca 3.5 mm long, recurved, broadest at the base,

minutely winged. Stigma ca 1 mm in diameter, plus or minus elliptical, concave. Anther ca 1.5 mm long, obtuse. Pollinarium ca 1 mm x 1 mm; pollinia 4, narrow-oblong, yellow, mealy; viscidium oval, ca 0.4 mm long. Capsule ca 8–12 mm x 4–5 mm, ovoid, on fleshy peduncle to 20 cm tall.

Distribution and Habitat: Widely distributed in south-western Western Australia (north of Perth to Walpole and to the east of Albany). This common species occurs in a wide range of habitats, including dense scrubby forests developed around springs and streams, high rainfall Karri forests and coastal scrubs on stabilized dunes.

Flowering Period: July and August.

Notes: *C. recurvus* has been confused for many years with *C. diemenicus* of the eastern states. It is a very distinct species which can be recognised by its strongly recurved flowers of a very dark colouration with a much less prominent labellum boss. In addition the inner throat of the labellum has very coarse, inward-facing teeth. These are either absent in *C. diemenicus* or are very fine and hardly noticeable.

Conservation Status: Common and well conserved.

Etymology: From the Latin '*recurvus*', recurved, curved backwards; in reference to the strongly recurved flowers.

DIPODIUM R. Br.

Dipodium R. Br. is a small genus of epiphytes and terrestrials, with the majority of the terrestrial species being saprophytes. *D. punctatum* (Smith) R. Br. is a complex which has long been treated as a single unit by workers who have a very broad species concept (eg Rupp 1943, 1946). In Australia, members of this complex are distributed from northern tropical areas to southern Tasmania and occur in a diversity of habitats from coastal lowlands to ranges and tablelands. Studies of fresh material from a wide selection of localities, supported by extensive field work, show that variation in this complex is discontinuous and taxa can be recognised based on subtle yet recurrent morphological features and patterns. Two species from the *D. punctatum* complex have already been described (Jones and Clements 1987) and four more are described here. A key to the saprophytic species of *Dipodium* found in Australia is presented.

Key to Saprophytic Species of *Dipodium* in Australia

- 1) Ratio of labellum length to width about 3:1, mid-lobe linear-elliptical in outline when flattened 2
 - Ratio of labellum length to width about 2:1, mid-lobe broadly elliptical to obovate in outline when flattened . . 4
- 2) Flowers pendant, wholly pink *D. elegantulum*
 - Flowers spreading, not pink 3
- 3) Flowers white, unspotted with a mauve labellum *D. stenochilum*
 - Flowers yellow with darker spots and striae *D. hamiltonianum*
- 4) Ovary gibbous, ovary and pedicel spotted, basal stem bracts long-acuminate *D. variegatum*
 - Ovary asymmetrical but not gibbous nor spotted, basal stem bracts obtuse to shortly acuminate 5
- 5) Flowers remaining campanulate, white with heavy blotches *D. campanulatum*
 - Flowers opening widely, light pink to deep pink or reddish 6
- 6) Perianth segments strongly recurved in the distal third 7
 - Perianth segments remaining flat or the tips recurving slightly 8

- 7) Flowers light pink to rose pink finely spotted *D. roseum*
 Flowers dark reddish purple, heavily blotched and spotted *D. atropurpureum*
 8) Flowers nearly flat, dark reddish pink with heavy blotches *D. pulchellum*
 Flowers not flat, segment tips slightly recurved, pale pink to bright pink with heavy blotches . . . *D. punctatum*

New Species

Dipodium atropurpureum D. Jones;
 species nova affinis *D. punctato* R. Br. a qua
 floribus atropurpureis ad atropurpureis,
 segmentis perianthi apice valde
 recurvis, et labello callo vix evoluto differt.
Typus: New South Wales; Youdales Trail near
 junction with Kangaroo Flat Rd, ca 50 km east
 of Walcha, 31°02'S, 152°04'E, 20 January
 1987, D. L. Jones 2551, L. Barton and T. D.
 Jones, (holo CBG, iso CBG, NSW).

Glabrous, saprophytic herb. Stem bracts to 15 mm x 12 mm, ovate-oblong, imbricate, greenish-purple, fleshy, acute. Inflorescence mostly 40–60 cm tall, fleshy, dark purplish-brown, bearing fifteen to forty flowers, the peduncle much longer than the rhachis. Pedicels 12–16 mm long, slender, twisted, straight, dark red. Ovary 5–6 mm x 2–2.5 mm, slightly gibbous, smooth to slightly warty, dark reddish-brown. Flowers 20–25 mm across, dark pinkish-purple to dark reddish purple, with darker spots and blotches, the segments strongly recurved in the distal half. Dorsal sepal 16–18 mm x 5–5.5 mm, linear-elliptical, obtuse. Lateral sepals 16–18 mm x 4.5–5 mm, linear-lanceolate, obtuse, divergent. Petals 15–17 mm x 4.5–5 mm, linear-lanceolate, slightly falcate, subacute to obtuse. Labellum 13–14 mm x 5–6.5 mm, dark purplish-red, projected forwards, decurved slightly in distal half; lateral lobes 5–6 mm x ca 1.3 mm, linear-spathulate, upcurved, sparsely scabrous to sparsely pubescent inside at base; mid-lobe 9–10 mm x 5–6.5 mm, broadly ovate to broadly obovate, slightly downcurved in distal half, obtuse. Labellum hairs 0.8–1 mm long, mauve, extending in a sparse, narrow, central band from near the callus, the band broadening in the distal half of the mid-lobe and occupying most of the dorsal surface in the distal half, the hairs somewhat tangled. Callus consisting of two, linear, pubescent keels ca 6 mm x 0.4 mm, remaining more or less parallel. Column ca 7.5 mm x 2.5 mm, white stained with red, fleshy, projected forwards from the end of the ovary, saccate at base, with a yellow, pubescent anterior patch below the centre. Anther cap ca 1.3 mm x 1.6 mm, with a short, superficial rostrum. Stigma ca 1.5 mm across, ovate, deeply sunken. Pollinarium ca 1.1 mm long; recinaculum ca 0.7 mm long, ovate; caudicles ca 0.3 mm long; pollinia ca 0.7 mm long, elliptical, not grooved, waxy, dark yellow. Capsule not seen.

Selected Collections: New South Wales; west of Yarras, ca 95 km west of Wauchope, 23 January 1926,

L. Wheeler 228, (NSW); ca 1.6 km north of Grevillea, Kyogle to Woodenbong Rd, 6 January 1971, H. Salasoo, (NSW).

Distribution and Habitat: *D. atropurpureum* is common on the ranges of northern New South Wales (Nnc, Nnt). It grows among low, sparse shrubs in open forest. Soils are usually yellow to brown clays or clay loams, often stony.

Flowering Period: December to February.

Notes: *D. atropurpureum* is a striking member of the *D. punctatum* complex. It can be recognised by its very dark, purplish-red, heavily blotched flowers in which the tips of the perianth segments are strongly recurved. The flowers are of a similar general shape to that of *D. roseum* D. Jones and M. Clements but of a much darker colouration. It is also somewhat similar to *D. pulchellum* D. Jones et M. Clements but the flowers of this latter species have a fuller, flatter appearance because the perianth segments are broader and the tips hardly recurve. *D. pulchellum* grows in well-structured soils in tall, moist forest whereas *D. atropurpureum* occurs in shallow, stony soils in stunted open forest. The new species is locally common within its range and exhibits little variation.

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin '*atropurpureus*', dark purple; in reference to the flower colour.

Dipodium campanulatum D. Jones;
 species nova affinis *D. punctato* R. Br. a qua
 floribus campanulatis albis roseis multum
 maculatis, segmentis perianthii non recurvis,
 et labello lobis lateralibus subspathulatis et
 plerumque erosis differt.

Typus: South Australia; Naracoorte, 36°58'S,
 140°46'E, 27 January 1987, K. Alcock s.n. (iso
 CBG, holotype CBG, AD).

Glabrous, terrestrial, saprophytic herb. Stem bracts to 16 mm x 16 mm, ovate-oblong, basal ones imbricate, brown, obtuse. Inflorescence mostly 40–70 cm tall, fleshy, green to reddish, bearing fifteen to thirty-five flowers, the peduncle much longer than the rhachis. Pedicels 10–18 mm long, slender, slightly twisted, straight, reddish. Ovary 5–7 mm x 2–3 mm, linear-ovoid, gibbous, smooth, reddish brown. Flowers 15–20 mm across, white with large, dark red spots and blotches, the perianth segments remaining incurved.

Dorsal sepal 12–14 mm x 3–5 mm, linear to linear-elliptical, obtuse. Lateral sepals 12–14 mm x 4–5.5 mm, linear-elliptical to linear-lanceolate, asymmetrical, divergent but incurved, obtuse. Petals 12–14 mm x 4–5 mm, linear-elliptical, slightly falcate, obtuse. Labellum 10–12 mm x 4–6 mm, white with prominent large, dark pink blotches, porrect, slightly decurved; lateral lobes 3–4.5 mm x 0.6–0.8 mm, linear-spathulate, upcurved, sparsely puberulous inside at base, apex erose; mid-lobe 6–7 mm x 4–5 mm, broadly elliptical-oblong, obtuse, lateral margins slightly recurved. Labellum hairs ca 0.5 mm long, mauve, erect and hardly tangled, extending in a narrow central band from the apex of the callus to the apex of the mid-lobe, broadening and occupying most of the dorsal surface in the proximal half. Callus consisting of two linear, parallel, pubescent keels ca 3 mm x 0.4 mm. Column ca 5 mm x 2 mm, white, fleshy, projected forwards from the end of the ovary, saccate at base, with a yellow, pubescent, anterior patch below the centre. Anther cap ca 0.9 mm x 0.8 mm, with a very short, obtuse rostrum. Stigma ca 1 mm across, ovate, deeply sunken. Pollinarium ca 0.8 mm long; retinaculum ca 0.3 mm long, ovate; caudicles ca 0.25 mm long; pollinia ca 0.4 mm long, elliptical, orange, waxy. Capsule 11–13 mm x 3–5 mm, obovoid, pendant, smooth.

Selected Collections: South Australia; Naracoorte Town Reserve, 12 January 1987, K. Alcock & R. Bates 9042 (AD); Joanna, 1961, D. Hunt (AD); Caroline Forest Reserve, 19 January 1985, C. Dickson 85 (AD); 8 mile Ck, 18 January 1969, M. Beek (CBG); Naracoorte, 20 December 1966, M. Beek (CBG).

Distribution and Habitat: This poorly collected species is known with certainty only from the Naracoorte area in South Australia (Sse). The author has seen fragmentary material from the Portland district which matches that of the South Australia material in most respects and the taxon may be generally scattered through the region. It grows among low scrub and fairly thick open forest, usually in sandy soil.

Notes: *D. campanulatum* is a most attractive species which can be recognised by its bell-shaped flowers which are white and very heavily marked by large, dark pink spots and blotches. The flowers characteristically do not open widely and the segment tips do not recurve as they do strongly in *D. roseum* and to a lesser extent in *D. punctatum*. *D. roseum* grows in close proximity to *D. campanulatum* but hybrids between the two are unknown. *D. campanulatum* was first brought to my notice by Kath Alcock, of Naracoorte, who has recognised its distinctiveness for more than twenty years.

Conservation Status: Poorly known and not conserved; suggest 2R according to Briggs & Leigh (1988).

Etymology: From the Latin '*campanulatus*', bell-shaped; in reference to the prevailing floral shape.

Dipodium elegantulum D. Jones; species nova affinis *D. punctato* R. Br. a qua alabastris rigide erectis, floribus semipendulis

atromalvinis et subtiliter punctatis, pedicellis longis curvatis, segmentis perianthii longioribus angustioribusque, et labello longiore angustioreque prope apicem sursum curvo et callo laminae multum pubentiore differt.

Typus: Queensland; ca 6 km south of Mareeba beside Kennedy Highway, 17°03'S, 145°25'E, 450 m., 14 November 1987, L. Lawler s.n. (holo CBG, iso CBG, BRI).

Glabrous, terrestrial, saprophytic herb. Stem bracts to 25 mm x 20 mm, ovate-oblong, imbricate, pinkish-cream, fleshy, subacute to nearly obtuse. Inflorescence mostly 50–80 cm tall, fleshy, creamy white to greenish, bearing 20–60 crowded, semi-pendant to pendant flowers, the peduncle much longer than the rhachis, the rhachis often stained purplish-pink. Pedicels 10–14 mm long, slender, curved, more or less twisted, dark pink. Ovary 5–7 mm x 2–3 mm, slightly gibbous, smooth, dark pink. Flowers 20–25 mm across, pale pink to dark pink with darker small spots and striae outside, lighter pink inside with a few large spots near the apex of the tepals, the segments spreading to recurved in the distal half. Dorsal sepal 14–17 mm x 3–4 mm linear-lanceolate, obtuse. Lateral sepals 15–18 mm x 2.5–3 mm, linear to linear-lanceolate, subacute. Petals 13–15 mm x 2.5–3 mm, linear-lanceolate, slightly falcate, subacute. Labellum 14–20 mm x 4–5 mm, dark pink projected forwards, curved upwards in distal half; lateral lobes 4–5 mm x ca 1 mm, linear-spathulate, upcurved, pubescent inside at base; mid-lobe 8–10 mm x 4–5 mm, narrow-rhomboid, strongly upcurved in distal half, apex subacute. Labellum hairs ca 0.4 mm long, mauve, extending in a narrow central band from the proximal half of the mid-lobe to the apex, the band broadening near the apex, hairs somewhat tangled. Callus consisting of two linear, pubescent keels ca 7 mm x 1 mm. Column ca 7 mm x 2.5 mm, white stained with pink, fleshy, projected forwards from the end of the ovary, saccate at base with an anterior pink pubescent patch below centre. Anther cap ca 2.8 mm x 2 mm, with a long, decurved rostrum. Stigma ca 1.4 mm across, ovate, deeply sunken. Pollinarium ca 2.4 mm long; retinaculum ca 1 mm long, ovate; caudicles ca 1.5 mm long; pollinia ca 1 mm long, elliptical, not grooved, dark yellow. Capsule not seen.

Selected Collections: Western edge of Windsor Tableland, 18 November 1971, A. W. Dockrill s.n. (QRS); ca 35 km south-east of Mt Garnet, 18 November 1967, S. A. Morain 237, (BRI); ca 10 km west of Torrens Ck., January 1976, R. Smythe s.n. (BRI); Cherry Tree Ck. near Herberton, 15 November 1981, N. Starkey s.n. (QRS); Almaden, ca 160 km west of Cairns, August 1937, H. Flecker s.n. (NSW).

Distribution and Habitat: North-eastern Queensland where widely distributed between the Windsor Tableland and the Hervey Range to the west of Townsville, with inland collections from Charters Towers and Torrens Ck in the Mitchell District (Qco, Qkn, Qks,

Qmi). This species grows in sparse, low woodland with a grass understorey. Soils are loams, gravelly loams or shallow, stony loams.

Flowering Period: August to December.

Notes: *D. elegantulum* is one of the most distinctive and attractive members of the genus and it is difficult to comprehend why it has been passed off as *D. punctatum* for so many years (see Rupp 1946). It can be easily recognised by its creamy flower stems and large, semi-pendant to pendant, crowded flowers which are an attractive dark pink colouration with very fine flecks and striae on the perianth segments. Its flowers, which are much larger and with narrower perianth segments than in *D. punctatum*, are similar in shape to those of *D. stenochilum* O. Schwartz, but this species has white flowers which are not obviously pendant nor crowded. The new species is not particularly variable over its range although colour may be pale pink to deep pink. Pressed specimens of the new species can be readily recognised by their unusual colouration.

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin, '*elegantulus*', very fine, elegant, graceful; all of which apply to this species.

Dipodium roseum D. Jones et M. Clements; species nova affinis *D. punctato* R. Br. a qua floribus roseolis subtiliter punctatis, segmentis perianthii valde recurvis, et labello callo cristis crassis differt.

Typus: Victoria; Old Coach Rd, Montrose, Dandenong Ranges, 37°49'S, 145°21'E, 24 February 1990, H. M. E. Richards 211 and D. R. Richards (holo CBG, iso CBG, MEL).

Glabrous, terrestrial, saprophytic herb. Stem bracts to 16 mm x 23 mm, ovate-deltate, dark brown, acute. Inflorescence mostly 40–80 cm tall, fleshy, green to dark reddish black, fleshy, bearing fifteen to more than forty flowers, the peduncle much longer than the rachis. Fertile bracts 5–10 mm x 2–3 mm, linear-ovate, brown, obtuse, closely sheathing. Pedicels 10–15 mm long, slender, slightly twisted, straight or curved, reddish-brown. Ovary 4–7 mm x 2–3 mm, linear-ovoid, not gibbous, smooth or sparsely verrucose, dark reddish brown. Flowers 20–30 mm across, pale rose pink with small, dark red spots, rarely white, perianth segments strongly recurved in the apical third. Dorsal sepal 14–20 mm x 3–6 mm, linear to linear-elliptical, obtuse to acute. Lateral sepals 14–20 mm x 3–6 mm linear-elliptical to linear-lanceolate, asymmetrical, widely divergent, obtuse to acute. Petals 13–19 mm x 4–6 mm, linear-elliptical, slightly falcate, obtuse to sub-acute. Labellum 10–15 mm x 4–6.5 mm, pink with darker pink lines, and pink hairs on the callus; lateral lobes 3–4 mm x 0.6–1 mm, linear-spathulate, upcurved, sparsely puberulous inside at base, apex obtuse, truncate or slightly retuse; mid-lobe 6–9 mm x

4–6.5 mm, elliptical to broadly elliptical-ovate, obtuse, lateral margins recurved. Labellum hairs ca 0.5 mm long, mauve, erect, extending from the apex of the callus to the apex of the mid-lobe, forming a broad patch which occupies most of the dorsal surface in the proximal half. Callus consisting of two, linear-tapered, more or less parallel, pubescent keels ca 3 mm x 0.5 mm. Column ca 5 mm x 2 mm, white, fleshy, projected forwards from the end of the ovary, saccate at base, with a yellow, pubescent, anterior patch below the centre. Anther cap ca 1.5 mm x 1 mm, with a prominent, beaked rostrum. Stigma ca 1.2 mm across, elliptical, deeply sunken. Pollinarium ca 1 mm long; retinaculum ca 0.7 mm long, ovate to elliptical; caudicles ca 0.5 mm long; pollinia ca 0.6 mm long, elliptical, not grooved, dark yellow. Capsule 14–17 mm x 10–12 mm, ovoid, pendant, dark red, smooth or sparsely verrucose, pedicel ruminant.

Selected Collections: New South Wales; Waterfall, 15 December 1946, A. W. Dockrill s.n. (NSW); Australian Capital Territory; Black Mountain, 22 November 1977, M. A. Clements, s.n. (CBS); Victoria; Deddick Trail, Snowy River National Park, 20 January 1980, A. C. Beaglehole 67420 (MEL); Victoria Range, Grampians, 11 February 1960, A. C. Beaglehole 15952 (MEL); Tasmania; Little Bluestone Bag, 31 December 1983, A. M. Buchanan 3557 (HO); South Australia; Summit, Mt Lofty, 28 December 1913, E. H. Ising (AD).

Distribution and Habitat: Widely distributed from the Central Tablelands of New South Wales to Victoria, South Australia and Tasmania (Nct, Nsc, Nst, Can, Vgi, Veh, Vwh, Vwp, Tas, Sse, SlS). It grows in a wide range of habitats from the coast to the mountains but is most conspicuous in open forests which have a sparse understorey. Soils range from sands and sandy loams to clay loams, krasnozems and shallow, skeletal types.

Flowering Period: November to March.

Notes: The nomenclatural change to this species, the common and familiar hyacinth orchid of south-eastern Australia, will undoubtedly be received with mixed feelings. *Dipodium punctatum* and *D. roseum* are easily separated in the field and in most cases can be recognised from herbarium specimens. *D. roseum* is distinguished by its rose-pink, finely spotted flowers the perianth segments of which recurve strongly. *D. punctatum*, by contrast, has darker, reddish-pink flowers which are heavily spotted and the perianth segments spread widely but are hardly recurved. In some areas, both species grow sympatrically but hybrids are unknown. *D. punctatum* is illustrated by plate 1442 in Fairley and Moore (1989); *D. roseum* is illustrated by plate 438 in Cochrane et al (1968).

Conservation Status: Widespread and well conserved in National Parks.

Etymology: From the Latin '*roseum*', rose-pink or pale red; in reference to the flower colour.

DIURIS Smith

Taxonomic problems in *Diuris* Smith strongly support the view that the genus is recently evolved and is still rapidly speciating (Jones 1970). A summary of the problems encountered in this genus is worth including; variation within a population which can be bewildering and is often continuous with clinal gradients frequent; successive races with fairly distinct but often overlapping flowering times add to the continuum; species complexes and look-alike species are prevalent; introgression is common between races and taxa, especially on the disturbed sites which this genus favours. Many of the interspecific hybrids are sterile but in others hybrid swarms may occur.

For this genus I have adopted a broader species concept than I have in others, so as to take into account the considerable variation within a taxon. The pollination study of Beardsell et al. (1986) is useful in introducing the concept that some groups within the genus mimic sympatric pea-flowered species (family Fabaceae), however my field studies show that this mimicry does not apply to all *Diuris*. In those which do act as floral mimics, particularly the complexes surrounding *D. corymbosa* Lindley, *D. longifolia* R. Br., *D. aurea* Smith and *D. maculata* Smith, an analysis of the colouration and arrangement of the dorsal sepal and labellum lobes of the orchid in relation to floral aspects of sympatric Fabaceae, provides valuable taxonomic evidence for the recognition of new taxa. From my extensive studies on this genus, in both eastern and western Australia, a number of new taxa have been identified. In this paper fifteen new species of *Diuris* are described and one conspicuous natural hybrid is recognised formally.

New Species

Diuris amplissima D. Jones; species nova
affinis *D. magnificae* D. Jones a qua postea
florescentia, floribus pro parte maxima aureis
brunneisque labello medilobo purpureo,
sepalo dorsali transversu ovato, et petalis
laminis angustioribus differt.

Typus: Western Australia; Moodiarrup,
33°36'S, 116°47'E, 23 September 1985, D. L.
Jones 1942, B. E. Jones and A. P. Brown, (holo
CBG, iso CBG, PERTH, AD).

Glabrous terrestrial herb growing in loose colonies. Tuberoles to 10 cm x 5 mm, linear-terete, fleshy, irregular, brownish, nearly parallel to soil surface. Leaves two or three, basal, 10–22 cm x 20–25 mm, broadly linear, obliquely erect, conduplicate, acute to subacute, bright green. Inflorescence 40–90 cm tall, sturdy. Sterile bracts 6–12 cm x 10–15 mm, lanceolate, acuminate, closely sheathing. Fertile bracts 1–6.5 cm x 6–12 mm, lanceolate, acuminate, closely sheathing. Flowers three to seven, ca 4 cm across, yellowish brown to brown with a purple labellum mid-lobe. Pedicels 1.5–7 cm long, slender, curved. Ovary 7–10 mm long, linear-ovoid, straight or curved. Dorsal sepal 12–15 mm x 16–23 mm, transversely ovate to narrowly reniform, projected forwards, cucullate and column-embracing in the proximal half, erect in distal half, distal margins irregular to crenulate, yellowish brown to brown. Lateral sepals 18–28 mm x 3–4.5 mm, linear to linear-ensiform, subacute to acute or unequally emarginate, green with purplish-brown markings, deflexed, usually remaining parallel. Petals erect to obliquely erect; lamina 18–30 mm x 12–15 mm, oblong to oblong-elliptical or linear-elliptical, entire or slightly retuse, yellowish brown, reverse side brown, sometimes with a paler central band; claw 5–7 mm long, linear, slightly curved, purple-brown, widening just near the apex. Labellum

12–16 mm long, projected forwards, apex recurved, deeply three-lobed, lateral lobes yellow-brown to brown, mid-lobe purple; lateral lobes 10–15 mm x 5–8 mm, broadly oblong to oblong-ovate, falcate, asymmetrical, widely spreading, broadly obtuse, upper margins denticulate-crenulate; mid-lobe broadly cuneate in outline when flattened (10–12 mm across), with a broad, shallow central ridge, decurved in distal half, entire or distal margins slightly crenulate, apex obtuse to emarginate. Labellum callus consisting of a yellow, central ridge ca 2 mm long, a vague swollen ridge extending well onto the mid-lobe. Column ca 5 mm x 4.5 mm, projected forwards from the end of the ovary. Anther ca 5 mm x 3 mm, ovate, greenish-purple. Pollinarium ca 3.5 mm x 2 mm; pollinia linear-clavoid, white; viscidium ca 0.8 mm across, ovate to elliptical. Stigma ca 3 mm x 3 mm, almost rectangular. Column wings ca 5 mm long, linear-oblong, cream or yellow with red crenulate to crisped margins. Capsule not seen.

Selected Collections: (all CBG); Western Australia; West Kojonup, 20 October 1989, R. Heberle s.n.; Lake Muir, 20 October 1986, cult. H. Richards s.n.; Dinninup, 11 October 1985, R. Heberle s.n.; 1 km west of Pardelup Prison Farm, Mt Barker Rd, 7 October 1985, D. L. Jones 2133 and B. E. Jones; 8 km east of Pardelup Prison Farm, Mt Barker Rd, 7 October 1985, D. L. Jones 2136 and B. E. Jones.

Distribution and Habitat: Endemic to south-western Western Australia where distributed from Moodiarrup to Lake Muir (Wda, Wav). It grows among grass and low shrubs in open forest and Wandoo woodland.

Flowering Period: Late September to early November.

Notes: Although part of the *D. corymbosa* complex, *D. amplissima* is readily distinguished by its very large flowers. Its closest congener is *D. magnifica* D. Jones which also has large flowers, however, those of

D. amplissima are predominantly in shades of yellow-brown to brown with a purple labellum mid-lobe whereas the flowers of the former are mainly yellow and purple. *D. magnifica* also flowers earlier and grows in near-coastal forests whereas *D. amplissima* occurs further inland. *D. amplissima* has narrower petal laminae than *D. magnifica* and a very broad dorsal sepal that is transversely ovate to nearly reniform in shape.

Conservation Status: Relatively widespread and conserved.

Etymology: From the Latin '*amplissimus*', largest; in reference to the impressive flowers.

Diuris brumalis D. Jones; species nova affinis *D. corymbosae* Lindley a qua antea florescentia, racemo plus floribus (ad 12), floribus minoribus, et labello lobis lateralibus medilobo linearicuneato longioribus differt.
Typus: Western Australia; Kalamunda, 31°58'S, 116°03'E, 23 August 1986, D. L. Jones 2338 & T. D. Jones, (holo CBG, iso CBG, PERTH, AD, MEL).

Glabrous terrestrial herb growing in loose colonies. Tuberoids to 7 cm x 4 mm, linear-terete, fleshy, irregular, brownish, nearly parallel to soil surface. Leaves two or three, basal, 14–20 mm x 8–10 mm, broadly linear, obliquely erect, conduplicate, acute to subacute, bright green. Inflorescence 20–50 cm tall, slender. Sterile bracts 4–7 cm x 8–10 mm, lanceolate, acuminate, closely sheathing. Fertile bracts 10–30 mm x 5–7 mm, lanceolate, acuminate, closely sheathing. Flowers three to twelve, ca 25 mm across, bright yellow with red to red-brown markings on the labellum. Pedicels 1–4.5 cm long, slender, straight or curved. Ovary 3–6 mm long, linear-ovoid, straight. Dorsal sepal 6–12 mm x 7–15 mm, ovate to ovate-cuneate, projected forwards, cucullate and column-embracing in proximal half, erect in distal half, yellow or suffused with red, apiculate, distal margins entire or shallowly crenulate. Lateral sepals 12–24 mm x 1.5–2.5 mm, linear-ensiform, falcate, deflexed, usually crossed, green with purplish brown markings, margins involute, acuminate. Petals obliquely erect, slightly recurved; lamina 10–18 mm x 6–12 mm, elliptical to ovate, subacute to obtuse, yellow, slightly brownish on reverse side; claw 2–6 mm long, linear, slightly curved, widening just near the apex. Labellum 6–9 mm long, projected forwards, deeply three-lobed, yellow with red to red-brown markings and suffusions; lateral lobes 6–10 mm x 3–6 mm, obliquely linear-oblong to oblong-ovate, falcate, asymmetrical, widely spreading, broadly obtuse, upper margins entire or crenate; mid-lobe cuneate in outline when flattened (3–7 mm across), with a broad, shallow, central ridge, entire or distal margins shallowly crenulate, apex decurved, obtuse to emarginate. Labellum callus consisting of a yellow, central ridge ca 4 mm long, a vague, swollen ridge extending nearly to the apex. Column ca 3.5 mm x 2.5 mm, projected forwards from the end of the ovary. Anther ca 3.2 mm x 2 mm, linear-

ovate, brown. Pollinarium ca 3 mm x 1.6 mm, pollinia linear-clavoid, white; viscidium ca 0.5 mm across, ovate to elliptical. Stigma ca 2.3 mm x 1.6 mm, almost rectangular. Column wings ca 3.5 mm long, linear-oblong, cream to yellowish, margins irregular crenulate. Capsule not seen.

Selected Collections: Western Australia; St Emile Rd, Kalamunda, 23 August 1986, D. L. Jones 2340 (CBG).

Distribution and Habitat: Endemic to south-western Western Australia where common in the Darling Scarp (Wda). It is found on hills and slopes in open forest growing in gravelly loams and laterites.

Flowering Period: June to August.

Notes: *D. brumalis* is the first member of the *D. corymbosa* complex to flower. It has relatively small flowers in hues of yellow and red to red-brown, with up to twelve flowers in a raceme. The lateral lobes of the labellum are often longer than the relatively narrow mid-lobe. *D. corymbosa* Lindley which flowers later, has fewer, larger flowers which are heavily suffused with brown and the labellum mid-lobe is very broad and usually much longer than the lateral lobes.

Conservation Status: Common and conserved in National Parks.

Etymology: From the Latin, '*brumalis*', of the shortest day; in reference to this species winter flowering habit.

Diuris concinna D. Jones; species nova affinis *D. brevifoliae* R. Rogers a qua laminis petalorum latioribus ovatis, sepalo dorsali latiore, et medilobo labelli perlatiore late ovato differt.

Typus: Western Australia; Helms Arboretum, north of Esperance, 33°50'S, 121°53'E, 12 October 1985, D. L. Jones 2186 and B. E. Jones, (holo CBG, iso CBG, PER, MEL, AD, NSW).

Glabrous terrestrial herb. Tuberoids 15–35 mm x 7–9 mm, linear-terete to linear, fleshy, brown. Leaves three to five, basal, 8–13 mm x 1.5–2 mm, linear, green, obtuse, erect in a loose tuft. Inflorescence 20–40 cm tall, very slender. Sterile bracts 20–45 mm x 4–5 mm, linear-lanceolate, acute to subacute, closely sheathing. Fertile bracts 12–30 mm x 3–4 mm, linear to linear-lanceolate, acute, sheathing. Flowers one to five, ca 25 mm across, not crowded, clear bright yellow with red-brown markings on the dorsal sepal and labellum. Pedicels 20–40 mm long, slender, straight. Ovary 5–6 mm long, linear-obovoid, slightly curved. Dorsal sepal 8–14 mm x 5–8.5 mm, ovate to broadly ovate, projected forwards, cucullate and column-embracing in the proximal half, obliquely erect in distal half, distal margins recurved, apex subacute to truncate, yellow with two red-brown, basal blotches. Lateral sepals 10–17 mm x 2.5–3.5 mm, linear-ensiform, deflexed, parallel, asymmetrically acute, margins involute, inner third green, outer two-thirds purplish. Petals obliquely erect to spreading, widely divergent; lamina 8–13 mm x 6–9 mm, broadly

ovate, obtuse, bright yellow, strongly recurved, sometimes nearly horizontal; claw 3–6 mm long, linear-tapered, reddish brown, widening just near apex. Labellum 10–14 mm long, obliquely decurved, yellow with basal red-brown markings, deeply three-lobed; lateral lobes 4–7 mm x 2–3.5, linear-ovate to ovate, falcate, erect, spreading, obtuse to irregularly crenulate; mid-lobe broadly ovate in outline when flattened (8–11 mm across), margins recurved, yellow with red-brown, basal markings. Labellum callus extending well onto the base of the mid-lobe, consisting of two, divergent, incurved, red-brown ridges 5–6 mm long. Column ca 4 mm x 2.5 mm, projected forwards from the end of the ovary. Anther ca 3.6 mm x 1.8 mm, linear-ovate, brown. Pollinarium ca 2.5 mm x 1.3 mm; pollinia linear-clavoid, white, mealy; viscidium ca 0.5 mm across, broadly elliptical. Column wings ca 4 mm long, irregularly lanceolate, crenate or lobed, extending above the anther, white. Capsule not seen.

Distribution and Habitat: Endemic to south-western Western Australia between Esperance and Southern Cross (Wey). It grows among grass and low shrubs in sparse, stunted woodland in grey to white sand.

Flowering Period: October.

Notes: *D. concinna* has as its closest relative *D. brevifolia*. It can be distinguished from that species by its much broader perianth parts particularly the petal laminae, dorsal sepal and labellum mid-lobe. In Western Australia the new species has also been confused with *D. setacea* R. Br. and *D. filifolia* Lindley. *D. setacea*, which flowers only after fires, can be immediately recognised by its spirally twisted leaves and *D. filifolia* has a stiffly erect inflorescence with larger flowers having a rhomboid mid-lobe on the labellum and broad, scimitar-shaped lateral sepals.

Conservation Status: Although *D. concinna* grows in the Helms Arboretum it is not protected therein; a visit in 1988 revealed that the area where the type collection was made had been cleared for aborigiculture; suggest 2R by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*concinus*', neat, pretty, elegant; all of which apply to this attractive species.

Diuris conspicillata D. Jones; species nova
affinis *D. corymbosae* Lindley a qua floribus
flavis maculis prominentibus atrobrunneis in
centro labelli, sepalo dorsali obcuneato,
lamina petalorum longiore ellipticilanceolata,
et medilobo labelli anguste cuneato differt.
Typus: Western Australia; Dempster Head,
Esperance, 33°47'S, 121°48'E, 22 August
1989, D. Voigt s.n. (D. L. Jones 4863), (holo
CBG, iso CBG, PERTH).

Deciduous terrestrial herb. Tuberoids 20–50 mm x 4–6 mm, cylindrical, fleshy, brownish, more or less parallel to the soil surface. Leaves 1–3, basal, 10–19 cm x 5–12 mm, linear-lanceolate, erect to obliquely erect, conduplicate, acute to acuminate, bright green. Inflo-

rescence 18–30 cm tall, stout. Sterile bracts 5–9 cm x 8–12 mm, lanceolate to ovate-lanceolate, acuminate, closely sheathing. Fertile bracts 2.5–6 cm x 8–12 mm, ovate-lanceolate, acuminate, closely sheathing. Flowers 1–6, 3–4 cm across, yellow with dark brown blotches particularly on the labellum, lighter on the reverse of the petal laminae and an apical blotch on the dorsal sepal. Pedicels 2.5–6 cm long, slender, curved. Ovary 7–10 mm long, narrow-ovoid, straight or curved. Dorsal sepal 9–13 mm x 10–12 mm, obcuneate, projected forwards, cucullate and column-embracing in proximal third, erect and flared in distal two-thirds, yellow with a brown apical blotch particularly prominent from the rear, apiculate, distal margins entire or crenulate. Lateral sepals 17–23 mm x 2–3 mm, linear to linear-lanceolate, straight or slightly falcate, deflexed, parallel but crossing with age, margins involute, purplish brown with a green apex, obtuse. Petals erect, slightly divergent; lamina 15–25 mm x 8–9 mm, elliptical-lanceolate (sometimes ovate-elliptical), yellow, reverse side brownish, tip dark brown, entire; claw 6–9 mm long, green to purple-brown, linear, straight, widening just near the apex. Labellum 7–12 mm long, projected forwards at an oblique downwards angle, yellow with dark red-brown blotches, those at base of lateral lobes particularly prominent, sometimes nearly wholly dark red-brown, deeply 3-lobed; lateral lobes 6–9 mm x 3.5–5 mm, oblong, spreading or recurved, obtuse, upper margins denticulate-crenulate; mid-lobe narrow-cuneate when flattened (4–8 mm across), downcurved in distal third, distal margins entire or slightly crenulate, apex retuse to emarginate. Labellum callus confined to proximal half of the mid-lobe consisting of a single bright yellow ridge, a vague, swollen ridge extending nearly to the apex of the mid lobe. Column ca 5 mm x 3.5 mm, projected forwards from the end of the ovary. Anther ca 4 mm x 2.8 mm, broadly ovate, greenish. Pollinarium ca 4 mm x 2.5 mm; pollinia white, linear-clavoid, viscidium ca 0.8 cm across, ovoid to circular. Stigma ca 2 mm x 2 mm, almost rectangular. Column wings ca 3.5 mm long, linear-spathulate, cream to yellow with crenulate margins. Capsule 10–12 mm x 5–6 mm, obovoid.

Selected Collections: (all CBG); Dempster Head, 19 September 1988, D. Voigt s.n.; loc. cit., August 1988, R. Bates s.n.

Distribution and Habitat: Endemic to south-western Western Australia where apparently confined to coastal headlands near Esperance (Wey). It grows among dense low shrubs and under clumps of mallee eucalypts in limestone rubble and also among granite boulders; soils are mainly white sands.

Flowering Period: August and September.

Notes: *D. conspicillata* is part of the *D. corymbosa* complex but can be readily distinguished by its bright yellow flowers which have prominent dark red-brown blotches. The blotches at the base of the lateral lobes of the labellum are particularly prominent and impart the appearance of spectacles. Apart from the floral colouration, this species also has longer, narrower petals than

D. corymbosa, an obtuse dorsal sepal and a narrowly wedge-shaped mid-lobe on the labellum.

Conservation Status: Distribution uncertain and not known to be conserved; suggest 2K according to Briggs & Leigh (1988).

Etymology: From the Latin '*conspicillatus*', spectacled; the dark floral blotches often impart the impression that the flowers are wearing spectacles.

Diuris disposita D. Jones; species nova affinis *D. chrysanthae* D. Jones et M. Clements a qua tuberosidis multo majoribus, floribus minoribus remotis, sepalis lateralibus lineariblancoatis, et labello minore lobis lateralibus plus angustioribus differt.
Typus: New South Wales; ca 18 km north-west of Kempsey on the road to Armidale, 30°59'S, 152°41'E, 10 October 1986, D. L. Jones 2475 & P. D. Jones, (holo CBG, iso CBG, NSW, BRI, MEL).

Glabrous, solitary terrestrial herb. Tuberoids 35–50 mm x 20–30 mm, broadly ovoid to obovoid, fleshy, yellowish-brown, irregular, apex deeply forked. Leaf basal, usually solitary, rarely two, 15–30 cm x 4–5 mm, linear, obliquely erect to lax, conduplicate, green. Inflorescence 20–35 cm tall, very slender. Sterile bracts 30–45 mm x 4–5 mm, lanceolate, acute, closely sheathing. Fertile bracts 18–27 mm x 4–5 mm, linear-elliptical to linear-oblancoate, acute, green with a purplish tip, closely sheathing. Flowers two to seven, ca 20 mm across, widely spaced, yellow with brown markings on the labellum and dorsal sepal. Pedicels 9–25 mm long, slender, straight or curved. Ovary 8–10 mm long, linear-oblong, curved. Dorsal sepal 7–11 mm x 4–7 mm, ovate, projected forwards, cucullate and column-embracing in the proximal half then obliquely erect, obtuse, distal margins recurved, yellow with a greenish-brown central basal blotch and two red-brown blotches about half way from base. Lateral sepals 10–24 mm x 1.5–2 mm, linear-oblancoate to ensiform, deflexed, parallel or crossed, margins involute, green with brownish markings. Petals obliquely erect, slightly recurved, widely divergent; lamina 6–9 mm x 4.5–6.5 mm, broadly elliptical to obovate, obtuse, yellow, often recurved; claw 4–7 mm long, linear-tapered, green, curved, widening just near the apex. Labellum 7–9 mm long, obliquely decurved, yellow with red-brown markings, deeply three-lobed; lateral lobes 2–2.8 mm x 0.8–1.2 mm, linear to oblong, reddish brown, erect and column-embracing, obtuse or irregularly crenate; mid-lobe narrow-ovate to ovate in outline when flattened, (4–7 mm across), conduplicate, with central red-brown markings, obtuse. Labellum callus extending to base of mid-lobe, consisting of two, divergent, incurved ridges ca 4 mm long. Column ca 3 mm x 2 mm, projected forwards from the end of the ovary. Anther ca 2.6 mm x 1.5 mm, linear-ovate, green-brown. Pollinarium ca 2 mm x 1.2 mm; pollinia linear-clavoid, white; viscidium ca 0.4 mm across, elliptical. Column wings ca 3 mm long, irregularly lanceolate, about as long as the anther, white, irregularly

crenate. Capsule 12–16 mm x 3–4 mm, linear-obovoid, erect.

Distribution and Habitat: Endemic to north-eastern New South Wales in the vicinity of the Macleay River (Nnc). It grows on hills and slopes in tall open forest, particularly in swards of Kangaroo Grass (*Themeda triandra*); soils are shallow, grey, gravelly loams.

Flowering Period: September and October.

Notes: *D. disposita* is a distinctive species which has some affinities with *D. chrysantha*. It can be distinguished immediately from that species by its smaller flowers widely spaced on the inflorescence. In addition the labellum is smaller with much narrower lateral lobes and linear-oblancoate to ensiform lateral sepals. *D. disposita* is a very slender species with disproportionately large tuberoids.

Conservation Status: Not conserved and threatened by urban development; suggest 2E by criteria of Leigh and Briggs (1988).

Etymology: From the Latin '*dispositus*', widely spaced; in reference to the widely spaced flowers on the inflorescence.

Diuris exitela D. Jones; species nova affinis *D. abbreviatae* Benth. a qua floribus pallidioribus, sepalis lateralibus angustioribus, petalis valde demissis, et labello lobis lateralibus multo brevioribus differt.
Typus: Queensland; Mt Moffatt, 25°03'S, 148°03'E, 5 October 1989, E. Pederson s.n. (D. L. Jones 5208), (holo CBG, iso CBG, BRI).

Glabrous, terrestrial, solitary herb. Tuberoids 35–45 mm x 12–16 mm, linear-ovoid, fleshy, greyish-brown, entire. Leaves two, basal, 16–40 cm x 8–12 mm, linear, obliquely erect to lax, conduplicate, green. Inflorescence 30–70 cm tall, slender to moderately stout. Sterile bracts 6–9 cm x 7–9 mm, lanceolate, acute, closely sheathing. Fertile bracts 10–35 mm x 3–5 mm, elliptical to lanceolate, acute to acuminate, closely sheathing. Flowers two to twelve, ca 25 mm across, opening bright yellow, quickly fading to pale yellow, somewhat crowded, petals markedly drooping. Pedicels 8–35 mm long, slender, straight. Ovary 5–7 mm long, linear-oblong, curved. Dorsal sepal 9–12 mm x 5–7 mm, ovate, projected forwards, cucullate and column-embracing in the proximal half, then obliquely erect or the apical third incurved, obtuse, pale yellow with dark brown basal markings. Lateral sepals 10–16 mm x 1–2 mm, linear to linear-oblancoate, deflexed, crossed, margins involute, green with purple-brown markings. Petals spreading horizontally or more usually drooping, slightly recurved; lamina 9–13 mm x 5–8 mm, elliptical, obtuse; claw 4–6 mm long, linear, green to purplish, widening just near the apex. Labellum 10–15 mm long, obliquely decurved, pale yellow with purple-brown markings towards the base, deeply three-lobed; lateral lobes 1.5–2.5 mm x 0.6–0.7 mm, linear, purplish to brown, erect, divergent, acute to obtuse, or truncate, entire or emarginate; mid-lobe transversely ovate to broadly

ovate or obovate in outline when flattened (6–8 mm across), flat with an erect, folded, central ridge, pale yellow with some brownish markings, obtuse. Labellum callus extending onto the base of the mid-lobe, consisting of two parallel ridges divergent at the end, ca 4.5 mm long, apex entire or shallowly notched. Column ca 3 mm x 2.5 mm, projected forwards from the end of the ovary. Anther ca 2.8 mm x 1.6 mm, linear-ovate, brown. Pollinarium ca 3 mm x 2 mm; pollinia linear-clavoid, white; viscidium ca 0.4 mm across, elliptical. Column wings ca 3 mm long, linear, apex irregularly lobed, about as long as the anther, white. Capsule not seen.

Distribution and Habitat: Endemic to central-western Queensland (Qle). It occurs on sandstone ranges and escarpments growing in flat areas, on slopes, and among sandstone boulders in sparse woodland; soils are sands and gravels.

Flowering Period: September and October.

Notes: *D. exitela* is a distinctive species that probably has as its closest relative *D. abbreviata*. The new species is very robust and its flowers, which open bright yellow and quickly fade to pale yellow, have unusual drooping petals. The lateral lobes of the labellum are amongst the smallest of any *Diuris*.

Conservation Status: Moderately widespread, locally common and conserved.

Etymology: From the Greek '*exitelos*', fading or weakening; chosen to highlight the flower colour quickly changing from bright yellow to pale yellow after opening.

Diuris flavescens D. Jones; species nova affinis *D. chrysanthae* D. Jones et M. Clements a qua habitu brevior, floribus minoribus flavescens, et sepalis lateralibus linear-oblongatis ad ensiformis differt.

Typus: New South Wales; The Bight Cemetery, south-east of Wingham, 31°54'S, 152°22'E, 1 September 1989, D. L. Jones 4925 & M. A. Clements, (holo CBG, iso CBG, NSW, MEL).

Glabrous, solitary, terrestrial herb. Tuberoids 10–25 mm x 8–12 mm, ovoid to obovoid, fleshy, brown, entire or forked. Leaves two, basal, 8–17 cm x 3–4 mm, linear, obliquely erect to lax, conduplicate, dark green. Inflorescence 10–20 cm tall, very slender. Sterile bracts 15–25 mm x 3–4 mm, lanceolate, acute, sheathing or spreading. Fertile bracts 7–14 mm x 3–4 mm, linear-lanceolate, acute, closely sheathing. Flowers one to five, ca 12 mm across, pale yellow with dark brown markings on the dorsal sepal and labellum. Pedicels 5–25 mm long, slender, straight. Ovary 5–8 mm long, linear-oblong, straight or curved. Dorsal sepal 6–9 mm x 4–5 mm, linear-ovate, projected forwards, cucullate and column-embracing in the proximal half then obliquely erect, obtuse to apiculate, yellow with a greenish brown, basal blotch and two, red-brown

blotches about half way from base. Lateral sepals 12–18 mm x 1.2–1.8 mm, linear-oblongate to ensiform, deflexed, parallel or crossed, margins involute, green with brown markings, acuminate. Petals obliquely erect, widely divergent; lamina 6–9 mm x 4–5 mm, elliptical to nearly orbicular, obtuse, pale yellow; claw 4–6 mm long, linear-tapered, green to brown, curved, widening near the apex. Labellum 6–8 mm long, obliquely decurved, pale yellow with red-brown markings, deeply three-lobed; lateral lobes 2–3 mm x 0.8–1.2 mm, linear to linear-ovate, brown and yellow, erect, obtuse or irregularly crenulate; mid-lobe narrow-ovate to ovate in outline when flattened (4.5–6.5 mm across), conduplicate, with central red-brown markings, obtuse. Labellum callus extending to base of mid-lobe, consisting of two, divergent, incurved ridges ca 5 mm long. Column ca 3 mm x 2 mm, projected forwards from the end of the ovary. Anther ca 2.5 mm x 1.3 mm, linear-ovate, brown. Pollinarium ca 2 mm x 1.3 mm; pollinia linear-clavoid, white; viscidium ca 0.4 mm across, orbicular. Column wings ca 2.5 mm long, linear-deltate, irregularly lobed, longer than the anther, white. Capsule not seen.

Distribution and Habitat: To date known only from the type locality but doubtless more widespread (Nnc). It grows in tall open forest with a grassy understorey; the soil is a shallow, grey loam.

Flowering Period: September and October.

Notes: *D. flavescens* is related to *D. chrysantha* but is much shorter growing with fewer, smaller flowers of a very pale yellow colouration. Whereas the lateral sepals of *D. chrysantha* are obovate-spathulate in shape those of *D. flavescens* are linear-oblongate to ensiform.

Conservation Status: Poorly known and not conserved; suggest 2K by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*flavescens*', pale yellow; in reference to the flower colour.

Diuris heberlei D. Jones; species nova affinis *D. drummondii* Lindley a qua non in colonis, sine interventu flammae florescentia, in habitu multum brevior, et floribus paucioribus differt.

Typus: Western Australia; Nannarup to Moates Lagoon, east of Albany, 34°55'S, 118°12'E, 8 January 1987, R. Heberle s. n., (holo CBG, iso CBG, PERTH).

Glabrous perennial herb. Tuberoids 20–40 mm x 4–6 mm, irregularly linear-terete, brownish, usually growing nearly parallel to the soil surface. Leaves three to five, basal, 10–15 cm x 2–3 mm, linear, dark green, erect in a loose tuft, subacute to acuminate. Inflorescence 20–50 cm tall, very slender. Sterile bracts 2.5–6 cm x 4–5 mm, linear-lanceolate, acute to acuminate, closely sheathing. Fertile bracts 12–30 mm x 4–6 mm, lanceolate, acute to acuminate, closely sheathing. Flowers one to four, ca 35 mm across, yellow with red-brown markings on the base of the labellum. Pedicels 10–35 mm long, very slender, straight. Ovary 5–7 mm long, linear-ovoid,

curved. Dorsal sepal 12–16 mm x 7–9 mm, linear-ovate, projected forwards, cucullate and column-embracing in the proximal third then obliquely erect, apiculate, yellow with red-brown basal markings. Lateral sepals 18–24 mm x 4–5 mm, linear-ensiform, decurved, parallel, subacute to acute, greenish brown on outer two-thirds, inner third pale green. Petals obliquely erect, divergent, recurved; lamina 11–16 mm x 8–11 mm long, brownish, linear-tapered, curved, widening just near the apex. Labellum 12–18 mm long, obliquely decurved, deeply three-lobed, yellow with red-brown basal markings; lateral lobes 6–10 mm x 4–7 mm, asymmetrically ovate, spreading, distal margin crenulate; mid-lobe broadly ovate in outline when flattened (10–13 mm across), flat, obtuse, with a shallow, central ridge, yellow with brown basal markings. Labellum callus extending well onto the mid-lobe, consisting of two, nearly parallel, red-brown ridges ca 8 mm long. Column ca 6 mm x 3 mm, projected forwards from the end of the ovary. Anther ca 4.5 mm x 2 mm, linear-ovate, green-brown. Pollinarium ca 4 mm x 2 mm; pollinia linear-clavoid, white; viscidium ca 0.6 mm across, elliptical. Column wings ca 6 mm long, more or less linear, irregularly crenate, about as long as the anther. Capsule 15–18 mm x 7–8 mm, obovoid.

Distribution and Habitat: Endemic to south-western Western Australia where known only from an area to the east of Albany (Wda). It grows among low shrubs on stabilised sand dunes, in white sand.

Flowering Period: January and February.

Notes: *D. heberlei* is related to *D. drummondii* but the two occupy different habitats, have a different biology and are morphologically distinct. *D. drummondii* grows in winter-wet swamps where it forms extensive colonies and flowers only after fires. By contrast *D. heberlei* grows singly or in small groups in well-drained soils and does not need the stimulus of a fire to flower. *D. drummondii* is an extremely vigorous species with up to ten flowers on an inflorescence which can reach over one metre tall. *D. heberlei* is much less vigorous and usually only has two or three flowers. It also tends to begin flowering when *D. drummondii* is finished and has been noted as flowering as late as February (R. Heberle, pers. comm.).

Conservation Status: Rare and not known to be conserved; suggest 2R according to Briggs & Leigh (1988).

Etymology: It gives me great pleasure to name this species after its discoverer, Ron Heberle, of Albany. Ron has a vast knowledge of the orchids of Western Australia, is the discoverer of innumerable new species and has been of major help with my research.

Diuris luteola D. Jones et B. Gray; species nova
affinis *D. chrysanthae* D. Jones et M. Clements
a qua floribus flavescentibus, sepalis
lateralibus linearibus ad linearioblanceolatis,
petalis lamina elliptica, et labello lobis
lateralibus angustioribus differt.

Typus: Queensland; Herberton Range, 17°24'S, 145°20'E, 4 September 1983, D. L. Jones 1186 & B. Gray, (holo CBG, iso CBG, BRI, NSW, MEL, QRS, AD).

Glabrous terrestrial herb. Tuberoids to 25 mm x 11 mm, linear-ovoid to ellipsoid, brown, fleshy. Leaf solitary, basal, 20–35 cm x 3–4 mm, linear, dark green, bright purplish at base, erect or lax. Inflorescence 12–45 cm tall, very slender. Sterile bracts 15–40 mm x 3–4.5 mm, linear-lanceolate, acute to subacute, closely sheathing. Fertile bracts 10–25 mm x 4–5 mm, lanceolate, acute, sheathing. Flowers one to six, ca 25 mm across, pale yellow with a few brown markings on the labellum and dorsal sepal. Pedicels 10–25 mm long, slender, straight. Ovary 4–5 mm long, linear-ovoid, curved. Dorsal sepal 7–10 mm x 5–8 mm, ovate, projected forwards, cucullate and column-embracing in the proximal half, erect in distal half, distal margins recurved, apex obtuse or apiculate, yellow or with a couple of small red-brown blotches near the base. Lateral sepals 12–20 mm x 1.5–2.5 mm, linear to linear-oblong, obtuse to acute, deflexed, crossed, margins involute, green with some brown suffusions. Petals obliquely erect, widely divergent, partly recurved; lamina 6–10 mm x 4.5–8.5 mm, elliptical to broadly obovate, obtuse, pale yellow; claw 3–5 mm long, linear-tapered, dark red brown, curved, widening just near the apex. Labellum 6–9 mm long, projected forwards or obliquely decurved, pale yellow with brown markings, deeply three-lobed; lateral lobes 2.5–3 mm x 0.8–1.4 mm, linear to oblong, erect, spreading, curved, obtuse to irregularly crenulate; mid-lobe linear-ovate to ovate in outline when flattened (4–7 mm across), ridged along midline, pale yellow with some light, brown basal markings. Labellum callus extending onto the base of the mid-lobe, consisting of two, more or less parallel ridges ca 4.5–5 mm long. Column ca 3.5 mm x 3 mm, projected forwards from the end of the ovary. Anther ca 3.3 mm x 1.8 mm, linear-ovate, brown. Pollinarium ca 3 mm x 1.5 mm; pollinia linear-clavoid, white, mealy; viscidium ca 0.4 mm across, elliptical. Column wings ca 3.5 mm long, irregularly lanceolate, crenate, about as long as the anther, white. Capsule not seen.

Selected Collections: Queensland; Battleship Spur, Carnarvon Range, 14 September 1988, E. Pederson s.n. (D. L. Jones 2883) (CBG); Blackdown Tableland, 28 August 1990, D. L. Jones 6322 and B. E. Jones (CBG).

Distribution and Habitat: Endemic to north-eastern and central-eastern Queensland where distributed between the Windsor Tableland and Blackdown Tableland, (Qco, Qkn, Qks, Qle). It grows among grass on ridges and slopes in sparse open forest, usually in shallow stony soil.

Flowering Period: July to September.

Notes: *D. luteola* has affinities with *D. chrysantha* but is a more slender species with pale yellow, scarcely blotched flowers (orange-yellow and heavily blotched in *D. chrysantha*), petal laminae which are generally elliptical in shape, narrower lateral lobes on the

labellum and linear to linear-oblongate lateral sepals. Illustrated on page 166 of Pearson (1989).

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Latin '*luteolus*', pale yellow; in reference to the flower colour.

Diuris magnifica D. Jones; species nova affinis

D. corymbosae Lindley a qua floribus majoribus et valde coloratis, et *D. altissimae* D. Jones a qua antea florescentia, floribus pro parte maxima aureis purpureisque, sepalo dorsali ovato saepe apiculato, et laminis petalorum latioribus differt.

Typus: Western Australia; Kwinana Reserve, Thomas Rd, Mandogalup, 32°13'S, 115°49'E, 4 September 1986, D. L. Jones 2473 & T. D. Jones, (holo CBG, iso CBG, PERTH).

Glabrous terrestrial herb growing in loose colonies. Tuberoids to 9 cm x 4 mm, linear-terete, fleshy, irregular, brown, nearly parallel to soil surface. Leaves two or three, basal, 12–22 cm x 18–24 mm, broadly linear, obliquely erect, conduplicate, acute to subacute, bright green. Inflorescence 30–60 cm tall, sturdy. Sterile bracts 4–8 cm x 12–15 mm, lanceolate, acuminate, closely sheathing. Fertile bracts 1.5–6 cm x 8–12 mm, lanceolate, acuminate, closely sheathing. Flowers three to seven, ca 4 cm across, bright yellow with purple labellum lobes and a yellow to orange dorsal sepal. Pedicels 1.5–7 cm long, slender, straight or curved. Ovary 8–11 mm long, linear-ovoid, straight or curved. Dorsal sepal 12–17 mm x 10–16 mm, ovate to nearly obovate, projected forwards, cucullate and column-embracing in proximal half, erect in distal half, yellow or orange, strongly apiculate, distal margins entire or shallowly crenulate. Lateral sepals 16–26 mm x 2.5–3 mm, linear-lanceolate to ensiform, falcate, deflexed, usually crossed, green with purplish-brown markings, acuminate. Petals erect, often crowded and overlapping; lamina 16–24 mm x 12–14 mm, ovate-elliptical to ovate, subacute or obtuse, yellow, brownish on reverse side, with a paler central band; claw 4–6 mm long, linear, slightly curved, purple-brown, widening just near the apex. Labellum 13–18 mm long, projected forwards, apex recurved, deeply three-lobed, mauve or purple with some yellow markings; lateral lobes 10–16 mm x 5–8 mm, obliquely linear-oblong to oblong-ovate, falcate, asymmetrical, widely spreading, broadly obtuse, upper margins crenate; mid-lobe cuneate to ovate-cuneate in outline when flattened (9–15 mm across) with a broad, shallow, central ridge, decurved in distal half, entire or distal margins shallowly crenulate, apex obtuse to emarginate. Labellum callus consisting of a yellow, central ridge ca 3 mm long, a vague, swollen ridge extending well onto the mid-lobe. Column ca 4.5 mm x 4 mm, projected forwards from the end of the ovary. Anther ca 4 mm x 3 mm, ovate, brownish. Pollinarium ca 3.3 mm x 2 mm; pollinia linear-clavoid, white; viscidium ca 0.8 cm across,

ovate to elliptical. Stigma ca 3 mm x 3 mm, almost rectangular. Column wings ca 5 mm long, linear-oblong, cream with brown crenulate to crisped margins. Capsule not seen.

Selected Collections: Western Australia; ca 4 km south of Mandurah, 3 September 1986, D. L. Jones 2470 (CBG).

Distribution and Habitat: Endemic to south-western Western Australia where distributed between Perth and Mandurah (Wda). It grows among grass and low shrubs in tall scrub dominated by *Eucalyptus gomphocephala* and *Banksia* spp., in grey to white sand.

Flowering Period: August and September.

Notes: *D. magnifica* is part of the *D. corymbosa* complex but is readily distinguished from that species by its much larger, highly colourful flowers. It is closest to *D. amplissima* but is earlier flowering, grows mainly in near-coastal habitats and has broader petal laminae and a narrower, ovate dorsal sepal. Its floral colours are mainly in hues of yellow, orange and purple whereas brown predominates in *D. amplissima*. Illustrated on page 369 in Hoffman and Brown (1984).

Conservation Status: Locally common but threatened by urban development; suggest 2R by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*magnificus*', noble, splendid, magnificent; the large, colourful flowers are the most magnificent in the genus.

Diuris micrantha D. Jones; species nova affinis *D. laxiflorae* Lindley a qua habitu elatiore, et floribus multo minoribus differt.

Typus: Western Australia; Johnsons Rd, Mandogolup, 32°12'S, 115°50'E, 23 September 1985, D. L. Jones 1965, (holo CBG, iso CBG, PERTH).

Glabrous terrestrial herb. Tuberoids to 30 mm x 8 mm, linear to linear-obovoid, fleshy, brown. Leaves four to six, basal, 8–13 mm x 1.5–2 mm, linear, green, reddish at base, somewhat fleshy, obtuse, erect in a loose tuft. Inflorescence 30–60 cm tall, very slender. Sterile bracts 3–6 cm x 3.5–4.5 mm, linear-lanceolate, acute to subacute, closely sheathing. Fertile bracts 10–40 mm x 4–5.5 mm, lanceolate, acute, sheathing. Flowers one to six, ca 13 mm across, not crowded, yellow with red-brown markings. Pedicels 10–20 mm long, slender, straight. Ovary 4–5 mm long, linear-obovoid, straight. Dorsal sepal 6–7.5 mm x 2.5–3.5 mm, linear-elliptical to linear-ovate, projected forwards, cucullate and column-embracing in the proximal half, erect in distal half, distal margins recurved, apex obtuse, dark red-brown at base, centre yellow, with a prominent red-brown, apical blotch. Lateral sepals 6–10 mm x ca 1.5 mm, linear, slightly falcate, asymmetrically acute, deflexed, parallel, margins involute, green with purplish brown markings. Petals obliquely erect, divergent; lamina 4–5.5 mm x 3.5–5 mm, broadly ovate to orbic-

ular, obtuse, yellow with a prominent, dark, red-brown apical blotch, erect; claw 2–3 mm long, linear-tapered, dark red-brown, widening just near apex. Labellum 5–7 mm long, obliquely decurved, yellow with dark red brown markings and suffusions, deeply three-lobed; lateral lobes 3–4 mm x 1.5–2.5, linear to linear-ovate or linear-spathulate, erect, spreading, obtuse to irregularly crenulate; mid-lobe ovate-cuneate to broadly lunate in outline when flattened (5–7 mm across), conduplicate, yellow with heavy red brown suffusions and a red-brown apical blotch. Labellum callus extending onto the base of the mid-lobe, consisting of two, parallel, red-brown ridges ca 3.5 mm long. Column ca 3 mm x 2 mm, projected forwards from the end of the ovary. Anther ca 2.6 mm x 1.5 mm, linear-obovate, brown. Pollinarium ca 2 mm x 1.2 mm; pollinia linear-clavoid, white, mealy; viscidium ca 0.3 mm across, elliptical. Column wings ca 2.3 mm long, irregularly lanceolate, crenate, extending well above the anther, white. Capsule not seen.

Distribution and Habitat: Endemic to south-western Western Australia where known only from a small area to the south of Perth (Wda). It grows among rushes and sedges in winter-wet swamps, in grey to blackish sand. The bases of the flowering plants are often covered with shallow water.

Flowering Period: September and October.

Notes: *D. micrantha* has obvious affinities with *D. laxiflora* Lindley but is a much taller growing species with the smallest flowers of the group. Illustrated in the lower left hand plate, page 52 in Hopper et al (1990).

Conservation Status: Rare and threatened by urban development; suggest 2E by criteria of Briggs and Leigh (1988).

Etymology: From the Greek 'micros' small, 'anthos', a flower; in reference to the small flowers of this species.

Diuris X nebulosa D. Jones; hybrida nova ad *D. punctatam* Smith attingens sed floribus flavis, lilacinis et violaceis suffusis, petalis latioribus, lobis labelli latioribus, et sepalis lateralibus brevioribus.

Typus: New South Wales; Lake Burrill, 35°23'S, 150°27'E, 24 October 1981, M. A. Clements 2384, (holo CBG, iso CBG).

Glabrous terrestrial herb growing sporadically with putative parents. Tuberoids to 35 mm x 20 mm, irregularly obovoid, forked, fleshy, brownish. Leaves two, basal, 20–35 cm x 6–7 mm, linear, obliquely erect, conduplicate, acute, bright green. Inflorescence 35–55 cm tall, sturdy. Sterile bracts 3–6 cm x 6–9 mm, lanceolate, acuminate, closely sheathing. Fertile bracts 1–3.5 cm x 6–8 mm, lanceolate, acuminate, closely sheathing. Flowers two to six, ca 3 cm across, yellowish heavily suffused with mauve and purple especially the labellum. Pedicels 2–5 cm long, slender, erect. Ovary 9–11 mm long, linear-ovoid, curved. Dorsal sepal 10–14 mm x

7–10 mm, broadly ovate, projected forwards, cucullate and column-embracing in the proximal half, erect in distal half, yellowish to purplish, obtuse to apiculate. Lateral sepals 20–30 mm x 2.5–3 mm, linear-ensiform, subacute to acute, green and purplish brown, parallel or crossed. Petals erect to obliquely erect; lamina 8–13 mm x 6–10 mm, elliptical to broadly obovate, entire or slightly retuse, yellowish with mauve suffusions; claw 3–5 mm long, linear, curved, greenish brown, widening just near the apex. Labellum 10–13 mm long, projected forwards, deeply three-lobed, lateral lobes and mid-lobe yellow suffused with mauve or purple; lateral lobes 3–5 mm x 1.5–2.5 mm, ovate to obovate, falcate, asymmetrical, widely spreading, broadly obtuse, upper margins entire; mid-lobe broadly ovate-cuneate in outline when flattened (9–12 mm across), margins entire. Labellum callus confined to proximal half of the mid-lobe, consisting of two rounded ridges, incurved near the apex, yellow with purple markings. Column ca 5.5 mm long. Anther 4 mm x 2 mm, linear-ovate. Pollinarium ca 4 mm long; viscidium ca 7 mm across; pollinia ca 3.6 mm long, linear-clavoid, white. Stigma ca 2.5 x 3 mm, obovate. Column wings ca 4.5 mm long, linear-lanceolate, white, margins irregular. Capsule not seen.

Distribution and Habitat: Central and south-eastern New South Wales (Ncc, Nsc) in open forest and grassland growing in grey to brown clay loams.

Flowering Period: September to November.

Notes: This taxon, a natural hybrid between *D. aurea* and *D. punctata*, only grows in close proximity to the parents. Although loathe to name natural hybrids in this promiscuous genus, I feel that this striking cross deserves recognition.

Conservation Status: Widespread and conserved.

Etymology: From the Latin 'nebulosus', clouded; in reference to the unevenly blended floral colours.

Diuris oporina D. Jones; species nova affinis *D. parvipetalae* (Dockr.) D. Jones et Clements a qua autumnno florenti, folio solitario base rubropurpureo, sepalis dorsali latiore et sepalis lateralibus angustioribus minoribusque, et petalis ovatis permajoribus distincte unguiculatis differt.

Typus: Queensland; Great Dividing Range, north-east of Watsonville, 17°24'S, 145°20'E, 1050 m., 2 May 1988, L. Lawler 5, (holo CBG, iso CBG, BRI). SYN *D. punctata* Sm forma *blackneyae* Bailey, Compr. Cat. Queensland Pl. 847, f.973 a,b&c (1909). Type: Ravenshoe, North Queensland, 2 November 1912, F. A. Blakney s.n. (holo BRI!).

Glabrous terrestrial herb. Tuberoids to 30 mm x 10 mm, obovoid, entire, light brown, fleshy. Leaf solitary, basal, 12–23 cm x 3.5–5 mm, linear-subulate, lax, conduplicate, purplish-red at the base, acuminate. Inflorescence 20–43 cm tall, slender, reddish at the base. Sterile bracts 20–45 mm x 3–4 mm, lanceolate, acuminate, closely

sheathing. Fertile bracts 12–35 mm x 3–4 mm, lanceolate, acuminate, sheathing at the base, sometimes reddish. Flowers one to ten, white with mauve, lilac or purple markings on the dorsal sepal and labellum. Pedicels 7–18 mm long, slender. Ovary 4–5 mm long, narrow ovoid, curved. Dorsal sepal 9–10 mm x 4.5–5 mm, oblong-obovate, projected forwards and cucullate in proximal half, obliquely erect or slightly decurved in distal half, apiculate, distal margins recurved or revolute, white with purple stains and suffusions in proximal half. Lateral sepals 25–35 mm x ca 1 mm, linear, parallel or crossed, green, subacute. Petals obliquely erect; lamina 6.5–8 x 4–5 mm, ovate, white, margins often revolute, entire or slightly emarginate; claw 4–5 mm long, purple-brown, linear, widening just near the apex. Labellum 7–8 mm long, projected forwards at oblique downwards angle, with prominent mauve or purple markings, deeply 3-lobed; lateral lobes 2–2.5 mm x 2.5 mm, linear-oblong, erect, entire or slightly lobed; mid-lobe cuneate to rhomboid, 4–5 mm across when flattened, margins near widest point curved upwards. Labellum callus confined to proximal half of the mid-lobe, consisting of two rounded ridges, incurved near the apex, with purple markings. Column 4–4.5 mm long. Anther 3–3.2 mm x 1.3–1.5 mm, purple-black. Pollinia 4, about 3 mm x 0.8 mm, white, attached to an ovoid viscidium ca 0.7 mm across. Stigma ca 1.5 mm x 1.5 mm, oblong. Column wings ca 3 mm long, linear-oblancoate, white, margins irregular. Capsule 8–9 mm x 4–4.5 mm, obovoid.

Distribution and Habitat: Drier ranges of the Atherton Tableland and Evelyn Tableland, north-eastern Queensland (Qco). It occurs on ridges and slopes under sparse open forest and woodland, growing in shallow skeletal clay loams. Often found among grass particularly dense swards of *Themeda triandra*.

Flowering Period: March to May, sometimes extending to July.

Notes: *D. oporina* is part of the *D. punctata* complex and has been previously known as *D. punctata* forma *blackneyae* Bailey. It is the northernmost member of the group and can be distinguished by its very small, pale-coloured flowers and a solitary leaf which is reddish-purple at the base. Its autumn flowering habit is notable since all other related species flower in late spring and early summer. *D. parvipetala* (Dockr.) D. Jones & Clements, which is spring flowering, has similarities but is more robust with distinctly cuneate petals and much longer lateral sepals.

Conservation Status: Restricted and not conserved; suggest 3R by the criteria of Briggs & Leigh (1988).

Etymology: From the Greek '*oporinus*', autumnal; in reference to its autumn flowering habit.

Diuris praecox D. Jones; species nova affinis *D. abbreviatae* Benth. a qua florescentia praecoci, et labello medilobo elliptico ad ovato et lobis lateralibus multo longioribus differt.

Typus: New South Wales; Glenrock State Recreation Area, Merewether Heights, Newcastle, 32°58'S, 151°46'E, 30 August 1989, D. L. Jones 4896 & M. A. Clements, (holo CBG, iso CBG, NSW).

Glabrous terrestrial herb, solitary or in clumps. Tuberosity to 25 mm x 12 mm, ovoid to obovoid, entire, brown, fleshy. Leaves 2–3, basal, 15–35 cm x 3–5 mm, linear-subulate, conduplicate, acuminate. Inflorescence 20–40 cm tall, slender, scape somewhat flexuose. Sterile bracts two, 30–80 mm x 6–8 mm, oblong-lanceolate, acuminate, closely sheathing. Flowers six to ten, often nodding, clear yellow with dark markings on the base of the dorsal sepal and labellum, sometimes also the lamina of the petals. Fertile bracts 16–45 mm x 4–8 mm, oblong-lanceolate, acuminate, closely sheathing. Pedicels 15–50 mm long, slender, curved near the apex. Ovary 5–7 mm long, ovoid, curved. Dorsal sepal 9–11 mm x 4.5–6 mm, narrow ovate, projected forwards and cucullate in proximal half, obliquely erect in distal half, bluntly apiculate, a dark blotch at the base and sometimes also two small blotches at the widest point near the margins. Lateral sepals 12–15 mm x 1.5–2 mm, linear to linear-lanceolate, parallel, acuminate, greenish-brown, the tip green. Petals erect to obliquely erect, unmarked or with a few dark spots; lamina 8–12 mm x 5–6 mm, narrow-elliptical to ovate; claw 4–6 mm long, blackish, widening gradually into the lamina. Labellum 9–12 mm long, projected forwards at an oblique downwards angle, with prominent dark brown markings, deeply 3-lobed; lateral lobes 3–4 mm x 0.8–1.4 mm, linear to linear-obovate, erect, apex irregular; mid-lobe cuneate in proximal half, then expanded into a narrow to broadly ovate lamina 5–7 mm across when flattened, usually folded or somewhat gibbous along midline, apex obtuse to truncate. Labellum callus confined to two well defined ridges ca 4 mm long divergent near the apex, a shallow ridge between them extending onto the lamina. Column ca 4 mm long. Anther ca 3.5 mm x 2 mm, ovate, brown. Pollinia 4, ca 2.5 mm x 0.5 mm, white, attached to an ovoid viscidium ca 0.8 mm across. Stigma ca 2 mm x 2 mm, cordate. Column wings ca 3 mm long, the apex crenate to digitate. Capsule not seen.

Distribution and Habitat: Endemic to central-eastern New South Wales (Nnc ?Ncc). It grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey.

Flowering Period: Late July to early September.

Notes: *D. praecox* is closely related to *D. abbreviata* but flowers earlier, occupies a different habitat and is morphologically distinct especially in the labellum which has a much narrower mid-lobe (elliptical to ovate in shape) and longer lateral lobes. *D. abbreviata* is a late-flowered species of the ranges and tablelands whereas *D. praecox* grows in coastal and near-coastal situations.

Conservation Status: Threatened by urban development; suggest 2E by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*praecox*', precocious, early; in reference to relatively early flowering habit of this species especially in comparison with *D. abbreviata*.

Diuris pulchella D. Jones; species nova affinis *D. corymbosae* Lindley a qua floribus minoribus multipictis aureis malvinis albis et viridibus differt.

Typus: Western Australia; 13.5 km from Mt Ney, 33°23'S, 122°28'E, 9 August 1980, M. A. Clements 1876, (holo CBG, iso PERTH).

Glabrous terrestrial herb forming loose colonies. Tuberosities to 6 cm x 4 mm, linear-terete, fleshy, irregular, brown, growing nearly parallel to ground surface. Leaves 2–3, basal, 10–20 cm x 6–10 mm, linear-lanceolate, obliquely erect, conduplicate, acute to acuminate, bright green. Inflorescence 30–50 cm tall, stout. Sterile bracts 5–9 cm x 6–10 mm, lanceolate, acuminate, closely sheathing. Fertile bracts 3–5 cm x 4–6 mm, lanceolate, acuminate, closely sheathing. Flowers one to five, 2.5–3 cm across, bright yellow with mauve, white and greenish markings on the dorsal sepal and labellum. Pedicels 3.5–7.5 cm long, slender, straight. Ovaries 7–10 mm long, linear-ovoid, straight or slightly curved. Dorsal sepal 9–14 mm x 10–13 mm, obovate to nearly orbicular-reniform, projected forwards, cucullate and column-embracing in proximal half, erect in distal half, yellow, some mauve towards centre, apiculate, distal margins entire or crenulate. Lateral sepals 15–22 mm x 2.5–3 mm, linear-lanceolate, slightly falcate, obliquely deflexed, margins involute, green with purplish stainings, obtuse to subacute. Petals erect or obliquely erect; lamina 15–17.5 mm x 9–11 mm, ovate to ovate-oblong, yellow, lightly stained with brown on reverse side, entire or crenulate; claw 5–7 mm long, greenish mauve, widening just near the apex. Labellum 9–10 mm long, projected forwards, mauve with some yellow and white markings; deeply 3-lobed; lateral lobes 8–10 mm x 3–4 mm, obliquely lanceolate, falcate, spreading or recurved, obtuse, upper margins entire or crenulate; mid-lobe cuneate to orbicular-reniform when flattened (7–10 mm across), downcurved in distal third, distal margins entire to crenulate, apex shallowly retuse. Labellum callus confined to proximal quarter to third of the mid-lobe, consisting of a single yellow ridge, a vague swollen ridge extending well onto the mid-lobe. Column ca 4 mm x 3 mm, projected forwards from the end of the ovary. Anther ca 4 mm x 2 mm, linear-ovate, greenish-purple. Pollinarium ca 3 mm x 2 mm; pollinia white, linear-clavoid; viscidium ca 0.7 mm long, ovoid to circular. Stigma ca 2.5 mm x 2.5 mm, ovate. Column wings ca 3 mm long, linear-oblong, cream or yellow, crenate to lobed. Capsule not seen.

Distribution and Habitat: Endemic to south-western Western Australia where distributed from south-east of Esperance to Mt Boyatup (Wey, Wro). It occurs on granite outcrops growing among low shrubs or in exposed crevices, in reddish brown gravelly loam.

Flowering Period: August and September.

Notes: *D. pulchella* is closely related to *D. corymbosa* but can be recognised by its smaller, highly colourful flowers being in bright hues of yellow, mauve, white

and green. By contrast the larger flowers of *D. corymbosa* are mostly in colour combinations of yellow and reddish brown. The new species is widespread and common on the granite outcrops to the east of Esperance and has also been reported to occur on offshore islands (R. Heberle, pers. comm.).

Conservation Status: Common and conserved in National Parks.

Etymology: From the Latin '*pulchellus*', beautiful; in reference to the highly colourful and attractive flowers.

Diuris recurva D. Jones; species nova affinis *D. corymbosae* Lindley a qua floribus per minoribus (13–16 mm diametro), sepalis lateralibus valde falcatis cruciatim et saepe recurvis, et labello crista centrali prominenti usque paene apicem medilobo differt.

Typus: Western Australia; ca 0.5 km south of Ogilvie West Road on Yerina Spring Road, north-west of Northampton, 28°08'S, 114°22'E, 8 August 1986, A. P. Brown 315, (holo CBG, iso CBG, PERTH).

Leaves one or two, linear-tapered, to 15 cm x 5 cm, folded, dark green. Racemes to 40 cm tall, stiff. Sterile bracts two, to 5 cm x 6 mm, lanceolate, closely sheathing. Flowers one to four, 13–16 mm across, yellow densely suffused with dark burgundy red. Pedicels 15–25 mm long, slender. Fertile bracts to 35 mm x 7 mm, lanceolate, closely sheathing, often curved, green or purplish. Ovary about 6 mm x 3 mm, narrow-ovoid. Dorsal sepal 8 mm x 7 mm, obovate, recurved in the distal third, then often revolute, the apex with a small mucro, yellow with reddish suffusions. Lateral sepals 9–12.5 mm x 1.5–2 mm, linear-lanceolate, strongly falcate, apex unequally acuminate, green or reddish-green, usually crossed below the labellum, often recurved. Petals 10–13 mm x 4–6.5 mm, held obliquely erect or recurved; lamina 5–7 mm x 4–6.5 mm, elliptical to ovate, yellow, often with reddish suffusions on the reverse; claw 4–6 mm long, expanded suddenly just near the apex, greenish-brown. Labellum projected forwards; lateral lobes 4–5 mm x 1.5–2 mm, spreading or obliquely erect, recurved, the apical margin irregular, dark reddish-brown; mid-lobe 4–5 mm x 3–4.5 mm, spatulate, flat or the margins recurved, dark reddish-brown with yellow patches. Callus of a single raised ridge which occupies most of the mid-lobe, fleshy on top. Column about 4 mm x 2 mm, white. Wings about 4 mm x 1 mm, ca spatulate, distal margins irregularly lobed. Anther about 3 mm x 1 mm, narrow-ovate, reddish-brown. Pollinia ca 3 mm x 1.2 mm, narrow-ovate, white; viscidium ca 0.5 mm long. Stigma 2 mm x 1.5 mm, ovoid, sunken.

Selected Collections: Western Australia: ca 1.5 km south of Moora, A. P. Brown 615, 29 July 1987 (CBG); Korrelocking, 11 km east of Wyalkatchem, Wayne Merritt, 28 August 1988 (CBG).

Distribution and Habitat: Endemic to south-western Western Australia where known from limited areas to the north of Perth (Wir). It grows in low heath with taller emergent shrubs, in boggy, clay soils.

Flowering Period: July to August.

Notes: *D. recurva* is related to *D. corymbosa* but flowers earlier and has much smaller flowers with very curved lateral sepals which cross below the labellum and are often recurved beneath the mid-lobe. Additionally the petal laminae and dorsal sepal are often recurved and the labellum is much smaller

with narrow lateral lobes and a very prominent central ridge which extends nearly to apex of the mid-lobe. This ridge is somewhat fleshy on the ventral surface. Illustrated in the top right hand plate, page 52 in Hopper et al. (1990).

Conservation Status: Uncommon to rare and not conserved; suggest 2R according to Briggs and Leigh (1988).

Etymology: From the Latin '*recurvus*', recurved, curved backwards; in reference to the recurved lateral sepals and petals.

GASTRODIA R. Br.

Gastrodia R. Br. is a small genus of saprophytic orchids distributed in tropical, subtropical and temperate regions. Until now, two species have been recorded from Australia (Clements 1989). One of these, *G. sesamoides* R. Br., although treated as a widespread single unit by flora writers (Willis 1962, Jessop & Toelken 1986, Rye 1987, Ross & Jones 1989) consists of a group of taxa which can be discerned by subtle yet recurrent differences in floral morphology, growth habit and habitat preference. Four new species from that complex and a further new species related to *G. elata* Blume, are described here.

New Species

Gastrodia crebriflora D. Jones; species nova
affinis *G. sesamoidi* R. Br. a qua perrobustiore,
floribus confertis vix aperientibus, et labello
angustiore obscure trilobato callo laminae per-
latiore differt.

Typus: Queensland; Blackdown Tableland,
23°43'S, 149°06'E, 5 October 1988,
E. Pederson s.n., (D. L. Jones 2934), (holo
CBG, iso CBG, BRI).

Glabrous, perennial, terrestrial, saprophytic herb. Rhizome 6–12 cm x 16–28 mm, irregularly swollen, fleshy, brown, covered with numerous papery scales. Inflorescence 50–110 cm tall, thick, fleshy, pale brown, shiny. Sterile bracts seven to nine, 6–10 mm x 8–10 mm, oblong to ovate, closely sheathing, lower ones encircling the scape. Fertile bracts 3–5 mm x 1–3 mm, linear-ovate, subacute, dark brown, closely sheathing. Pedicels 6–10 mm long, moderately slender, recurved. Flowers fifteen to thirty-five, 12–13 mm x ca 6.5 mm, tubular, nodding, white, sometimes brownish towards the base, white within the perianth, verrucose near base. Ovary 4–4.5 mm x 3.5 mm, linear-ovoid to ovoid, strongly verrucose. Dorsal sepal 12–13 mm x ca 7 mm, united with the lateral sepals for all but the distal 2 mm, distal margins incurved, dorsal surface somewhat verrucose. Lateral sepals 12–13 mm x ca 9 mm, distal 4 mm free, hardly divergent, outer surface near apex strongly verrucose. Petals ca 4 mm x 3 mm, transversely obovate, attached laterally near the apex of the dorsal sepal, white, margins entire to slightly irregular.

Labellum 11–12 mm x ca 3.5 mm, linear in proximal half with a shallow constriction near the middle and the apex then suddenly expanded into the main lamina which is very obscurely three-lobed; lateral lobes ca 2 mm x 1.8 mm, margins strongly convoluted; mid-lobe ca 3 mm x 3 mm, more or less ovate, lateral margins sinuate to convolute, distal margin thickened, slightly irregular. Lamina callus consisting of three raised yellow ridges in the proximal third, developing into a raised plate with irregularly thickened margins on the lateral lobes, coalescing into a single, thick, irregular central ridge along the mid-lobe to the apex; pseudopollen coarse, dark yellow, profuse on either side of callus on mid-lobe. Column 9–10 mm x ca 3 mm, linear to linear-obovate, slightly recurved from the end of the ovary, pale brown, smooth; column wings ca 0.5 mm long, broadly obtuse, projecting just above the base of the anther cap. Anther cap ca 1.8 mm long, smooth, with a short rostrum. Pollinia ca 1.6 mm long, pale yellow, granular, quickly losing cohesion. Rostellum ca 2 mm across, obliquely deflexed, prominent. Stigma ca 1.5 mm x 1.5 mm, elliptical, sunken. Capsule 11–13 x 6–7 mm, ovoid, light brown with whitish spots, held stiffly erect.

Distribution and Habitat: At present this species is known only from the Blackdown Tableland in central-eastern Queensland (Qle). It grows in loose colonies on protected slopes in tall open forest, often close to fallen trees; soils are sands derived from decomposed sandstone.

Flowering Period: September and October.

Notes: *G. crebriflora* bears a superficial resemblance to *G. sesamoides* but it is an extremely robust species which has numerous, white flowers crowded in the raceme. These flowers are self-pollinating and last only one or two days before closing. Capsule development is very rapid and dehiscence occurs within two weeks of flowering. The labellum of *G. crebriflora* is of a similar shape to that of *G. sesamoides* but is generally narrower with much thicker basal margins, more strongly convoluted lateral margins and a much broader lamina callus. It is a poorly collected species which is probably missed by collectors because of its rapid growth cycle. Illustrated on page 196 of Pearson (1989).

Conservation Status: Suggest 2K according to Briggs and Leigh (1988).

Etymology: From the Latin 'creber' close, crowded together, *flos* flower; in reference to the numerous, crowded flowers.

Gastrodia entomogama D. Jones; species nova *G. sesamoidi* R. Br. affinis, sed habitu robustiore, rhizomate majore, floribus majoribus multioribus latiore aperientibus, et labello multo latiore lobis lateralibus prominentioribus, differt.

Typus: Australian Capital Territory; Mt. Franklin, 35°29'S, 148°47'E, 22 January 1990, D. L. Jones 5625 & T. D. Jones (holo CBG, iso CBG).

Glabrous, terrestrial saprophytic herb. Rhizome 8–20 cm x 2–4 cm, irregularly terete, swollen, fleshy, brown, covered with numerous closely sheathing, papery scales. Inflorescence 25–90 cm tall, thick, fleshy, brittle, dark brown to blackish. Sterile bracts six to eight, 6–15 mm x 8–12 mm, oblong-ovate, closely sheathing, lower ones encircling the base of the scape. Fertile bracts 4–8 mm x 2–4 mm, linear-ovate to ovate, subacute, closely sheathing to spreading. Pedicels 7–11 mm long, slender, recurved. Flowers five to more than fifty, 15–20 mm x 10–12 mm, tubular, semi-pendant, light to dark brown with white tips, crystalline white within the perianth, opening widely, with a strong spicy fragrance. Ovary 5–7 mm x ca 4 mm, linear-ovoid, irregularly verrucose. Dorsal sepal 15–20 mm x ca 8 mm, united with the lateral sepals for all but the distal 5 mm, distal margins incurved, irregularly crenulate, outer surface irregularly verrucose. Lateral sepals 15–20 mm x ca 10 mm, distal 5 mm free and widely divergent, outer surface irregularly verrucose. Petals ca 4.5 mm x 4 mm, oblong-orbicular to transversely obovate, attached laterally near the apex of the dorsal sepal, crystalline white, margins irregularly crisped to crenate. Labellum 15–17 mm x 6.5–8 mm, broadly ovate, with thickened orange margins in the proximal 4 mm where attached to the sinus of the lateral sepals, then contracted before expanding into the main lamina which is prominently three-lobed; lateral lobes ca 8 mm x 3 mm, white, lateral margins incurved and irregularly crenate, distal margins with

two or three lacerations; mid-lobe ca 6 mm x 4 mm, more or less oblong, orange, lateral margins incurved or thickened, irregularly crisped to sinuate, distal margin thickened, irregularly lobed. Lamina callus consisting of two yellow to orange ridges which extend from the base of the lamina to the base of the mid-lobe where they thicken and become dark orange before coalescing and becoming a series of irregularly thickened ridges which extend along the central part of the mid-lobe nearly to the apex; pseudopollen coarse, dark yellow, profuse all over the callus on mid-lobe. Column 13–15 mm x 4–4.5 mm, linear to linear-elliptical, slightly recurved from the end of the ovary, white or pale brown, anterior and dorsal surfaces in proximal half transversely wrinkled, smooth in distal half; column wings ca 2 mm long, linear-deltate, not exceeding the anther cap. Anther cap ca 3 mm long, smooth, with a prominent rostrum. Pollinia ca 2 mm long, dark orange, granular. Stigma ca 2.5 mm x 2.5 mm, ovate, sunken. Capsule 25–30 mm x 9–11 mm, ovoid to ellipsoid, erect, dark brown, irregularly verrucose.

Selected Collections: (all CBG); New South Wales; Mt. Tomah, 6 December 1970, B. Whitehead s.n.; 13 km west of Kiandra, 10 January 1981, M. A. Clements 2429; Victoria; Upper Ferntree Gully, 20 November 1965, D. L. Jones s.n.; Mt. Donna Buang, 20 December 1959, I. G. Matthias s.n.; Tasmania; near Scamander, 7 December 1977, M. E. Phillips 1156.

Distribution and Habitat: Widely distributed from the Central Tablelands of New South Wales through Victoria to Tasmania. (Vct, Nst, ACT, Veh, Vwh, Vgi, Vwp, Tas). This species mainly grows in mountainous areas in such habitats as snow gum communities, tall open forest and along the margins of wet sclerophyll forest; soils are mainly well-structured loams and krasnozems. Flowering is stimulated by summer fires but the species can also flower in their absence.

Flowering Period: October to January.

Notes: *G. entomogama* has been confused with *G. sesamoides* but is much more robust than that species with much larger rhizomes, taller, thicker inflorescences which support many more flowers; the flowers themselves are larger, open more widely and with a much stronger fragrance; the labellum is larger with well developed lateral lobes and a much more prominent callus which produces copious quantities of dark yellow to orange pseudopollen. *G. entomogama* is insect-pollinated (Jones 1985), whereas *G. sesamoides* is automogamous. Plants of an Australian *Gastrodia* naturalised in South Africa appear to be of this species rather than *G. sesamoides*. Illustrated by plate 350 in Nicholls (1969) and also plate 437 in Cochrane et al (1968).

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Creek 'entomon', insect; 'gamos', marriage, union; in reference to the flowers being insect-pollinated.

Gastrodia lacista D. Jones; species nova affinis

G. sesamoidi R. Br. a qua petalis minoribus, et labello base latiore lobis lateralibus margine breviter laceratis et callo cristis crassioribus et columna breviori multum angustiore differt.

Typus: Western Australia; near Albany, 35°01'S, 117°52'E, 23 November 1989, R. Heberle s.n. (D. L. Jones 5404), (holo CBG, iso CBG, PERTH, AD, MEL).

Glabrous, terrestrial, saprophytic herb. Rhizome 4–8 cm x 10–18 cm, irregularly terete, fleshy, brownish, with scattered, closely sheathing scales. Inflorescence 25–65 cm tall, slender, fleshy, brittle, brown, shiny. Sterile bracts six to eight, 4–10 mm x 6–10 mm, oblong-ovate, closely sheathing, lower ones encircling the scape. Fertile bracts 3–6 mm x 2–3 mm, linear-ovate to ovate, subacute, closely sheathing. Pedicels 3–5 mm long, slender, recurved. Flowers five to twenty-five, 10–12 mm x ca 6 mm, tubular, nodding, dark brown with white tips, crystalline white within the perianth. Ovary 4.5–5.5 mm x 2 mm, linear-ovoid, smooth or verrucose. Dorsal sepal 10–12 mm x ca 6 mm, united with the lateral sepals for all but the distal 4 mm, distal margins incurved. Lateral sepals 10–12 mm x ca 8 mm, distal 4 mm free, widely divergent, dorsal surface near apex sparsely verrucose. Petals ca 2.5 mm x 3 mm, transversely obovate, attached laterally near the apex of the dorsal sepal, crystalline white, margins irregularly crenate. Labellum 9–10 mm x ca 5 mm, obovate-rectangular and attached to sinus of lateral sepals in proximal 3 mm, then contracted before expanding into the main lamina which is obscurely three-lobed; lateral lobes ca 2 mm x 2 mm, lateral margins shortly and irregularly lacerated; mid-lobe ca 3 mm x 3 mm, more or less rectangular, white, lateral margins sinuate to crisped, distal margin thickened, entire. Lamina callus consisting of three yellow ridges which extend from the base of the lamina to the middle of the mid-lobe where they coalesce into a single, thick, irregular ridge, the ridges on the lateral lobes very thick and irregular; pseudopollen coarse, dark yellow, profuse on either side of callus on mid-lobe. Column 9–10 mm x ca 2.5 mm, linear, slightly recurved from the end of the ovary, pale brown, smooth; column wings ca 1 mm long, deltate, obtuse, projecting just above the base of the anther cap. Anther cap ca 1.5 mm long, smooth, with a very short rostrum. Pollinia ca 1.5 mm long, pale yellow, granular, quickly losing cohesion. Rostellum ca 1 mm across, deflexed, prominent. Stigma ca 1 mm x 1 mm, nearly circular, sunken. Capsule not seen.

Selected Collections: (all Western Australia): Yarrowee near Jamadup, 21 December 1921, I. Knox-Peden s.n. (AD); Landers Camp, December 1917, Dr Pulleine s.n. (AD); bed of Margaret River, 21 December 1982, R. Bates 2879 (AD); swamp near Pemberton, 22 December 1982, R. Bates 2903 (AD).

Distribution and Habitat: Widespread in south-western Western Australia (Wda) from south-west of Bunbury to east of Albany. This species commonly

grows in accumulations of leaf litter in jarrah forest and under casuarinas, usually forming loose colonies. Soils are white or grey sands or sandy loams.

Flowering Period: November to January.

Notes: Because of general similarities between growth habit and flowers, *G. lacista* has been assumed to be *G. sesamoides*, but the two can be distinguished by details of the labellum. That of *G. lacista* is much wider in the basal quarter, has shortly lacerated margins on the lateral lobes, an oblong-rectangular mid-lobe and much thicker callus ridges. Its flowers also have much smaller petals than those of *G. sesamoides* and a narrower, shorter column. The two species are separated by a distance of more than 5000 km. Illustrated on page 326 of Hoffman and Brown (1984).

Conservation Status: Widespread and conserved in National Parks.

Etymology: From the Greek '*lacisma*', tattered, torn; in reference to the shortly lacerated labellum margins.

Gastrodia urceolata D. Jones; species nova

affinis *G. elatae* Blume a qua rhizomate per minoribus exilioribus, bracteis fertilibus per minoribus ovatis, floribus minoribus, et labello lamina perlatiore differt.

Typus: Queensland; State Forest Reserve 194, Moomin, near Atherton, 17°22'S, 145°25'E, 1025 m., 20 November 1988, L. Lawler 20 (holo CBG, iso CBG, BRI).

Glabrous, terrestrial, saprophytic herb. Rhizome 6–10 cm x 8–12 mm, irregularly oblong, swollen, fleshy, brown. Inflorescence 20–80 cm tall, moderately thick, brittle, pale brown, somewhat shiny. Sterile bracts five or six, 3–5 mm x 8–9 mm, oblong, closely sheathing or encircling the scape. Fertile bracts 2–5 mm x 2–3 mm, ovate-deltate, dark brown, somewhat rugose, subacute, closely sheathing. Pedicels 2–4 mm long, slender, obliquely erect, yellowish-brown. Flowers ten to more than thirty, 12–14 mm x ca 8 mm, tubular, saccate, white, held obliquely erect, segments verrucose near apex. Ovary ca 5 mm x 3 mm, linear-ovoid, ribbed, sparsely verrucose. Dorsal sepal 12–14 mm x ca 6 mm, united with the lateral sepals for all but the distal 2 mm, distal margins incurved, dorsal surface near apex sparsely verrucose. Lateral sepals 12–14 mm x ca 5 mm, distal 2 mm free, divergent, outer surface near apex strongly verrucose. Petals ca 5 mm x 2.3 mm, linear-oblong, attached laterally near the apex of the dorsal sepal and held obliquely erect like ears, white, margins folded inwards, minutely verrucose. Labellum 12.5–13.5 mm x ca 8 mm, linear in proximal quarter, then expanded into lateral lobes then constricted before expanding into the main lamina; lateral lobes ca 1.5 mm across, broadly deltate, obtuse, lateral margins strongly verrucose; mid-lobe ca 8 mm x 8 mm, broadly ovate, lateral margins folded and somewhat crisped, apex broadly obtuse to truncate, finely convolute to crisped, five longitudinal veins running the length of

the lamina, surface covered with appressed papillae. Lamina callus consisting of two, raised, papillate, parallel ridges extending onto the base of the mid-lobe, pseudopollen apparently absent. Column 9.5–11 mm x ca 4 mm, linear-elliptical to linear-rhomboid, pale brown, erect, curved forwards near the apex, surface sparsely wrinkled; column wings ca 0.3 mm long, tooth-like, projecting just above the base of the anther cap. Anther cap ca 1.6 mm long, smooth, with a vestigial rostrum. Pollinia ca 1.5 mm long, yellow, coarsely granular. Rostellum ca 1 mm across, porrect, not prominent. Stigma ca 1 mm x 1 mm, elliptical, sunken. Capsule ca 6 mm x 6 mm, urceolate, brown, sparsely verrucose, held erect.

Distribution and Habitat: This species is known only from a single locality on the Atherton Tableland in north-eastern Queensland (Qco). It grows in a mixed open forest of eucalypts and casuarinas in flat areas towards the top of ridges. The soil is a grey gravelly loam but the plants are always found close to rotting logs.

Flowering Period: November and December.

Notes: With its upright saccate white flowers, *G. urceolata* is quite distinct from any other Australian species but it bears some resemblance to *G. elata* from Japan and China. It is much less robust than that species with smaller rhizomes, much smaller fertile bracts which are ovate to deltate in shape and larger, white flowers with a larger and much broader labellum. The flowers of *G. urceolata* release a faint, spicy perfume in warm weather.

Conservation Status: Poorly known and not conserved; suggest 2K according to Briggs & Leigh (1988).

Etymology: From the Latin '*urceolatus*', vase- or urn-shaped; in reference to the shape of the capsule.

Gastrodia vescula D. Jones; species nova affinis *G. sesamoidi* R. Br. a qua minore debiliore, floribus 1–3, petalis minoribus, labello minore angustiore medilobo oblongo et operculo antherae tenuiore verrucoso differt.

Typus: South Australia; Honans Scrub Flora Reserve, 37°37'S, 140°10'E, 20 November 1988, R. Bates 16113 (holo AD, iso CBG).

Glabrous, terrestrial, saprophytic herb. Rhizome 2–4 cm x 4–6 mm, irregularly terete, fleshy, brownish, with scattered, closely sheathing scales. Inflorescence 5–20 cm tall, very slender, fleshy, brittle, light brown, shiny. Sterile bracts four to six, 3–7 mm x 4–7 mm, oblong-ovate, closely sheathing, encircling the scape. Fertile bracts 4–6 mm x 4–6 mm, broadly deltate to trapéziform, margins somewhat irregular, closely sheathing. Pedicels 2–6 mm long, very slender, straight or recurved. Flowers one to three, 10–12 mm x ca 5.5 mm, tubular, porrect or more usually nodding, light

brown, shiny, perianth tips white, white within the perianth. Ovary ca 3.5–4 mm x 2 mm, obovoid, verrucose. Dorsal sepal 10–11 mm x ca 4 mm, united with the lateral sepals for all but the distal 2 mm, dorsal surface near apex somewhat irregular. Lateral sepals 10–11 mm x ca 6 mm, distal 2 mm free, hardly divergent, dorsal surface near apex sparsely verrucose. Petals ca 3 mm x 1.8 mm, obovate-elliptical, attached laterally near the apex of the dorsal sepal, translucent white, distal margins thickened, irregular, white. Labellum 10–11 mm x ca 3 mm, linear and attached to sinus of lateral sepals in proximal 4 mm then expanding into two obliquely erect, obtuse lobes ca 1 mm across before contracting into the main lamina which is distinctly three-lobed; lateral lobes ca 2 mm x 1.5 mm, more or less rectangular, lateral margins irregularly crenulate; mid-lobe ca 4 mm x 2 mm, more or less oblong-rectangular, white, lateral margins finely crenulate, distal margin thickened, irregularly crenulate. Lamina callus consisting of three yellow ridges which extend from the base of the lamina to the base of the mid-lobe where they coalesce into a single, somewhat sinuate ridge; pseudopollen extremely fine, pale yellow, scattered on either side of callus ridge on mid-lobe. Column 8–9 mm x ca 2.5 mm, linear, erect, projecting from the end of the ovary, pale brown, conspicuously wrinkled; column wings ca 1 mm long, deltate, projecting above the base of the anther cap. Anther cap ca 2 mm long, verrucose, with a beaked rostrum. Pollinia ca 2 mm long, pale yellow, granular, quickly losing cohesion. Rostellum ca 1.3 mm across, not prominent. Stigma ca 1 mm x 1 mm, nearly circular, sunk. Capsule not seen.

Distribution and Habitat: At present this species is known only from south-eastern South Australia but it may also occur in similar habitats in south-western Victoria (Sse, ?Vwh). It grows in leaf litter on damp sand in open forest which has a dense understory of *Leptospermum* sp.

Flowering Period: November and December.

Notes: *G. vescula* bears superficial similarities to *G. sesamoides* but it can be easily recognised by its short, weak stems which have only one to three flowers in the raceme. The flowers themselves have much smaller petals and a narrower labellum, the mid-lobe of which is nearly rectangular. It also has a very narrow column which is prominently wrinkled and with a verrucose anther cap. In general appearance the new species resembles *G. minor* Petrie, from New Zealand, but that species has a very short column.

Conservation Status: Uncommon but probably overlooked due to its cryptic nature; suggest 2RC according to Briggs & Leigh (1988).

Etymology: From the Latin '*vesculus*', little, weak, thin, all of which describe the habit of this species.

GENOPLESIMUM R. Br.

Genoplesium R. Br. was recently reinterpreted and more carefully circumscribed as a genus distinct from *Prasophyllum* R. Br. (Jones and Clements 1989) and in that paper all relevant combinations for accepted, previously described taxa were made. Fifteen new species are described here.

New Species

Genoplesium alticolum D. Jones et B. Gray;
species nova affinis *G. woollsii* (F. Muell.)
D. Jones et M. Clements a qua labello late
ovatoribicirculari textura tenuiore et lamina
callo integro vel emarginato differt.
Typus: Queensland; Cook District; State
Forest Reserve 185, Parish of Danbulla,
Platypus Logging Area, 17°09'S, 145°33'E,
720 m, 18 December 1988, B. Gray 4956 (holo
QRS, iso QRS).

Terrestrial tuberous herb. Leaf 15–25 cm x ca 2 mm, terete, green, reddish at the base; lamina 15–22 mm x 2.5–3 mm, subulate, closely sheathing the scape, ending 2–3 cm below first flower. Inflorescence 18–25 cm tall, bearing 10–25 flowers in an uncrowded spike 2–4 cm long. Flowers ca 5 mm across, dark purplish-red with some green markings, semi-deflexed. Ovary ca 2.5 mm long, linear, slightly curved. Dorsal sepal 4.5–5 mm x ca 4 mm, ovate, concave, cucullate, acuminate, dark reddish-purple with darker marginal bands and three central stripes, the margins beset with short dark cilia. Lateral sepals ca 5 mm x 1.5 mm, linear-lanceolate, gibbous at base, dark purplish-red, spreading nearly horizontally or obliquely erect, widely divergent, distally involute, subacute, apex sometimes with a vestigial gland. Petals ca 3 mm x 1.3 mm, broadly ovate, acuminate, widely spreading, dark purplish-red with darker marginal bands and three central stripes, margins densely beset with short, spreading cilia. Labellum ca 2.8 mm x 1.5 mm, broadly obovate-elliptical, dark purplish-black, fleshy, not recurved, margins densely beset with coarse, short, spreading, more or less glandular cilia; callus occupying about half the area of the ventral surface of the lamina, extending three-quarters to the labellum apex, dark purplish-red, thickest and broadest just above the base then tapered to the apex, apex apiculate, densely covered with sileaceous, ellipsoidal colluviae, those near the apex almost cilia. Column ca 2 mm long, reddish purple; foot ca 0.6 mm long, ligulate, slightly curved. Column wings notched for three-quarters of way to the base, the lobes not divergent; posterior lobe linear-oblong, obtuse, pale, entire; anterior lobe lanceolate, acuminate, curved, conspicuously denticulate to ciliate. Anther ca 0.8 mm long, with a filiform rostrum ca 0.3 mm long. Stigma ca 0.6 mm x 0.6 mm, ovate-elliptical. Pollinarium ca 0.9 mm long; pollinia ca 0.75 mm long, yellow, coarsely granular; caudicle ca 0.1 mm long; viscidium 0.2 mm across. Capsule ca 3.5 mm x 2 mm, obovoid.

Distribution and Habitat: At present known only from Walsh's Pyramid and the higher peaks of the Herberton Range, north-eastern Queensland. Altitudinal range 600–750 m. (Qco). It occurs in sparse or stunted open forest, often on ridge tops growing in shallow, clay loam but also in sandy soils among granite sheets. This species frequently grows within grass tussocks or among low herbs and shrubs.

Flowering Period: December to February.

Notes: *G. alticolum* bears superficial similarities to *G. woollsii* but is morphologically distinct and can be distinguished by its relatively broad, ovate-orbicular labellum with its prominently raised, colluviate callus. The callus is often emarginate and the cells on the distal extremity are elongated, nearly extending as cilia. The labellum is also much less fleshy than that of *G. woollsii*. The two species are separated geographically by a distance of approximately 1800 km.

Conservation Status: Rare and conserved; suggest 2RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*altum*', a height, '*-cola*', dweller; in reference to the occurrence of this species on the higher ranges on and adjacent to the Atherton Tableland.

Genoplesium arrectum D. Jones; species nova affinis *G. archeri* (J. D. Hook.) D. Jones et M. Clements a qua floribus confertis fuscatis, sepalis lateralibus rigide erectis parallelis remanentibus vel plus minusve divergentibus non gibbosis, et columna alis anticis dense denticulatis differt.

Typus: Victoria; Knocker track, Omeo, 37°06'S, 147°36'E, 29 November 1989, P. Branwhite s.n. (D. L. Jones 5433) (holo CBG, iso CBG, NSW, MEL).

Terrestrial tuberous herb. Leaf 10–18 cm x 1.5–2 mm, terete, reddish at base; lamina 10–15 mm x 2.5–3 mm, subulate, sheathing the scape, ending 10–15 mm below the first flower. Inflorescence 13–21 cm tall, bearing 3–20 flowers in a densely crowded spike 2–3.5 cm long. Flowers ca 3 mm across, dark purple, semi-erect with stiffly erect lateral sepals. Ovary 3–3.5 mm long, linear-ovoid, curved. Dorsal sepal ca 4 mm x 2.5 mm, broadly ovate, cucullate, glabrous, purplish-mauve, margins with a darker, narrow band, three similar longitudinal bands also present. Lateral sepals ca 5 mm x 1.2 mm, linear-lanceolate, dark purplish-black, not gibbous,

held stiffly erect, parallel or slightly divergent, distal margins incurved, eglandular. Petals ca 3.5 mm x 1.2 mm, narrow-ovate, acuminate, projecting forwards, light purple with darker stripes and marginal bands, glabrous. Labellum ca 3 mm x 1.8 mm, broadly elliptical to ovate-elliptical, dark reddish purple, subacute to shortly apiculate, thick and fleshy, margins beset with numerous, coarse, spreading dark purple cilia ca 0.8 mm long; callus occupying about one third of the ventral surface area of the lamina, extending three-quarters to the labellum apex, dark purplish black, thickest and broadest above the base then tapered. Column ca 1.8 mm long, erect; foot ca 0.4 mm long, ligulate, curved. Column wings very shallowly notched, the lobes hardly divergent; posterior lobe linear-oblong, pale, entire, obtuse; anterior lobe ovate-lanceolate, acuminate, pinkish-mauve, coarsely denticulate-ciliate. Anther ca 0.9 mm long, with a filiform rostrum ca 0.3 mm long. Stigma ca 0.8 mm x 0.6 mm, ovate-elliptical. Pollinarium ca 1 mm long; pollinia ca 0.8 mm long, yellow, coarsely granular; caudicle ca 0.15 mm long; viscidium ca 0.15 mm across, Capsule not seen.

Distribution and Habitat: North-eastern Victoria at an altitudinal range of ca 900–1200 m. (Veh). It grows in subalpine and montane grasslands among sparse low shrubs in shallow stony soil.

Flowering Period: November to March.

Notes: *G. arrectum* is closely related to *G. archeri*. It can be distinguished from that taxon by its non-gibbous, stiffly erect lateral sepals which remain parallel or diverge slightly and its very densely denticulate/ciliate anterior column wings. Dried specimens can be readily identified by the dark colouration of the flowers and the noticeably erect lateral sepals. It also has affinities with *G. morinum* D. Jones but that species has larger flowers in which the lateral sepals are porrect or deflexed.

Conservation Status: Poorly known and not conserved; suggest 3K by criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*arrectus*', erect; in reference to the stiffly erect lateral sepals.

Genoplesium citriodorum D. Jones et M. Clements; species nova affinis *G. morisii* (Nicholls) D. Jones et M. Clements a qua altiore, floribus minoribus valde citriodoris, et labello brevior non spatulato differt.

Typus: New South Wales; Blue Mountains, Woodford, beside railway line, 33°44'S, 150°29'E, 7 February 1988, D.L. Jones 2508, M. A. Clements & R. G. Tunstall (holo CBG, iso CBG, NSW, MEL, AD).

Terrestrial tuberous herb. Leaf 20–30 cm x 2–2.5 mm, terete; lamina 15–20 mm x ca 3 mm, subulate, sheathing the scape, ending 3–5 cm below the first flower. Inflorescence 30–40 cm tall, bearing 20–33 flowers in a fairly crowded spike 4–5.5 cm long. Flowers ca 5 mm across, dark purplish black, facing downwards. Ovary ca 3.5 mm long, linear, curved. Dorsal sepal ca

5 mm x 2 mm, narrow-ovate, cucullate, with an apiculus ca 0.1 mm long, sparsely ciliate, the cilia ca 0.1 mm long, with three prominent red longitudinal stripes and with prominent red marginal bands. Lateral sepals ca 5.5 mm x 1.3 mm, linear-lanceolate, gibbous at the base, obliquely deflexed, widely divergent, distal margins incurved. Petals ca 3.5 mm x 1.2 mm, narrow ovate, long-acuminate, divergent, with dark red longitudinal stripes and marginal bands, margins sparsely ciliate. Labellum ca 4 mm x 1.5 mm, linear-obovate, purple, narrowed in proximal quarter, acuminate, the margins beset with numerous, coarse, spreading purplish cilia ca 1 mm long; callus occupying about one third of the ventral surface area of the lamina, extending two-thirds to the apex, colluviate, dark reddish-purple, broadest and thickest near the base then tapered and ca 0.6 mm wide. Column ca 2 mm long, erect; foot ca 0.5 mm long, ligulate, curved. Column wings notched ca half way to base, the lobes not widely divergent; posterior lobe linear-ovate, clear, entire, obtuse or nearly truncate; anterior lobe ovate-lanceolate, long-acuminate, the margins denticulate or shortly ciliate. Anther ca 1.2 mm long, with a filiform rostrum. Stigma ca 0.5 mm x 0.5 mm, ovate. Pollinarium ca 1 mm long; pollinia ca 0.8 mm long, yellow, granular; caudicle ca 0.1 mm long; viscidium ca 0.1 mm across. Capsule not seen.

Selected Collections: all New South Wales; Woodford, 24 January 1989, D. L. Jones 3472 and G. Savage (CBG); Woodford, 18 February 1990, D. L. Jones 5685 and B. E. Jones (CBG).

Distribution and Habitat: Known only from the Blue Mountains in New south Wales but there fairly widespread (Ncc). Plants are usually found growing under shrubs in shallow sandy soil over large, flat sandstone slabs and boulders; less commonly among rushes and sedges in wet seepage areas.

Flowering Period: December to April.

Notes: *G. citriodorum* is similar in general appearance to *G. morisii* and *G. simulans*, but is much taller with smaller, more numerous flowers in a longer raceme and a shorter, non-spathulate labellum with a blackish callus. The flowers also have a strong lemon perfume which is very noticeable on warm days. Neither *G. morisii* nor *G. simulans* has such a strong scent, nor do they smell of lemon. This species is relatively common in some localities and flowers freely without the intervention of fires. On some disturbed sites (for example Woodford), where *G. citriodorum* and *G. simulans* grow sympatrically, natural hybrids between the two are not uncommon.

Conservation Status: Not known to be conserved but probably found in the Blue Mountains National Park; suggest status of 2R according to Briggs and Leigh (1988).

Etymology: From the Latin '*citriodorus*', lemon scented; in reference to the strong lemon perfume of the flowers.

Genoplesium confertum D. Jones; species nova affinis *G. psammophilo* D. Jones a qua floribus confertis et rubris viridisque, et labello obovato crassiore differt.

Typus: Queensland; Wide Bay; ca 1 km east of Webers Plains on Gympie-Rainbow Beach Rd, 26°01'S, 153°03'E, 8 April 1987, D. L. Jones 2589 & P. D. Jones (holo CBG, iso CBG, BRI).

Terrestrial tuberous herb. Leaf 10–16 cm x ca 1 mm, terete, green, somewhat pinkish towards base; lamina 11–13 mm x ca 1.4 mm, subulate, closely sheathing the scape, ending 1–2 mm below the first flower. Inflorescence 12–22 cm tall, bearing 10–60 flowers in a densely crowded spike 1.5–3.5 cm long. Flowers ca 3 mm across, reddish becoming green towards the apex of the sepals, facing downwards. Fertile bracts ca 3 mm x 1.5 mm, ovate, margins more or less denticulate. Ovary ca 3 mm long, linear, curved. Dorsal sepal ca 3 mm x 2.2 mm, broadly ovate, cucullate, obtuse to apiculate, entire, pinkish-red. Lateral sepals ca 4 mm x 1.4 mm, linear-lanceolate, gibbous at the base, obliquely decurved, divergent, subacute, with a vestigial, whitish, elongated, apical gland. Petals ca 2.2 mm x 1 mm, ovate-lanceolate, blackish-red, entire, obtuse, with a prominent whitish, teardrop-shaped terminal gland. Labellum 2–2.2 mm x ca 1.2 mm, obovate, dark red, thick and fleshy, acute to apiculate, margins in the anterior half denticulate; callus occupying about two-thirds of the ventral surface area of the lamina, extending nearly to the apex, entire, blackish, thick, fleshy, colluviate, grooved centrally, ca 0.6 mm wide at the base. Column ca 2 mm long, erect; foot ca 0.5 mm x 0.5 mm, projected forwards, blackish. Column wings shallowly notched, the lobes hardly divergent, purplish-black; posterior lobe more or less oblong, falcate, obtuse, margins denticulate; anterior lobe triangular, often nearly vestigial, acute, margins denticulate. Anther ca 1.2 mm long, obtuse, with a filiform rostrum ca 0.3 mm long. Stigma ca 0.5 mm x 0.5 mm, orbicular, sunken. Pollinarium ca 1 mm long; pollinia ca 0.8 mm long, yellow, granular; caudicle ca 0.1 mm long, ligulate; viscidium ca 0.15 mm across. Capsule not seen.

Distribution and Habitat: Endemic to south-eastern Queensland where distributed in coastal districts (Qwb, Qmo). It is found among low shrubs in heathland on stabilised dunes, growing in white sand.

Flowering Period: February to May.

Notes: *G. confertum* is related to *G. psammophilum* D. Jones but is distinguished by its densely crowded flowers which are red and green in colour (uncrowded and wholly red to red-brown in *G. psammophilum*). In addition its labellum is obovate (elliptical in *G. psammophilum*) and much thicker. *G. confertum* has been previously misidentified in Queensland as *Prasophyllum trifidum* Rupp (Hunt 1948), which recently has been treated as a taxonomic synonym of *G. rufum* (R. Br.) D. Jones & Clements (Jones & Clements 1989).

Conservation Status: Moderately widespread and conserved in Coolool National Park.

Etymology: From the Latin '*confertus*', crowded; in reference to the densely crowded flowers.

Genoplesium morinum D. Jones; species nova affinis *G. archeri* (J. D. Hook.) D. Jones et M. Clements affinis, sed floribus majoribus dense confertis, sepalis lateralibus oblique deflexis, petalis latioribus carnosioris marginibus ciliatis et labello angustiore elliptico, differt.

Typus: New South Wales; Kanangra Boyd National Park, 33°55'S, 150°07'E, January 1990, J. Riley s.n., (holo CBG, iso CBG, NSW, MEL).

Terrestrial, tuberous herb with leaf of previous year often extant at anthesis. Leaf 12–20 cm x 2–2.5 mm, moderately stout, terete, dark green or purplish, usually purplish at base; lamina 12–20 mm x ca 5 mm, subulate, sheathing scape or apex spreading, ending 5–12 mm below the first flower. Inflorescence 15–24 cm tall, bearing ten to twenty flowers in a densely crowded spike 2–3 cm long. Flowers 5–6 mm across, dark reddish purple, nodding, with obliquely deflexed lateral sepals. Ovary ca 4 mm long, linear, curved. Dorsal sepal ca 6 mm x 3 mm, ovate, cucullate, long-acuminate, entire, red with dark red marginal bands and three similar longitudinal stripes. Lateral sepals 6.5–7 mm x 1.5–1.8 mm, linear-lanceolate, not gibbous, obliquely deflexed, divergent, distally involute, apical gland abortive, linear. Petals ca 5.5 mm x 2 mm, broadly ovate, long-acuminate, moderately fleshy, divergent, dark reddish purple with darker marginal bands and three to five prominent central stripes, margins irregularly stepped to erose, beset with coarse, purple hairs ca 0.4 mm long. Labellum ca 4.3 mm x 2.2 mm, linear-elliptical, dark purplish red, acute to apiculate, the margins densely beset with coarse, spreading, purple hairs 0.8 mm long; callus thick and fleshy, occupying about half the central surface area of the lamina, colluviate, dark purplish black, broadest and thickest just above the base then tapered and extending nearly to the apex. Column ca 2.5 mm long, erect; foot ca 1.5 mm long, ligulate, strongly curved. Wings lobed ca one fifth to base, the lobes not widely divergent; posterior lobe linear-ovate, whitish, entire, obtuse to subacute; anterior lobe very broadly ovate-lanceolate, reddish, the margins strongly denticulate/ciliate. Anther ca 1.5 mm long, with a filiform rostrum ca 0.4 mm long. Stigma ca 0.8 mm x 0.6 mm, oblong-ovate. Pollinarium ca 1.4 mm long; pollinia ca 0.9 mm long, yellow, glandular; caudicle ca 0.3 mm long; viscidium ca 0.15 mm across. Capsule not seen.

Distribution and Habitat: Central New South Wales and northern Victoria (Nct, Veh). This species grows in montane forest usually among swards of *Poa* sp. under *Eucalyptus pauciflora*, less commonly in shallow soils

over rocks. Soils are usually well-structured, red-brown loams.

Flowering Period: November to January.

Notes: It is amazing that this distinctive species has been overlooked by previous workers. Although related to *G. archeri*, specimens can be immediately distinguished by their dense spikes of dark purple flowers in which the sepals remain deflexed, the broad, somewhat fleshy petals with their coarse marginal cilia and the relatively narrow, elliptical labellum. Nicholls (1969) has an illustration of this species (fig d, plate 159) and records that the cattlemen knew them as 'mulberries on sticks'. An interesting feature of the growth habit of this species is that the leaf from the previous year is often still present when the growth from the new tuberoid flowers.

Conservation Status: Rare but conserved; suggest 2RC according to Briggs and Leigh (1988).

Etymology: From the Latin '*morinus*', mulberry coloured; chosen to reflect both the flower colour and the shape of the inflorescence which resembles a mulberry.

Genoplesium pedersonii D. Jones; species nova affinis *G. rufo* (R. Br.) D. Jones et M. Clements a qua floribus minoribus autogamis, sepalis lateralibus proportione brevissimis et relative crassibus, et labello minore differt.

Typus: Queensland; Jump-up, Blackdown Tableland, 23°44'S, 149°07'E, 12 March 1989, E. Pederson s.n. (D. L. Jones 3810) (holo CBG; iso CBG, BRI).

Terrestrial tuberous herb. Leaf 8–16 cm x 1–1.8 mm, slender to almost filiform, terete, reddish at base; lamina 12–19 mm x 2–3.5 mm, subulate, sheathing scape at base, obliquely erect, ending 3–12 mm below the first flower. Inflorescence 10–25 cm tall, bearing 5–30 flowers in an elongated, uncrowded spike 2–6 cm long. Flowers ca 1.5 mm across, greenish-red to red with a dark purplish-red labellum, nodding, with spreading sepals, self-pollinating, the peduncle elongating in fruit. Fertile bracts ca 1.5 mm x 1.3 mm, obovate-oblong, apiculate. Ovary 1–1.5 mm long, linear-obovoid, curved. Dorsal sepal ca 1.5 mm x 1.5 mm, broadly ovate, concave, cucullate, glabrous, greenish with reddish margins. Lateral sepals ca 2.5 mm x 1 mm, lanceolate, prominently gibbous in proximal half, green to reddish, obliquely erect, widely divergent, distally involute, apical gland abortive. Petals ca 1.3 mm x 0.7 mm, ovate, apiculate, projected forwards, greenish with reddish margins, entire or irregularly serrulate. Labellum ca 1.6 mm x 1 mm, obovate, purplish-red, subacute, recurved in proximal half, thick and fleshy, margins irregular; callus occupying about two-thirds of the ventral surface area of the lamina, extending nearly to the apex, dark purplish-black, either thickest and broadest near the base then constricted or tapered from base to apex, Column ca 1.5 mm long, erect; foot ca 0.4 mm long, dark purple,

curved. Column wings deeply notched, the lobes divergent; posterior lobe lanceolate, acuminate-filiform, entire; anterior lobe oblong, truncate, purplish, entire. Anther ca 0.6 mm long with a filiform rostrum ca 0.15 mm long. Stigma ca 0.4 mm x 0.4 mm, orbicular. Pollinarium ca 0.8 mm long; pollinia ca 0.6 mm long, cream to pale yellow, coarsely granular, incoherent; caudicle ca 0.2 mm long; viscidium ca 0.2 mm across. Capsule 2.5–3 mm x 1.8–2 mm, ovoid-obovoid.

Distribution and Habitat: At present known only from the Blackdown Tableland in central Queensland (Qle). It occurs in seepage areas on sandstone ledges growing in coarse sandy soil with *Drosera* sp., sedges and mosses.

Flowering Period: December to April.

Notes: *G. pedersonii* has affinities with *G. rufum* and also bears similarities to *G. nudum* (J. D. Hook.) D. Jones & Clements. It can be distinguished from *G. rufum* by the much smaller, self-pollinating flowers the lateral sepals of which do not reflex upwards. Its flowers are of a similar size to those of *G. nudum* but from this species it differs by its obovate, nearly entire labellum which is thinner textured and with a different lamina callus.

Conservation Status: Apparently rare but conserved; suggest 2RC by criteria of Briggs & Leigh (1988).

Etymology: It gives me great pleasure to name this species after its discoverer, Mr Ted Pederson, a very keen observer who has made numerous significant orchid discoveries in central Queensland and has been of tremendous assistance to my botanical research.

Genoplesium psammophilum D. Jones; species nova affinis *G. sigmoideo* D. Jones a qua altiore, petalis apice glande abortivo, et labello margine minute sparsimque denticulato differt.

Typus: Queensland; Moreton District, ca 9 km north of Dunwich on road to Amity, 27°30'S, 153°24'E, 20 May 1987, D. L. Jones 2558 and B. E. Jones (holo CBG, iso CBG, BRI).

Terrestrial tuberous herb. Leaf 10–25 cm x ca 1 mm, slender, terete, green, pinkish or reddish towards the base; lamina 14–16 mm x ca 2 mm, subulate, closely sheathing the scape at the base, distal half spreading, ending 1–3 mm below the first flower or exceeding it. Inflorescence 12–30 cm tall, bearing 5–35 flowers in a crowded spike 1–3.5 cm long. Flowers ca 3 mm across, dark red or brownish-red, sometimes with a yellowish band on the lateral sepals, deflexed. Fertile bracts ca 2 mm x 1.2 mm, ovate-deltate, acute to acuminate, closely sheathing. Ovary ca 2 mm long, linear-obovate, smooth to sparsely verrucose. Dorsal sepal ca 2–2.6 mm x 1.5–2 mm, ovate, cucullate, acuminate to attenuate, rarely emarginate, dark red. Lateral sepals 3–3.5 mm x ca 1 mm, lanceolate to oblong-lanceolate, red, slightly gibbous at the base, obliquely decurved, widely divergent, distally involute, subacute, with a vestigial whitish terminal gland. Petals ca 2 mm x 1 mm, ovate

to ovate-lanceolate, projected forwards or recurved, red, acute, with a sigmoid, whitish, terminal gland, sometimes this gland vestigial. Labellum 2.2–2.5 mm x 1–1.3 mm, elliptical to obovate, light to dark red, thick and fleshy, distal margins irregular to denticulate, sub-acute to apiculate, apex sometimes recurved; callus occupying about half of the ventral surface area of the lamina, extending two-thirds to three-quarters to the apex, channelled at the base, reddish to reddish-black, thick, fleshy, ca 0.5 mm wide at the base. Column ca 2 mm long, erect; foot ca 0.5 mm x 0.3 mm, projected forwards, curved, dark red. Column wings lobed about one quarter to one half of the way to the base, the lobes hardly divergent, whitish; posterior lobe linear-deltate, obtuse, entire; anterior lobe lanceolate, acuminate, curved, sparsely denticulate. Anther ca 1 mm long, with a filiform rostrum ca 0.4 mm long. Stigma ca 0.5 mm x 0.5 mm, ovate-elliptical, sunken. Pollinarium ca 1 mm long; pollinia ca 0.8 mm long, yellow, coarsely granular; caudicle ca 0.1 mm long, ligulate; viscidium ca 0.15 mm across. Capsule ca 3 mm x 1.3 mm, ovoid.

Distribution and Habitat: Endemic to south-eastern Queensland (Qwb, Qmo), where a component of coastal and near-coastal wallum and heathland communities, growing in grey to white sands; less commonly on the lee slopes of stabilised dunes.

Flowering Period: March to May.

Notes: *G. psammophilum* is related to *G. sigmoideum*. The labellum margins of *G. psammophilum* are minutely and sparsely denticulate (densely denticulate to shortly ciliate in *G. sigmoideum*) and its petal tips lack the well-developed and prominent white sigmoid gland of *G. sigmoideum*. This gland is usually absent or abortive in *G. psammophilum*. The two species occupy very different habitats, *G. psammophilum* being a species of sandy soils in coastal and near coastal areas whereas *G. sigmoideum* is a species of the mountains growing in shallow clay soils.

Conservation Status: Widespread and conserved in reserves and National Parks.

Etymology: From the Greek, 'psammos', sand, 'philos', loving; this species seems to be invariably found growing in sandy soils.

Genoplesium rhyoliticum D. Jones et M. Clements; species nova affinis *G. morrisii* (Nicholls) D. Jones et M. Clements a qua floribus minoribus, et labello obovato margine sine ciliis et callo angusto decrescente per totam longitudinem columnae differt.
Typus: New South Wales; Pambula, 36°56'S, 149°52'E, 14 February 1988, M. Parris 9577 (holo CBG; iso CBG, NSW).

Terrestrial, tuberous herb. Leaf 10–15 cm x 2–2.5 mm, slender, terete, reddish at base; lamina 10–15 mm x ca 3 mm, subulate, sheathing the scape, ending 1–2 cm below the first flower. Inflorescence 12.5–19 cm tall, bearing 5–18 flowers in a moderately crowded spike 2–

3 cm long. Flowers ca 4 mm across, dark purplish black, semi-erect. Ovary ca 3 mm long, linear-oblong, curved. Dorsal sepal ca 4.5 mm x 2 mm, narrow-ovate, cuculate, glabrous, greenish, margins with a prominent, narrow dark band, three longitudinal purplish-black bands also prominent. Lateral sepals ca 5 mm x 1 mm, linear-lanceolate, not gibbous at base, obliquely erect, slightly divergent or nearly parallel, distally involute. Petals ca 4 mm x 1 mm, narrow-ovate, long-acuminate to nearly filiform, widely divergent, greenish with purplish-black longitudinal stripes and marginal bands, glabrous or very shortly papillate. Labellum ca 3.5 mm x 1.7 mm, obovate, dark purplish-black, narrowed in proximal two-thirds, sub-acuminate, thick and fleshy, the margins beset with numerous, coarse, spreading purplish hairs ca 0.2–0.5 mm long; callus occupying about half the ventral surface area of the lamina, extending to the apex, colluviate, dark purplish-black, broadest and thickest near the base, then tapered and ca 0.6 mm wide near the middle. Column ca 2 mm long, erect; foot ca 0.5 mm long, projected forwards, curved upwards. Column wings shallowly notched, the lobes not divergent; posterior lobe linear-ligulate, whitish, entire, obtuse; anterior lobe ovate-lanceolate, obtusely acuminate, margins prominently denticulate-ciliate. Anther ca 1 mm long, with a filiform rostrum ca 0.5 mm long. Stigma ca 0.5 mm x 0.5 mm, ovate-elliptical. Pollinarium ca 1.2 mm long; pollinia ca 0.8 mm long, yellow, granular; caudicle ca 0.5 mm long; viscidium ca 0.4 mm across. Capsule not seen.

Distribution and Habitat: Known only from the type locality on the south coast of New South Wales (Nsc), where it grows under shrubs and trees in shallow soil on an outcrop of rhyolite.

Flowering Period: December to January.

Notes: *G. rhyoliticum* is closely related to *G. morrisii* but has smaller flowers, an obovate labellum with a narrow, tapered callus extending the full length of the lamina and lacks any marginal cilia on the petals. To date this species is known from a single population, restricted to an outcrop of rhyolite and has not been found in other adjacent habitats.

Conservation Status: Suggest 1K by criteria of Briggs & Leigh (1988).

Etymology: From a possible predilection this species has for rocks of rhyolite formation.

Genoplesium sigmoideum D. Jones; species nova affinis *G. psammophilo* D. Jones a qua minore, petalis apice glande alba prominenti sigmoidea, et labello margine dense denticulato differt.

Typus: Queensland; Moreton District, Daves Creek area, Lamington National Park, 28°13'S, 153°13'E, 1 December 1985, D. L. Jones 2195 (holo CBG; iso CBG, BRI).

Terrestrial tuberous herb. Leaf 8–14 cm x ca 1 mm, slender, terete, green, reddish at the base; lamina 10–

15 mm x 1.5–2 mm, subulate, closely sheathing the scape, ending about 1 mm below first flower. Inflorescence 10–18 cm tall, bearing 5–20 flowers in a dense, crowded spike 2–4 cm long. Flowers ca 3.5 mm across, dark red, semi-deflexed. Ovary about 2 mm long, linear-obovoid, slightly curved. Dorsal sepal ca 2.2 mm x 1.5 mm, ovate, concave, cucullate, glabrous, dark red, bluntly apiculate. Lateral sepals ca 4 mm x 1 mm, linear-lanceolate, gibbous at base, obliquely decurved, widely divergent, thick-textured, distally involute, subacute, with a vestigial, whitish, terminal gland. Petals ca 2.1 mm x 0.8 mm, linear-ovate, projected forwards or slightly spreading, red, subacute, with a prominent, white, sigmoid terminal gland. Labellum ca 2.2 mm x 1.3 mm, elliptical-obovate, dark red, apiculate, projected forwards or obliquely erect, not recurved, thick and fleshy, margins densely covered with short cilia; callus occupying most of the ventral surface area of the lamina, extending nearly to apex, dark purplish red, thickest and broadest just above base then gradually tapered to apex, constricted in proximal third, densely covered with sileaceous, ellipsoid colluviae. Column ca 1.5 mm long, erect, dark red; foot ca 0.7 mm long, ligulate, slightly curved. Column wings notched for about one third their length, the lobes divergent; posterior lobe linear-deltate, pale, entire; anterior lobe acuminate, curved, denticulate. Anther ca 1.2 mm long, with a filiform rostrum ca 0.3 mm long. Stigma ca 0.5 mm x 0.5 mm, ovate. Pollinarium ca 1.2 mm long; pollinia ca 0.8 mm long, yellow, coarsely granular; caudicle ca 0.1 mm long; viscidium ca 0.2 mm across. Capsule ca 4 mm x 2 mm, obovoid.

Distribution and Habitat: At present known only from the Daves Creek area, Lamington National Park (Qmo). It grows among low shrubs, in shallow, yellow-brown, gravelly loam on rock ledges.

Flowering Period: December and January.

Notes: *G. sigmoideum* is related to *G. psammophilum* and whereas they both have reddish flowers, those of *G. sigmoideum* are darker and the labellum margins are densely denticulate to shortly ciliate. In *G. psammophilum* the flowers are brighter red and the labellum margins are minutely and sparsely denticulate. The prominent white apical gland on the petals of *G. sigmoideum* is a useful identifying feature. In *G. psammophilum* this gland is usually absent or abortive and is never as well developed and prominently white as in *G. sigmoideum*. The two species grow in very different habitats, *G. sigmoideum* being a species of shallow clay soils in the mountains, whereas *G. psammophilum* is a species of coastal and near coastal districts growing in sand.

Conservation Status: Conserved in Lamington National Park; suggest 2RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*sigmoideus*', curved like the letter s; in reference to the shape of the petal gland.

Genoplesium simulans D. Jones; species nova affinis *G. morrisii* (Nicholls) D. Jones et M. Clements a qua floribus majoribus, sepalo dorsali latiore, labello linearibovato ad linearispathulato proportione magno, et columna alis perangustis differt.

Typus: New South Wales; near Holly Lodge, Bell to Mt Wilson Road, 33°31'S, 150°18'E, 7 February 1988, D. L. Jones 2506, M. A. Clements and R. G. Tunstall (holo CBG, iso CBG, NSW, MEL). *Prasophyllum morrisii* var. *intermedium* Rupp, Victorian Naturalist 65: 147, f. 17 (1948). Types: 'Woodford', Feb.-Mar., 1948, I. Bowden s.n. (lecto NSW), syn. nov.

Terrestrial tuberous herb. Leaf 12–40 cm x 1.5–2 mm, slender, terete; lamina 10–20 mm x 2.5 mm, subulate, sheathing the scape, ending 4–6 cm below the first flower. Inflorescence 16–46 cm tall, bearing 5–23 flowers in a fairly crowded spike 2–4 cm long. Flowers ca 7 mm across, dark purplish black, facing downwards. Ovary ca 4.5 mm long, linear-obovoid, curved. Dorsal sepal ca 5 mm x 4 mm, broadly ovate, concave, cucullate, long-acuminate, purple with darker, narrow marginal bands, five similar longitudinal bands also present, margins densely adorned with coarse, dark purple cilia ca 0.5 mm long. Lateral sepals ca 7 mm x 1.5 mm, linear-lanceolate, dark reddish-purple, strongly gibbous at base, projected forwards in basal third then stiffly erect, widely divergent, distally involute, apical gland linear, almost vestigial. Petals ca 4 mm x 1 mm, linear-ovate, long-acuminate, widely divergent, greenish-purple with dark marginal bands and one to three dark central stripes, margins sparsely ciliate. Labellum 5–6 mm x ca 1.9 mm, linear-obovate to linear-spathulate, slightly constricted near centre, dark purplish-black, recurved in proximal quarter and again near apex, thin-textured, the margins densely beset with coarse, spreading, dark purplish-black cilia to 1.2 mm long, apiculus 0.4 mm long; callus occupying about half the ventral surface area of the lamina, extending about three-quarters to the apex, purplish black, thickest and broadest just above base then gradually tapered, slightly constricted in distal two-thirds. Column ca 3.3 mm long, reddish, erect; foot ca 1 mm long, ligulate, incurved. Column wings notched for about one third their length, the lobes slightly divergent; posterior lobe linear, obtuse, pale, entire; anterior lobe lanceolate, acuminate, denticulate. Anther ca 1.2 mm long, with a filiform rostrum ca 1 mm long. Stigma ca 1 mm x 0.6 mm, ovate-elliptical. Pollinarium ca 1.2 mm long; pollinia ca 0.8 mm long, yellow, coarsely granular; caudicle ca 0.15 mm long; viscidium ca 0.15 mm across. Capsule not seen.

Selected Collections: all New South Wales; Mt Irvine, 17 February 1990, D. L. Jones 5665 and B. E. Jones (CBG); Wentworth Falls, 18 February 1990, D. L. Jones 5686 and B. E. Jones (CBG).

Distribution and Habitat: Endemic to the Central Tablelands of New South Wales (Nct), growing under shrubs in moss gardens and shallow sandy soils in crevices and over sheets of sandstone. Also among sedges and grasses in open forest growing in shallow clay loam.

Flowering Period: January to March.

Notes: *G. simulans* is a common species of the Blue Mountains that up to now has been known as *Prasophyllum morrisii* var. *intermedium* Rupp, a name which I consider completely inappropriate for such a distinctive taxon. It has obvious affinities with *Genoplesium morrisii* but is readily recognised by its larger flowers with a proportionately much larger labellum which is linear-obovate to spatulate in shape and constricted just below the middle. It also has a much broader dorsal sepal and very narrow column wings. The two species are separated geographically by a distance of about 500 km.

Conservation Status: Relatively widespread and conserved in National Parks.

Etymology: From the Latin '*simulans*', imitating, resembling; chosen because of the similar general appearance between this species and *G. morrisii*.

Genoplesium superbum D. Jones; species nova affinis *G. fimbriato* (R. Br.) D. Jones et M. Clements a qua floribus majoribus pallidioribus, sepalis lateralibus proportione magnis, et labello callo brevi differt.
Typus: New South Wales; Morton National Park, ca 2 km north-east of Endrick River on road to Nowra, 35°07'S, 150°08'E, 5 February 1989, M. A. Clements 4772 (holo CBG, iso CBG, NSW).

Terrestrial tuberous herb. Leaf 14–18 cm x ca 2 mm, slender, terete, green, reddish-brown at the base; lamina 15–20 mm x ca 2.5 mm, subulate, closely sheathing the scape, ending 2–3 cm below the first flower. Inflorescence 17–23 cm tall, bearing 4–15 flowers in an uncrowded spike 2.5–5 cm long. Flowers about 12 mm across, the lateral sepals dark pinkish purple, the other segments lighter, facing downwards. Fertile bracts ca 2 mm x 1 mm, ovate-oblong, obtuse. Ovary ca 4 mm long, linear-obovate, curved. Dorsal sepal ca 5.5 mm x 3 mm, ovate, cucullate, acuminate, with an apiculus ca 0.5 mm long, prominently ciliate, the cilia ca 0.4 mm long, greenish-white, margins with a prominent, narrow red band, three longitudinal red stripes also prominent. Lateral sepals ca 10 mm x 1.3 mm, linear-lanceolate, dark pinkish-purple, slightly gibbous at the base, upcurved, widely divergent, distally involute, subacute. Petals ca 5 mm x 1.8 mm, ovate-lanceolate, long-acuminate to almost filiform, divergent, with dark red longitudinal stripes and marginal bands, margins with numerous coarse cilia. Labellum ca 7.5 mm x 3 mm, linear-obovate, pinkish-purple, narrowed in proximal half, subacute, the margins beset with numerous coarse tangled pinkish-mauve hairs ca 2 mm

long; callus occupying less than half of the ventral surface area of the lamina, extending just over half way to the apex, pale green to cream flecked with purplish red, broadest and thickest near the base then tapered and ca 0.8 mm wide. Column ca 2.5 mm long, erect; foot ca 0.8 mm long, ligulate, incurved. Column wings lobed more than half way to base, the lobes hardly divergent; posterior lobe linear-oblong, obtuse to acute, white, entire; anterior lobe linear-lanceolate, long-acuminate to almost filiform, the anterior margins denticulate. Anther ca 1.2 mm long, with a filiform rostrum ca 0.6 mm long. Stigma ca 1 mm x 0.8 mm, ovate. Pollinarium ca 1 mm long; pollinia ca 0.7 mm long, yellow, granular; caudicle ca 0.2 mm long, ligulate. Viscidium ca 0.15 mm across. Capsule not seen.

Selected Collections: Endrick River, 17 December 1987, R. G. Tunstall s.n. (CBG); Morton National Park, 3 March 1990, D. L. Jones 5695 and B. E. Jones (CBG).

Distribution and Habitat: Endemic to southern parts of the Sydney Hawkesbury Sandstone system in Morton National Park (Nsc). It grows amongst low shrubs in sandy clay soils which are inundated during wet periods; also in moist, sandy soils in open forest.

Flowering Period: December to March.

Notes: *G. superbum* has affinities with *G. fimbriatum*, *G. morrisii* and *G. simulans*. It differs from all of these by its much larger flowers, particularly its very large lateral sepals, and the short lamina callus on the labellum. Its flowers have dark sepals but a much lighter coloured labellum than *G. morrisii* and *G. simulans* and they lack the lemon fragrance of *G. fimbriatum*.

Conservation Status: Localised and relatively rare but conserved in Morton National Park; suggest 2RC according to the criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*superbus*', large, magnificent, superb; chosen for the large, colourful flowers of this species.

Genoplesium systemum D. Jones; species nova affinis *G. morrisii* (Nicholls) D. Jones et M. Clements affinis, sed floribus minoribus rubidis, sepalis lateralibus brevioribus minus recurvis, sepalo dorsali latiore sparsim piloso, petalis multo angustioribus sparsim ciliatis, et labello minore abrupte angustato callo ad apicem extenso, differt.
Typus: New South Wales; Conimbla National Park, 33°46'S, 148°25'E, 22 April 1989, D. L. Jones 3944, and B. E. Jones (holo CBG, iso CBG, NSW, MEL).

Terrestrial tuberous herb. Leaf 12–30 cm x 1–2 mm, slender to relatively stout, terete, reddish at base; lamina 15–25 mm x 2–3 mm, subulate, sheathing the scape at base, obliquely erect, ending 5–10 mm below the first flower. Inflorescence 15–36 cm tall, bearing twelve to thirty-two flowers in a fairly dense, crowded spike 3–6 cm long. Flowers 6–6.5 mm across, light

reddish with a purplish labellum, semi-nodding with obliquely deflexed lateral sepals. Ovary ca 2 mm long, linear-ovoid, curved. Dorsal sepal ca 3.5 mm x 2.5 mm, broadly ovate, concave, cucullate, greenish with reddish purple marginal bands and a prominent central band, margins ciliate. Lateral sepals ca 5 mm x 1.5 mm, linear-lanceolate, light reddish-green, gibbous at base, obliquely deflexed, widely divergent, distally involute, apex with an abortive gland. Petals ca 3 mm x 0.8 mm, linear-ovate, long-acuminate, widely divergent, light greenish with dark reddish marginal bands and a central stripe, sparsely ciliate. Labellum ca 3.5 mm x 1.5 mm, linear-ovate, dark purple, apiculate, suddenly recurved near apex, tapered from proximal third, the margins beset with numerous, coarse, spreading, purplish moniliform hairs to 1 mm long; callus occupying about three-quarters of the ventral surface of the lamina, colluviate, dark purple, broadest and thickest near the base then tapered and ca 0.6 mm wide, extending to apex of lamina. Column ca 2.3 mm long, erect. Wings lobed ca nearly to base, the lobes not widely divergent; posterior lobe linear-ovate, white, entire, obtuse; anterior lobe ovate, long-acuminate, the margins denticulate. Anther ca 1 mm long with a filiform rostrum ca 0.5 mm long. Stigma ca 0.6 mm x 0.6 mm, ovate-elliptical. Pollinarium ca 1 mm long; pollinia ca 0.8 mm long, yellow, granular; caudicle ca 0.2 mm long, yellow, granular; caudicle ca 0.2 mm long; viscidium ca 0.2 mm across; capsule ca 0.45 mm x 0.3 mm, linear-ovoid.

Selected Collections: Conimbla National Park, 18 April 1989, D. L. Jones 3905, M. A. Clements and R. G. Tunstall (CBG).

Distribution and Habitat: At present known only from two areas in Conimbla National Park near Cowra but undoubtedly more widespread than this (Nst), (see also notes below). It grows on ridges and slopes among low shrubs in open forest which is dominated by *Eucalyptus sideroxylon*. The soil is a grey-brown clay loam.

Flowering Period: February to April.

Notes: *G. systemum* has affinities with *G. morrisii* but can be distinguished by its smaller, reddish flowers, with shorter, spreading or slightly erect lateral sepals, a shorter, broader dorsal sepal, much narrower, sparsely ciliate petals and a smaller, much more tapered labellum with the callus extending to the apex. The new taxon has similarities with *Prasophyllum morrisii* var. *contortum* Nicholls which Jones and Clements (1989) treated as a synonym of *G. morrisii*. Plate 166 in Nicholls (1969) shows a labellum of similar shape to that of *G. systemum* but with darker and much hairier flowers. Also the labellum tip of *G. systemum* is not twisted, a condition which Nicholls emphasises. While there is no doubt that *G. systemum* is a distinct entity, further studies are required into the status of *P. morrisii* var. *contortum*.

Conservation Status: Restricted but conserved; suggest 2KC according to Briggs and Leigh (1988).

Etymology: From the Greek '*systemos*', tapering to a point; in reference to the labellum shape.

Genoplesium tectum D. Jones; species nova affinis *G. archeri* (J. D. Hook.) D. Jones et M. Clements a qua floribus minoribus distantibus longiore rhachidi, labello elliptico parvo margine ciliis brevibus sparsis, et columna alis anticis longiacuminatis differt.

Typus: Queensland; North Kennedy District, Sunday Creek, south of Cardwell, 18°30'S, 146°10'E, 12 December 1988, P. S. Lavarack 3626 (holo CBG; iso CBG, BRI).

Terrestrial tuberous herb. Leaf 15–30 cm x 2–2.5 mm, slender, terete; lamina 10–20 mm x ca 3 mm, subulate, sheathing the scape, ending 2–5 cm below the first flower. Inflorescence 20–40 cm tall, bearing 5–30 flowers in an uncrowded spike 4–5 cm long, only a few flowers open at once. Flowers ca 4 mm across, light reddish with a dark reddish-black labellum, semi-pendant. Ovary ca 2 mm long, linear-ovoid, curved. Dorsal sepal ca 3 mm x 1.8 mm, broadly ovate, cucullate, glabrous, light reddish, margins with a prominent, narrow dark band, three longitudinal reddish black bands also prominent. Lateral sepals ca 3.5 mm x 1.2 mm, linear-lanceolate, slightly gibbous at base, obliquely erect, widely divergent, distally involute, apex with a small gland. Petals ca 2.5 mm x 0.8 mm, narrow-ovate, long-acuminate to nearly filiform, widely divergent, light reddish with dark reddish-purple stripes and marginal bands, glabrous. Labellum ca 5 mm x 2.5 mm, elliptical-obovate, dark reddish-purple, narrowed in proximal half, subacute to shortly apiculate, thick and fleshy, the margins beset with numerous, coarse, spreading purplish cilia ca 0.25 mm long; callus occupying about half of the ventral surface area of the lamina, extending nearly to the apex, finely colluviate, dark reddish black, thickest near base, broadest near middle then tapered. Column ca 1.5 mm long, erect; foot ca 0.3 mm long, ligulate, incurved. Column wings notched for about half their length, the lobes hardly divergent, the anterior lobe much longer; posterior lobe linear-tapered, pale, entire, obtuse; anterior lobe lanceolate, acuminate, outer margin denticulate. Anther ca 0.8 mm long, with a filiform rostrum ca 0.3 mm long. Stigma ca 0.7 mm x 0.35 mm, elliptical. Pollinarium ca 0.8 mm long; pollinia ca 0.5 mm long, yellow, granular; caudicle ca 0.2 mm long; viscidium ca 0.12 mm across. Capsule not seen.

Distribution and Habitat: Known only from north-eastern Queensland from the vicinity of Sunday Creek to the south of Cardwell (Qks). It grows among dense sedges and low shrubs in woodland dominated by *Melaleuca viridiflora*. Soils are grey sandy loams that are inundated during the wet season.

Flowering Period: November to March.

Notes: *G. tectum* is a distinctive species with no obvious relationships with any other member of the genus except perhaps distantly to *G. archeri*. It can be recognised by its tall slender habit, fairly small flowers widely spaced on the spike and the relatively small elliptical labellum sparsely fringed with short cilia.

The long-acuminate anterior column wing is also distinctive as is the unusual habitat where the species grows. Illustrated by a line drawing on page 87 of Lavrack and Gray (1985).

Conservation Status: *G. tectum* occurs near the Hinchinbrook Channel National Park but to date has not been found within the park. The only known populations occur on Vacant Crown Land and consequently the suggested conservation status is 2E by the criteria of Briggs & Leigh (1988).

Etymology: From the Latin 'tectus', hidden or concealed; this slender species is very difficult to find among the dense vegetation where it grows.

Genoplesium turfosum D. Jones; species nova affinis *G. archeri* (J. D. Hook.) D. Jones et M. Clements affinis, sed habitu minore, floribus minoribus confertis, labello sparsim ciliato callo angustiore, differt.

Typus: New South Wales; ca 7 km along Tarrangera Dam Rd, Kosciuszko National Park, 35°52'S, 148°38'E, ca 1000 m, 16 December 1989, D. L. Jones 5570, B. E. Jones and T. D. Jones (holo CBG, iso CBG, NSW).

Terrestrial, tuberous herb. Leaf 5–13 cm x 3–4 mm, slender, terete, purplish at base; lamina 8–12 mm x ca 3 mm, subulate, sheathing the scape, ending 2–6 mm below the first flower. Inflorescence 6–15 cm tall, bearing two to twenty-five flowers in a dense, crowded spike 8–20 mm long. Flowers ca 4 mm across, dark purplish red, facing downwards. Ovary ca 2.5 mm long, linear-obovoid, curved. Dorsal sepal ca 3.5 mm x 2 mm, linear-ovate, concave, cucullate, subacute, reddish purple with darker, narrow marginal bands, three similar longitudinal bands also present. Lateral sepals ca 4.5 mm x 1.4 mm, linear-lanceolate, dark reddish purple, not gibbous at base, projected forwards in basal fifth, then horizontal or obliquely erect, widely divergent, distally involute, apical gland vestigial. Petals ca 3 mm x 1.3 mm, linear-ovate, obtuse or apiculate, reddish purple with dark marginal bands and a central stripe. Labellum 5.5–6 mm x 3.4–3.7 mm, linear-ovate to ovate, apiculate, apex recurved, thin-textured, the margins sparsely beset with coarse, spreading, blackish hairs to 1.5 mm long; callus occupying about one third of the ventral surface area of the lamina, dark purplish black, thickest and broadest just above the base then tapered to a long, linear portion, extending to the labellum apex. Column ca 1.6 mm long, purplish, erect; foot ca 0.3 mm long, linear, incurved. Wings hardly notched; anterior lobe pale, obtuse to truncate, denticulate. Anther ca 0.9 mm long, with a short, obtuse rostrum. Stigma ca 0.6 mm x 0.6 mm, ovate. Pollinarium ca 0.8 mm long; pollinia ca 0.5 mm long, yellow, granular; caudicle ca 0.1–1.5 mm long; viscidium ca 0.12 mm across. Capsule not seen.

Distribution and Habitat: South-eastern New South Wales where at present known only from swamps in Kosciuszko National Park but readily overlooked and

probably more widespread. The species is found among dense sedges in wet boggy conditions close to streams. Soils are black, fibrous, peaty loams which are wet throughout the year.

Flowering Period: November and December.

Notes: This species is very easily overlooked because of its small stature and growing as it does in a dense sward of sedges. Although distantly related to *G. archeri*, it is readily distinguished by its much smaller stature and smaller flowers densely arranged in a compact spike. The labellum callus is extremely narrow when compared to that of *G. archeri* and related species and the labellum is very sparsely hairy. The new species grows within a few metres of the type locality of *Chiloglottis turfosa* D. Jones.

Conservation Status: Rare but conserved; suggest 2RC according to Briggs and Leigh (1988).

Etymology: From the Latin, 'turfosum', peaty, boggy; in reference to the boggy habitat.

Genoplesium validum D. Jones; species nova affinis *G. archeri* (J. D. Hook.) D. Jones et M. Clements a qua perrobustiore, floribus numerosioribus, et labello oblongielliptico proportione minore et margine ciliis sparsis brevibusque differt.

Typus: Queensland; Spring Creek, Blackdown Tableland, 23°48'S, 149°01'E, 12 March 1989, E. Pederson s.n. (D. L. Jones 3811) (holo CBG; iso CBG, BRI).

Terrestrial tuberous herb. Leaf 20–30 cm x 2.6–3 mm, slender, terete, reddish at base; lamina 25–35 mm x 3–4 mm, subulate, sheathing the scape at base, obliquely erect, ending 3–10 cm below the first flower. Inflorescence 25–40 cm tall, bearing 15–35 flowers in a dense, moderately crowded spike 5–9 cm long. Flowers ca 4 mm across, dark purplish, semi-nodding with stiffly erect lateral sepals. Ovary 2–2.5 mm long, linear-ovoid, slightly curved. Dorsal sepal ca 4.5 mm x 2 mm, narrowly ovate-elliptical, concave, cucullate, glabrous, greenish with dark purplish, narrow marginal bands, three similar longitudinal bands also present. Lateral sepals ca 5 mm x 1.2 mm, linear-lanceolate, dark reddish-purple, projected forwards in basal third then stiffly erect, parallel or slightly divergent, distally involute, apex with a prominent whitish gland. Petals ca 3.5 mm x 1 mm, linear-ovate, acuminate, divergent, light greenish with dark purplish marginal bands and a central stripe, glabrous. Labellum ca 2.8 mm x 1.5 mm, broadly oblong-elliptical, dark purplish-black, subacute to shortly apiculate, suddenly recurved in proximal quarter and again near apex, thick and fleshy, the margins sparsely beset with coarse, spreading, purplish hairs 0.1–0.4 mm long; callus occupying about half the ventral surface area of the lamina, extending nearly to labellum apex, dark purplish black, thickest and broadest just above

the base, then gradually tapered. Column ca 2 mm long, erect; foot ca 0.5 mm long, slightly curved. Column wings very shallowly notched, the lobes hardly divergent; posterior lobe oblong, pale, entire, acute, often hooked; anterior lobe lanceolate, acute, purplish, coarsely denticulate-ciliate. Anther ca 1 mm long, with a filiform rostrum ca 0.5 mm long. Stigma ca 0.5 mm x 0.8 mm, ovate-elliptical. Pollinarium ca 1 mm long; pollinia ca 0.7 mm long, yellow, coarsely granular; caudicle ca 0.2 mm long; viscidium ca 0.2 mm across. Capsule not seen.

Distribution and Habitat: At present known only from the Blackdown Tableland in Central Queensland (Qle). It occurs on sandstone escarpments, growing on ledges and crevices in shallow sandy soil.

Flowering Period: December to April.

Notes: *G. validum* is related to *G. archeri* but is a much more robust species with lighter-coloured flowers having a smaller, oblong-elliptical labellum which is prominently reflexed near the base and again at the apex, and with sparse, short cilia on the margins. This is one of the tallest growing species in the genus achieving dimensions similar to those of *G. acuminatum* (Rupp) D. Jones and M. Clements. Illustrated on page 337 of Pearson (1989).

Conservation Status: Rare but conserved; suggest 2RC by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*validus*', strong or robust; in reference to the very robust habit of this species.

PRASOPHYLLUM R. Br.

This genus is being revised by Bates (see for example Bates 1989, 1989a, 1990), but following the circumscription of *Prasophyllum* R. Br. and *Genoplesium* R. Br. (Jones and Clements 1989), and recent field studies it was decided that a collaborative approach would be of benefit in solving the taxonomy of some groups. *Prasophyllum* has always been regarded as being taxonomically difficult and to date no satisfactory account has been published. Taxonomic problems encountered include species complexes and numerous sister taxa and look-alike taxa, variation in floral morphology which may be continuous in some complexes, the presence of apomictic races which may be habitat specific but have some features which may be continuous, introgression (uncommon) and strict biological adaptation including reliance on habitat disturbance such as summer fires before massed flowering can occur. As a step towards the elucidation of the genus, eleven new species of *Prasophyllum* are described here.

New Species

Prasophyllum campestre R. Bates et D. Jones; species nova *P. fusco* R. Br. affinis, sed tepalis angustioribus, marginibus labelli crenulatis, et appendicibus columnae latis-simis obtusis, differt.

Typus: New South Wales; ca 13 km south-east of Nymagee on road to Bobadah, 22 September 1973, G. Cunningham and P. Millthorpe 1243 (holo NSW).

Slender, tuberous, terrestrial herb 10–40 cm tall. Tuberooids 1–2 cm across, subglobose. Leaf 8–35 cm long, yellowish green, base 5–8 mm across, reddish, free lamina suberect to lax, senescent at flowering. Floral bracts ca 2 mm x 2.5 mm, ovate, acute. Ovary ca 4 mm x 3 mm, obovoid, minutely tuberculate, set at about 40 degrees to the rhachis. Inflorescence a loose spike 5–8 cm long, consisting of 10–20 flowers. Flowers 9–11 mm across, greenish with red, purplish, brown and white tints, intensely fragrant, subsessile. Dorsal sepal 8–12 mm x ca 3 mm, linear-lanceolate acuminate, greenish with brown lines, decurved. Lateral sepals 7–10 mm x ca 1.5 mm, linear-lanceolate, greenish brown, free, widely divergent, distal margins involute, apex acuminate, often with a minute tooth about 1 mm from

tip. Petals 7–11 mm x ca 1.1 mm, linear, widely spreading, usually white with a brown or red median stripe, subacute, margins minutely crenulate. Labellum 6–9 mm x 3.5–4 mm, ovate-lanceolate in outline when flattened, sessile, proximal half obliquely erect with entire, downturned margins, not gibbous, veined, distal half reflexed at right angles, erect, the margins shallowly folded and slightly crenulate, generally folded back so as to expose the callus, apex acute to mucronate; callus 4.5–5.5 mm x ca 2 mm, ovate to ovate-lanceolate, greenish, fleshy, broad in the basal part, becoming narrower and increasingly raised past the bend and extending three-quarters of the way to the apex, basal swelling dark green. Column ca 2 mm x 2 mm, porrect from the end of the ovary; appendages 2–3 mm x ca 0.8 mm, oblong, white, broadest towards the apex, obtuse truncate or irregular, basal lobe prominent, half as long as main lobe and connate with it. Anther ca 2.5 mm x 2 mm, ovate, reddish brown, rostrum obtuse. Pollinarium ca 1.5 mm long; viscidium ca 0.2 mm long, triangular, white; hamulus ca 0.3 mm x 0.1 mm, ligulate; pollinia ca 1.3 mm long, linear-clavoid, yellow, sectile. Stigma ca 1.5 mm x 1 mm, reniform, the rostellum higher than column appendages. Capsule ca 8 mm x 5 mm, obovoid, yellow green.

Selected Collections: Queensland; hills west of Inglewood, no date, J. L. Boorman s.n. (NSW); New South Wales; 30 km north-west of West Wyalong, 6 October 1987, R. Bates 11309 (AD); Nangerybone, 9 October 1987, R. Bates 11414 (AD); Cocoparra Reserve, 29 September 1969, J. H. Willis s.n. (MEL); Gulgong, October 1945, G. & P. Althofer s.n. (NSW); Hay, Zara and Wanganella, 12 September 1912, G. Officer s.n. (NSW).

Distribution and Habitat: Widespread throughout the inland plains of eastern Australia from north of the Murray River to south-eastern Queensland, extending as far west as the Darling River (Qdd, Nnt, Nct, Nst). This species apparently prefers more fertile, water-retentive soils in semi-arid grassland and open woodland, much of which has been converted to pasture.

Flowering Period: Late September and early October.

Notes: This species has affinities with *P. fuscum* but can be distinguished by its narrower floral segments, crenulate margins to the labellum and very broad, obtuse column appendages. It also bears similarities to *P. occidentale* R. Rogers, from which it can be distinguished by its thin-textured, tricoloured flowers, the narrow, spreading lateral sepals, the large, pale, widely spreading petals and the broad column appendages. Its very short flowering season is an adaptation to the climate, being a means of coping with rapid drying of the soil in spring. Individual plants were noted to complete their flowering in a few days and release seed within two weeks of anthesis (R. Tunstall, pers. comm.). The flowers exude a powerful, sickly-sweet fragrance. Material collected from Hay, Zara and Wanganella is atypical in having short, crowded spikes.

Conservation Status: Widespread, sporadic and uncommon; suggest 3RC by criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*campestris*', of the plains; in reference to its habitat.

Prasophyllum candidum R. Bates et D. Jones; species nova affinis *P. suttonii* R. Rogers et B. Rees sed habitu robustiore, folio majore, inflorescentia majore confertiore, floribus majoribus pallidioribus non purpureo-tinctis, sepalis lateralibus liberis late divergentibus viridibus, petalis fere integris, et hamulo latiore, differt.

Typus: New South Wales; ridge ca 0.5 km west of Rocky Plains Ck., Tumut — Adaminaby Rd., 36°53'S, 148°30'E, 4 January 1990, D. L. Jones 5607 (holo CBG, iso CBG, AD, NSW, MEL).

Stout, fleshy, robust terrestrial herb 15–50 cm tall. Tuberoids to 3 cm across, oblong to obovoid. Leaf 20–40 cm long, yellowish green, base 8–22 mm across, greenish or purplish, free lamina suberect, often withered at flowering. Floral bracts ca 2 mm x 3 mm, ovate, obtuse. Ovary ca 6 mm x 3 mm, obovoid to obpyriform,

at about 30 degrees to the rhachis. Inflorescence a dense crowded spike 6–10 cm long, consisting of 10–40 flowers. Flowers 12–16 mm across, white, fragrant. Dorsal sepal 8–12 mm x ca 4 mm, linear-obovate, subacute, incurved, greenish with 3–5 brown striae, entire or with irregular margins. Lateral sepals 8–12 mm x ca 2.6 mm, linear-lanceolate, free, widely divergent, greenish, obliquely erect, anterior margins involute, apex obtuse. Petals 8–10.5 mm x ca 3 mm, linear-lanceolate, parallel to widely divergent, obtuse, entire, white with a darker basal median stripe. Labellum 9–12 mm x 6–7 mm, ovate-oblong to oblong-lanceolate in outline when flattened, crystalline white, proximal half obliquely erect with irregular but nearly entire, downturned margins, distal half swept back in a semi-circle, the margins intensely folded and crisped, the apex protruding between the lateral sepals; callus 6–7 mm x ca 3.5 mm, linear-ovate, fleshy, yellowish green, channelled centrally, margins white and smooth, ending just above the bend, apex deeply bifurcate, basal swelling prominent, dark green, pyramidal. Column ca 4 mm x 3.3 mm, porrect from the end of the ovary; appendages ca 3 mm x 1 mm, linear-falcate (thumb-shaped), pale pink, obtusely truncate. Anther ca 2.3 mm x 1.6 mm, ovate, reddish, rostrum truncate or emarginate. Pollinarium ca 3 mm long; viscidium ca 0.3 mm long, oblong, white; hamulus ca 1.5 mm x 0.3 mm, ligulate; pollinia ca 2.3 mm long, linear-clavoid, yellow, sectile. Stigma ca 2 mm x 2.3 mm, pink and white, the rostellum as high as the appendages. Capsule ca 9 mm x 5 mm, obovoid, yellow green.

Selected Collections: New South Wales; on the flats by Cave Ck., Kosciusko National Park, 26 December 1987, R. Bates 13489 (AD); Tantangara Dam Rd., Kosciusko National Park, 24 December 1987, R. Bates 13434 (AD); Victoria; Cobungra, 24 December 1930, H. Morgan s.n. (MEL); Spring Ck., Cobungra, 26 December 1986, R. Bates 6699 (AD).

Distribution and Habitat: South-western New South Wales and north-eastern Victoria where locally common in the sub-alpine meadows above 1000 m altitude; possible also extending to Tasmania (Nst, Veh, ?Tas)

Flowering Period: December to early February.

Notes: This species has been previously confused with *P. suttonii*, a later flowering, more slender species which has a shorter leaf and fewer, smaller flowers in the inflorescence (these being colourful with purple tints) and broader, often crenulate petals. Both species sometimes grow sympatrically but do not overlap in their flowering times. *P. candidum* also superficially resembles *P. odoratum* but can be immediately distinguished by its labellum which curves in a semi-circle (abruptly reflexed in *P. odoratum*). The flowers of *P. candidum*, which are noticeably fragrant, open quickly after the inflorescence bursts through the leaf and may even be partly open while the spike is still enclosed within the sheath.

Conservation Status: Common and well conserved in National Parks.

Etymology: From the Latin '*candidus*', shining white; in reference to the intensely white flowers.

Prasophyllum chasmogamum R. Bates et D. Jones; species nova *P. fusco* R. Br. affinis, sed floribus late aperiens columnam expositam, labello late ovato-lanceolato basi latissimo disciforme, et calli aliquantum irregulariter marginato, differt.

Typus: Victoria; ca 6 km west of Bairnsdale, beside railway line, 37°50'S, 147°36'E, 5 November 1969, T. B. Muir 4765 (holo MEL).

Slender terrestrial tuberous herb 15–40 cm tall. Tuberoids 6–10 mm across, ovoid. Leaf 12–30 cm long, dark green, base 3–5 mm across, red to purple, free lamina suberect, often withered at anthesis. Floral bracts ca 2 mm x 1.5 mm, linear-ovate, acute. Ovary ca 6 mm x 3 mm, obovoid, shiny green, set at about 30 degrees to the rhachis. Inflorescence a narrow loose spike 5–7 cm long, consisting of 10–20 flowers. Flowers 7–9 mm across, predominately yellowish green and reddish brown, opening widely, fragrant, sessile. Dorsal sepal 8–10 mm x ca 3 mm, linear-ovate, green with brown striae, nearly vertical, subacute to acuminate. Lateral sepals 8–10 mm x 1–1.5 mm, linear-lanceolate, connate nearly to the apex or free from the base, erect or recurved, subacute, anterior margins involute almost from the base to apex. Petals 7–10 mm x 1.2–1.4 mm, linear to linear-lanceolate, green with brown striae, upswept, correct, incurved to widely spreading, subacute. Labellum 7–9 mm x 4–5 mm, broadly ovate-lanceolate in outline when flattened, greenish, mauve or pink, narrowed to a short basal claw, not gibbous when viewed from the side, proximal half almost orbicular, obliquely erect, flat with entire margins, distal half recurved at right angles, with entire or slightly crenulate margins, the apex touching the sepals or protruding through them, apiculate; callus 5–6.5 mm x 2–2.5 mm, elliptical-lanceolate, fleshy, green, channelled centrally, margins entire or crenate, narrowed beyond the bend and extending nearly to the labellum apex. Column ca 2.5 mm x 3 mm, correct from the end of the ovary, exposed by the wide expansion of the tepals; appendages ca 2.3 mm x 0.8 mm, linear-oblong, pale green, truncate or emarginate. Anther ca 1.8 mm x 1.8 mm, ovate, dark red brown. Pollinarium ca 2 mm long; viscidium ca 0.25 mm long, ovate, white; hamulus ca 0.3 mm long, ligulate; pollinia ca 1.2 mm long, linear-clavoid, yellow, sectile. Stigma ca 1.5 mm x 1.5 mm, quadrate, the rostellum about as high as the appendages. Capsule ca 5 mm x 3 mm, obovoid, shiny green.

Selected Collections: Victoria; ca 3.2 km east of Munro, 24 October 1987, R. Bates 11394 (AD); Bairnsdale, 18 October 1938, W. Hunter (W. H.

Nicholls 680–690) (MEL); Bairnsdale, November 1930, T. S. Hart, (W. H. Nicholls 173–4) (MEL); west of Bairnsdale, 15 October 1963, E. V. Barton s.n. (MEL).

Distribution and Habitat: Apparently endemic on the plains to the west of Bairnsdale but perhaps more widespread before settlement. Grows in open woodland and moist grassland in clay loams.

Flowering Period: October and November.

Notes: This species has been confused with *P. fuscum* but is readily distinguished by its widely opening flowers in which the column is exposed, the broadly ovate-lanceolate labellum with its very broad, disc-like base and the broad, thick callus with somewhat irregular margins. Until recently this species was common on the railway reserve to the west of Bairnsdale but with its sale and conversion to farmland the estimated population is now less than 100 plants. Flowering occurs freely without the intervention of summer fires.

Conservation Status: Rare and endangered; suggest 2E by criteria of Briggs & Leigh (1988).

Etymology: From the Greek '*chasma*', wide open, '*gamos*', marriage; in reference to the widely opening flowers in which the column is exposed.

Prasophyllum dossenium R. Bates et D. Jones; species nova *P. odorato* R. Rogers affinis, sed floribus vividius coloratis, labello et sepalis lateralibus ad basin prominenti gibbosis, columnae appendicibus vivide coloratis, et sepalorum lateralium cum apiculo brevi duro, differt.

Typus: New South Wales; ca 20 km east of Guyra, 30°13'S, 151°42'E, 21 November 1987, R. Bates 12793 (holo AD, iso AD, NSW).

Slender to robust terrestrial tuberous herb 20–50 cm tall. Tuberoids globose. Leaf 20–40 cm long, dark green, base 5–10 mm across, reddish, free lamina suberect. Floral bracts ca 2 mm x 2 mm, ovate, obtuse. Ovary ca 5 mm x 2 mm, set at about 30 degrees to the rhachis. Inflorescence a moderately crowded spike 3–8 cm long, consisting of 5–30 flowers. Flowers 12–14 mm across, pink, white and greenish brown, fragrant. Dorsal sepal 7–11 mm x 4–5 mm, ovate-lanceolate, acuminate or apiculate, incurved, undersurface dark brown, upper with three green or pale brown longitudinal stripes. Lateral sepals 7–11 mm x ca 2.5 mm, linear-lanceolate, usually free and strongly gibbous at the base then connate with free tips, less commonly completely free, obliquely erect, recurved near the apex, dark brown or purple brown, anterior margins involute, apex apiculate, produced into a thickened, appendix-like tail ca 0.8 mm long. Petals 8–10 mm x ca 3 mm, linear-lanceolate, widely divergent, tip recurved or incurved, apiculate, white or pink with a dark median stripe. Labellum 9–12 mm x 5–6 mm, ovate to ovate-oblong in outline when flattened, white or pale pink, gibbous at the base, proximal half correct or decurved with entire downcurved margins, distal half sharply recurved with

irregularly folded and crisped, crenulate margins, the apex touching the labellum base; callus 5–6.5 mm x ca 2.5 mm, ovate, fleshy, yellowish green, channelled centrally, margins white and smooth, ending just above the bend, apex entire or bifurcate, basal swelling prominent, dark green. Column ca 4 mm x 4 mm, porrect from the end of the ovary; appendages ca 3 mm x 1.5 mm, linear-oblong, bright pink, apex irregularly truncate or obtuse. Anther ca 3 mm x 2 mm, ovate, dark red-brown. Pollinarium ca 3.3 mm long; viscidium ca 0.5 mm long, white; hamulus ca 1 mm long, ligulate; pollinia ca 2.3 mm long, linear-clavoid, yellow, sectile. Stigma ca 2.5 mm x 2 mm, more or less quadrate, pink to purple, the rostellum higher than the appendages. Capsule ca 7 mm x 4.5 mm, obovoid, shiny green.

Selected Collections: New South Wales; ca 20 km south-west of Ebor, 22 November 1987, R. Bates s.n. (AD); Ben Lomond, on high peak and along railway line, 15 December 1989, D. L. Jones 5514 and C. H. Broers (CBG, NSW).

Distribution and Habitat: Apparently endemic to the New England Tableland where it occurs in grassland and open grassy woodland above 800 m altitude (Nnt). Soils are red basalt loams and grey to brown gravelly loams.

Flowering Period: November to January.

Notes: *P. dosseum* belongs to a complex of species including *P. odoratum*, *P. patens* and *P. suttonii*. It can be distinguished from all of these by the prominent hump on both the labellum base and the free base of the lateral sepals and the unusual fleshy apiculi on the lateral sepals. *P. dosseum* is a well defined species which shows scant morphological variation. Flowering plants are conspicuous in their habitat but have been rarely collected. The flowers are attractively scented and last up to two weeks if not pollinated.

Conservation Status: Rare and not conserved; suggest 3R by criteria of Briggs & Leigh (1988).

Etymology: From the Latin '*dosseus*', humpbacked; in reference to the strongly gibbous lateral sepals.

Prasophyllum exilis D. Jones et R. Bates; species nova *P. brevilabrae* (Lindley) J. D. Hook affinis, sed habitu multo brevior gracillimo (paene filiforme), floribus paucioribus late dispositis, labelli callo densiore papilloso, et hamulo longiore, differt.
Typus: Queensland; Torbanlea, 25°21'S, 152°36'E, June 1987, L. Barton s.n. (holo CBG, iso CBG, AD, BRI, NSW).

Slender to almost filiform tuberous herb to 20 cm tall. Tuberooids ovoid to obovoid. Leaf 6–12 cm long, dark green, base ca 2 mm across, purplish, free lamina erect, rigid, acuminate. Floral bracts ca 0.8 mm long, ovate. Ovary 2–3 mm x 1.5 mm, pyriform, set at about 20 degrees to the rachis. Inflorescence a short sparse spike, consisting of 2–10 flowers, scape green or brown. Flowers 4–6 mm across, green or purplish brown and white, lilac-perfumed, sessile. Dorsal sepal 4–6 mm x ca

2 mm, linear-ovate, purplish brown, obliquely deflexed, apiculate. Lateral sepals 5–6.5 mm x ca 1 mm, linear-lanceolate, purplish brown, gibbous at base, obliquely erect to erect, connate except for the apex, distal margins incurved, apex apiculate. Petals 4–5.5 mm x ca 1 mm, linear-oblong, porrect or incurved, green or purple brown with a white tip or wholly white, distal quarter somewhat expanded with crenulate margins. Labellum 5.5–7 mm x 2.8–3 mm, oblong in outline when flattened, sessile, white, proximal half porrect with slightly crenulate, recurved margins, distal half sharply folded and lying on proximal half, margins folded and crenulate; callus 3.5–4 mm x 2–2.5 mm, linear-ovate, greenish, shiny, channelled centrally, papillose, ending just beyond bend. Column ca 2 mm x 2 mm, porrect from the end of the ovary; appendages ca 2 mm x 0.5 mm, linear, sigmoid, purplish, acute. Anther ca 1.3 mm x 1 mm, ovate, greenish yellow. Pollinarium ca 2 mm long; viscidium ca 0.1 mm long, white; hamulus ca 0.9 mm long, very slender, ligulate; pollinia ca 1.2 mm long, linear-clavoid, yellow, sectile. Stigma ca 1.5 mm x 1.5 mm, ovate, pink, the rostellum as high as the appendages. Capsule ca 5 mm x 3 mm, ovoid, shiny green to purplish.

Selected Collections: Queensland; Burleigh Heads, 15 August 1945, T. E. Hunt 347 (BRI, MEL); Noosa Heads, 15 September 1913, H. Longman (R. S. Rogers 2460, 2465) (AD); Mr Archer's Station, 28 August 1843, L. Leichhardt s.n. (MEL); Childers, 14 August 1952, W. W. Abell s.n. (NSW); Mooloolaba, 5 September 1968, R. M. Edwards s.n. (NSW); New South Wales; north of Cudgen Lake, September 1987, R. Bates 11292 (AD).

Distribution and Habitat: Endemic to south-eastern Qld and north-eastern NSW (Qwb, Qmo, Nnc), where restricted to coastal and lowland near-coastal localities. It grows in damp grassy places in open forest, woodland and wallum communities; soils are moisture retentive clays and silts.

Flowering Period: June to early September.

Notes: *P. exilis* is a distinctive species readily recognised by its short, extremely slender habit and very few flowers widely spaced in the inflorescence. Although the flowers of *P. exilis* and *P. brevilabre* are of similar general morphology, those of *P. exilis* are smaller with a densely papillose labellum callus and a longer, much more slender hamulus.

Conservation Status: 3RC according to Briggs & Leigh (1988).

Etymology: From the Latin '*exilis*', thin, slender, meagre, poor; in reference to the habit.

Prasophyllum incompositum D. Jones; species nova *P. odorato* R. Rogers affinis, sed floribus confertis in spica brevior, sepalis lateralibus gibbosis, petalis lineari-obovatis, labello angustiore valdiore flexo et callo exile, differt.

Typus: Queensland; Carnarvon Range, 24°49'S, 147°45'E, 14 September 1988, E. Pederson s.n. (D. L. Jones 2891) (holo CBG, iso CBG).

Slender terrestrial tuberous herb 30–55 cm tall. Tuberosities 10–13 mm across, ovoid. Leaf 35–60 cm long, dark green, base 5–7 mm across, reddish, free lamina erect, often exceeding the inflorescence. Floral bracts ca 2 mm x 2 mm, ovate, subacute. Ovary ca 6 mm x 2 mm, set at about 20 degrees to the scape. Inflorescence a densely crowded spike 5–9 cm long, consisting of 5–30 flowers presenting an untidy, disorganised appearance. Flowers 11–13 mm across, greenish brown and white, sessile, fragrant, the segments overlapping. Dorsal sepal 8–11 mm x 3–4.5 mm, linear-ovate to ovate-lanceolate, acuminate, obliquely decurved or incurved, green with brownish striae. Lateral sepals 8–10 mm x ca 2 mm, linear-lanceolate, green with a brown median stripe, gibbous at the base, obliquely erect with recurved tips, free to the base, widely divergent, margins incurved, apex acuminate. Petals 7–10 mm x ca 2 mm, linear-oblong, widely divergent, subacute, white with a dark median stripe. Labellum 9–11 mm x ca 4 mm, linear-oblong in outline when flattened, constricted just above the middle, white, proximal half porrect with entire downcurved margins, distal half sharply recurved, with strongly and irregularly folded and crisped to crenulate margins, the apex protruding through the lateral sepals; callus 5.5–6 mm x ca 3 mm, linear-elliptical, thin-textured but fleshy, green, channelled centrally, margins white and smooth, ending at the bend, apex obtuse, basal swelling prominent, dark green. Column ca 3.5 mm x 3 mm, porrect from the end of the ovary; appendages ca 3 mm x 0.6 mm, linear-lanceolate, pale green, subacute. Anther ca 2.3 mm x 1.8 mm, ovate, dark purplish brown. Pollinarium ca 3.3 mm long; viscidium ca 0.4 mm long, ovate, white; hamulus ca 1 mm long, ligulate, slender; pollinia ca 2.3 mm long, linear-clavoid, yellow, sectile. Stigma ca 2 mm x 2 mm, ovate, pinkish, the rostellum higher than the appendages. Capsule not seen.

Distribution and Habitat: Apparently endemic to the Carnarvon Range in central Queensland but probably more widespread. It grows in moist grassy areas in sparse woodland; soils are sands derived from decomposed sandstone.

Flowering Period: August and September.

Notes: This species, part of the complex surrounding *P. odoratum*, can be recognised by its relatively short inflorescence of crowded flowers in which the segments overlap. Other differences include a gibbous base to the lateral sepals, linear-obovate petals, a narrower labellum with a sharper flexure above the middle and a thinner-textured callus. *P. incompositum* is the most northerly distributed member of the genus.

Conservation Status: Poorly known but conserved in a National Park; suggest 2KC according to Briggs & Leigh (1988).

Etymology: From the Latin '*incompositus*', disarranged, confused; in reference to the untidy, disorganised appearance of the inflorescence.

Prasophyllum montanum R. Bates et D.

Jones; species nova *P. fusco* R. Br. affinis, sed floribus pallidis, sepalis lateralibus connatis, marginibus labelli crenulatis, callo ruguloso, et appendicibus columnae lineari-oblongis, differt.

Typus: Australian Capital Territory: Mt Franklin, near Ski Chalet, 3 February 1967, L. G. Adams 1675 (holo CANB, iso CANB, NSW).

Robust, fleshy terrestrial herb 20–80 cm tall. Tuberosities to 3 cm across, obovoid or forked. Leaf 15–70 cm long, yellowish green, base 8–10 mm across, purplish red, free lamina suberect, usually partly senescent at flowering. Floral bracts ca 4 mm x 2 mm, ovate, obtuse. Ovary ca 5 mm x 2.5 mm, obovoid, set at about 30 degrees to the rachis. Inflorescence a moderately dense raceme 5–15 cm long, consisting of 10–50 flowers. Flowers 8–10 mm across, pale-green and white, pale pink or lilac, rarely purplish, fragrant, on thick pedicels to 1 mm long. Dorsal sepal 9–15 mm x 3–4 mm, ovate-lanceolate, green with fine lines, decurved, acute to acuminate. Lateral sepals 10–15 mm x 2–2.5 mm, linear-lanceolate, green, conjoined for about half their length then free, parallel or divergent, erect, distal margins involute, apex linear-terete. Petals 8–12 mm x 2–2.5 mm, linear-lanceolate, green or purplish, incurved to spreading, acute to subacute, margins often crenulate. Labellum 7–9 x 4–5 mm, broadly ovate-sagittate to ovate-lanceolate in outline when flattened, shortly clawed, white or pink to purple, proximal half obliquely erect, slightly gibbous or almost flat in older flowers, no basal swelling, margins downturned, slightly crenulate to undulate, distal half recurved at right angles, the margins crenulate to lightly crisped; callus 5.5–6.5 mm x 2.5–3 mm, ovate-sagittate, raised and fleshy, broadest in proximal two-thirds then caudate, extending three-quarters of way to apex, minutely rugulose and not shiny. Column ca 3 mm x 2.2 mm, porrect from the end of the ovary; appendages ca 2 mm x 0.8 mm linear-oblong, obtuse, pale green, with thick 1 mm high, connate basal lobes. Anther ca 2 mm x 1.6 mm, ovate, brownish, with a distinct median ridge, rostrum subacute to obtuse. Pollinarium ca 2.3 mm long; viscidium ca 0.3 mm long, oblong, white; hamulus ca 2 mm x 0.8 mm, ligulate; pollinia ca 2 mm long, linear-clavoid, yellow, sectile. Stigma ca 1.5 mm x 1.5 mm, reniform, the rostellum much higher than the appendages. Capsule ca 12 mm x 6 mm, obovoid, greenish to purplish.

Selected Collections: Australian Capital Territory: Mt Gingera, 3 January 1988, R. Bates 13741 (AD); New South Wales: Tantangara Ridge, Kosciuszko National Park, 25 January 1984, R. Matthews 241 (AD); Victoria: Suggan Buggan, December 1939, W. Hunter s.n. (MEL); Cobungra, 6 January 1934, H. Morgan s.n. (MEL); Mt Wellington, 1 January 1937, D. Matthews

s.n. (MEL); near Cobbler Hut, late December 1935, W. H. Nicholls 639 (MEL).

Distribution and Habitat: Restricted to montane peaks above 1500 m. altitude and extending from the Brindabella Range near Canberra to the Australian Alps of north-eastern Victoria (Can, Nst, Veh). This species usually grows on rather dry rocky sites on high rocky ridges under sparse eucalypt forest. Soils are shallow gravelly loams.

Flowering Period: Late December to February.

Notes: This species has some affinities with *P. fuscum* but can be distinguished by its paler, pastel-coloured flowers with conjoined lateral sepals, crenulate labellum margins, a rugulose callus plate and linear-oblong column appendages. It also has similarities to *P. pyriforme* E. Coleman from which it can be distinguished by its larger, pastel-coloured flowers and its montane habitat. The flowers are sweetly perfumed and may all open within a very short time during hot weather.

Conservation Status: Relatively widespread, uncommon and conserved in National Parks; suggest 3RC by criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*montanus*', pertaining to the mountains; in reference to the habitat.

Prasophyllum petilum D. Jones et R. Bates; species nova *P. campestre* R. Bates et D. Jones affinis, sed habitu graciliori, floribus paucioribus minoribus, anthera parva, et hamulo brevissime, differt.

Typus: Australian Capital Territory; Hall, 5 November 1988, D. L. Jones 3431 and M. A. Clements (holo CBG, iso CBG).

Slender, terrestrial tuberous herb 15–30 cm tall. Tuberoïds 8–12 mm across, ovoid. Leaf 12–25 cm long, dark green, base 2–3 mm across, red to purple, free lamina suberect, usually withered at anthesis. Floral bracts ca 1.5 mm x 1.5 mm, ovate, obtuse to acute. Ovary ca 3 mm x 1.8 mm, obpyriform, set at about 30 degrees to the rhachis. Inflorescence a narrow, sparse spike 4–8 cm long, consisting of 5–18 flowers. Flowers 5–7 mm across, pink to light mauve, lightly fragrant, sessile. Dorsal sepal 5.5–7.5 mm x ca 3 mm, ovate-lanceolate, pinkish green with two or three fine brown striae, obliquely decurved or reflexed, subacute. Lateral sepals 5.5–7.5 mm x ca 1.5 mm, linear-lanceolate, connate in the proximal half, free and nearly parallel in the distal half, obliquely erect, involute near the apex. Petals 4.5–5.5 mm x ca 1 mm, linear to linear-lanceolate, mauve with a darker median band, upswept, porrect, incurved to spreading, subacute. Labellum 4–5 mm x ca 2.3 mm, linear ovate-lanceolate in outline when flattened, greenish-mauve or pinkish, narrowed to a short basal claw, slightly gibbous when viewed from the side, proximal half broadly elliptical, obliquely erect, with downcurved, nearly entire margins, distal half recurved at right angles, with entire to slightly

crenulate margins, obtuse, not protruding through the sepals; callus 3.5–4 mm x ca 1.5 mm, elliptical-lanceolate, fleshy, yellowish green, channelled centrally, margins entire or slightly crenate, extending three-quarters of way to the labellum apex. Column ca 1.7 mm x 1.6 mm, porrect from the end of the ovary, exposed by the wide expansion of the tepals; appendages ca 1.5 mm x 0.6 mm, linear-oblong, pale green, obtuse, basal lobe prominent. Anther ca 1 mm x 0.8 mm, ovate, dark brown, with a median ridge. Pollinarium ca 1.1 mm long; viscidium ca 0.2 mm long, ovate, white; hamulus almost vestigial; pollinia ca 1 mm long, linear-clavoid, yellow, sectile. Stigma ca 1 mm x 1 mm, quadrate, the rostellum nearly as high as the appendages. Capsule ca 4 mm x 2.5 mm, obovoid, shiny green.

Distribution and Habitat: Known with certainty only from the type locality but inconspicuous even when in flower and readily overlooked. The species grows in moist grassy patches in sparse woodland developed on fertile soils; much of this habitat has been converted to pasture.

Flowering Period: Late October and November.

Notes: This species has affinities with *P. campestre* R. Bates and D. Jones but is smaller, with a much more slender habit with fewer, smaller flowers in a narrow, sparse spike. The flowers also have a very small anther and a short, almost vestigial hamulus on the pollinarium.

Conservation Status: Endangered; suggest 1E according to the criteria of Briggs and Leigh (1988).

Etymology: From the Latin '*petilus*', thin, slender, weak; in reference to the habit of the orchid.

Prasophyllum spicatum R. Bates et D. Jones; species nova *P. odorato* R. Rogers affinis, sed floribus dense confertis, petalis spathulatis marginibus crenulatis, labello albo callo brevi, et appendicibus columnae latis, differt.

Typus: Victoria; ca 20 km south-west of Dergholm, 18 November 1989, R. Bates 21553 (holo AD, CBG, HO, Mel, NSW, PERTH).

Prasophyllum odoratum var. *album* auct. non (R. Rogers) R. Rogers.

Slender terrestrial herb 10–80 cm tall. Tuberoïds ca 10 mm across, globose. Leaf 20–60 cm long, dark green, base 4–8 mm across, purplish, free lamina suberect, usually withered at flowering. Floral bracts ca 1.5 mm x 2 mm, ovate, obtuse. Ovary 4–6 mm x 2–3 mm, pyriform, at about 10 degrees to the rhachis. Inflorescence a densely crowded, narrowly cylindrical spike 6–20 cm long, consisting of numerous flowers. Flowers 8–10 mm across, white with reddish brown or greenish markings on the sepals, fragrant. Dorsal sepal 6–8 mm x 2–3 mm, linear-ovate, subacute, held horizontally or incurved, thick textured. Lateral sepals 6–8 mm x 1.5–2 mm, linear-oblong, free and divergent, suberect, distal

margins involute, apex obtuse. Petals 6–8 mm x 1.5–2 mm, spatulate to oblong-spatulate, white, obtuse, with crenulate margins, often with a reddish-brown, basal median longitudinal stripe. Labellum 7–10 mm x 5–6 mm, ovate to broadly elliptical in outline when flattened, crystalline white, proximal half obliquely erect with irregular but nearly entire, downturned margins, base slightly gibbous, distal half recurved at 50–80 degrees, the apex erect and not protruding between the lateral sepals, the margins intensely folded and crisped, the surface minutely tuberculate; callus 3–3.5 mm x ca 2 mm, linear-oblong, yellowish, thin textured, channelled centrally, ending well below the bend, apex emarginate, basal swelling prominent, dark green, pyramidal. Column ca 3 mm x 3 mm, porrect from the end of the ovary; appendages ca 2.8 mm x 0.8 mm, oblong, falcate, truncate, with a broad basal lobe. Anther ca 1.5 mm x 1.5 mm, ovate, reddish, truncate. Pollinarium ca 2.2 mm long; viscidium ca 0.2 mm long, broadly oblong; hamulus ca 0.4 mm x 1.2 mm ligulate; pollinia ca 1.5 mm long, linear-clavoid, yellow, sectile. Stigma ca 1.8 mm x 1.8 mm, green to pink, the rostellum higher than the appendages. Capsule ca 10 mm x 5 mm, obovoid, shiny green.

Selected Collections: Victoria; Cape Paterson, 27 October 1987, R. Bates 11431 (AD); Stony Point, 12 October 1969, T. B. Muir 4742 (MEL, NSW); Anglesea, 9 October 1934, C. French jr s.n. (W. H. Nicholls 513) (MEL); Lower Glenelg River, 8 November 1959, A. C. Beaglehole 18626 (MEL); South Australia; Border Track south of Comaum, 18 November 1989, R. Bates 21562 (AD).

Distribution and Habitat: Southern Victoria from Wilson's Promontory westwards to near Mt. Gambier, South Australia (Vgi, Vwp, Sse). This species commonly grows in sandy soils of low windswept heaths of the littoral zone, but it also extends into treed heathland up to 50 km inland.

Flowering Period: October to December.

Notes: *P. spicatum* is part of a very complex group of taxa which includes *P. patens* R. Br., *P. truncatum* Lindley and *P. odoratum* R. Rogers; it has also been erroneously confused by many authors with *P. odoratum* var. *album* (R. Rogers) R. Rogers. *P. spicatum* can be distinguished from all other species in the complex by its flowers being densely crowded in a cylindrical spike, its spatulate petals with crenulate margins, a white labellum with a short callus plate and broad column appendages. Plants normally require disturbance (such as mowing or burning) to flower freely.

Conservation Status: Widespread and conserved in National Parks but close to extinction in South Australia; suggest 3RC according to Briggs and Leigh (1988).

Etymology: From the Latin '*spicatum*', spicate, in a spike; in reference to the dense spicate inflorescence.

Prasophyllum sylvestre R. Bates et D. Jones; species nova *P. fusco* R. Br. affinis, sed pedicellis longis, bracteis floralibus longioribus, floribus multo angustioribus gracilioribus pallidioribus, tepalis angustioribus acumina-tioribus, sepalis lateralibus partim connatis, et appendicibus columnae longioribus angustioribus vividius coloratis, differt.

Typus: New South Wales; ca 20 km north of Batemans Bay, beside Pacific Highway, 35°46'S, 150°15'E, 13 November 1987, R. Bates 12388 (holo AD, iso AD, NSW).

Slender terrestrial herb 20–50 cm tall. Tuberooids to 1 cm across, globose to ovoid. Leaf 16–40 cm long, bright green, base 3–4 mm across, red, free lamina obliquely erect. Floral bracts ca 3 mm x 2 mm, linear-ovate, acute, green. Ovary ca 4 mm x 16 mm, pyriform, set at about 30 degrees to the rhachis. Inflorescence a slender, uncrowded raceme 4–9 cm long, consisting of 5–30 flowers. Flowers 3–4 mm across, pale green, pink and reddish brown, on slender pedicels ca 1.5 mm long. Dorsal sepal 7–10 mm x ca 2.5 mm, linear ovate-lanceolate, subacute to apiculate, green with brown median stripe, deflexed at ca 60 degrees below horizontal. Lateral sepals 7–10 mm x ca 2 mm, linear-lanceolate, erect to obliquely erect, conjoined to near the middle then narrowly divergent, green with brown median stripe, distal margins involute, apex cymbiform. Petals 6–7.5 mm x 1–1.2 mm, linear, spreading or incurved, obliquely erect, greenish brown with pink-brown median stripe, subacute to acuminate. Labellum 6–9 mm x 2–3 mm, obovate-oblong in outline when flattened, shortly clawed, pink or white, proximal half obliquely erect with upcurved, entire or slightly crenulate margins, then suddenly constricted into a narrow, tail-like portion which is reflexed greater than right angles, margins slightly crisped or undulate, the subacute apex just protruding between the lateral sepals; callus 5.5–6.5 mm x ca 2 mm, linear-ovate, elongate, yellowish green or pinkish purple, channelled centrally, minutely rugulose, glistening, reaching almost to the apex of the lamina. Column ca 2 mm x 2 mm, porrect from the end of the ovary; appendages ca 2.5 mm x 0.7 mm, linear, sigmoid, pale pink, equal to or longer than the rostellum, obtuse. Anther ca 1 mm x 1 mm, ovate, green with brown edges. Pollinarium ca 1.8 mm long; viscidium ca 0.3 mm long, oblong, white; hamulus ca 0.3 mm long, ligulate; pollinia ca 1.3 mm long, linear-clavoid, yellow, sectile. Stigma ca 1 mm x 1 mm, the rostellum equal to or shorter than the appendages. Capsule ca 7 mm x 4 mm, obovoid, shiny green.

Selected Collections: New South Wales; Eden, December 1932, L. Banfield (W. H. Nicholls 294–298) (MEL); north of Batemans Bay, 25 October 1987, M. A. Clements s.n. (CBG); Victoria; near Genoa Ck., 25 November 1968, A. C. Beaglehole 25392 (MEL).

Distribution and Habitat: Endemic to south-eastern New South Wales and eastern Victoria (Nse, Veh). It grows in

tall open forest or moist areas adjacent to wet sclerophyll forest and rainforest. Plants flower best in disturbed sites such as along road verges or after summer fires.

Flowering Period: Late October to early December.

Notes: This species has been confused with *P. fuscum* R. Br. from which it differs in its narrower, more delicate, paler coloured flowers, longer pedicels and floral bracts, narrower, acuminate perianth segments, partly conjoined lateral sepals and longer, narrower, pale pink column appendages. Both species grow in different habitats with *P. fuscum* occurring in semi-swampy conditions. It also has some similarities with *P. affine* Lindley but the latter is a heathland species which is much more robust with larger, thicker textured flowers.

Conservation Status: Probably common and well conserved but its shy flowering habit means that it is rarely collected.

Etymology: From the Latin 'sylvestris', pertaining to forests; in reference to the habitat.

Prasophyllum wallum R. Bates et D. Jones; species nova *P. appendiculato* Nicholls affinis, sed floribus viridulis, labello parum reflexo albo basi lata orbiculari et callo ovato-sagittato, differt.

Typus: Queensland; Coolum, 19 August 1976, P. Sharpe 2067 (holo BRI).

Prasophyllum sp. 1, D. Jones in Ross and Jones 382 (1989).

Slender terrestrial herb 20–40 cm tall. Tuberoïds not seen. Leaf 15–35 cm long, green, base 7–10 mm across, greenish, free lamina to 15 cm long, suberect, apex lax. Floral bracts ca 1.5 mm x 2 mm, ovate, subacute to obtuse. Ovary ca 6 mm x 3 mm, ovoid, at about 30 degrees to the rachis. Inflorescence a short crowded spike, consisting of 12–18 flowers. Flowers 7–9 mm across, greenish with a white labellum, sessile, fragrant, erect. Dorsal sepal 7–10 mm x 3–4 mm, ovate-lanceo-

late, acute to acuminate, decurved, often with a brownish median band. Lateral sepals 7–10 mm x 2–3 mm, linear-lanceolate, erect, conjoined in the proximal half, greenish, distal margins suddenly incurved, apex acute, reflexed. Petals 5–8 mm x 1–2 mm, linear, spreading, falcate, acute, greenish with a dark median band. Labellum 7–8 mm x 5–6 mm, ovate-lanceolate in outline when flattened, white with red to brown tints, proximal half obliquely erect, broadly orbicular, distal third suberect, flat, margins undulate to crisped, apex 2–3 mm long, triangular, acute; callus 2–3 mm x 2–3 mm, transversely ovate to almost orbicular, greenish, margins smooth, raised, just extending to the apical section of the labellum. Column ca 3 mm x 3 mm, porrect from the end of the ovary; appendages ca 3 mm x 1 mm, linear-oblong, pale green, acute, basal lobe small. Anther ca 2 mm x 1.5 mm, ovate, reddish brown, obtuse, minutely tuberculate, ribbed dorsally. Pollinarium ca 2.5 mm long; viscidium ca 0.2 mm long, oblong, white; hamulus ca 0.4 mm long, ligulate; pollinia ca 2 mm long, linear-clavoid, yellow, sectile. Stigma ca 2 mm x 1.8 mm, green, the rostellum as high as the appendages. Capsule not seen.

Distribution and Habitat: South-eastern Queensland where distributed from Hervey Bay to Coolum but rarely collected. This species grows in wallum communities and also in adjacent stabilised dunes.

Flowering Period: August and September.

Notes: This very distinctive species could hardly be confused with any other. It can be recognised by its pale green and white flowers which are crowded in a short spike. Its hardly reflexed labellum with a broad, orbicular base and short, broad callus is very distinctive.

Conservation Status: Conserved in an Environmental Park but rare and threatened by development of its coastal habitat; suggest 2VC by criteria of Briggs and Leigh (1988).

Etymology: Chosen for the wallum plant community where this species grows.

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Acianthus apprimus, Mt Wilson, NSW.
Photo M. A. Clements.



Acianthus borealis (RHS - Herberton, Qld
and *A. fornicatus* (LHS - Batehaven, NSW)
Photo M. A. Clements.



Acianthus collinus Mt Werang, NSW. Photo
C. Bower.



Acianthus exiguus (RHS - Wardell, NSW)
and *A. fornicatus* (LHS - Batehaven,
NSW). Photo M. A. Clements



Acianthus exsertus (LHS - Bungonia, NSW)
and *A. pusillus* (RHS - Lamington Plateau,
Qld).



Arthrochilus latipes, Arnhem Land, NT.
Photo I. Morris.



Arthrochilus oreophilus, Herberton Range,
Qld. Photo M. A. Clements.



Arthrochilus prolixus, Bulahdelah, NSW.
Photo M. A. Clements.



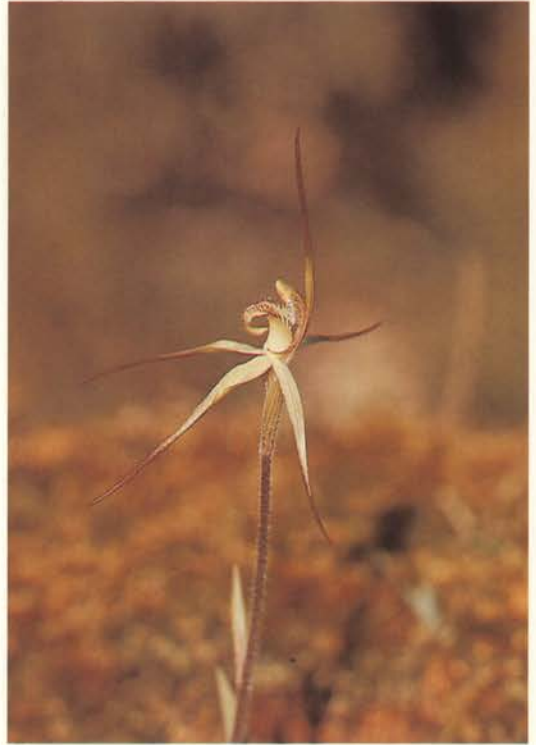
Arthrochilus rosulatus, south of Cooktown,
Qld. Photo M. A. Clements.



Caladenia aerochila, Lake Fyans, Vic. Photo J.
Jeanes.



Caladenia aestiva, Wulgulmerang, Vic. Photo
E. R. Rotherham.



Caladenia brumalis, SA. Photo M. A.
Clements.



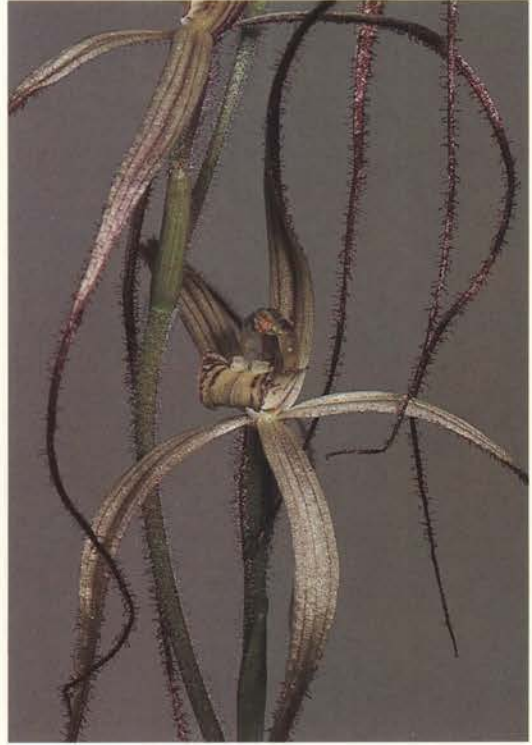
Caladenia clarkiae, eastern Vic. Photo J. Jeanes.



Caladenia corynepetala, Tas. Photo L. Rubenach.



Caladenia demissa, near Stawell, Vic. Photo J. Jeanes.



Caladenia flaccida, Sims Gap, NSW. Photo M. A. Clements.



Caladenia haemantha, SA. Photo N. Rohnlach.



Caladenia helvina, near Fingal, Tas. Photo L. Rubenach.



Caladenia leptoclavia, Bethungra, NSW. Photo C. Bower.



Caladenia phaeoclavia, Mullion Range, NSW. Photo C. Bower.



Caladenia richardsiorum, Little Dip, SA
Photo R. Bates



Caladenia rigens, near Rankin Springs,
NSW. Photo M. A. Clements.



Caladenia stellata, Sims Gap, NSW. Photo
M. A. Clements.



Chiloglottis anaticeps, Hastings Forest Way,
NSW. Photo D. L. Jones.



Chiloglottis longiclavata, Herberton Range, Qld. Photo M. A. Clements.



Chiloglottis palachila, Barrington Tops, NSW. Photo D. L. Jones.



Chiloglottis platyptera, Barrington Tops, NSW. Photo C. Bower.



Chiloglottis pluricallata, Barrington Tops, NSW. Photo C. Bower.



Chiloglottis seminuda, Wambool, NSW.
Photo M. A. Clements.



Chiloglottis trullata, Blackdown Tableland,
Qld. Photo M. A. Clements.



Chiloglottis valida, near Adaminaby, NSW.
Photo M. A. Clements.



Corybas limpidus, Ledge Beach, near Albany,
WA. Photo D. L. Jones.



Dipodium atropurpureum, north of Walcha, NSW. Photo D. L. Jones.



Dipodium campanulatum, Naracoorte, SA. Photo M. A. Clements.



Dipodium elegantulum, Atherton - Mareeba Rd., Qld. Photo D. L. Jones.



Dipodium roseum, Tidbinbilla, ACT. Photo M. A. Clements.



Diuris amplissima, Kojonup West, WA.
Photo R. Heberle.



Diuris brumalis, Kalamunda, WA. Photo D.
L. Jones.



Diuris concinna, Helms Arboretum, WA.
Photo M. A. Clements.



Diuris conspicillata, Esperance, WA. Photo
M. A. Clements.



Diuris flavescens, The Bight near Wingham, NSW. Photo M. A. Clements.



Diuris heberlei, Moates Lagoon, WA. Photo R. Heberle.



Diuris magnifica, Mandogalup, WA. Photo D. L. Jones.



Diuris micrantha, Mandogalup, WA. Photo D. L. Jones.



Diuris X nebulosa, Lake Burrill, NSW. Photo D. L. Jones.



Diuris oporina, near Watsonville, Qld. Photo J. Jeanes.



Diuris praecox, Newcastle, NSW. Photo M. A. Clements.



Diuris pulchella, Mt Ney, WA. Photo R. Heberle.



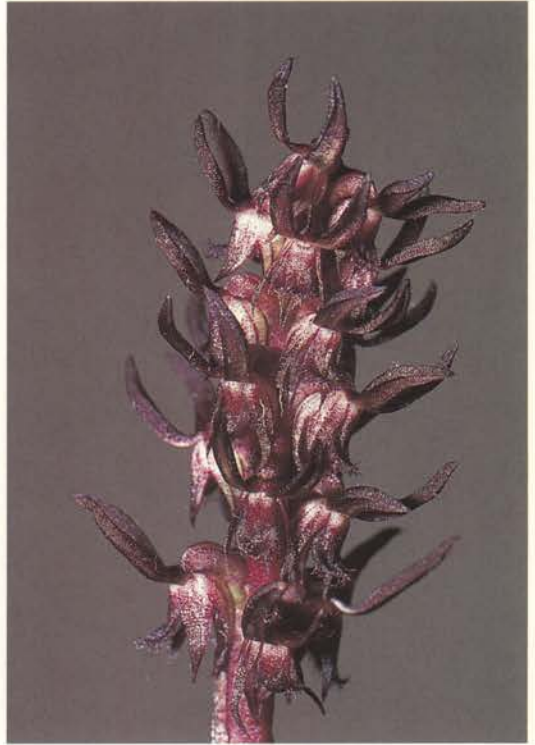
Diuris recurva, Northhampton, WA. Photo D. L. Jones.



Gastrodia entomogama, Mt Franklin, ACT. Photo M. A. Clements.



Gastrodia lacista, near Albany, WA. Photo R. Heberle.



Genoplesium arrectum, Omeo, Vic. Photo M. A. Clements.



Genoplesium citriodorum, Woodford, NSW.
Photo M. A. Clements.



Genoplesium pedersonii, Blackdown Table-
land, Qld. Photo M. A. Clements.



Genoplesium simulans, Clarence, NSW.
Photo M. A. Clements.



Genoplesium superbum, Endrick River,
NSW. Photo M. A. Clements.



Genoplesium systemum, Conimbla National Park. Photo M. A. Clements.



Genoplesium turfosum, Tantangara Dam Rd., NSW. Photo M. A. Clements.



Genoplesium validum, Blackdown Tableland. Photo M. A. Clements.



Prasophyllum campestre, west of West Wyalong, NSW. Photo M. A. Clements.



Prasophyllum dosseum, Ben Lomond, NSW.
Photo M. A. Clements.



Prasophyllum exilis, Torbanlea, Qld. Photo
D. L. Jones.



Prasophyllum montanum, Ingeegoodbee, Vic.
Photo J. Jeanes.



Prasophyllum spicatum, Cape Paterson, Vic.
Photo J. Jeanes.

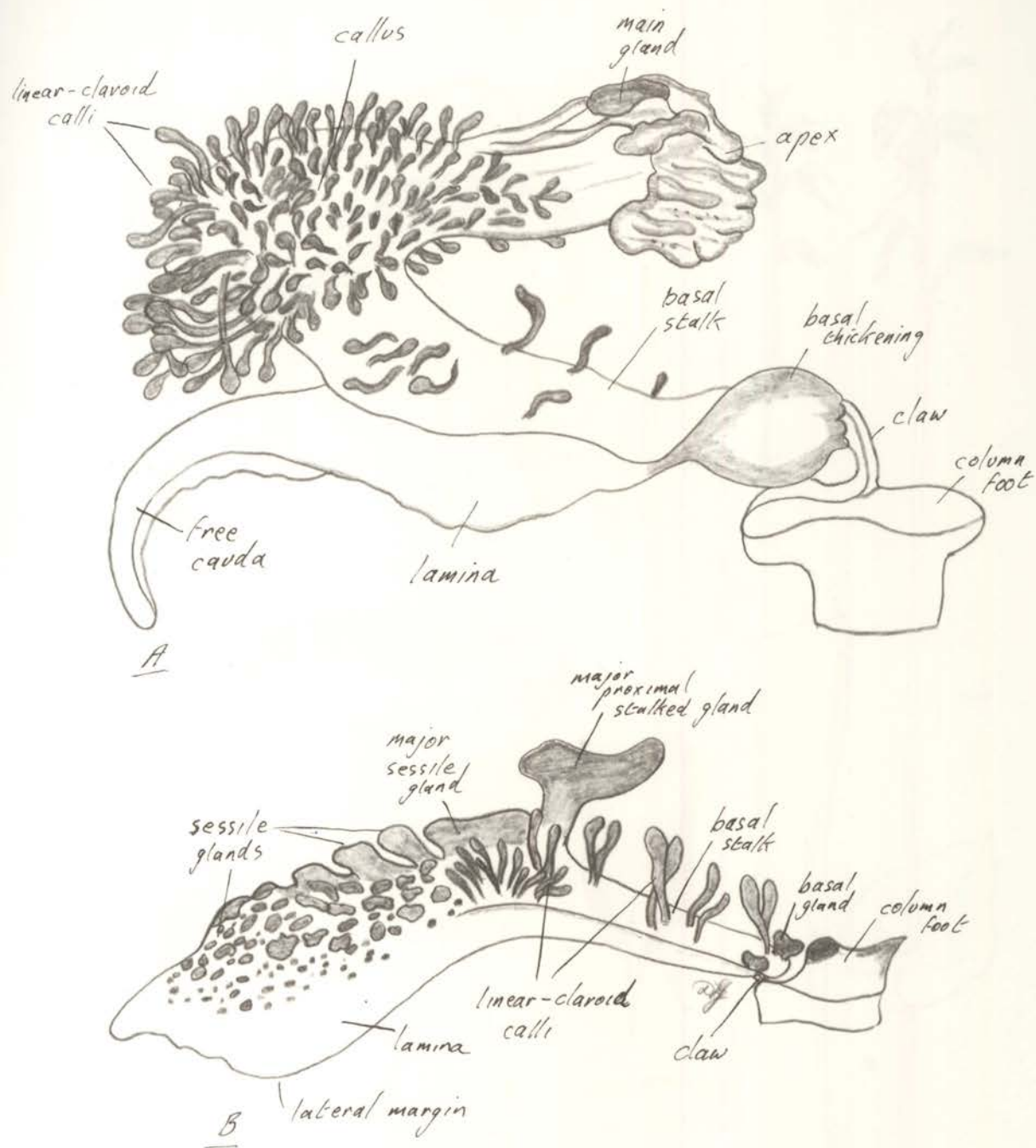


Fig. 1. Labellum explanatory terms, a) *Arthrochilus latipes*, b) *Chilognathus anaticeps*.

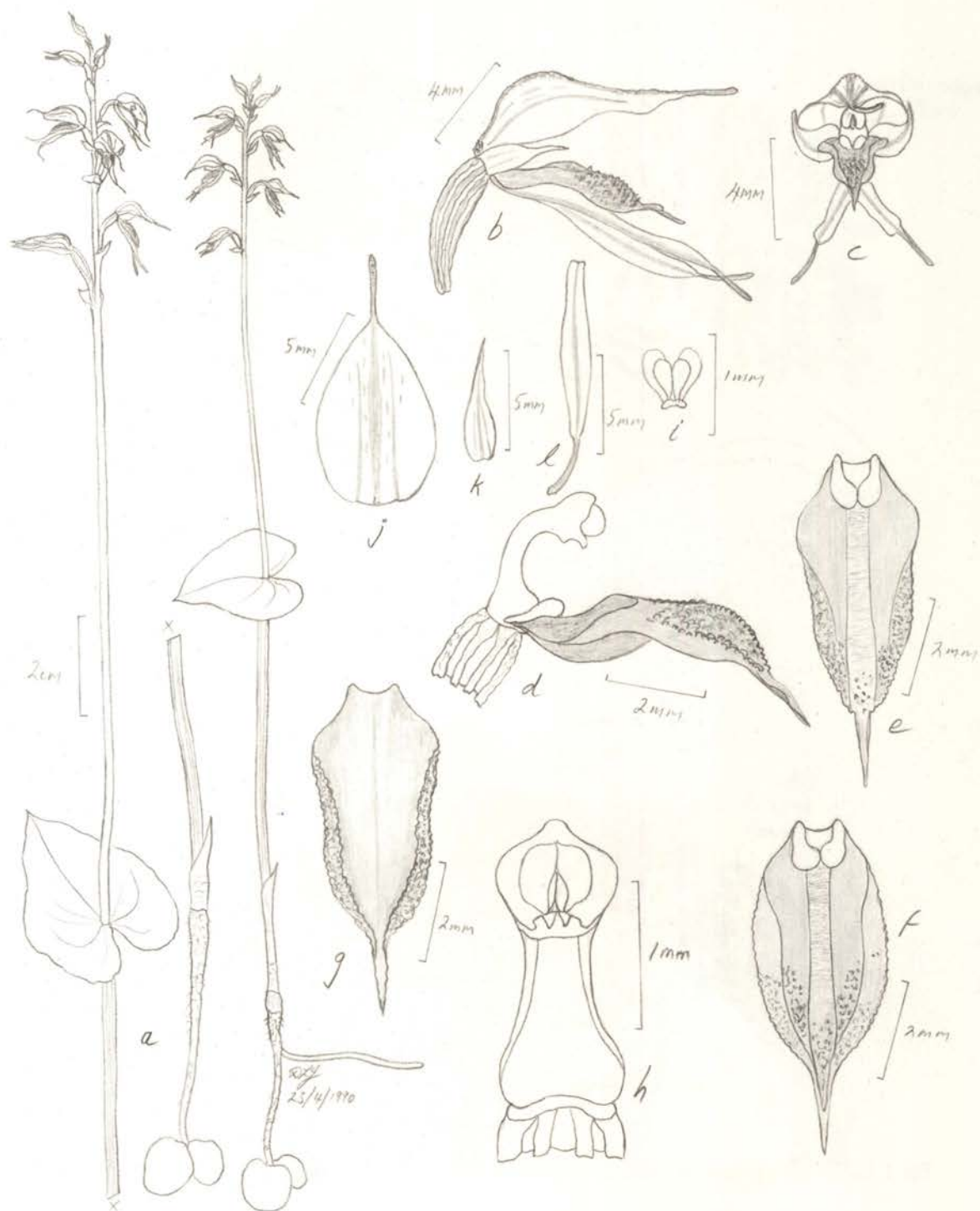


Fig. 2. *Acianthus apprimus* (Mt Wilson, NSW, D. L. Jones 5655), a) typical plants, b) flower from side, c) flower from front, d) labellum and column from side, e) labellum from above, f) labellum flattened out, g) labellum from below, h) column from front, i) pollinarium, j) dorsal sepal, k) petal, l) lateral sepal.

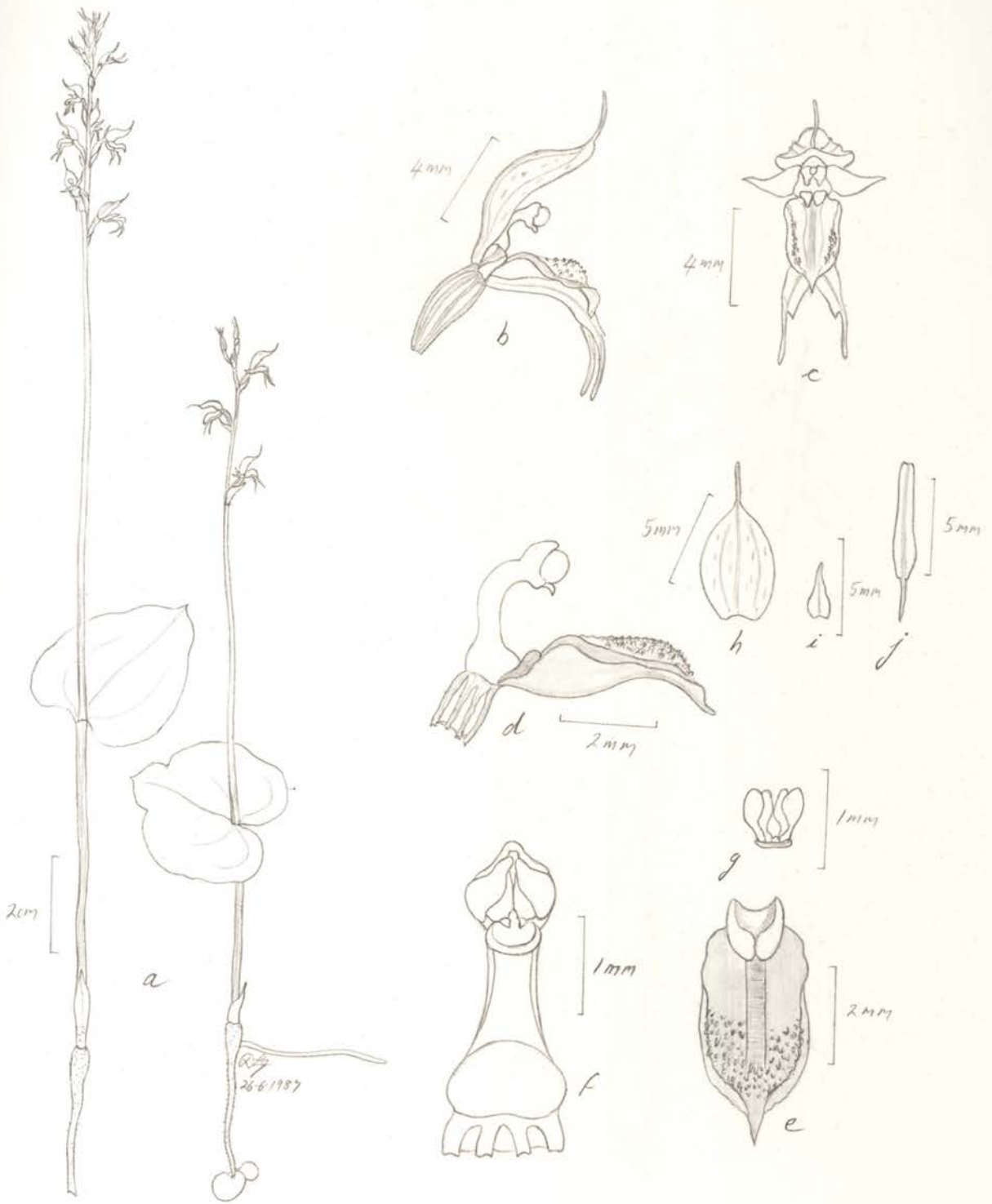


Fig. 3. *Acianthus borealis* (Davies Ck, Qld, H. Richards s.n.), a) typical plants, b) flower from side, c) flower from front, d) column and labellum from side, e) labellum from above, f) column from front, g) pollinarium, h) dorsal sepal, i) petal, j) lateral sepal.

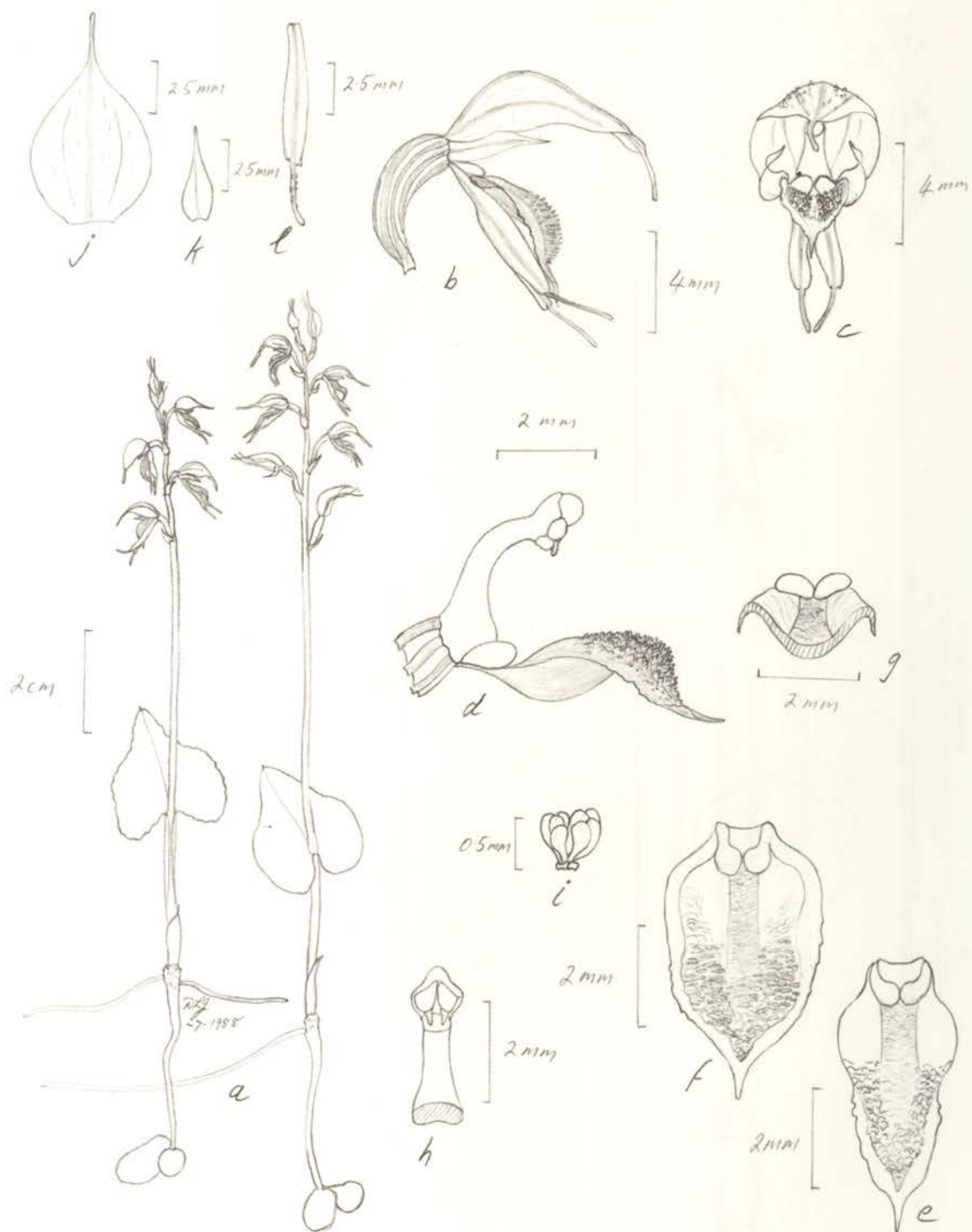


Fig 4. *Acianthus collinus* (Conimbla National Park, NSW, D. L. Jones 2704), a) typical plants, b) flower from side, c) flower from front, d) column and labellum from side, e) labellum from above, f) labellum flattened out, g) base of labellum, h) column from front, i) pollinarium, j) dorsal sepal, k) petal, l) lateral sepal.

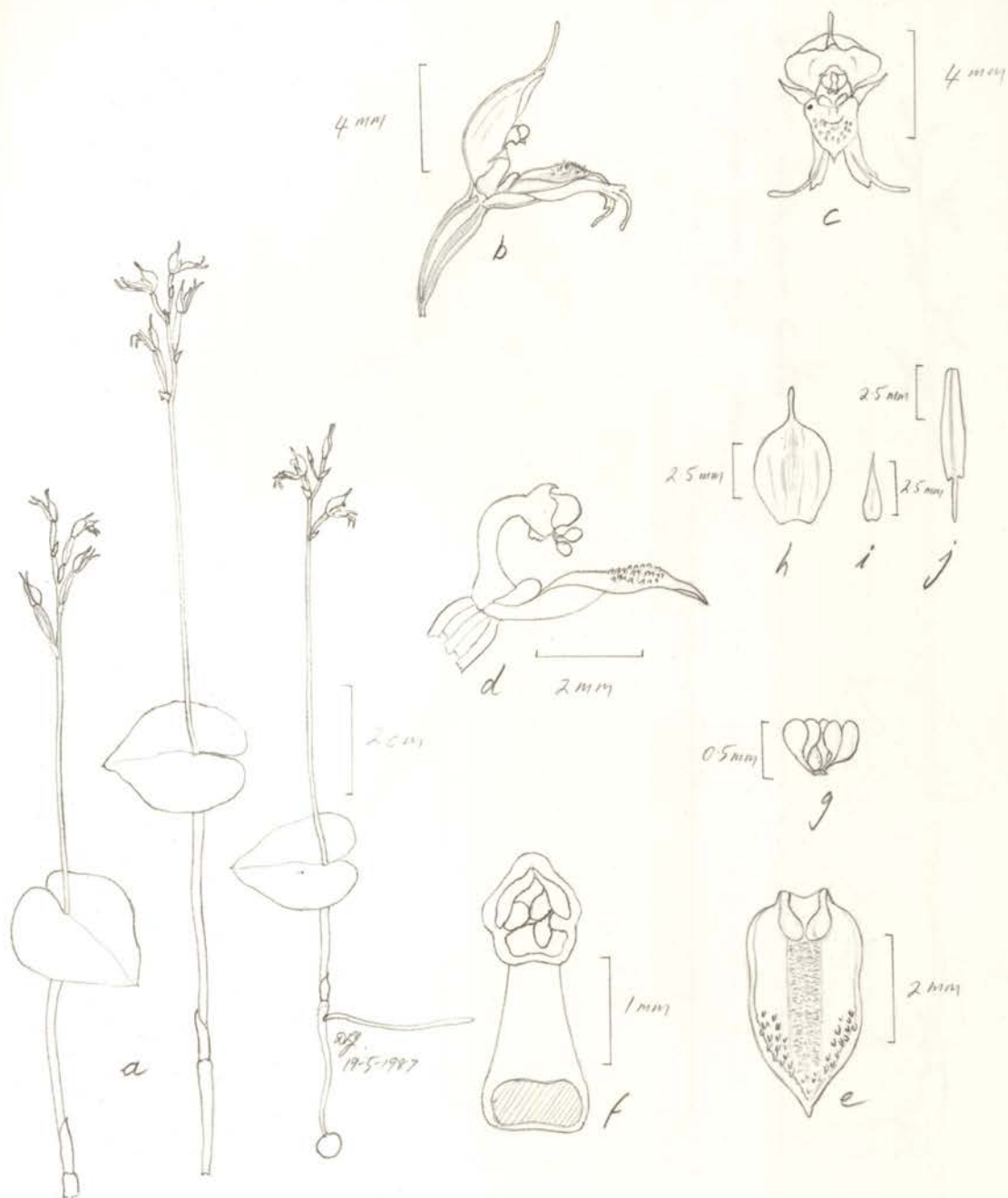


Fig. 5. *Acianthus exiguus* (Wardell, NSW, D. L. Jones 2550), a) typical plants, b) flower from side, c) flower from front, d) column and labellum from side, e) labellum from above, f) column from front, g) pollinarium, h) dorsal sepal, i) petal, j) lateral sepal.

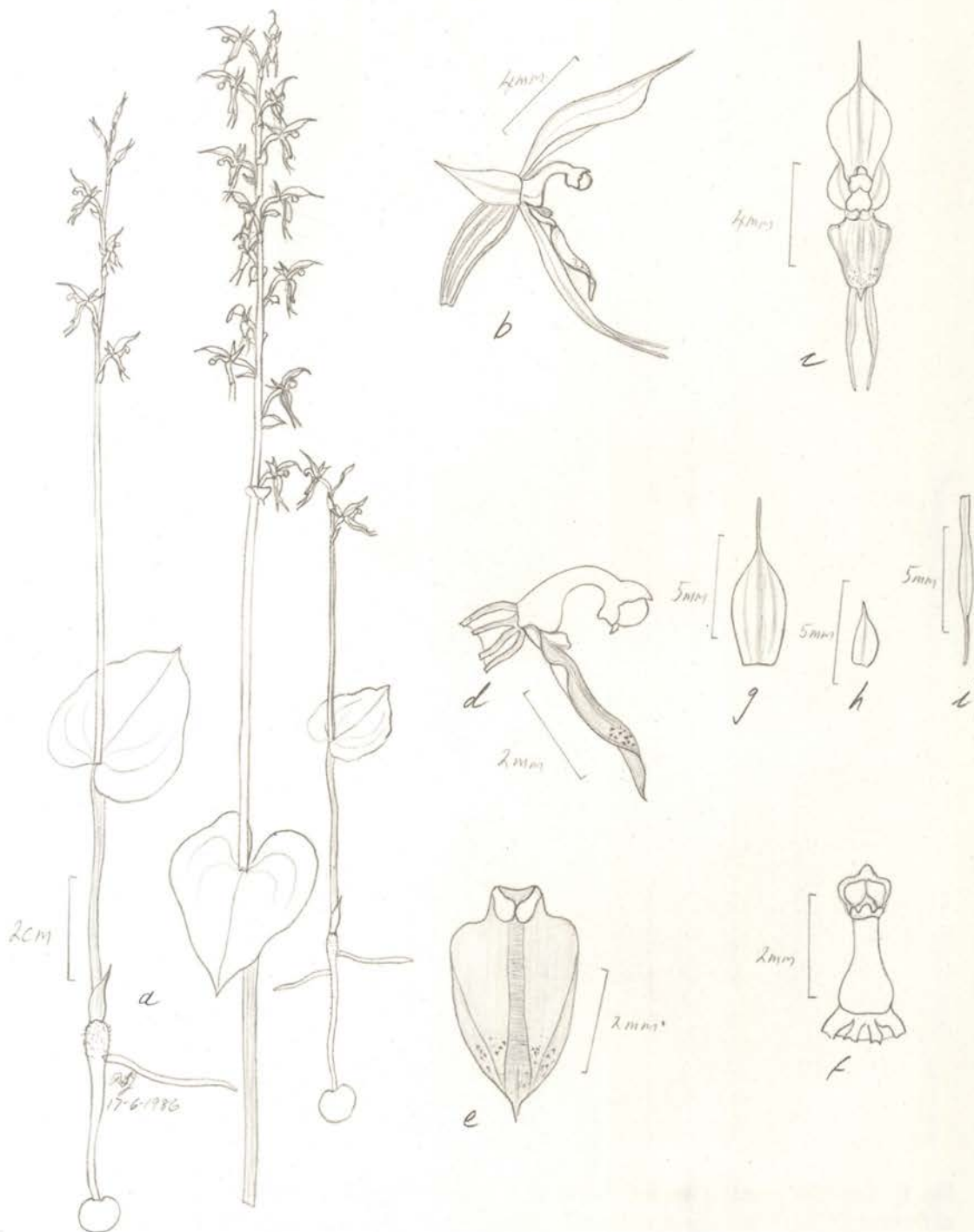


Fig. 6. *Acianthus pusillus* (Myponga, SA, H. Richards s.n.), a) typical plants, b) flower from side, c) flower from front, d) column and labellum from side, e) labellum from above, f) column from front, g) dorsal sepal, h) petal, i) lateral sepal.



Fig. 7. *Arthrochilus latipes* (Arnhem Land, NT, I. Morris s.n.), a) typical plant, b) flower from side, c) labellum and column foot from side, d) labellum from above, e) column from front, f) column from side, g) pollinium, h) head of labellum gland, i) dorsal sepal, j) lateral sepal, k) petal.



Fig. 8. *Arthrochilus oreophilus* (Mt Baldy, Qld, L. Lawler 24), a) typical plants, b) flower from side, c) labellum and column foot from side, d) labellum from above, e) column from front, f) column from side, g) pollinium, h) head of labellum gland, i) dorsal sepal, j) lateral sepal, k) petal.



Fig. 9. *Arthrochilus prolixus* (Wardell, NSW, J. Moye s.n.), a) typical plant, b) flower from side, c) labellum and column foot from side, d) labellum from above, e) column from front, f) column from side, g) labellum lamina with gland removed, h) labellum gland from below, i) head of labellum gland, j) dorsal sepal, k) lateral sepal, l) petal, m) floral bract.



Fig. 10. *Arthrochilus rosulatus* (south of Cooktown, Qld, L. Lawler 83), a) typical plants, b) flower from side, c) labellum and column foot from side, d) labellum from above, e) column from front, f) column from side, g) labellum lamina with gland removed, h) head of labellum gland, i) labellum gland from below, j) dorsal sepal, k) lateral sepal, l) petal, m) floral bract.

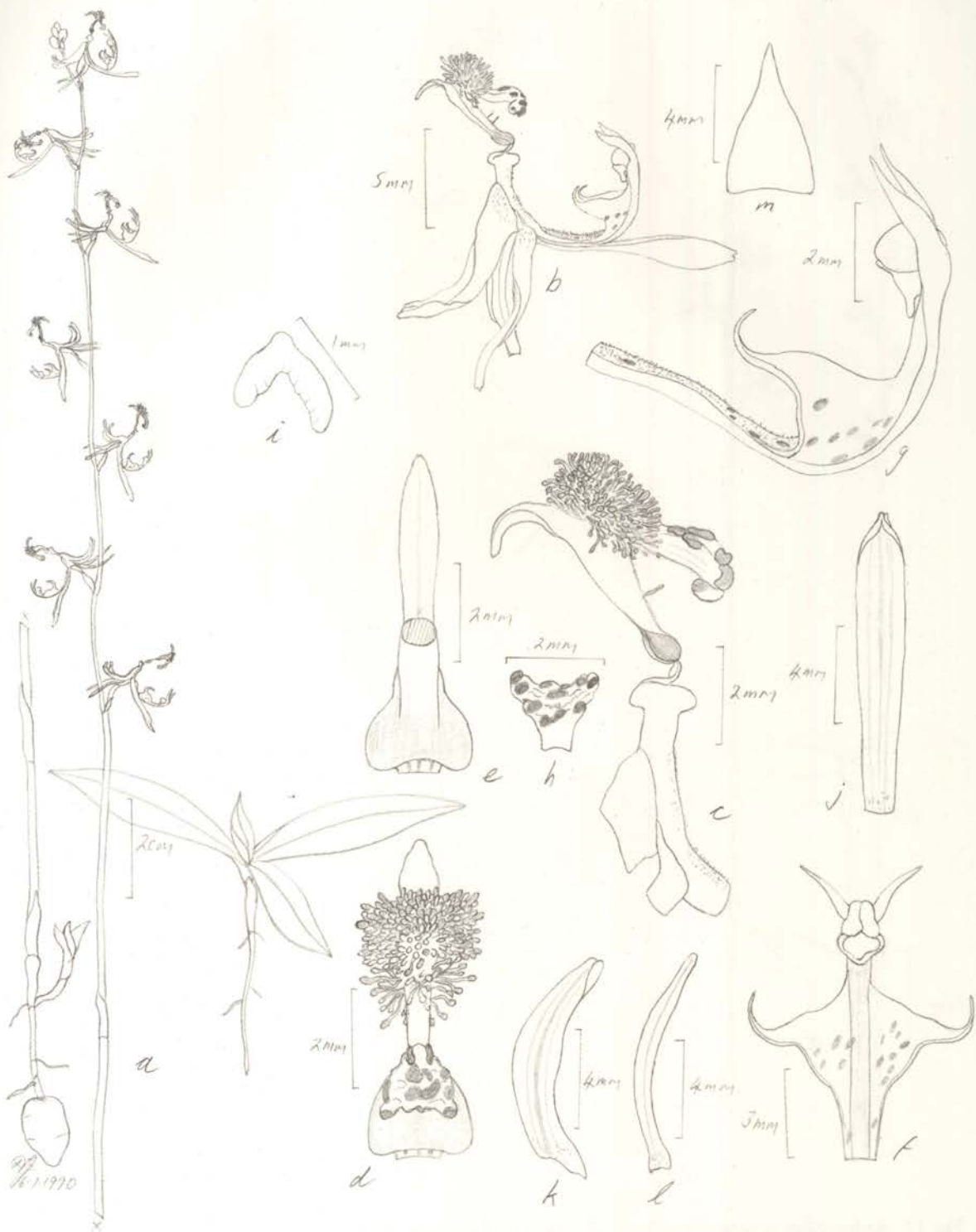


Fig. 11. *Arthrochilus sabulosus* (Horn Island, Qld, D. L. Jones 3558), a) typical plant, b) flower from side, c) labellum and column foot from side, d) labellum from above, e) labellum lamina with gland removed, f) column from front, g) column from side, h) head of labellum gland, i) pollinium, j) dorsal sepal, k) lateral sepal, l) petal, m) floral bract.

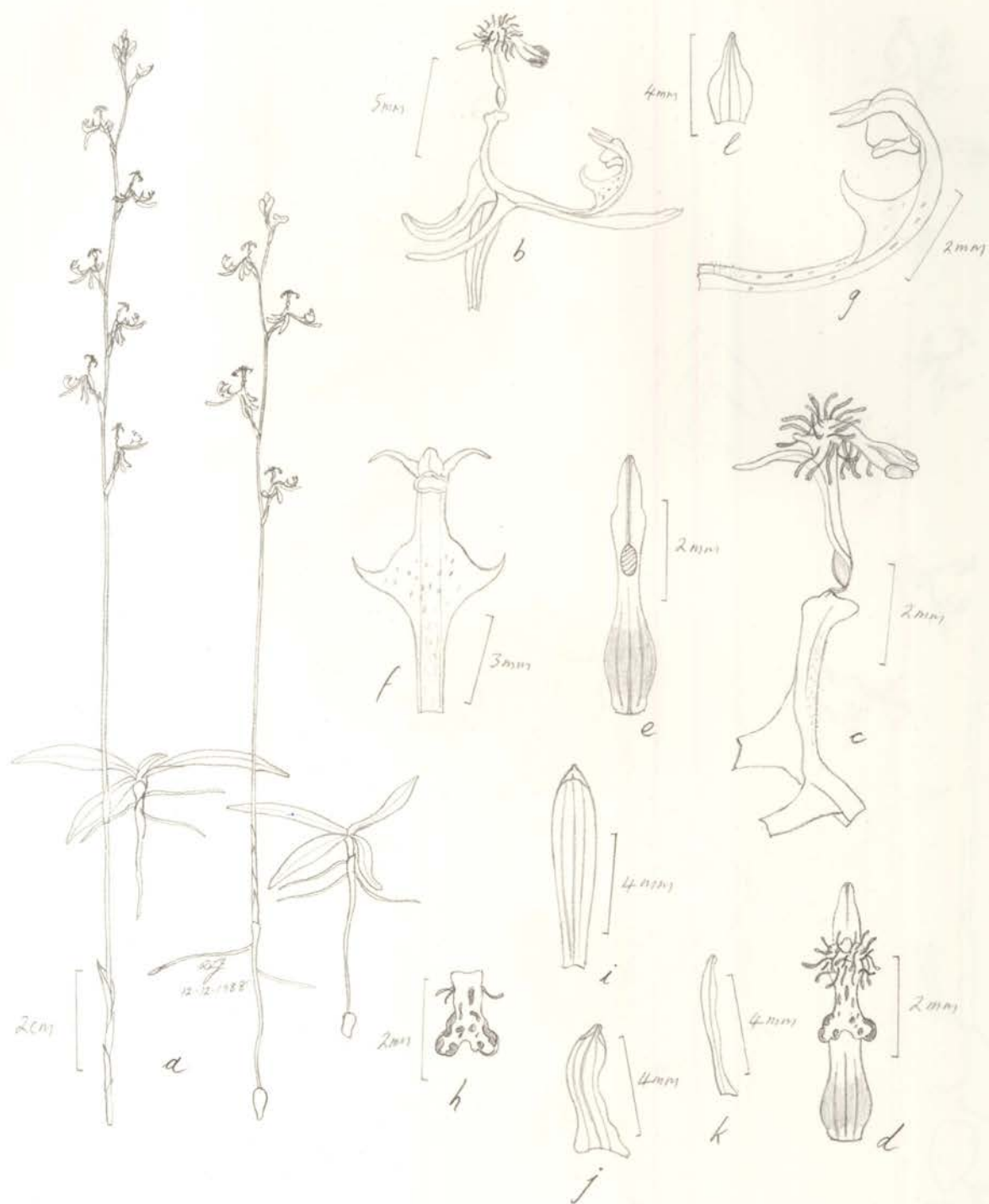


Fig. 12. *Arthrochilus stenophyllus* (Cardwell, Qld, P. S. Lavarack 3624), a) typical plants, b) flower from side, d) labellum from above, e) labellum lamina with gland removed, f) column from front, g) column from side, h) head of labellum gland, i) dorsal sepal, j) lateral sepal, k) petal, l) floral bract.

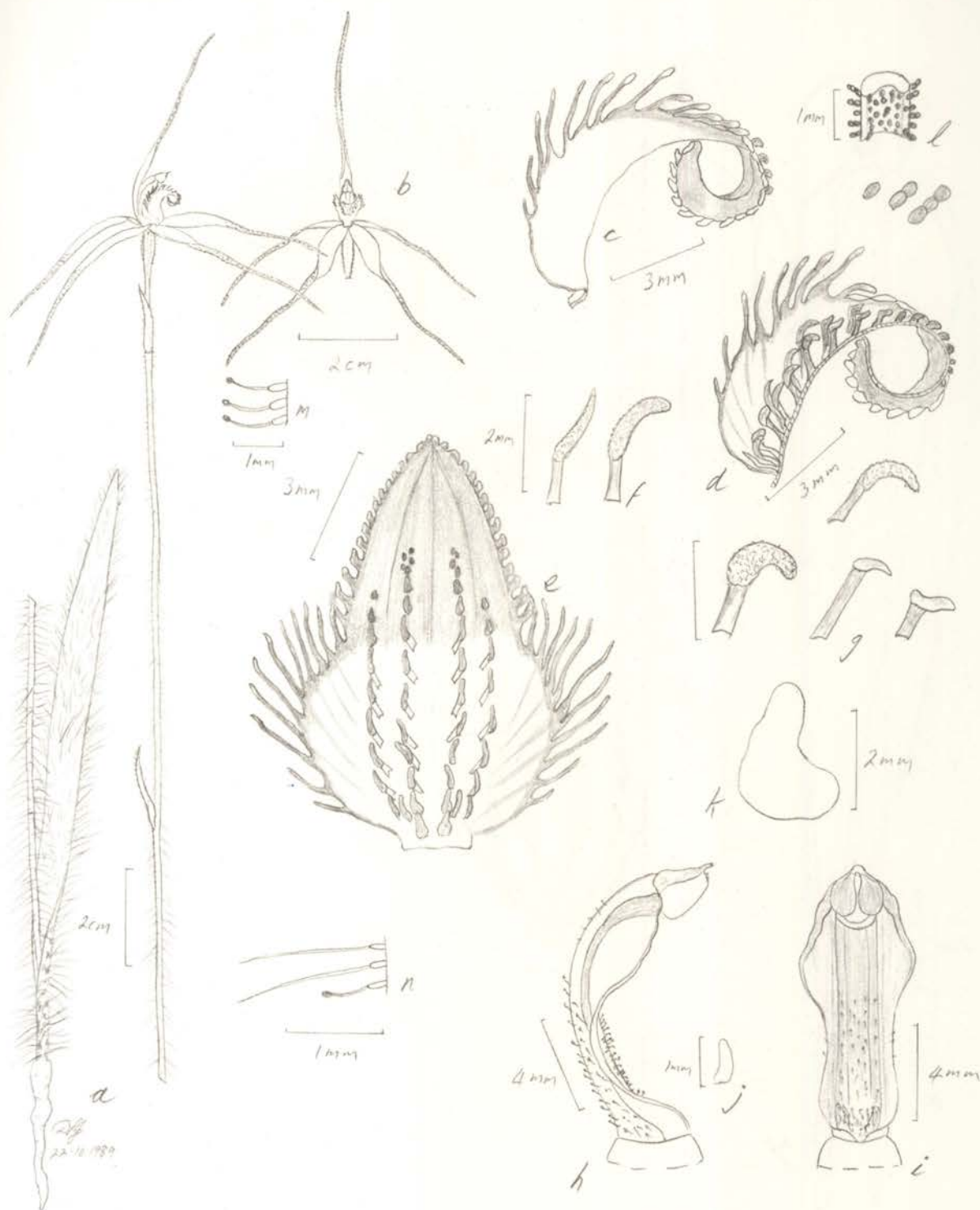


Fig. 13. *Caladenia aerochila* (Lake Fyans, Vic, D. L. Jones 5288), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) section of osmophore and trichomes, m) ovary trichomes, n) stem trichomes.



Fig. 14. *Caladenia aestiva* (Wulgulmerang, Vic, P. Branwhite s.n.), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) column from side, g) column from front, h) column gland, i) pollinium, j) basal calli, k) lamina calli, l) sepal line osmophore and glands, m) ovary trichomes, n) stem and leaf trichomes.

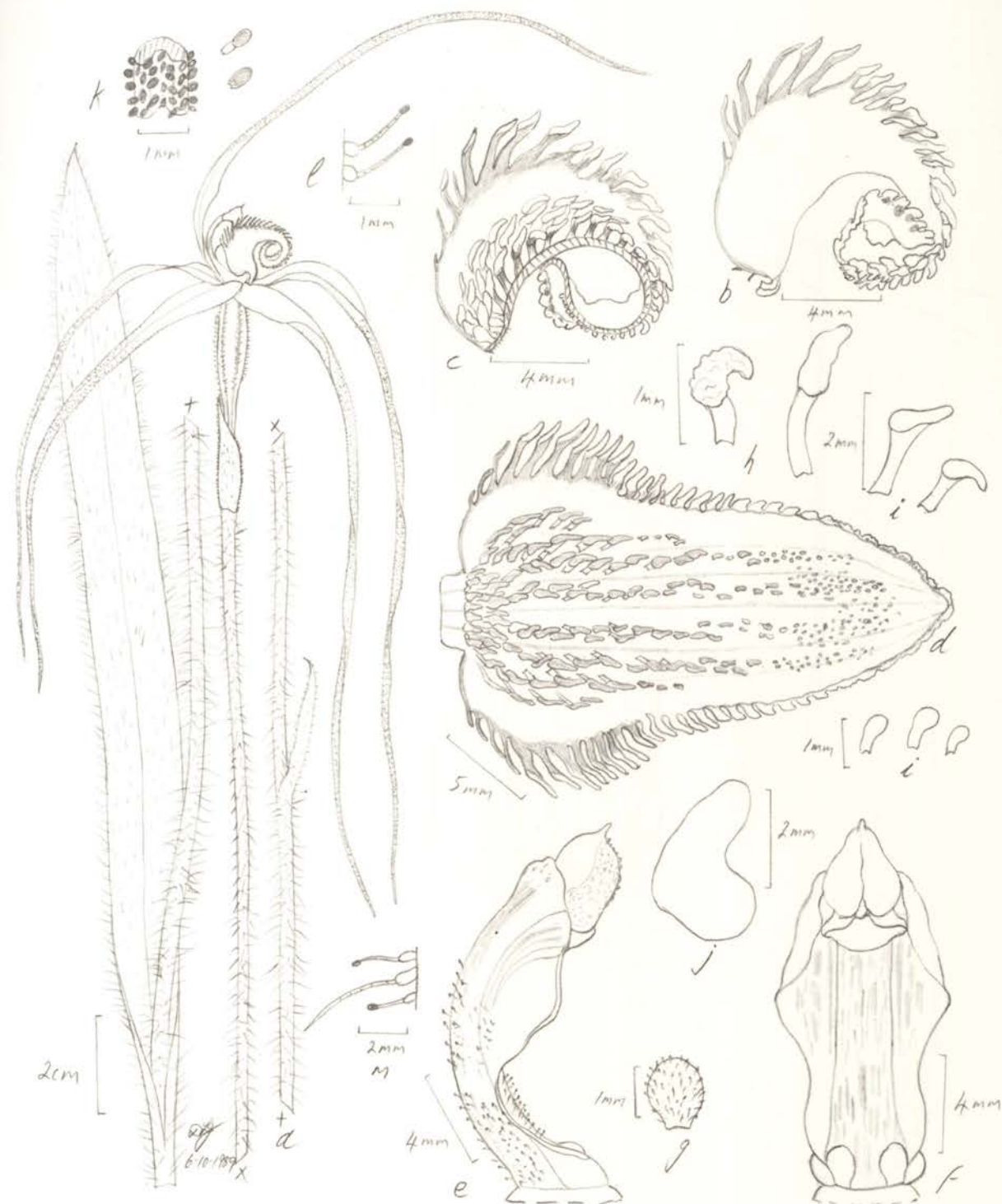


Fig. 15. *Caladenia argocalla* (Nuriootpa, SA, R. Bates 21022), a) plant, b) labellum from side, c) longitudinal section of labellum, d) labellum flattened out from above, e) column from side, f) column from front, g) column gland, h) basal calli, i) lamina calli, j) pollinium, k) section of osmophore and glands, l) ovary trichomes, m) stem and leaf trichomes.

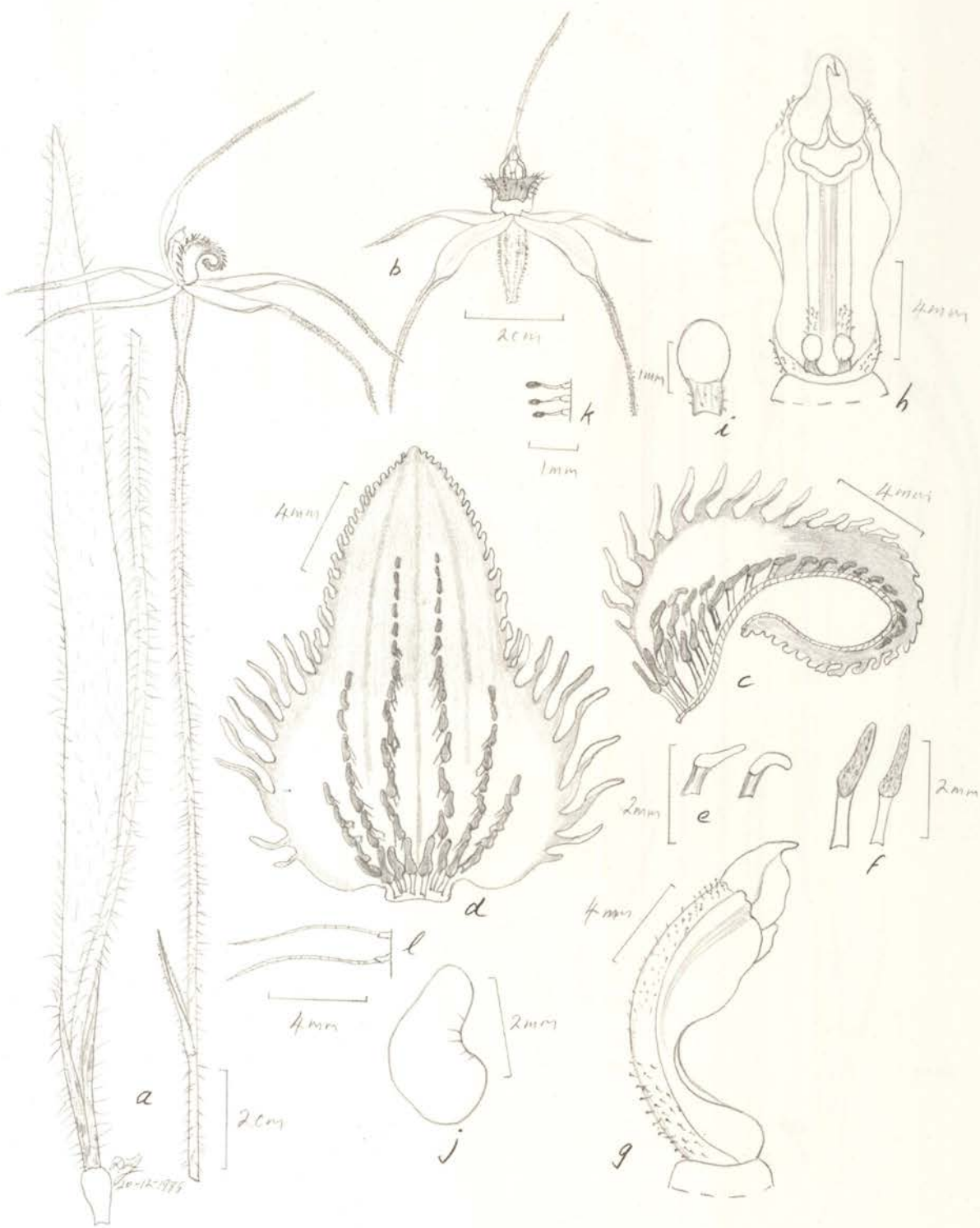


Fig. 16. *Caladenia beaugleholei* (Portland, Vic, C.&D. Woolcock s.n.), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) ovary trichomes, l) stem and leaf trichomes.

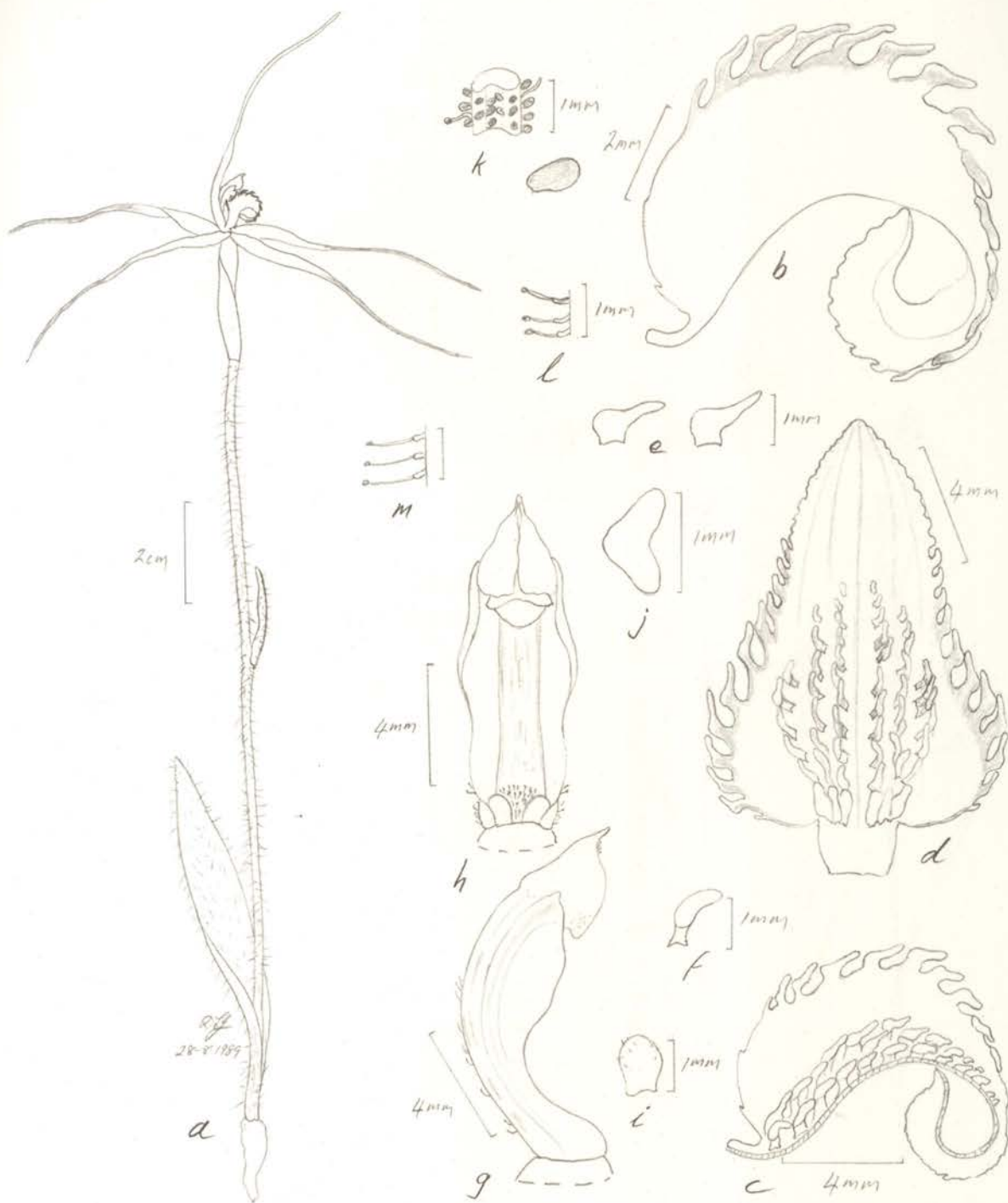


Fig. 17. *Caladenia brumalis* (Yorke Peninsula, SA, R. Bates s.n.), a) plant, b) labellum from side, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) section of osmophore and glands, l) ovary trichomes, m) stem and leaf trichomes.

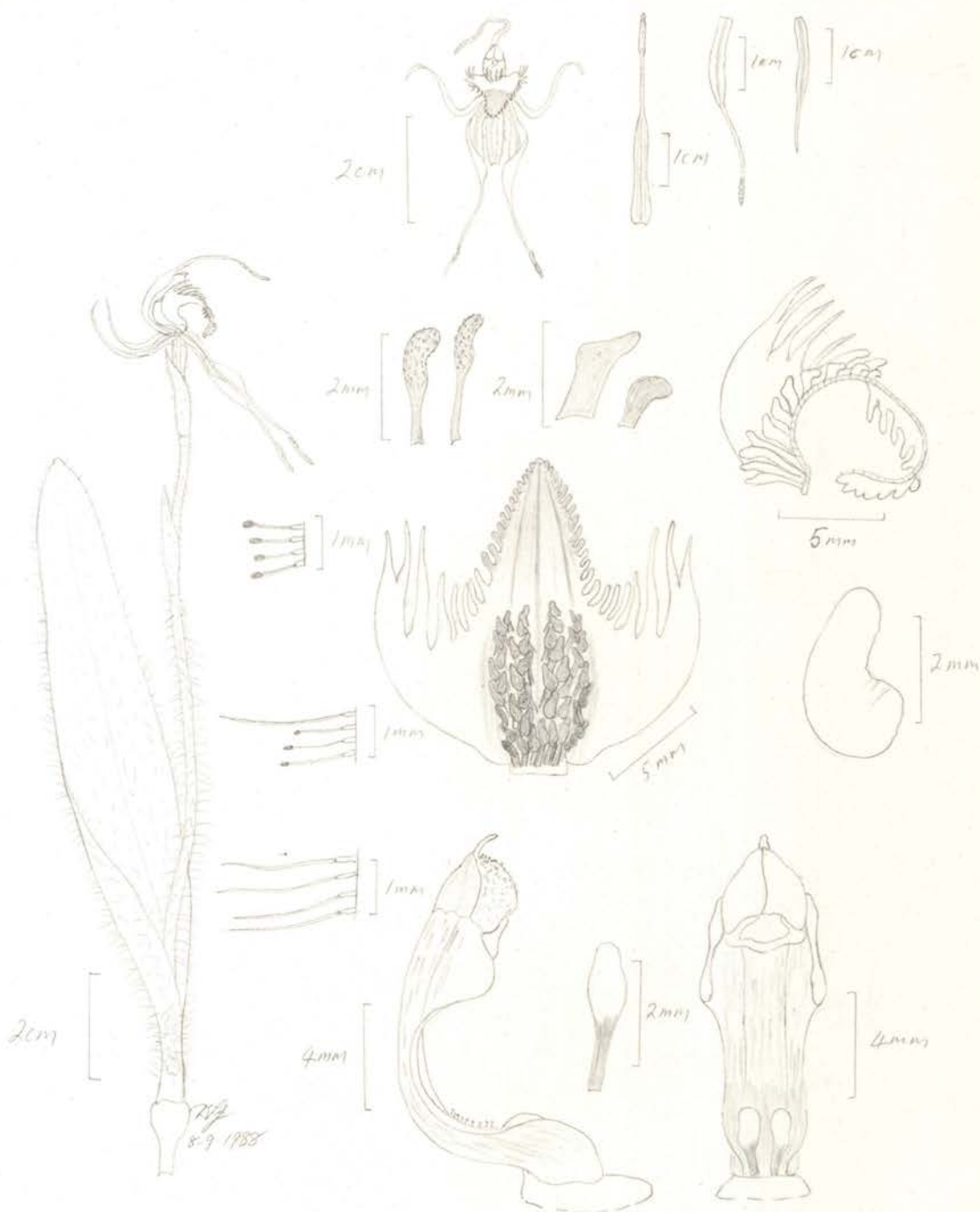


Fig. 19. *Caladenia clavula* (Mambray Ck, SA, R. Bates 15332), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) ovary trichomes, o) stem trichomes, p) leaf trichomes.



Fig. 20. *Caladenia cleistantha* (Gabo Island, Vic, D. L. Jones s.n.), a) plants, b) flower from side, c) labellum flattened out from above, d) column and labellum from side, e) column from side, f) column from front.

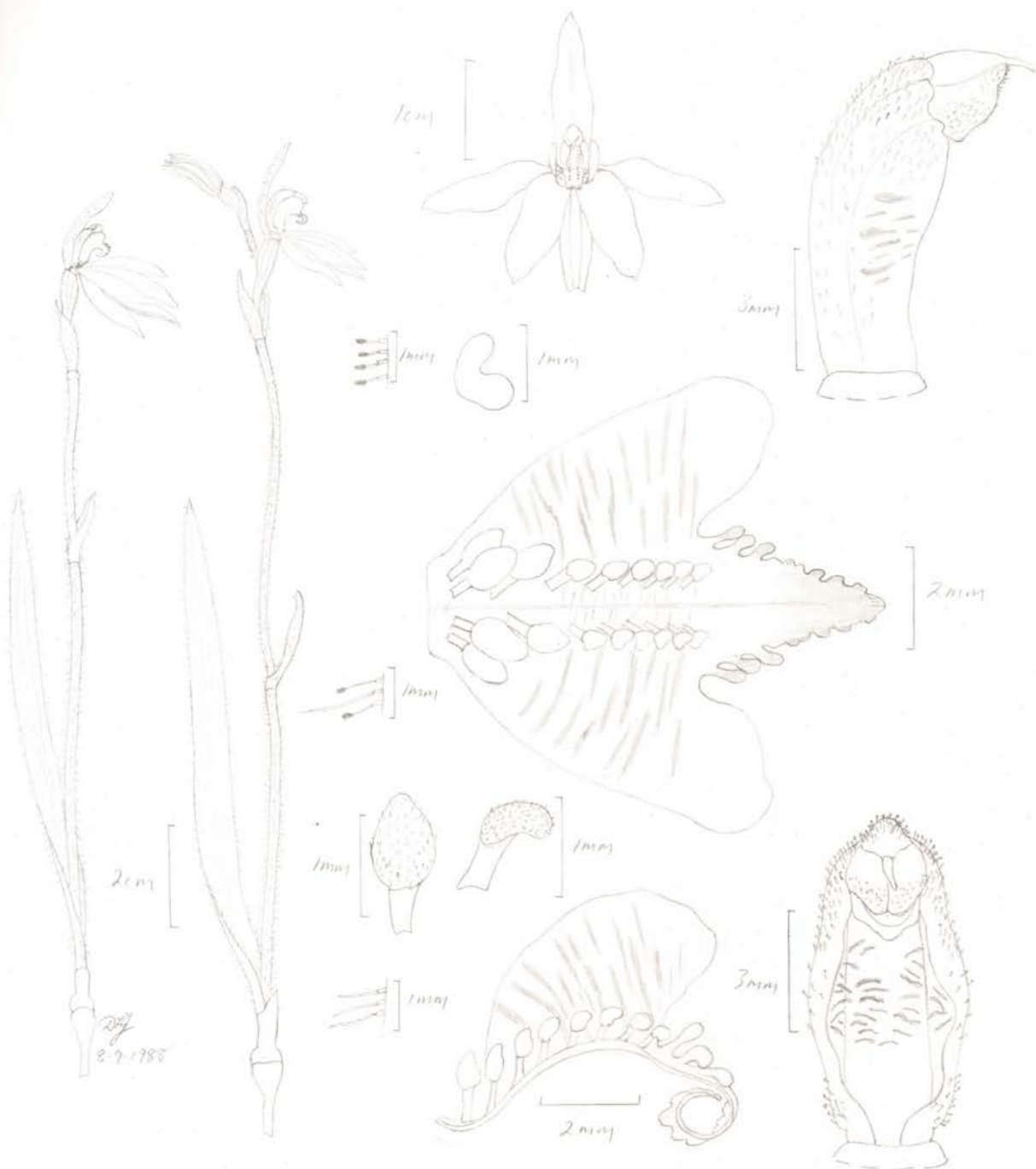


Fig. 21. *Caladenia coactilis* (Mambray Ck, SA, R. Bates 15318), a) plants, b) flower from front, c) labellum flattened out from above, d) longitudinal section of labellum, e) basal calli, f) lamina calli, g) pollinium, h) column from side, i) column from front, j) ovary trichomes, k) stem trichomes, l) leaf trichomes.

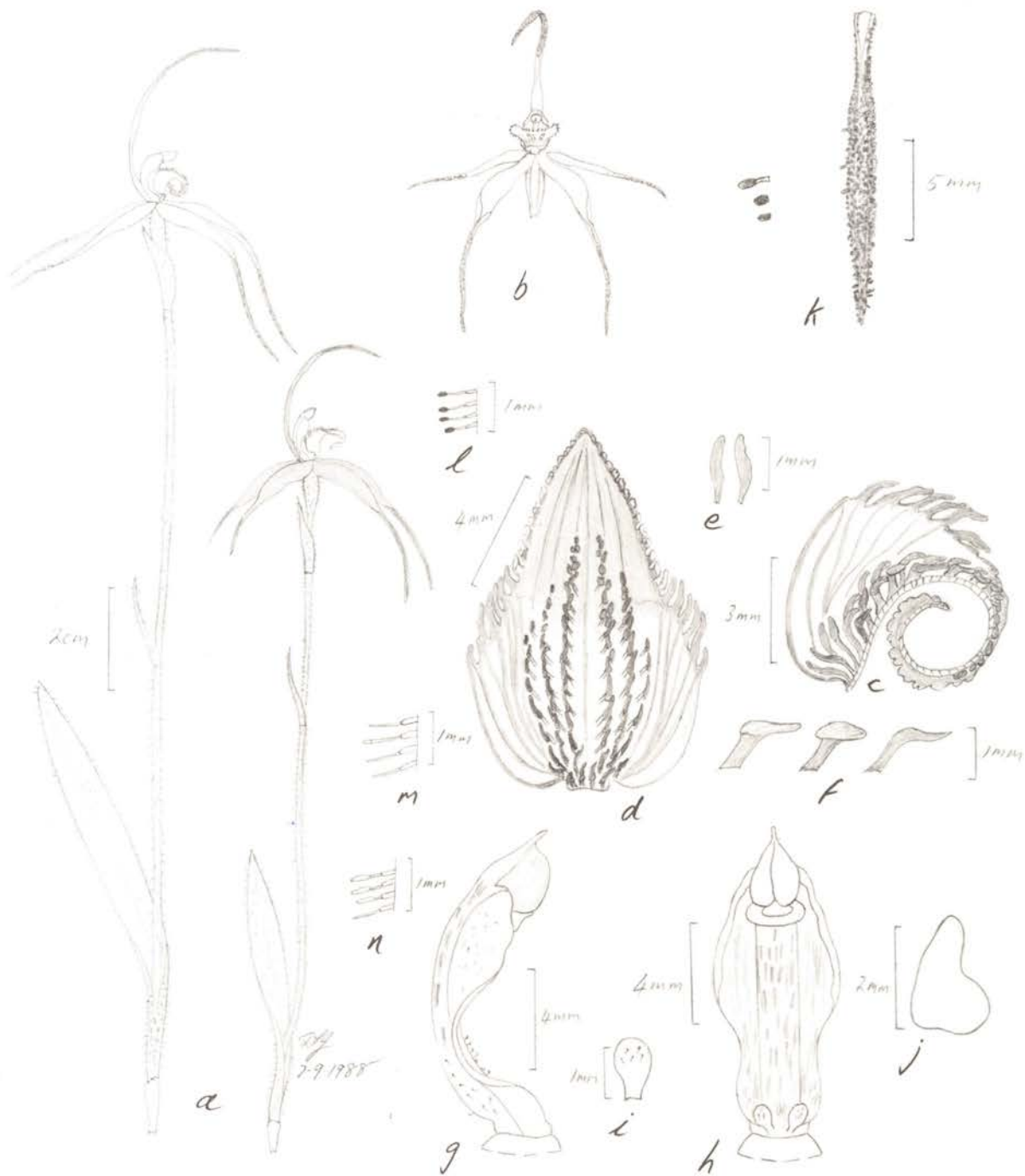


Fig. 22. *Caladenia colorata* (Hartley, SA, R. Bates 15085), a) plants, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) sepalline osmophore and glands, l) ovary trichomes, m) stem trichomes, n) leaf trichomes.



Fig. 23. *Caladenia conferta* (Port Julia, SA, R. Bates 15015), a) plants, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) basal gland, k) pollinium, l) section of sepalline osmophore, m) dorsal sepal, n) lateral sepal, o) petal, p) ovary trichomes, q) stem trichomes, r) leaf trichomes.

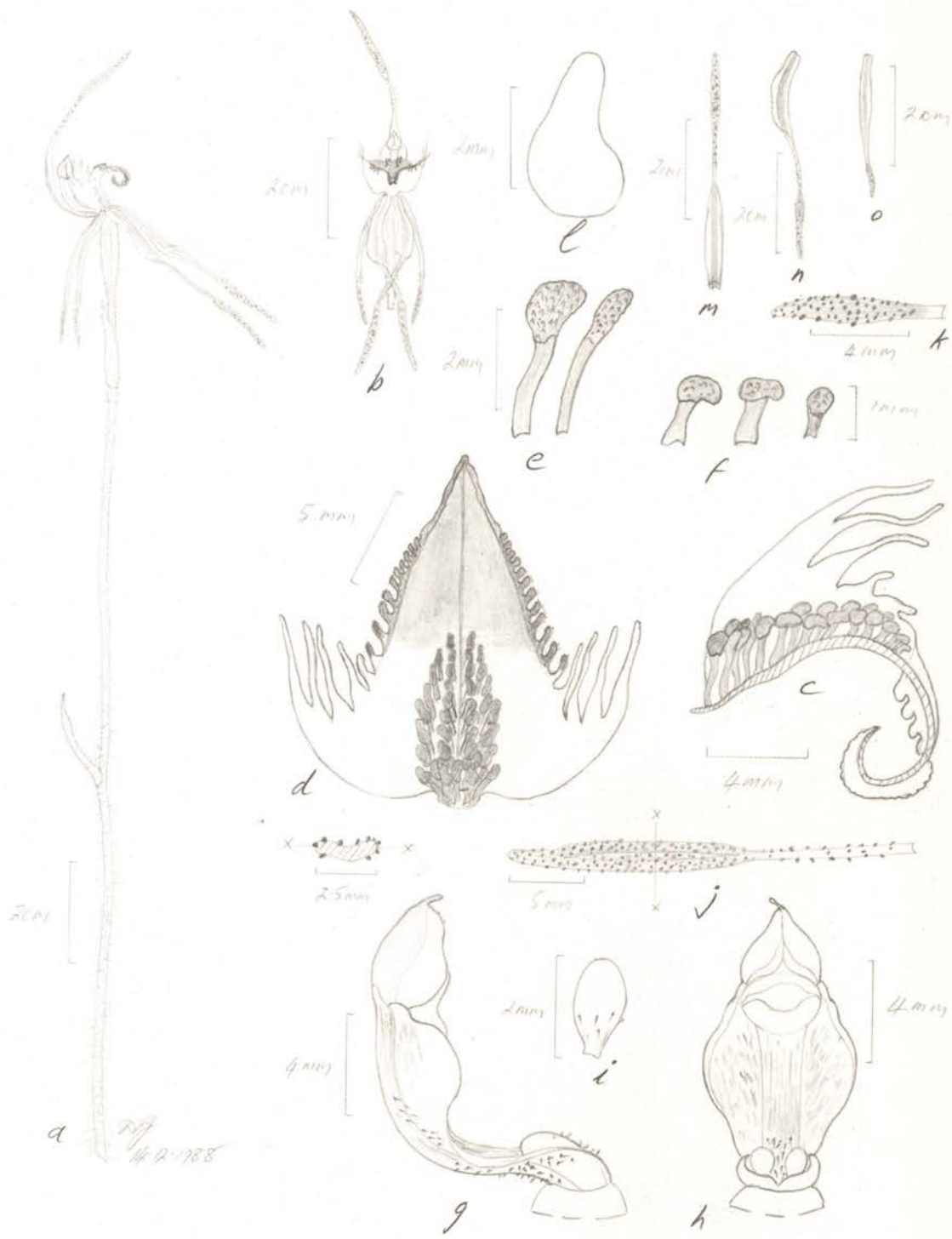


Fig. 24. *Caladenia corynepetala* (Coles Bay, Tas, M. Thomas s.n.), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above. e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) sepaline osmophore, k) petalline osmophore, l) pollinium, m) dorsal sepal, n) lateral sepal, o) petal.

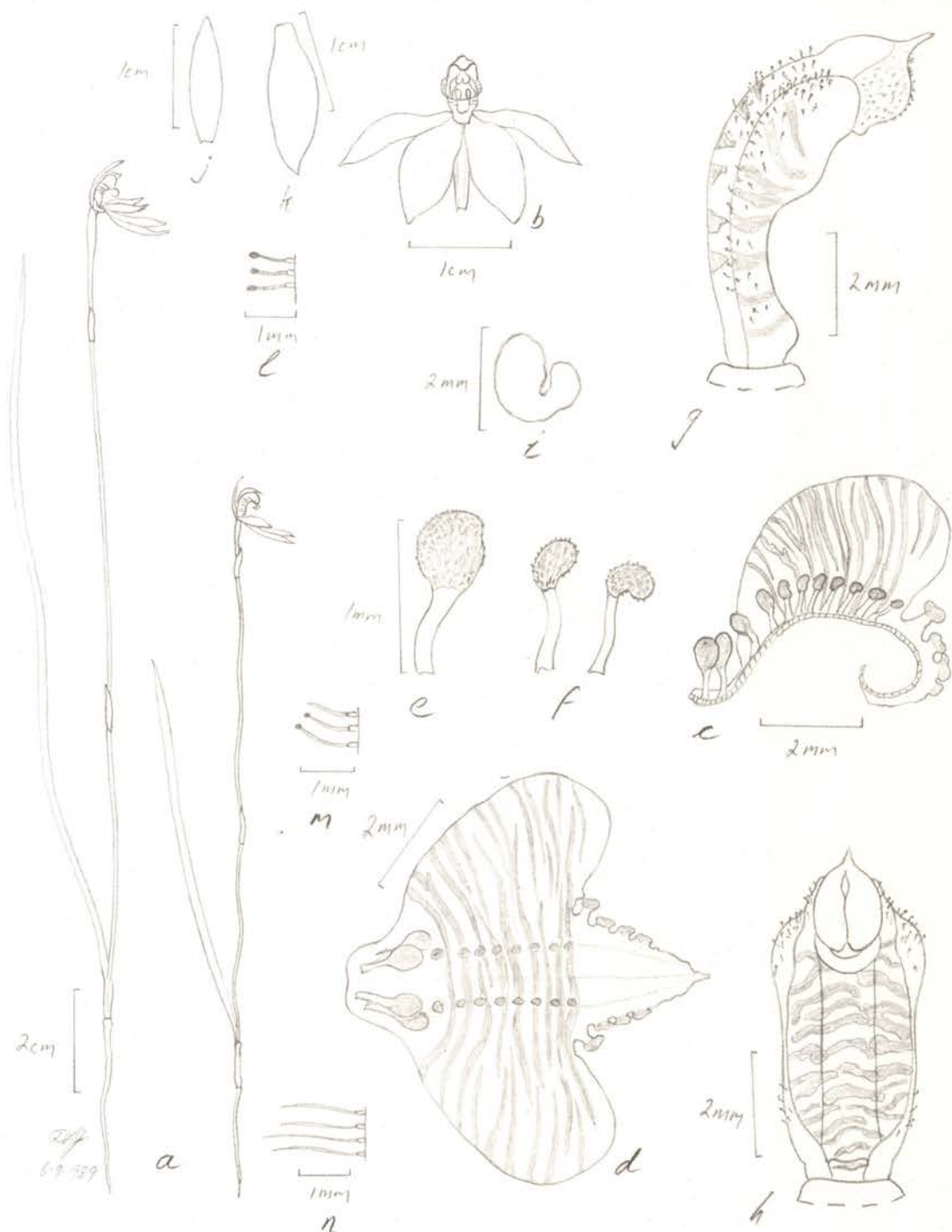


Fig. 25. *Caladenia curtisepala* (Mt Ku-rin-gai, NSW, A. D. Bishop J 82, 1-28), a) plants, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) pollinium, j) dorsal sepal, k) lateral sepal, l) ovary trichomes, m) stem trichomes, n) leaf trichomes.

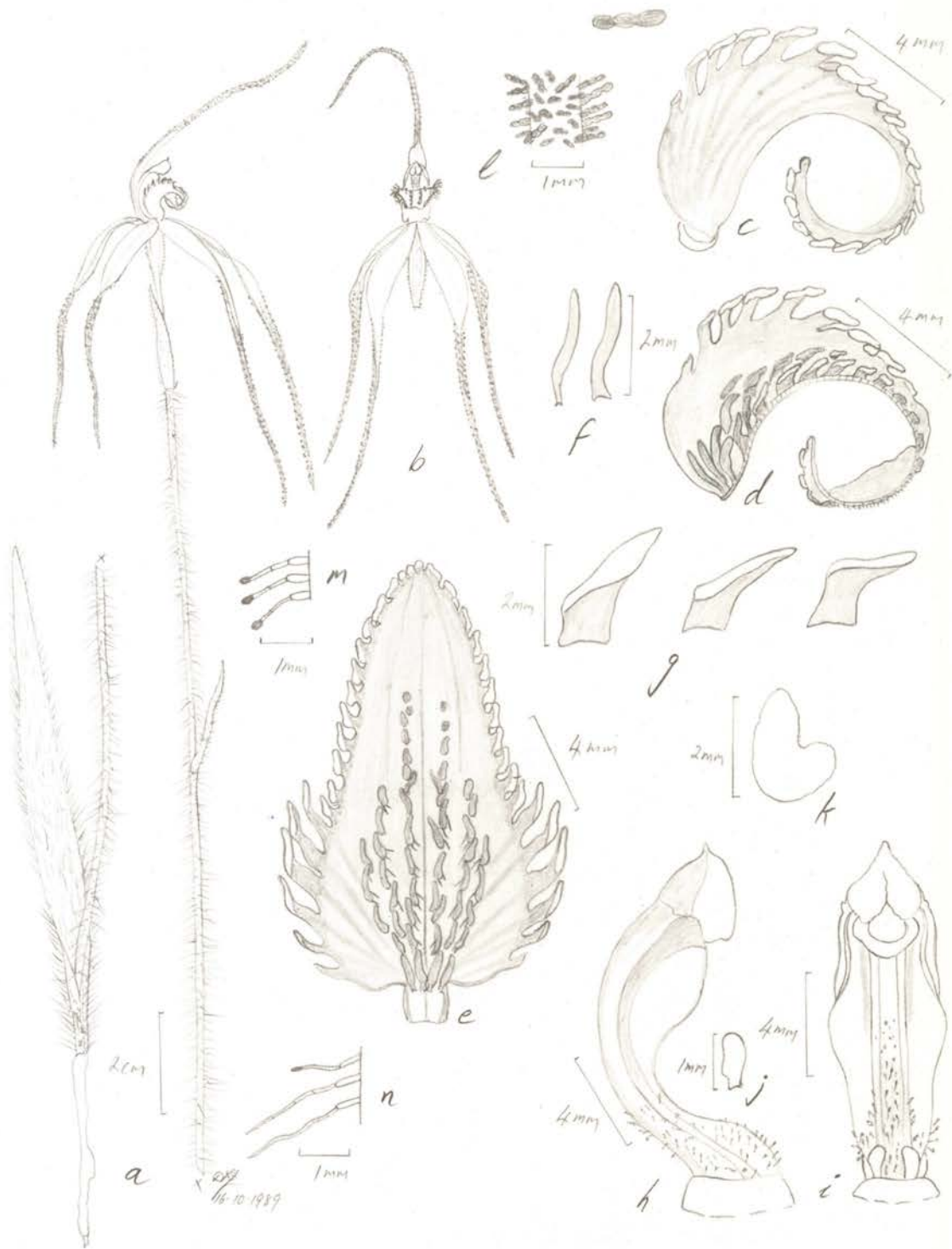


Fig. 26. *Caladenia demissa* (Stawell, Vic, P. Branwhite s.n.), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) section of osmophore, m) ovary trichomes, n) stem and leaf trichomes.

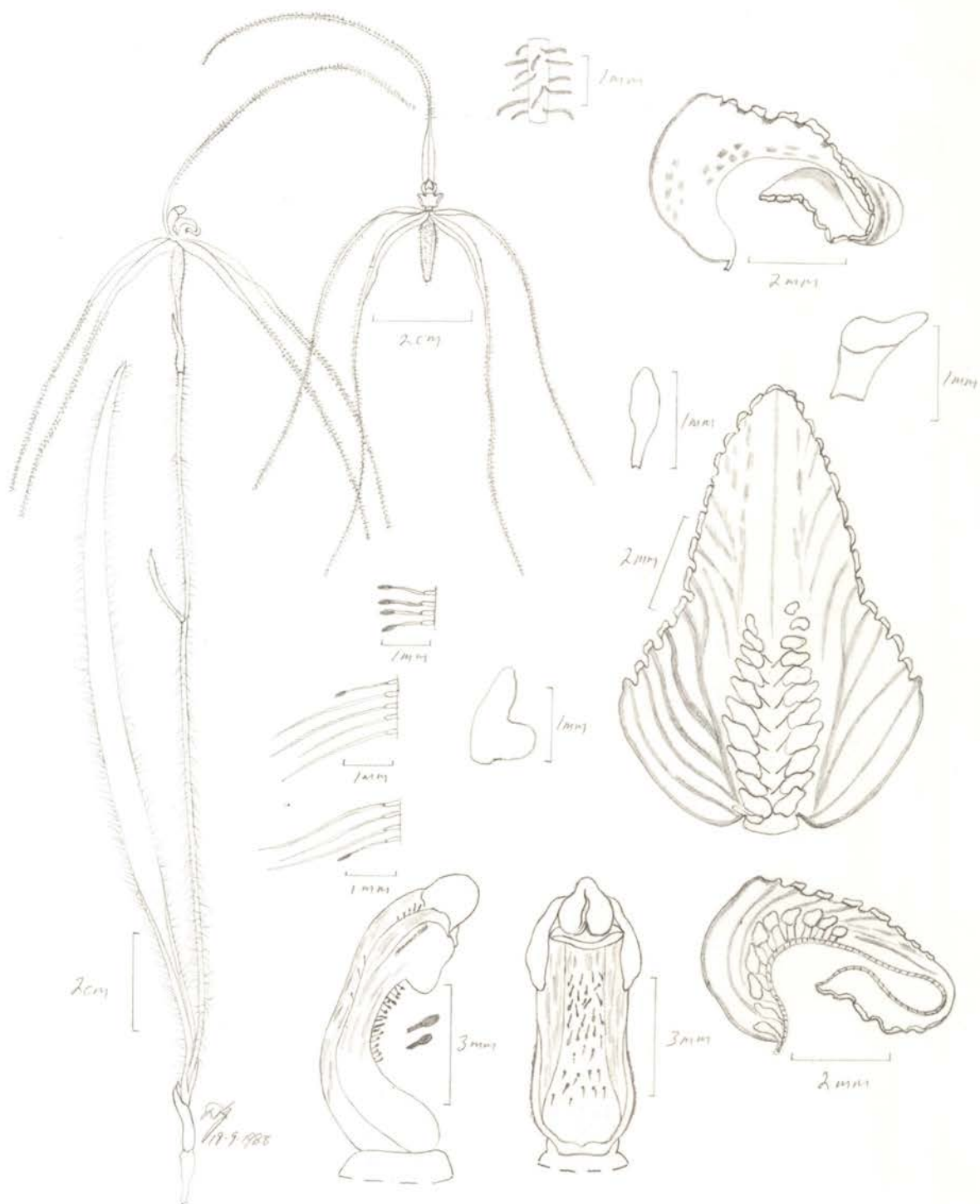


Fig. 27. *Caladenia flaccida* (Sims Gap, NSW, D. L. Jones 2855), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) pollinium, k) section of sepal filament, l) ovary trichomes, m) stem trichomes, n) leaf trichomes.

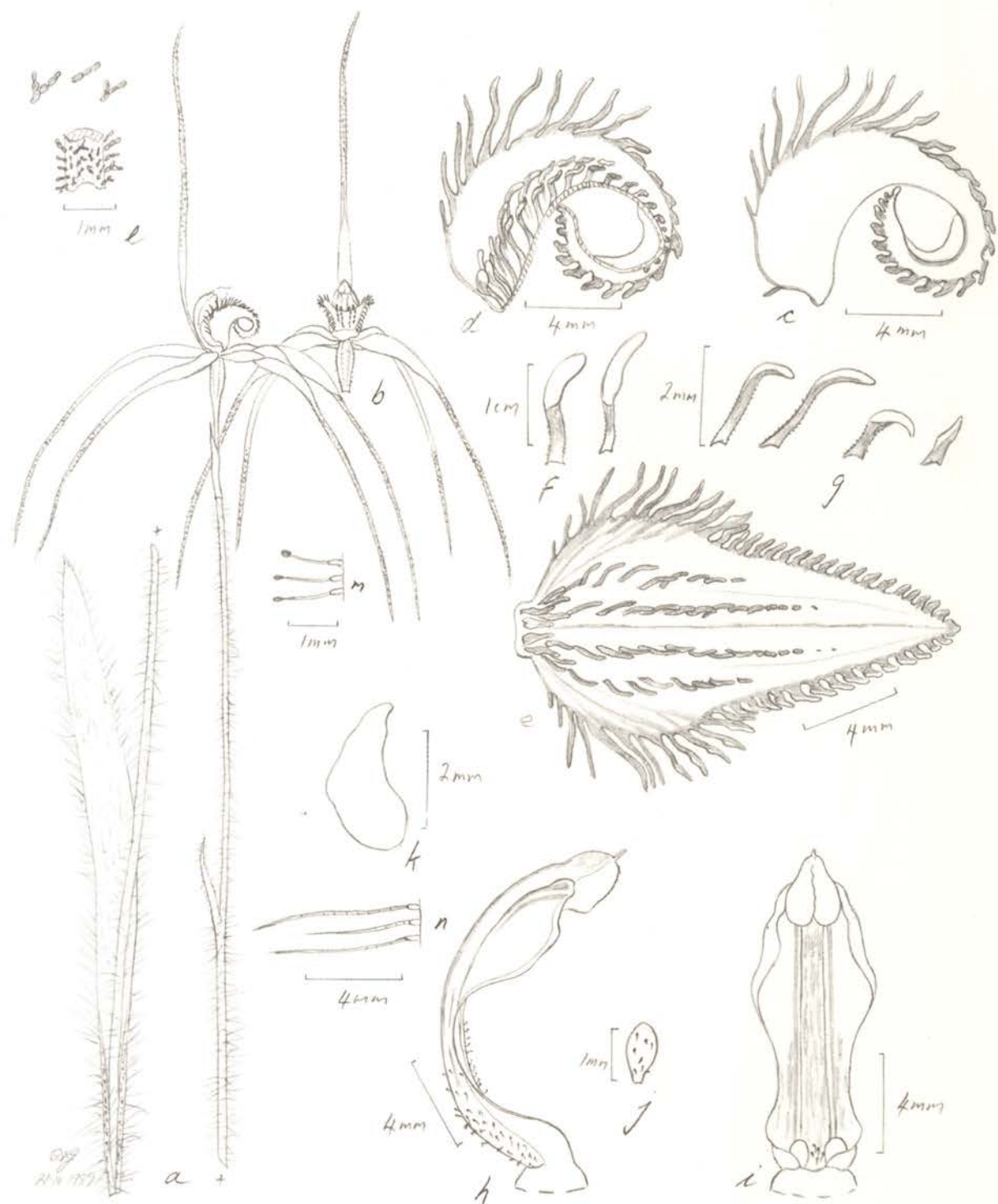


Fig. 28 *Caladenia floribunda* (Anglesea, Vic, P. Branwhite s.n.), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) section of sepal with glands, m) ovary trichomes, n) stem and leaf trichomes.

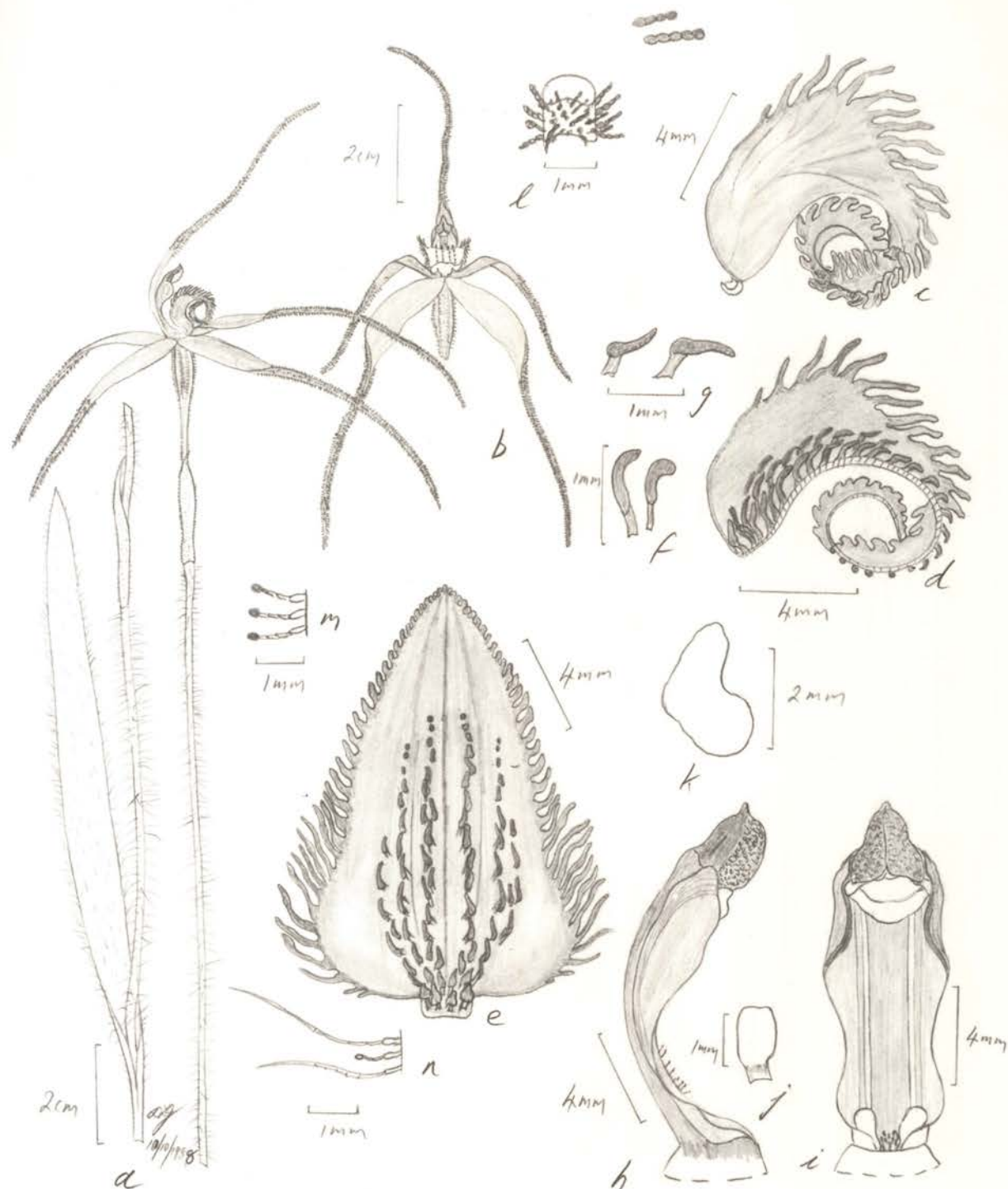


Fig. 29. *Caladenia haemantha* (Coonawarra, SA, R. Bates 15659), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) section of osmophore, m) ovary trichomes, n) stem and leaf trichomes.

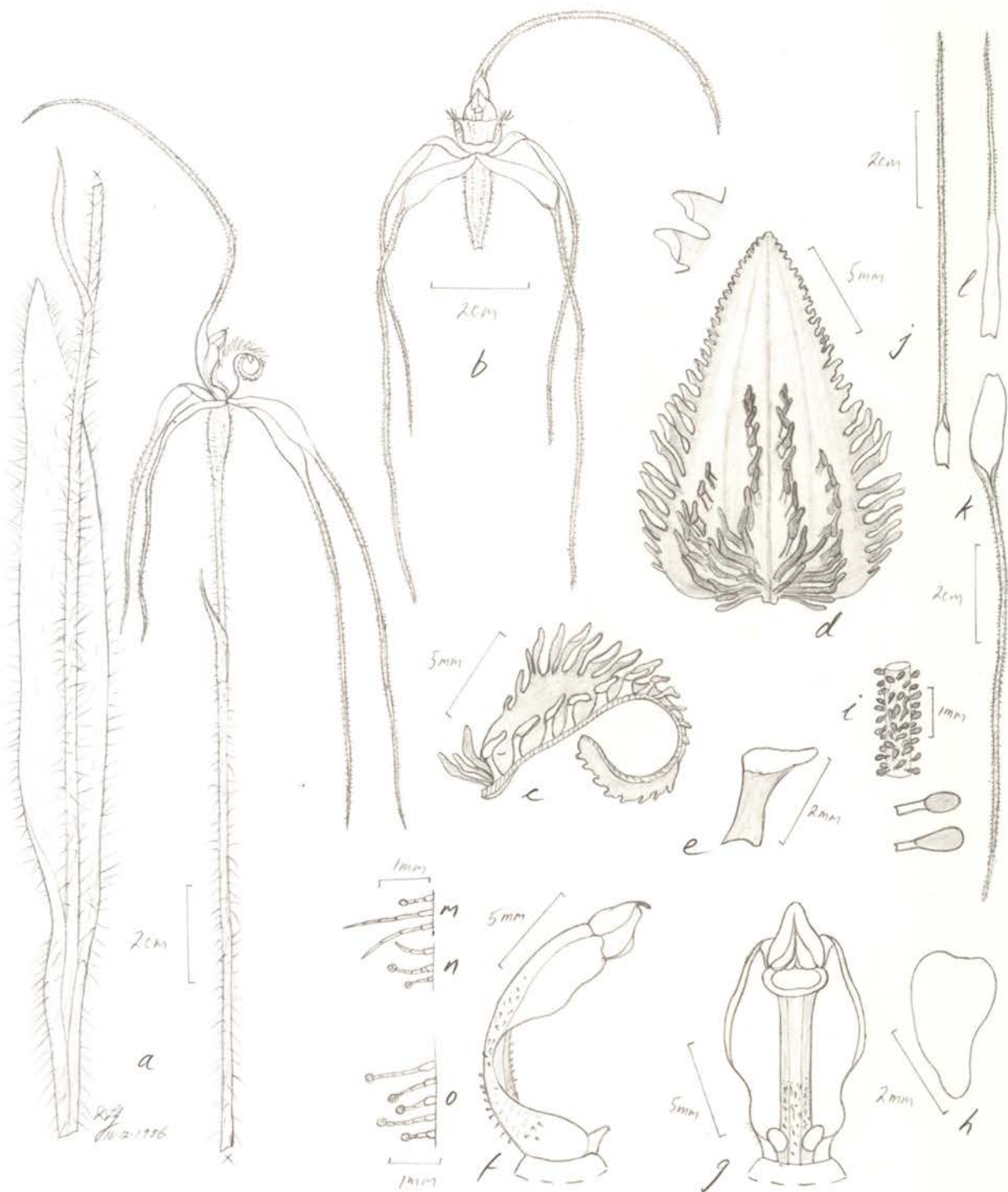


Fig. 30. *Caladenia helvina* (Fingal, Tas, L. Rubenach; s.n.), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) lamina calli, f) column from side, g) column from front, h) pollinium, i) section of sepalline osmophore and glands, j) dorsal sepal, k) lateral sepal, l) petal, m) ovary trichomes, n) stem trichomes, o) leaf trichomes.

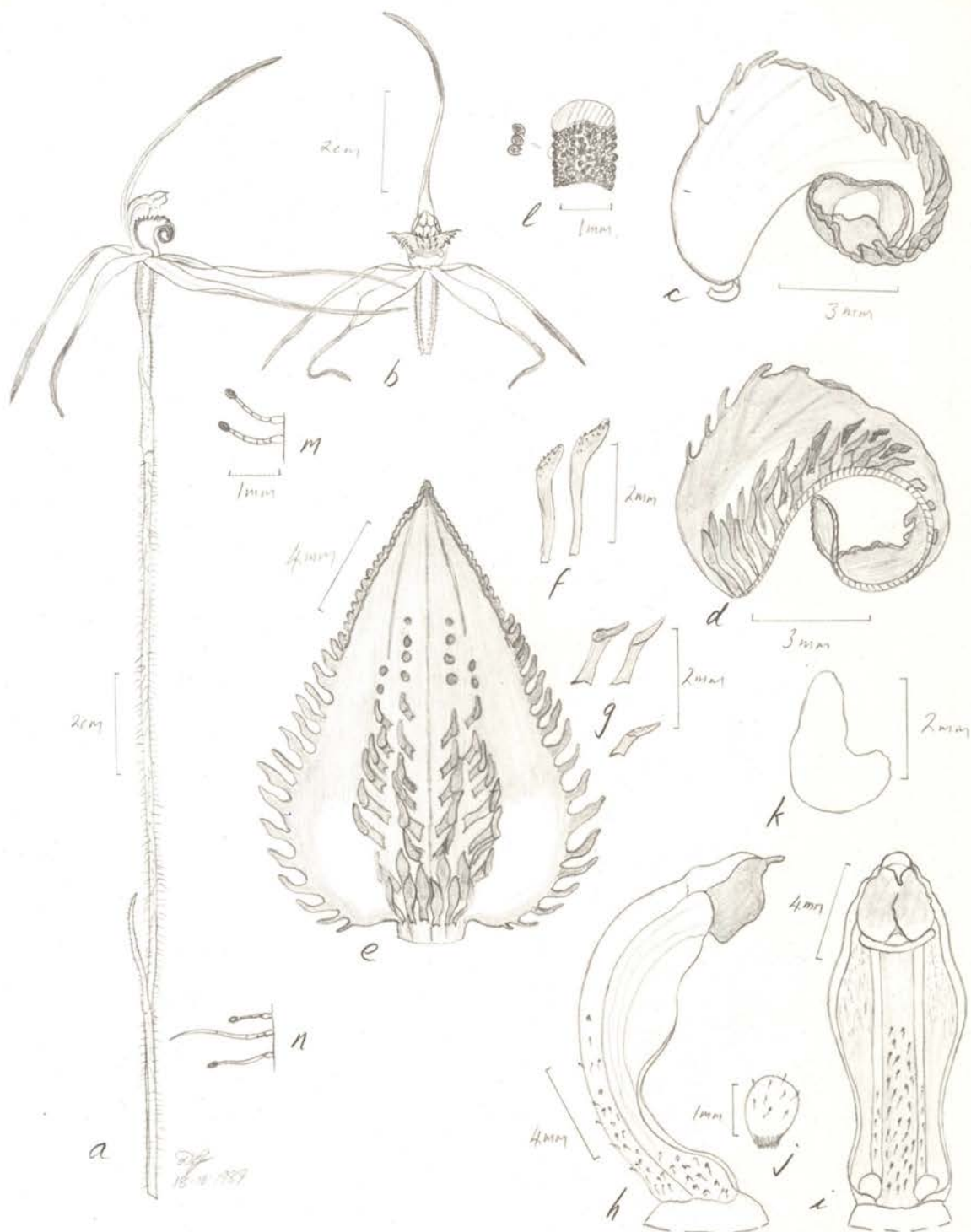


Fig. 31. *Caladenia leptoclavia* (Bethungra, NSW, D. L. Jones 5110), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) labellum from front, j) column gland, k) pollinium, l) section of osmophore, m) ovary trichomes, n) stem trichomes.

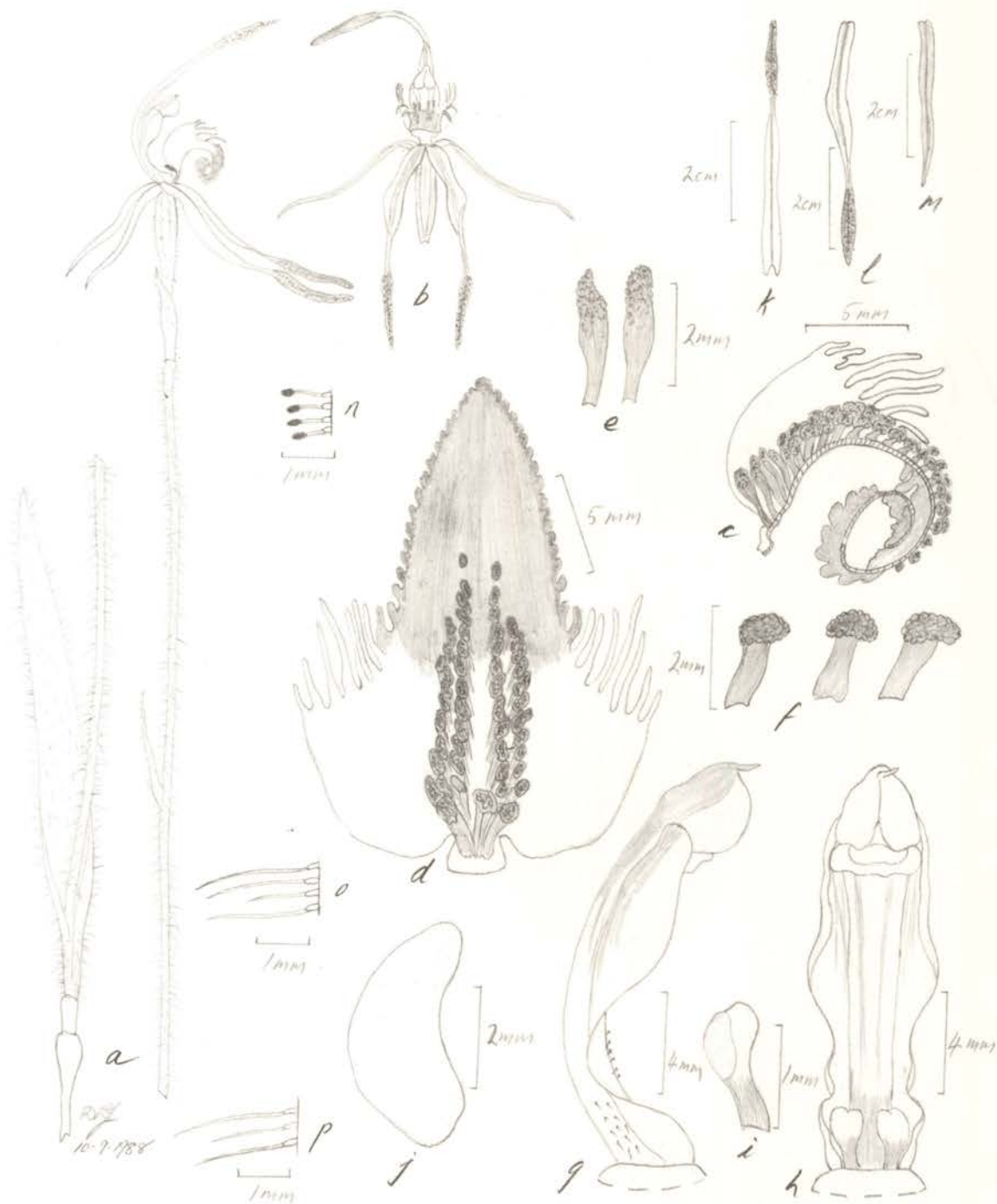


Fig. 32. *Caladenia macroclavia* (Minlaton, SA, R. Bates 15432), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) ovary trichomes, o) stem trichomes, p) leaf trichomes.

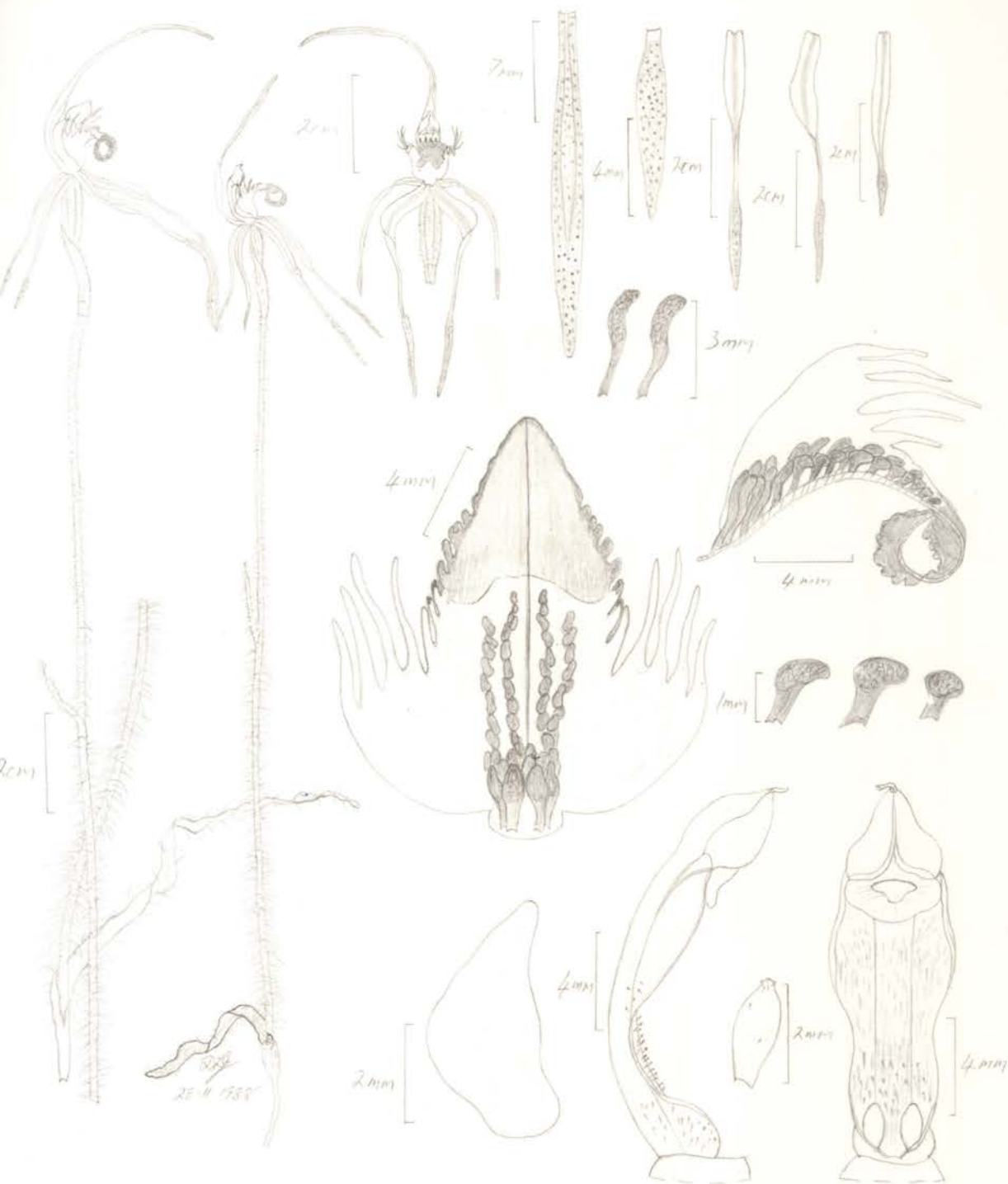


Fig. 33. *Caladenia necrophylla* (R. Bates 16102 & 16125), a) plant from Honans Scrub, SA, b) plant from Desert Camp, SA, c) flower from front, Honans Scrub, SA, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) dorsal sepal, m) lateral sepal, n) petal, o) sepalline osmophore, p) petalline osmophore.

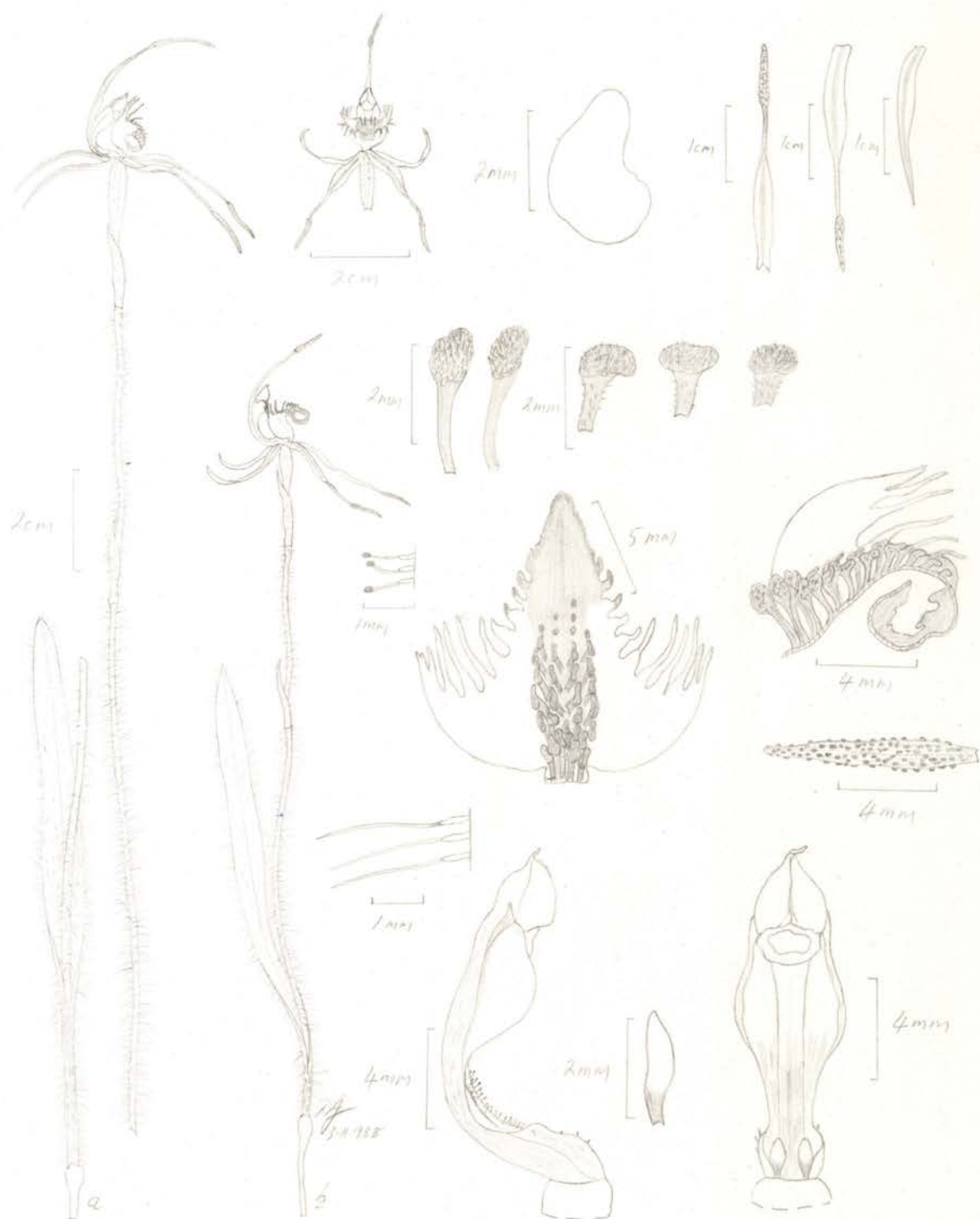


Fig. 34. *Caladenia phaeoclavia* (D. L. Jones 3423), a) plant from Wambool Nature Reserve, NSW, b) plant from Oakey Ck, NSW, c) flower from front, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) dorsal sepal, m) lateral sepal, n) petal, o) sepalline osmophore, p) ovary trichomes, q) stem and leaf trichomes.

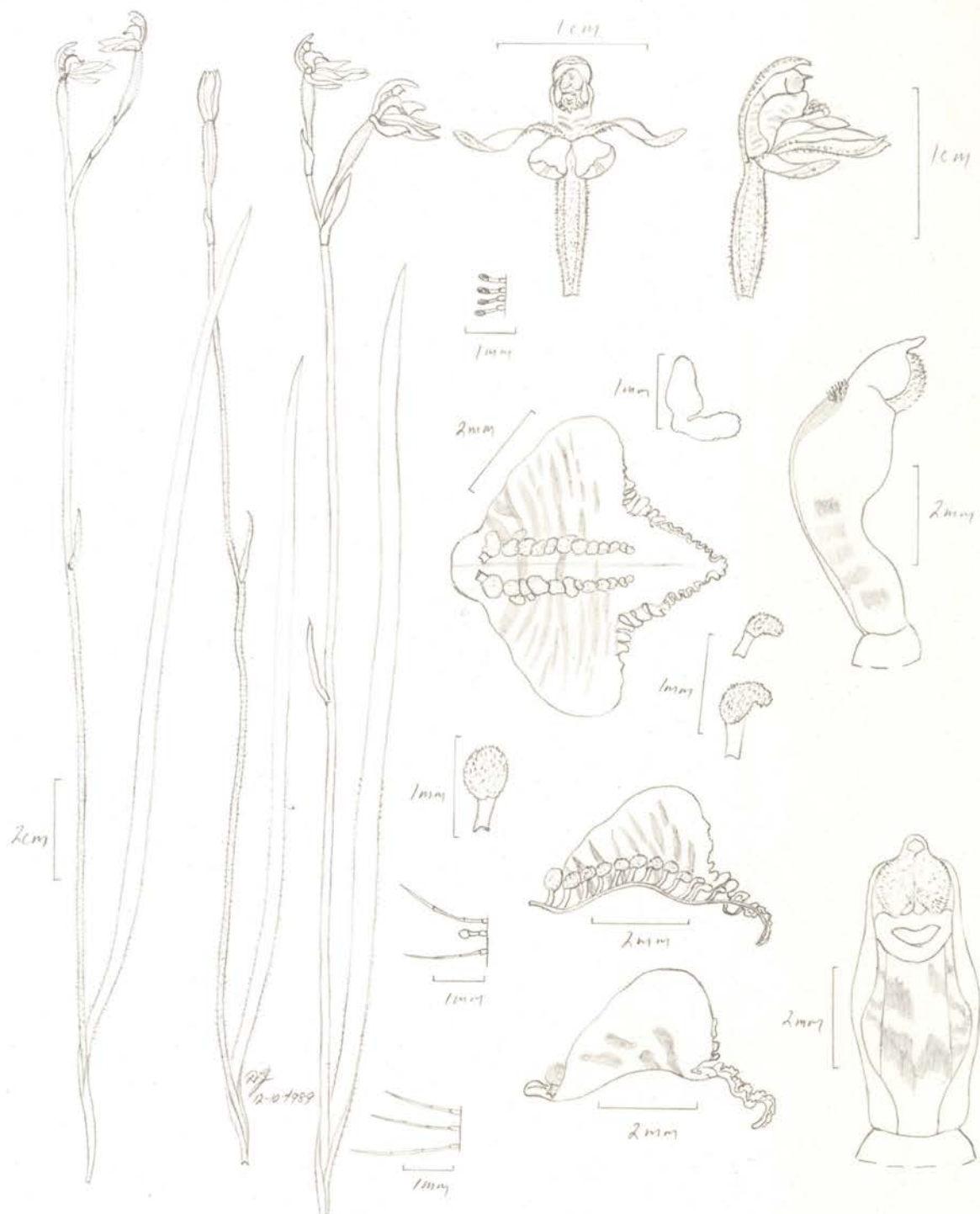


Fig. 35. *Caladenia prolata* (Meningie, SA, R. Bates 21045), a) plants, b) flower from front, c) flower from side, d) labellum from side, e) longitudinal section of labellum, f) labellum flattened out from above, g) basal calli, h) lamina calli, i) column from side, j) column from front, k) pollinium, l) ovary trichomes, m) stem trichomes, n) leaf trichomes.



Fig. 36 *Caladenia quadrifaria* (Smiths Lake, NSW, D. L. Jones 6477), a) plants, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) laminal calli, g) marginal calli, h) column from side, i) column from front, j) pollinium.

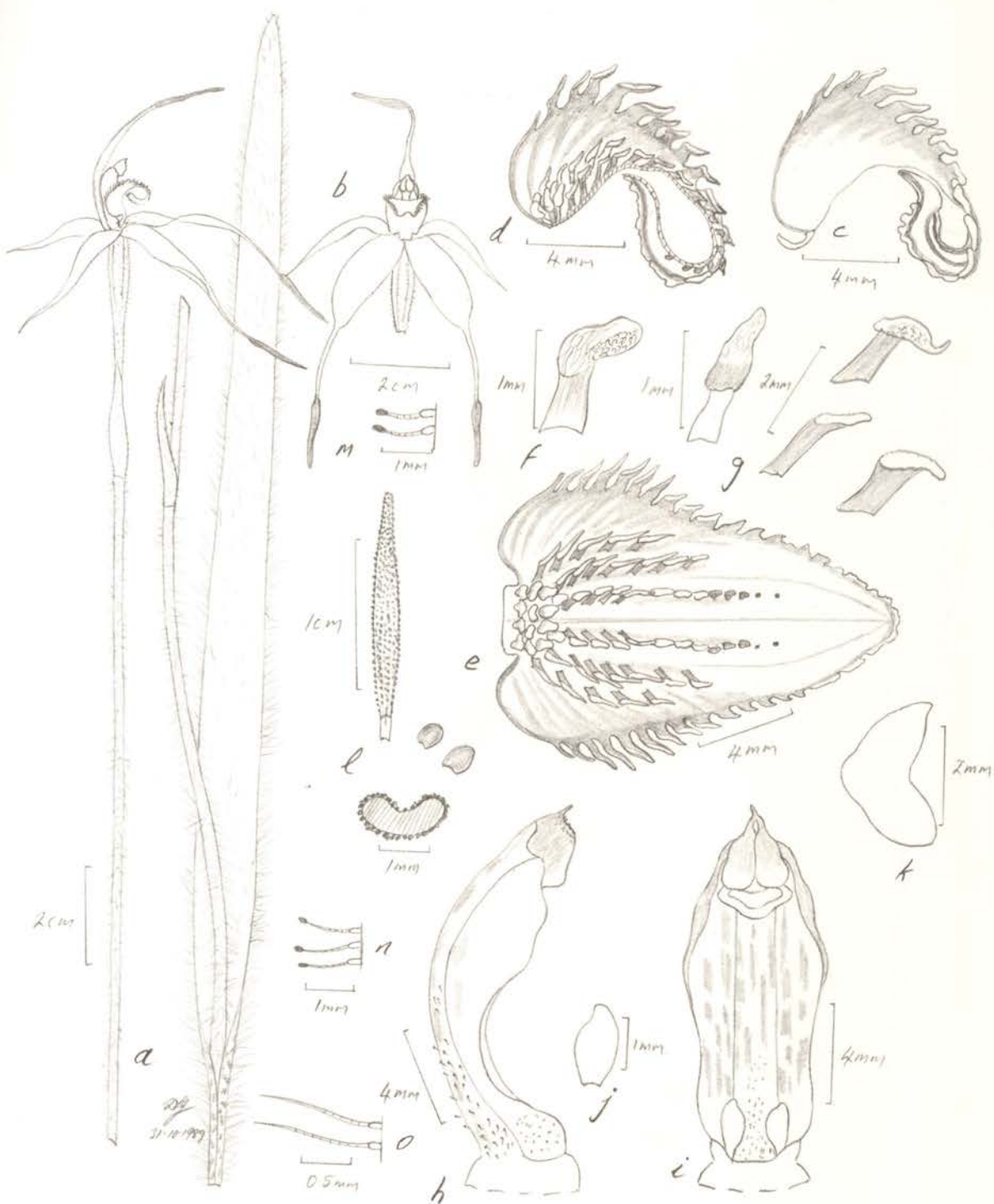


Fig. 37. *Caladenia richardsiorum* (Little Dip, SA, R. Bates 21273), a) plant, b) flower from front, c) labellum from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) column gland, k) pollinium, l) sepalline osmophore, m) ovary trichomes, n) stem trichomes, o) leaf trichomes.

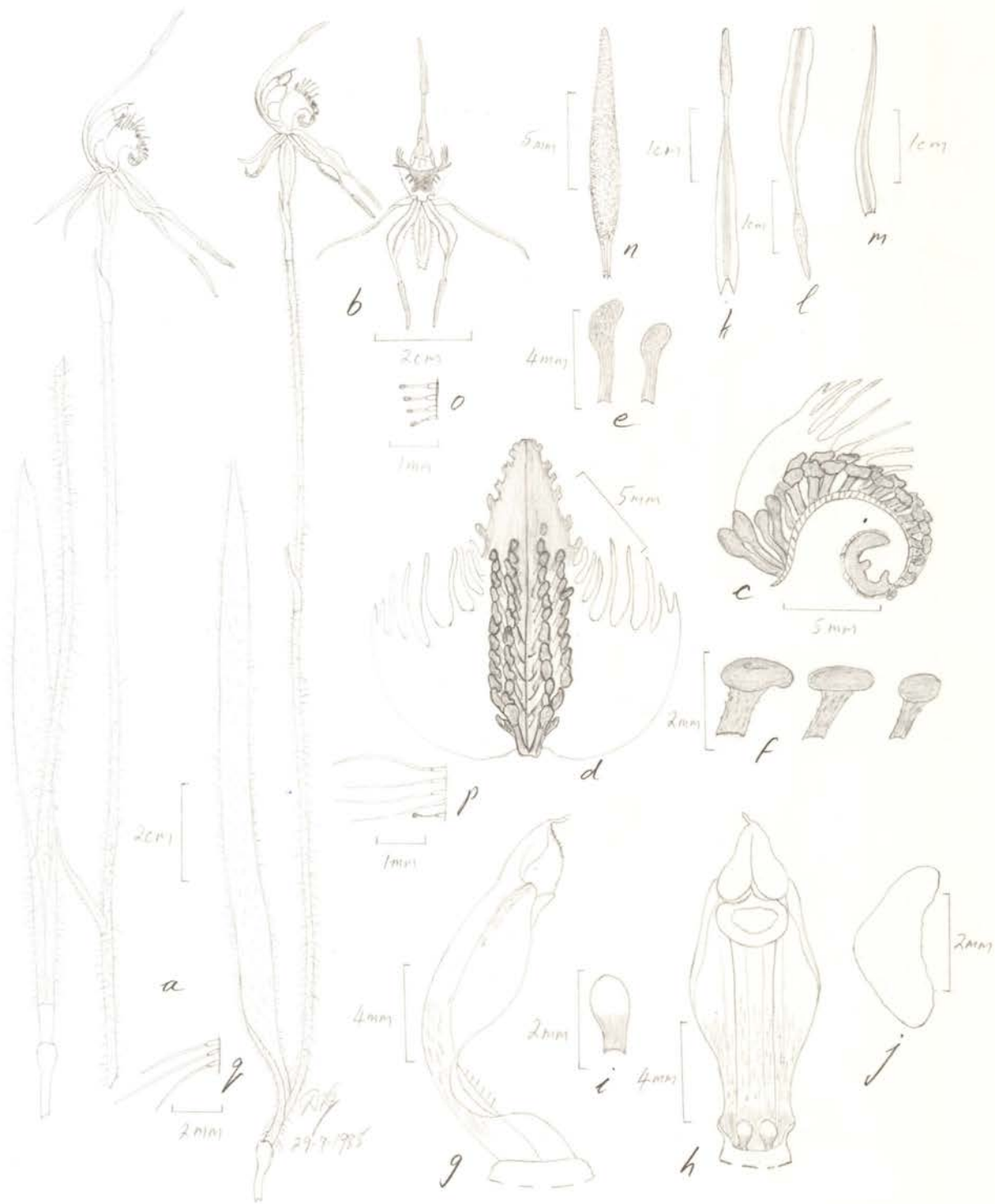


Fig. 38. *Caladenia rigens* (near Griffith, NSW, D. L. Jones 2846), a) plants, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) sepalline osmophore, o) ovary trichomes, p) stem trichomes, q) leaf trichomes.

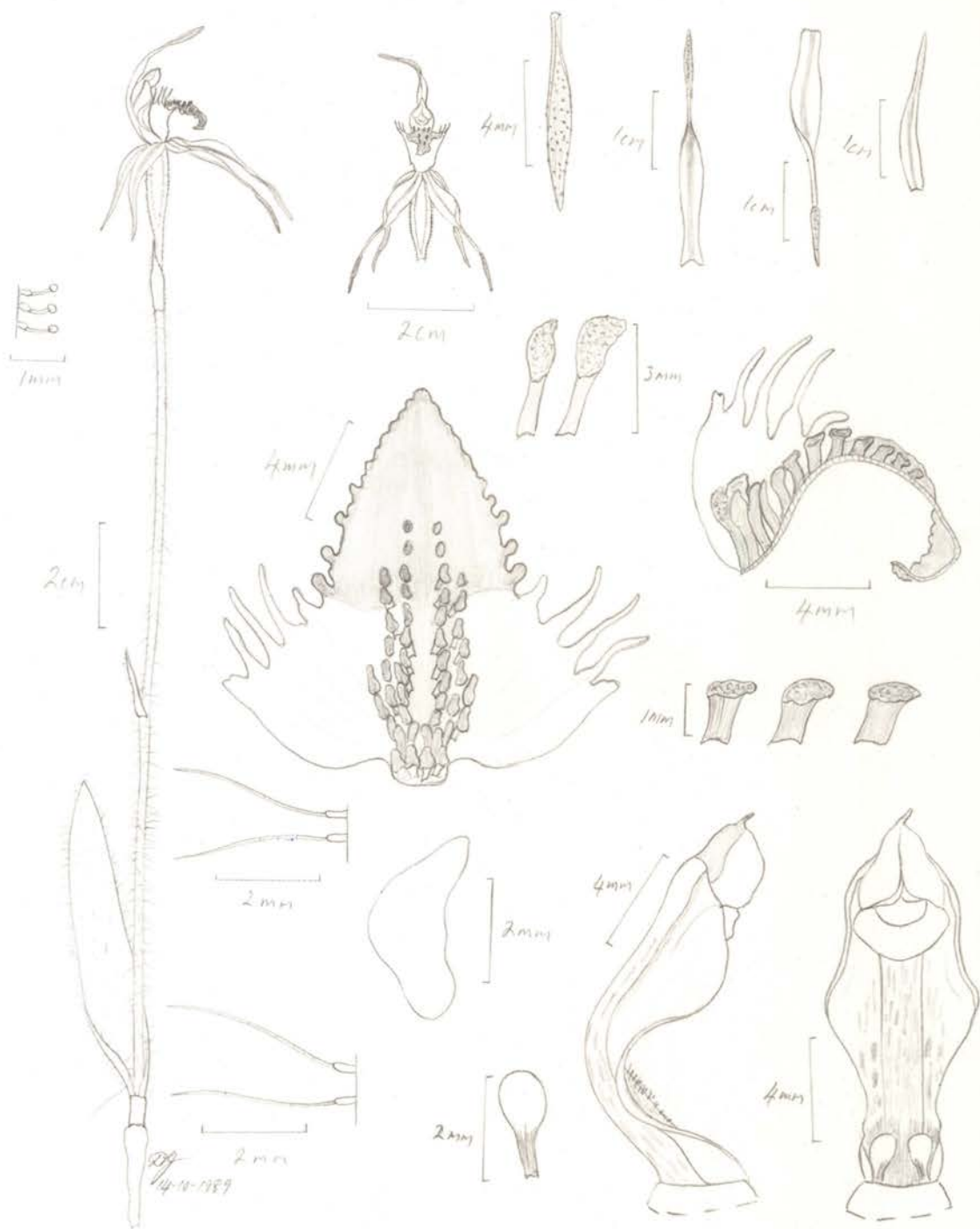


Fig. 39 *Caladenia septuosa* (Middleback Range, Whyalla, SA, R. Bates 20645), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) sepalline osmophore, o) ovary trichomes, p) stem trichomes, q) leaf trichomes.

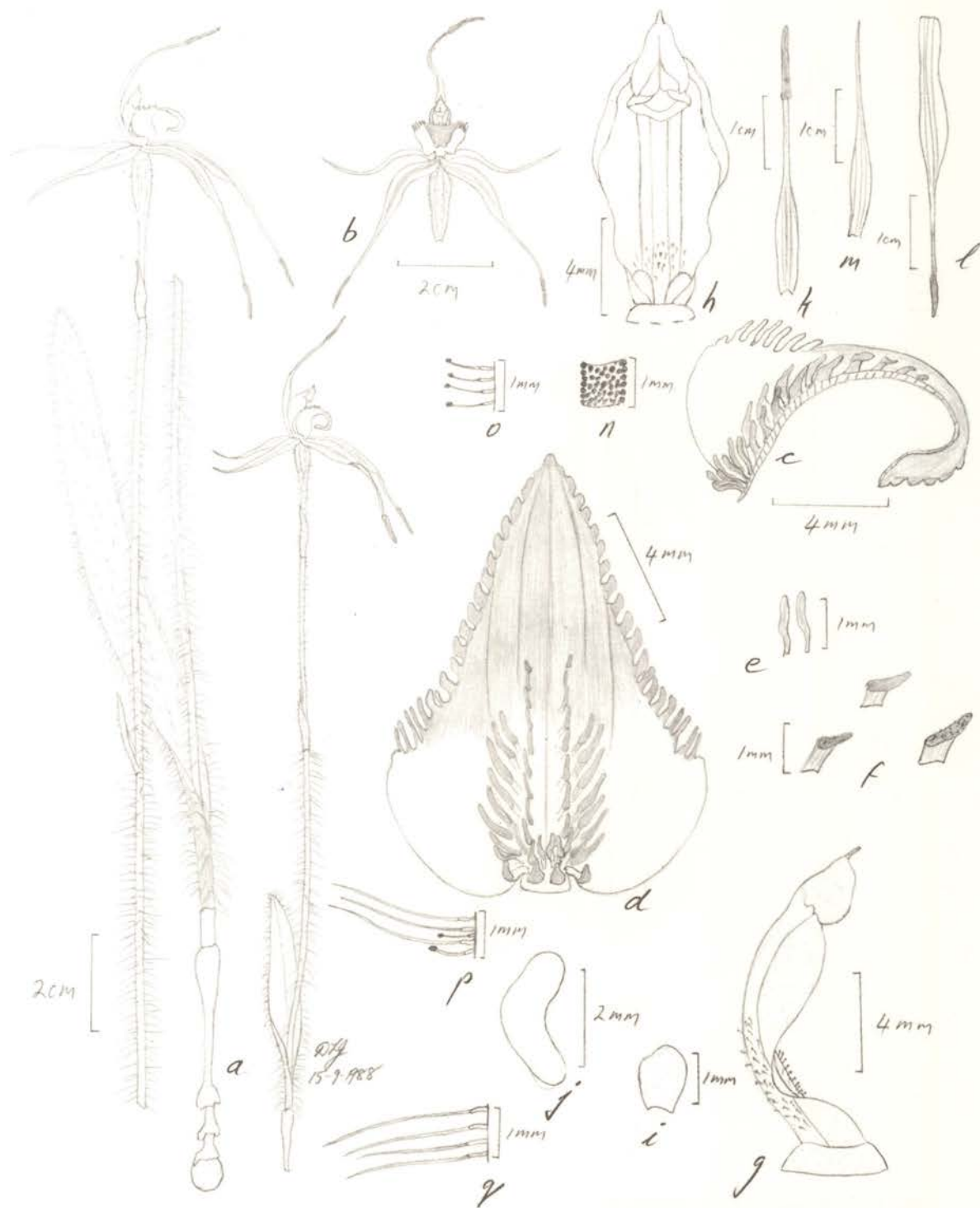


Fig. 40. *Caladenia stellata* (Sims Gap, NSW, D. L. Jones 2856), a) plants, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) column gland, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) section of osmophore, o) ovary trichomes, p) stem trichomes, q) leaf trichomes.

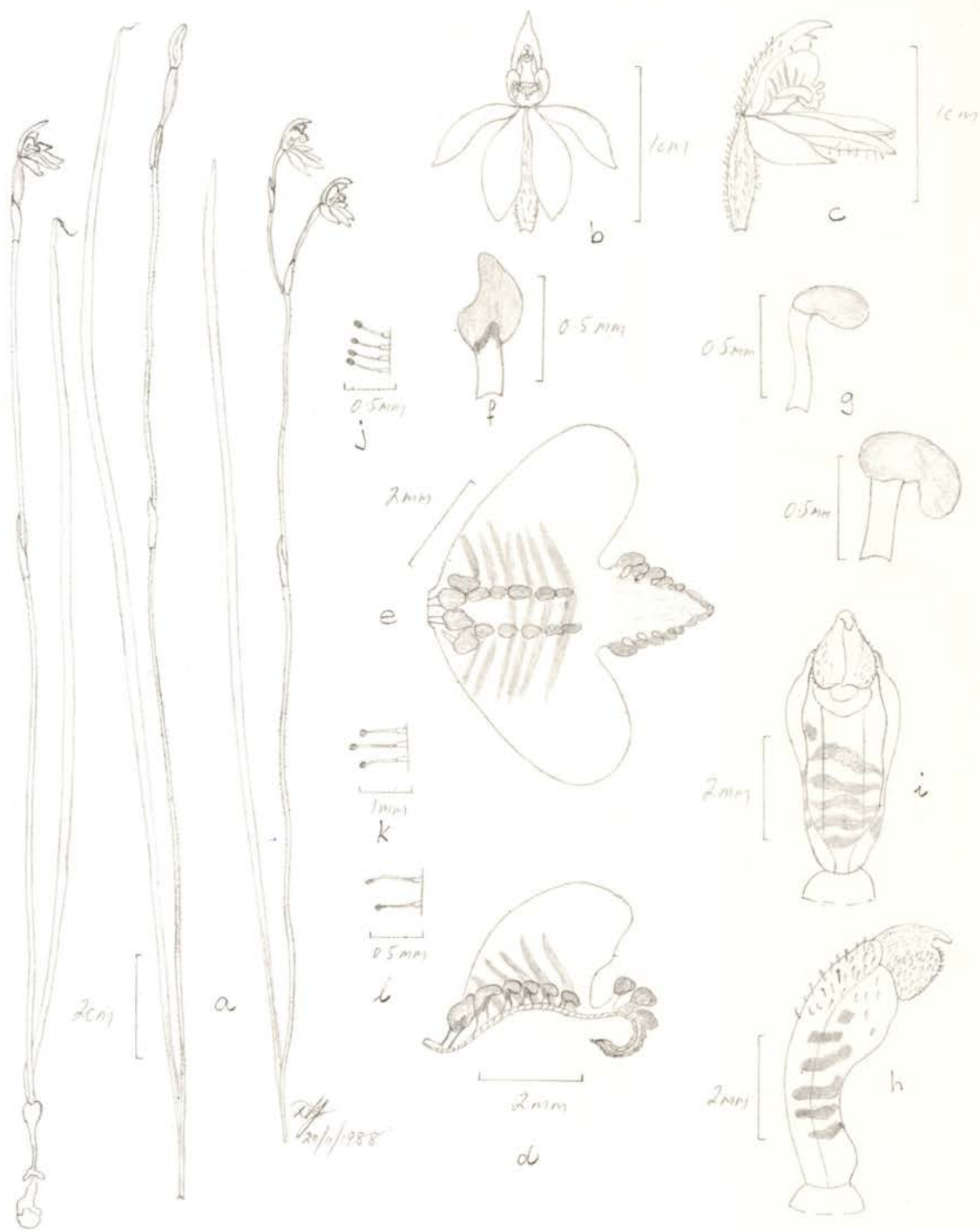


Fig. 41. *Caladenia vulgaris* (Honans Scrub, SA, R. Bates 16103), a) plants, b) flower from front, c) flower from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) ovary trichomes, k) stem trichomes, l) leaf trichomes.

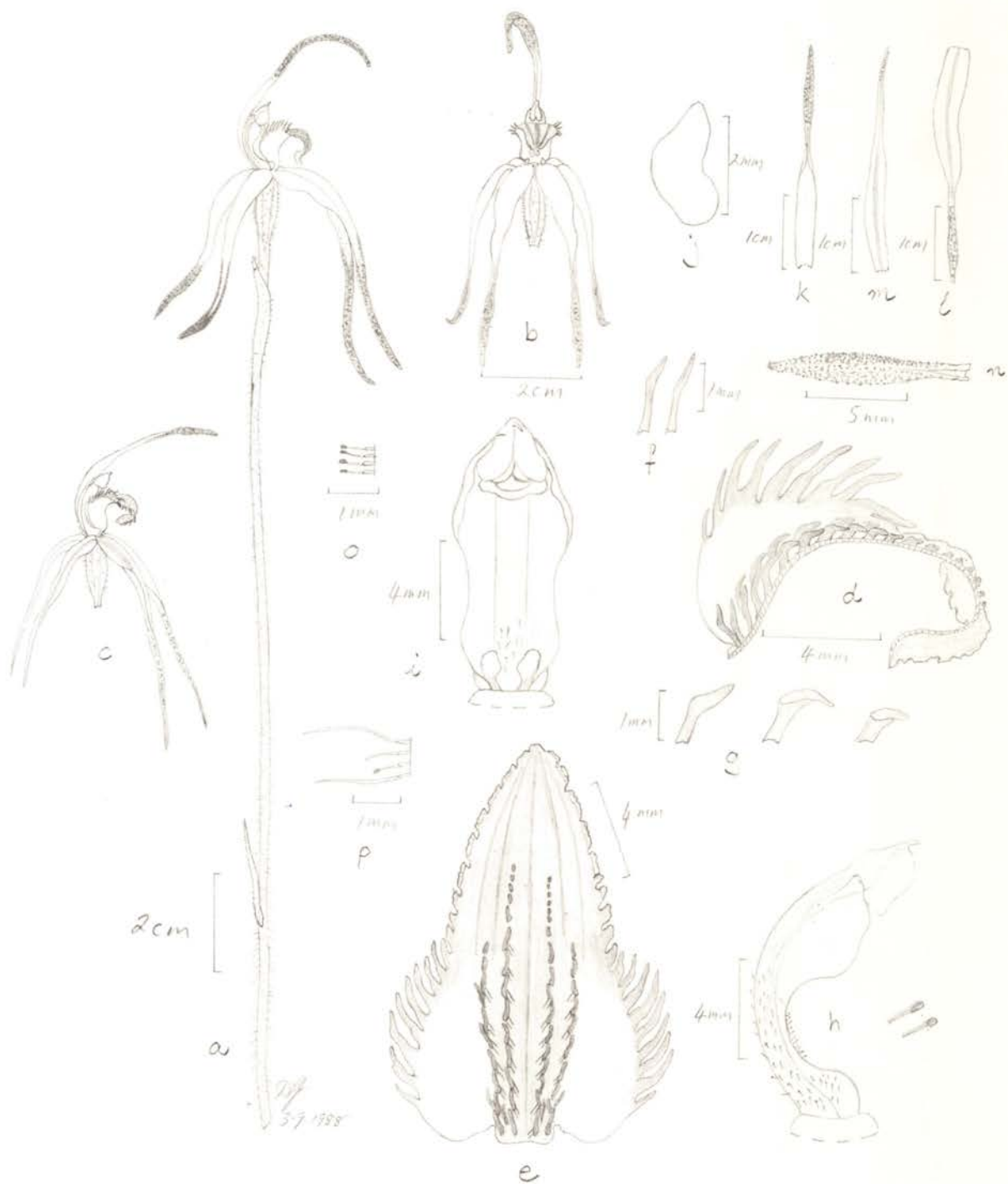


Fig. 42. *Caladenia woolcockiorum* (Upper Mambray Ck, SA, R. Bates 15319), a) plant, b) flower from front, c) flower from side, d) longitudinal section of labellum, e) labellum flattened out from above, f) basal calli, g) lamina calli, h) column from side, i) column from front, j) pollinium, k) dorsal sepal, l) lateral sepal, m) petal, n) sepalline osmophore, o) ovary trichomes, p) stem and leaf trichomes.

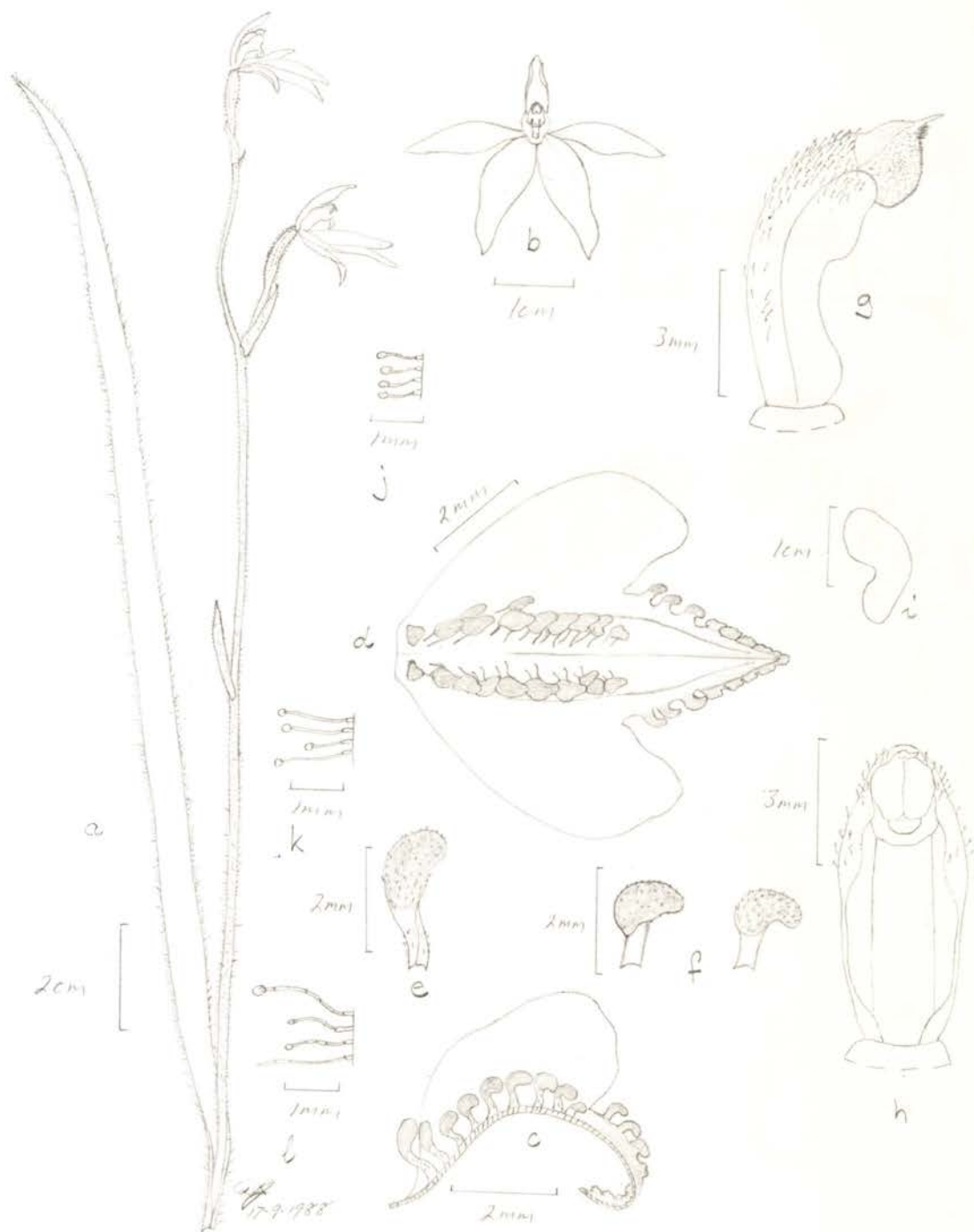


Fig. 43. *Caladenia xantholeuca* (Telowie Gorge, SA, 15508), a) plant, b) flower from front, c) longitudinal section of labellum, d) labellum flattened out from above, e) basal calli, f) lamina calli, g) column from side, h) column from front, i) pollinium, j) ovary trichomes, k) stem trichomes, l) leaf trichomes.

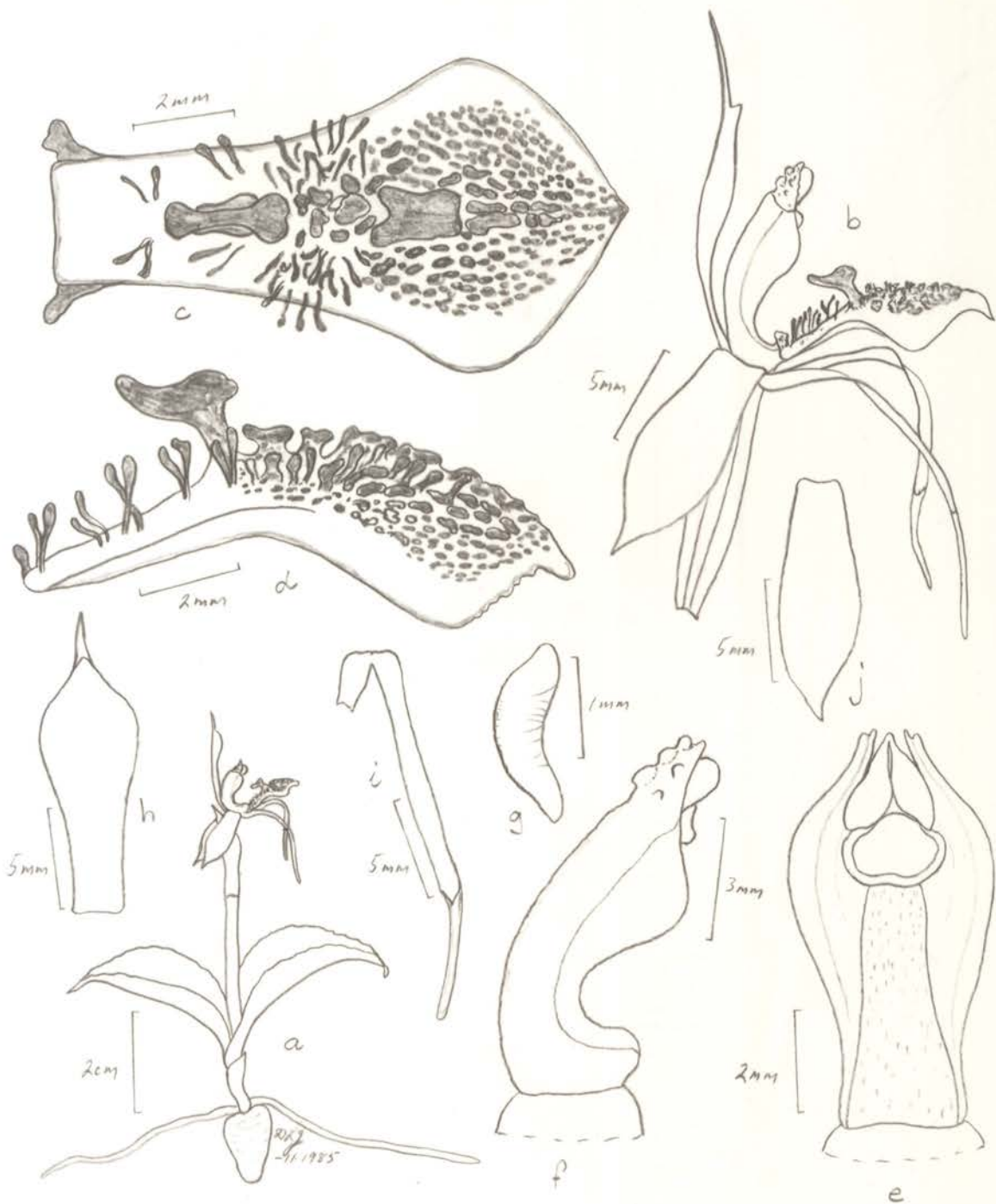


Fig. 44. *Chiloglottis anatriceps* (Hastings Forest Way, NSW, D. L. Jones 2229), a) plant, b) flower from side, c) labellum from above, d) labellum from side, e) column from front, f) column from side, g) pollinium, h) dorsal sepal, i) lateral sepal, j) petal.

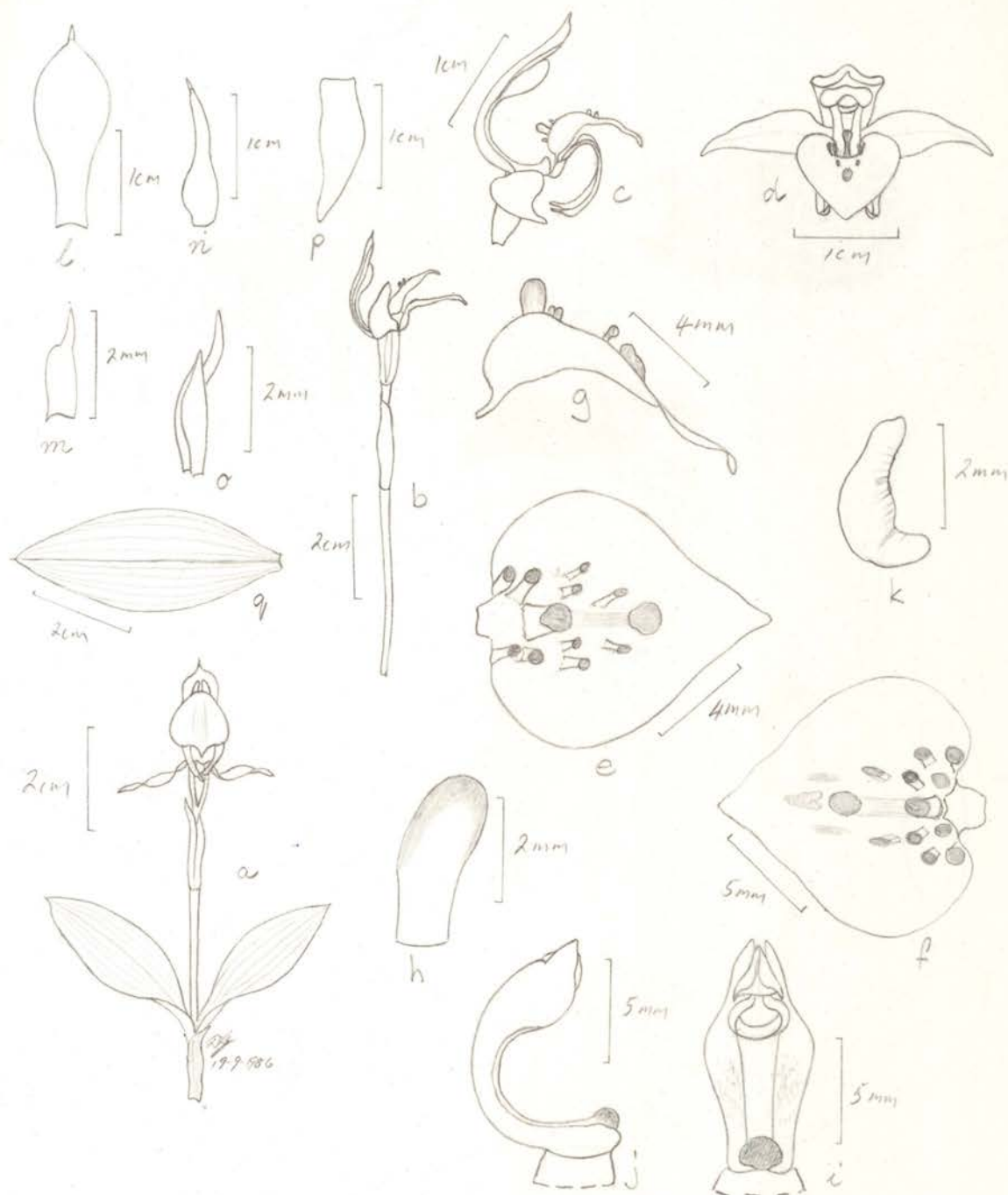


Fig. 45. *Chiloglottis chlorantha* (Jamberoo Mtn, NSW, R. G. Tunstall s.n.), a) plant, b) flowering stem from side, c) flower from side, d) flower from front, e, f) labella from above, g) labellum from side, h) main labellum gland, i) column from front, j) column from side, k) pollinium, l) dorsal sepal, m) dorsal sepal osmophore, n) lateral sepal, o) lateral sepal osmophore, p) petal, q) leaf.

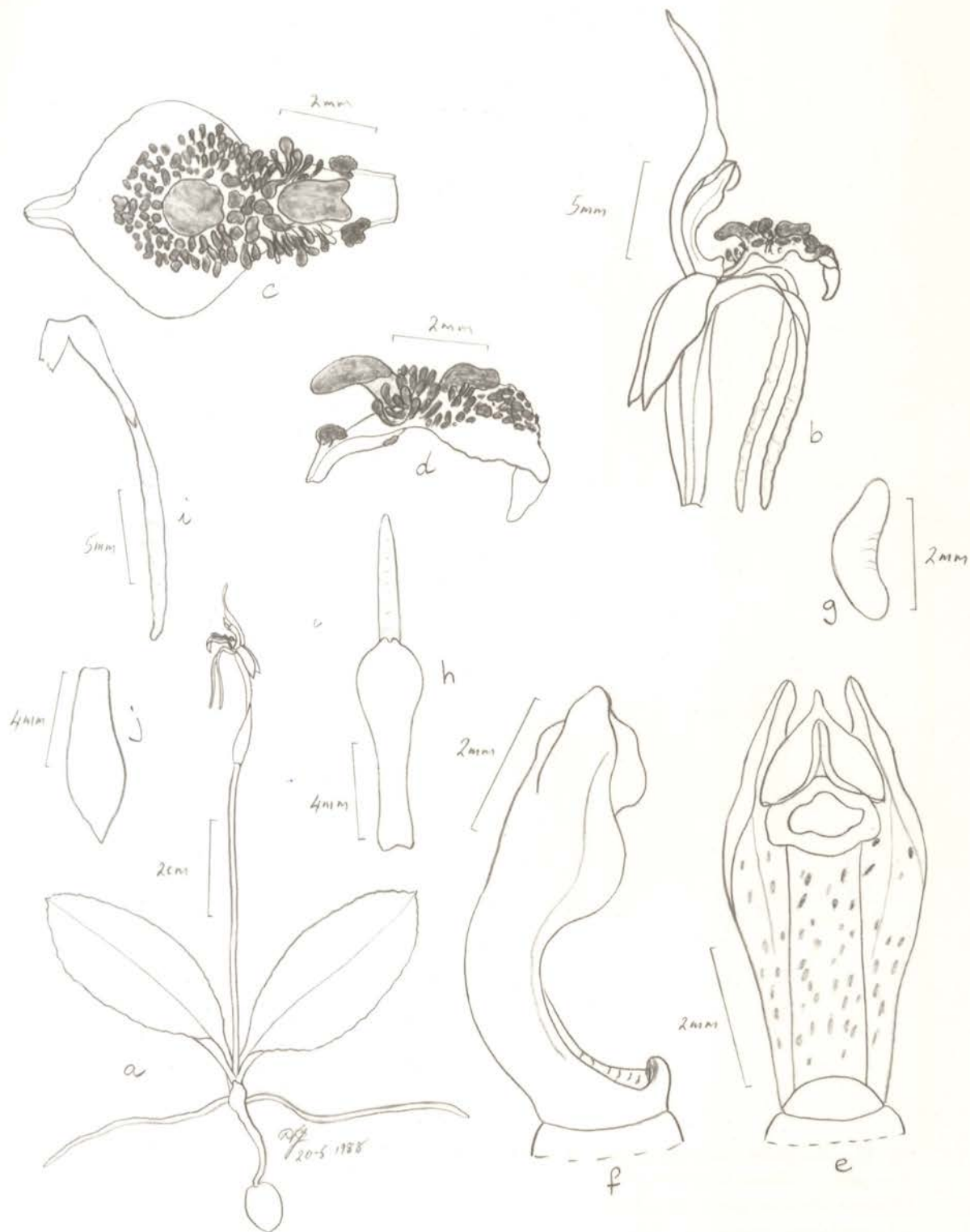


Fig. 46. *Chiloglottis longiclavata* (Herberton Range, Qld, B. Gray 4455), a) plant, b) flower from side, c) labellum from above, d) labellum from side, e) column from front, f) column from side, g) pollinium, h) dorsal sepal, i) lateral sepal, j) petal.

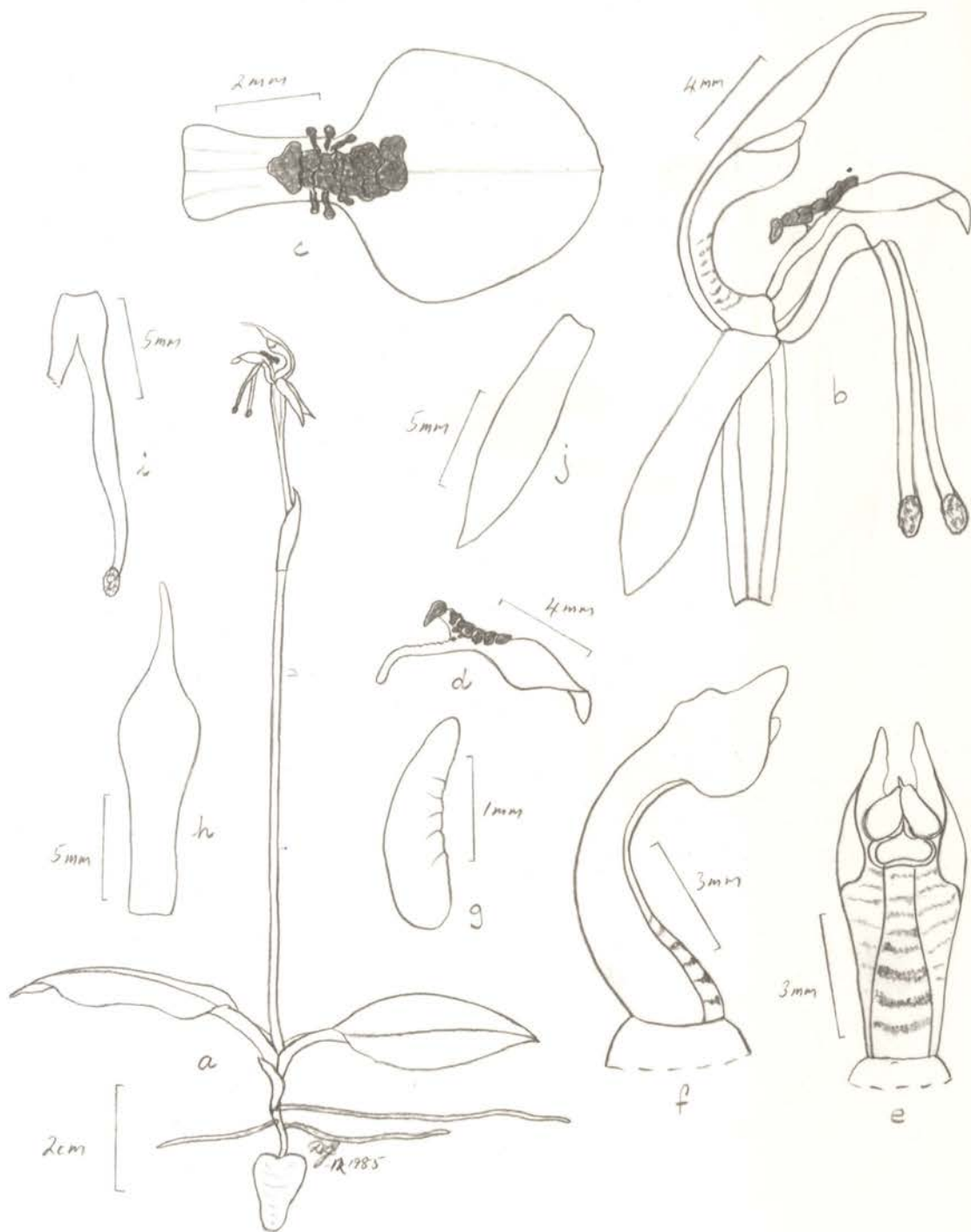


Fig. 47. *Chiloglottis palachila* (Barrington Tops. NSW, D. L. Jones 2208), a) plant, b) flower from side, c) labellum from above, d) labellum from side, e) column from front, f) column from side, g) pollinium, h) dorsal sepal, i) lateral sepal, j) petal.

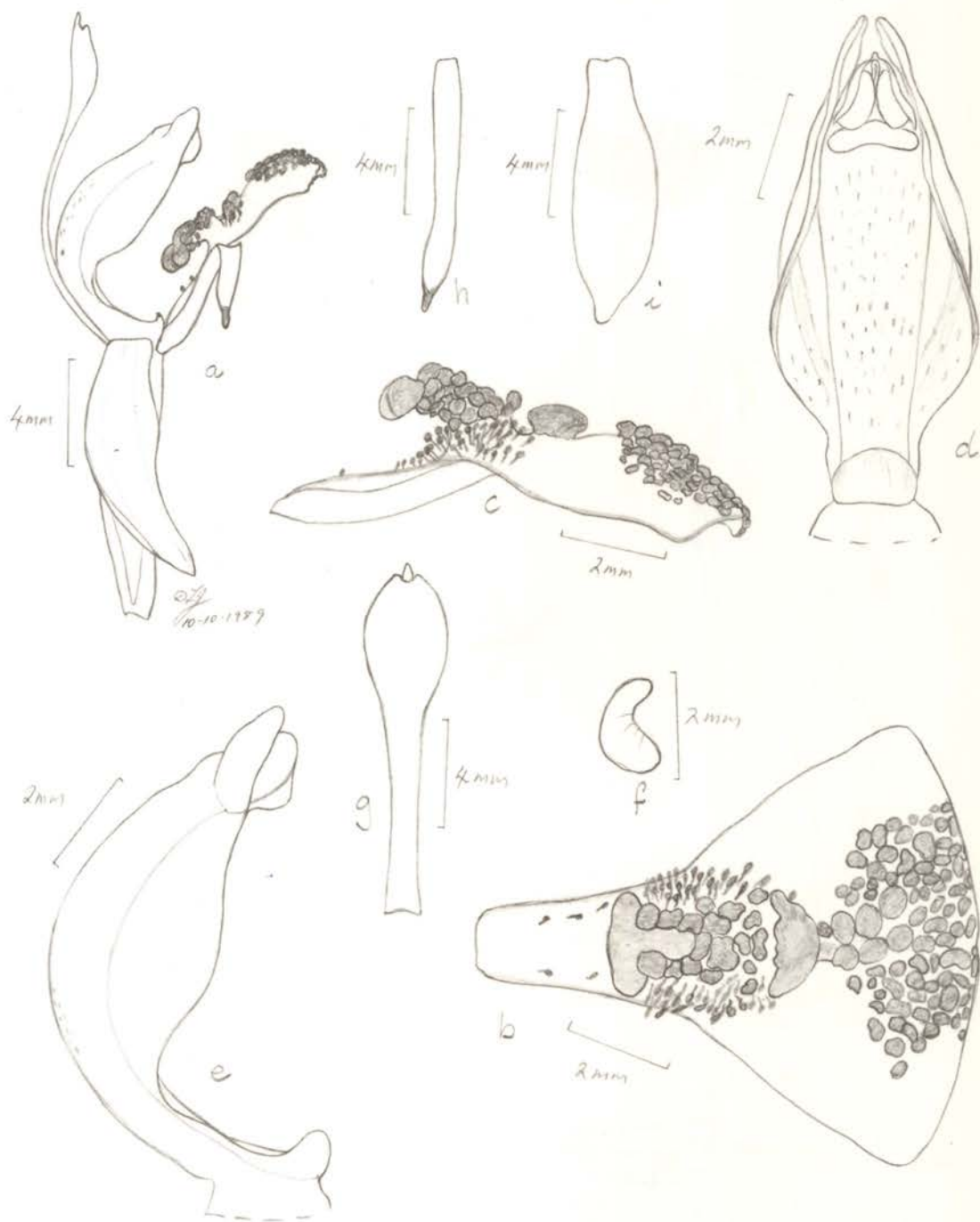


Fig. 48. *Chiloglottis platyptera* (Barrington Tops, NSW, D. L. Jones 5093), a) flower from side, b) labellum from above, c) labellum from side, d) column from front, e) column from side, f) pollinium, g) dorsal sepal, h) lateral sepal, i) petal.

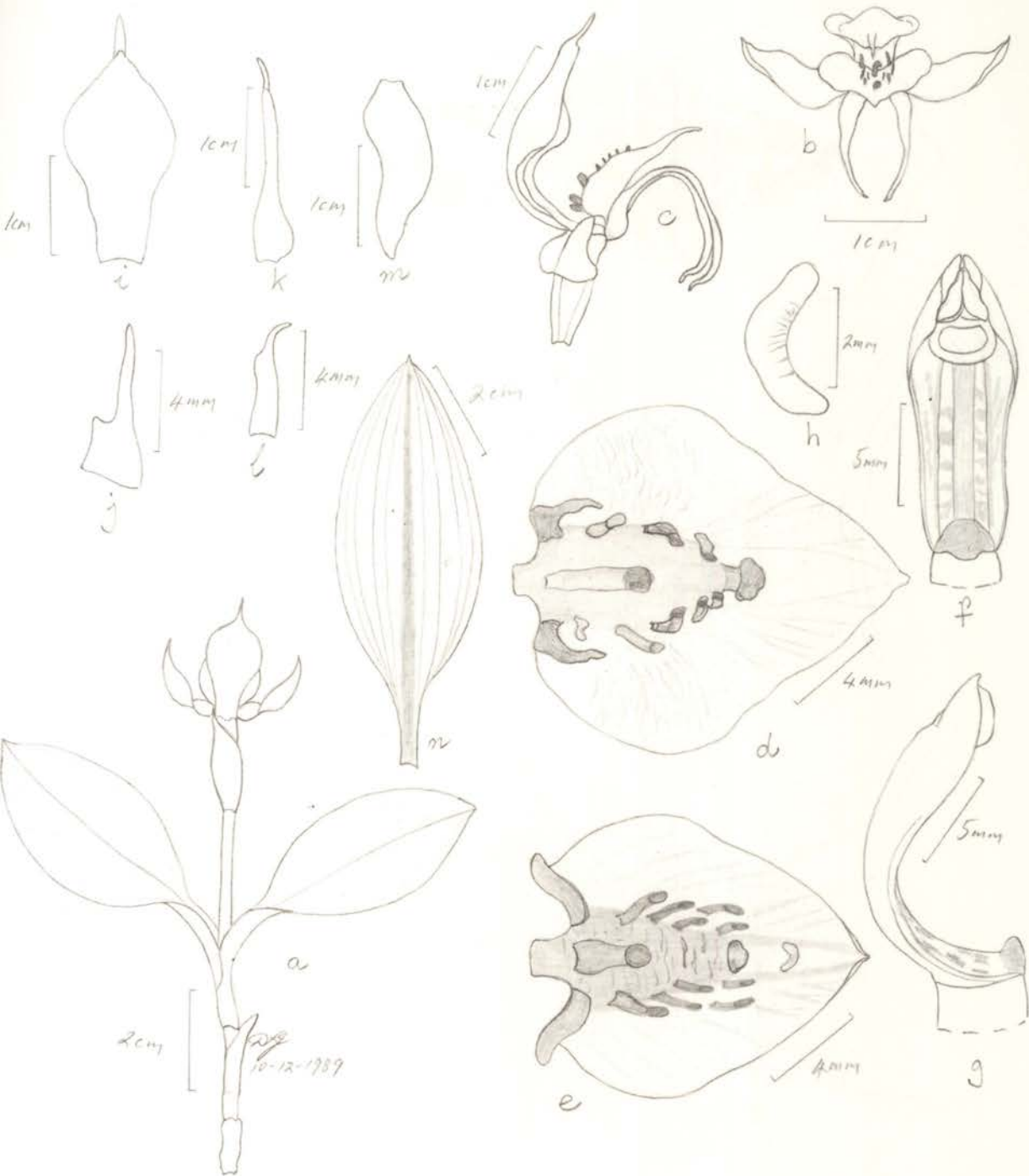


Fig. 49. *Chiloglottis pluricallata* (Point Lookout, NSW, D. L. Jones 5538), a) plant, b) flower from front, c) flower from side, d, e) labella from above, f) column from front, g) column from side, h) pollinium, i) dorsal sepal, j) dorsal sepal osmophore, k) lateral sepal, l) lateral sepal osmophore, m) petal, n) leaf.

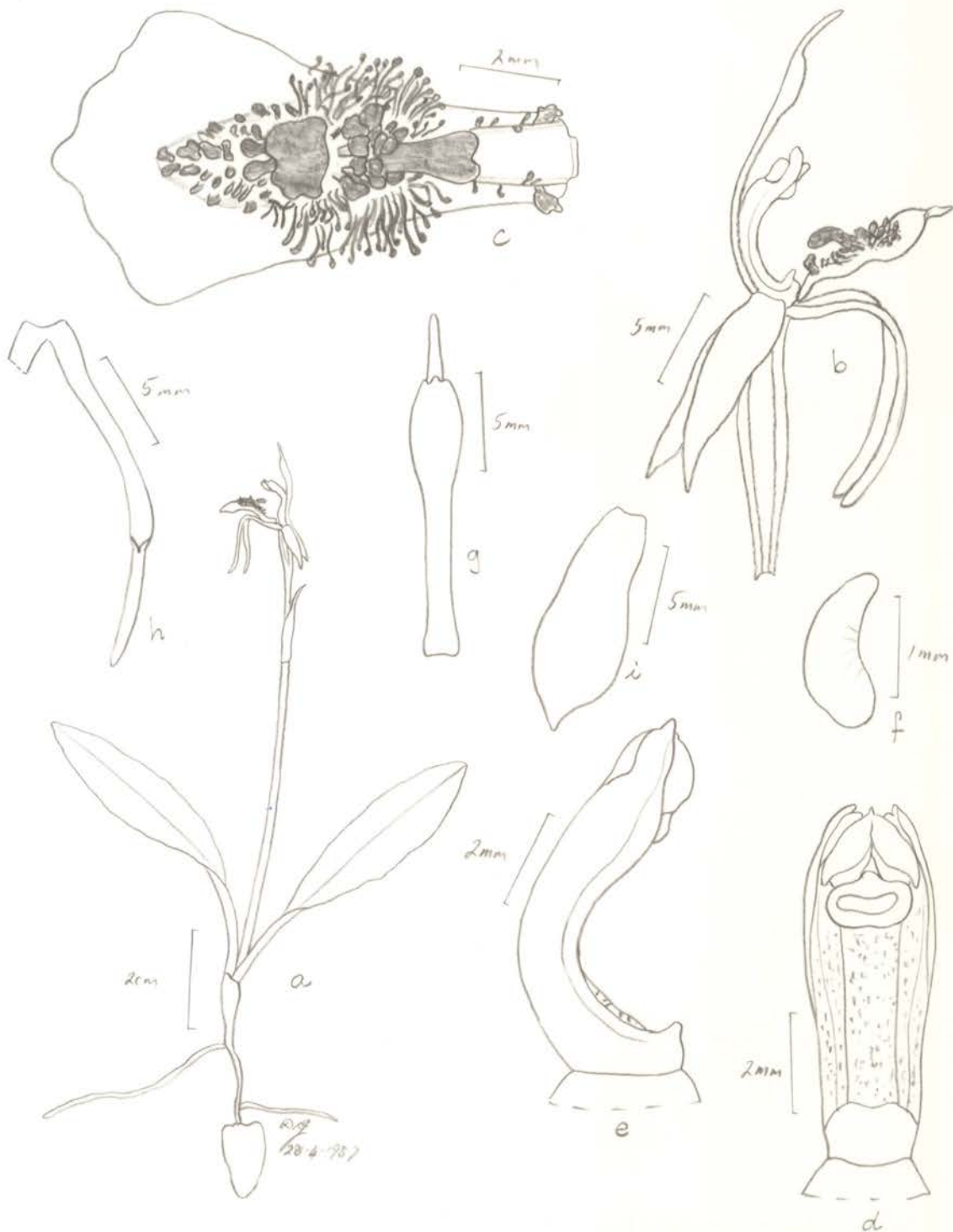


Fig. 50. *Chiloglottis seminuda* (Penrose State Forest, NSW, M. A. Clements s.n.), a) plant, b) flower from side, c) labellum from above, d) column from front, e) column from side, f) pollinium, g) dorsal sepal, h) lateral sepal, i) petal.



Fig. 51. *Chiloglottis sphynoides* (Pat's Bluff, Qld, C. Harman s.n.), a) plant, b) flower from side, c) labellum from above, d) lamina callus from side, e) column from front, f) column from side, g) pollinium, h) dorsal sepal, i) lateral sepal, j) petal.

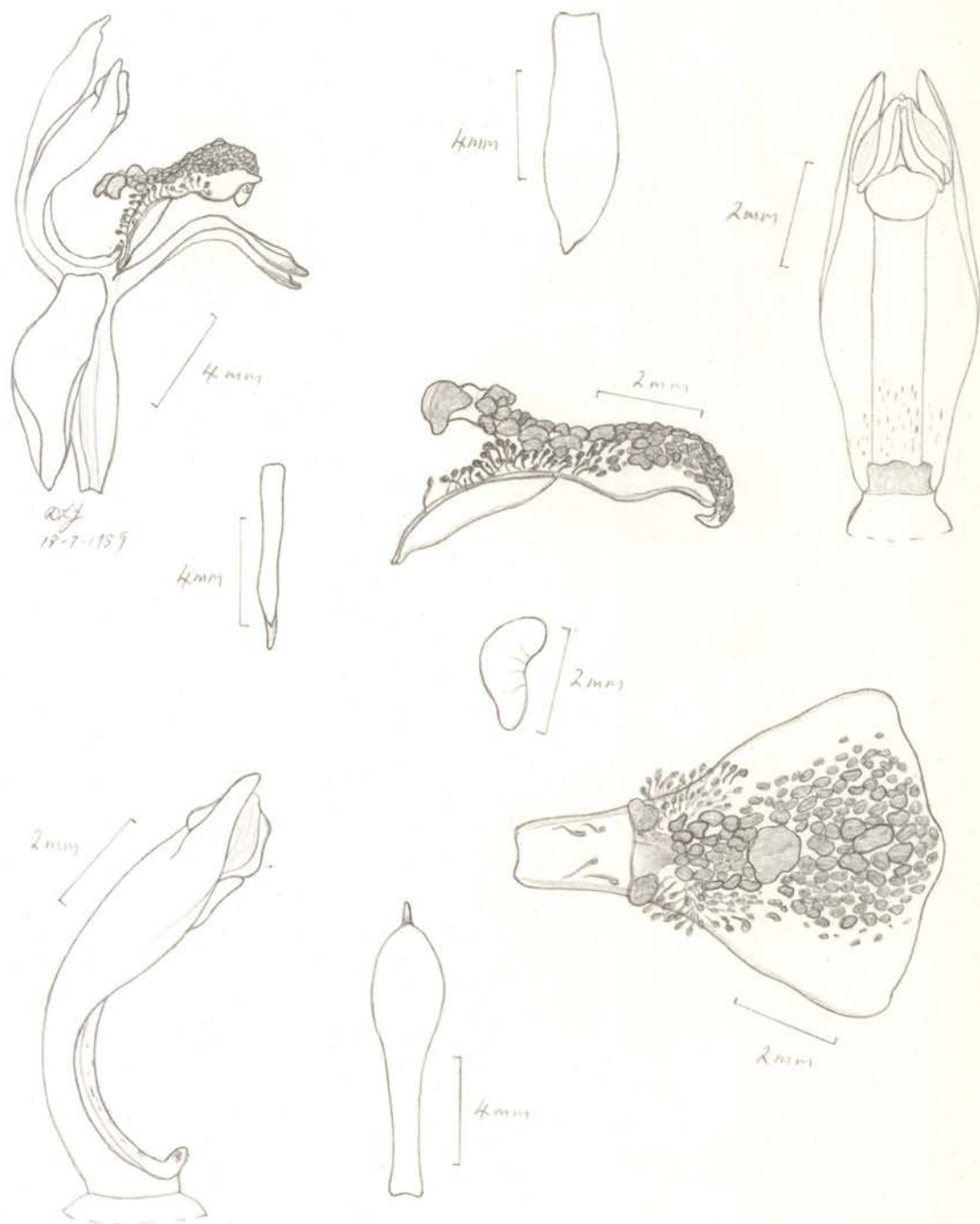


Fig. 52. *Chiloglottis trullata* (Blackdown Tableland, Qld, D. L. Jones 4552), a) flower from side, b) labellum from above, c) labellum from side, d) column from front, e) column from side, f) pollinium, g) dorsal sepal, h) lateral sepal, i) petal.

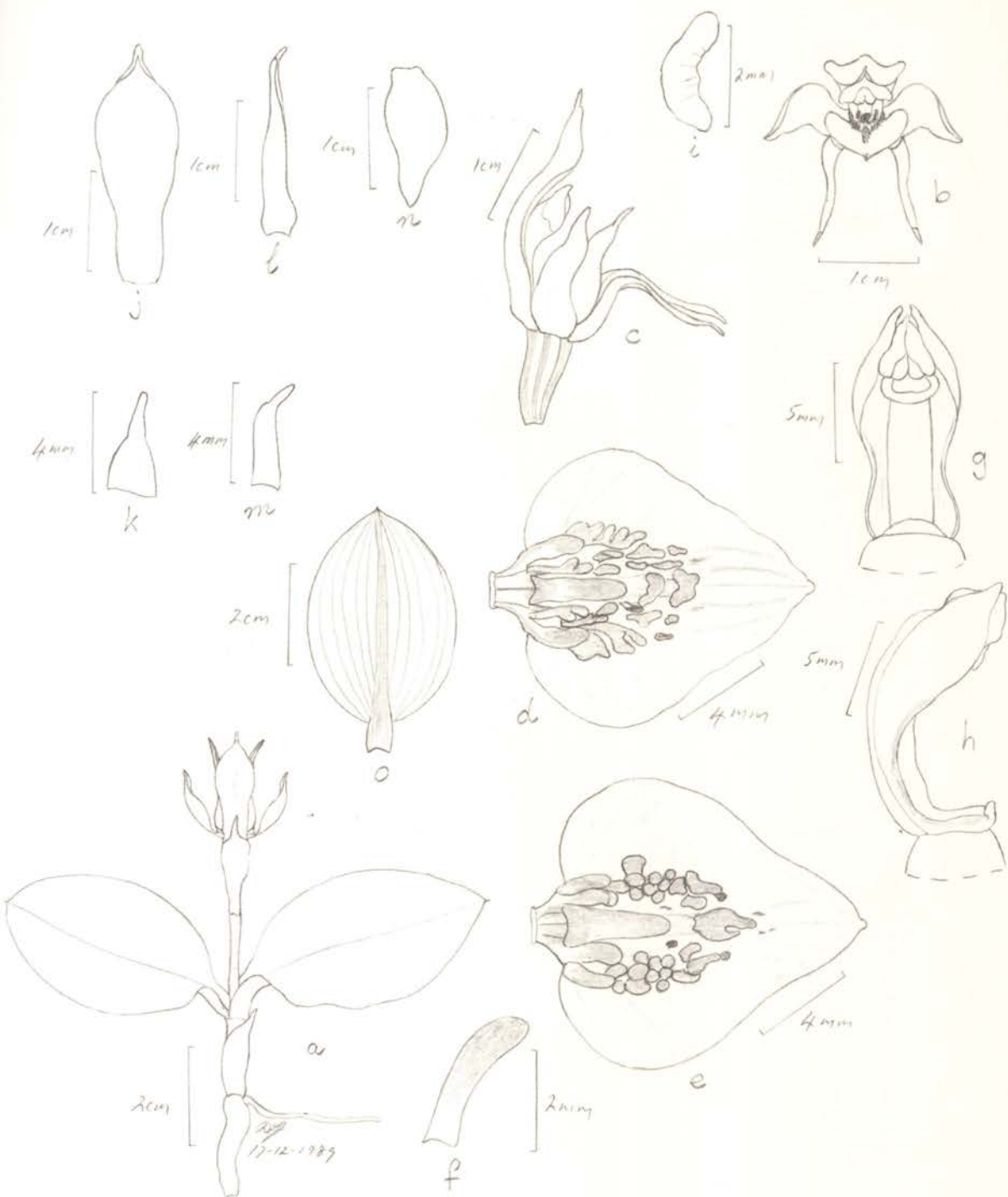


Fig. 53. *Chiloglottis turfosa* (Tantangara Dam Rd. NSW, D. L. Jones 5571), a) plant, b) flower from front, c) flower from side, d, e) labella from above, f) main labellum gland, g) column from front, h) column from side, i) pollinium, j) dorsal sepal, k) dorsal sepal osmophore, l) lateral sepal, m) lateral sepal osmophore, n) petal, o) leaf.

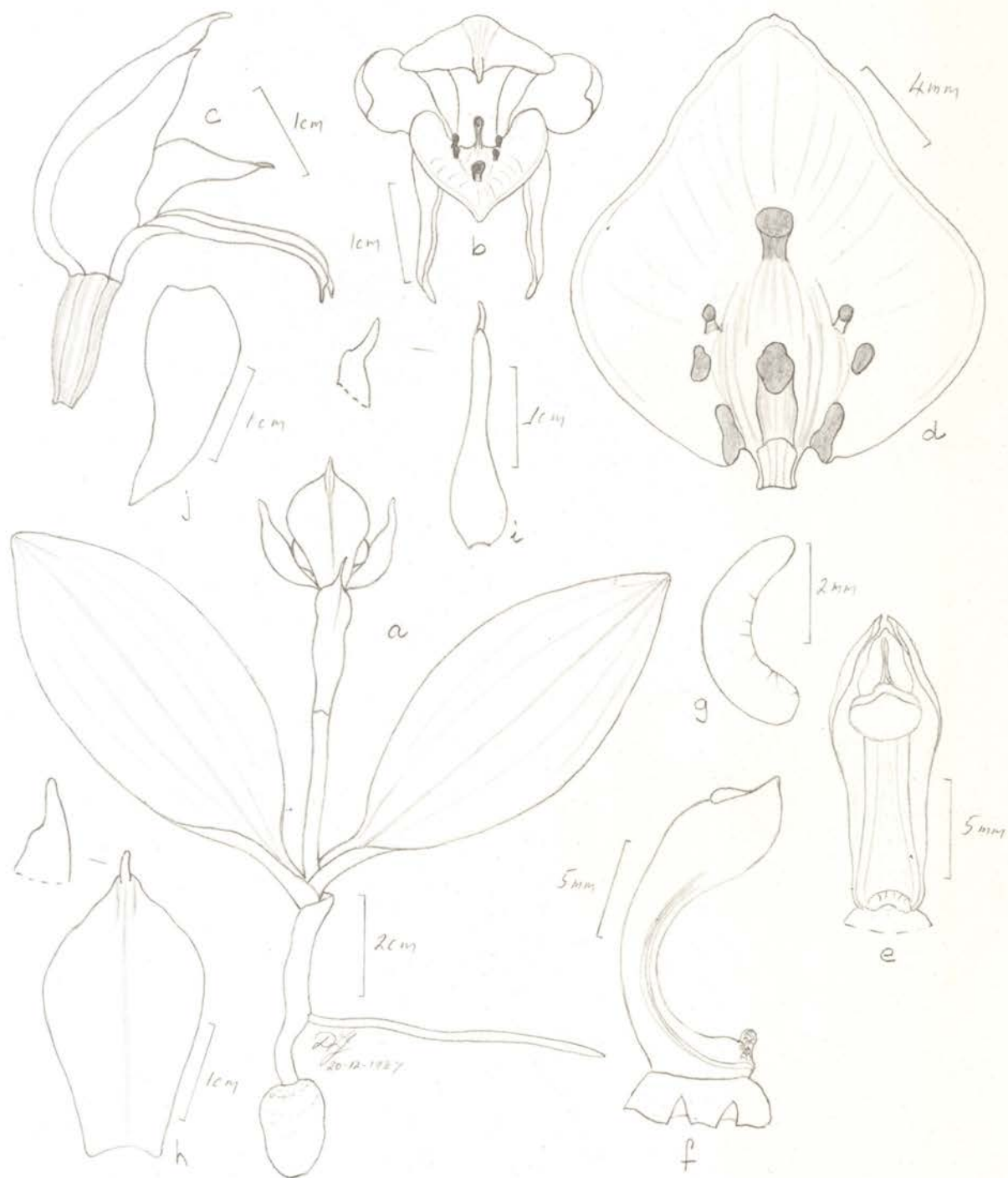


Fig. 54. *Chiloglottis valida* (Ginini Flats, ACT, D. L. Jones 5453), a) plant, b) flower from front, c) flower from side, d) labellum from above, e) column from front, f) column from side, g) pollinium, h) dorsal sepal, i) lateral sepal, j) petal.

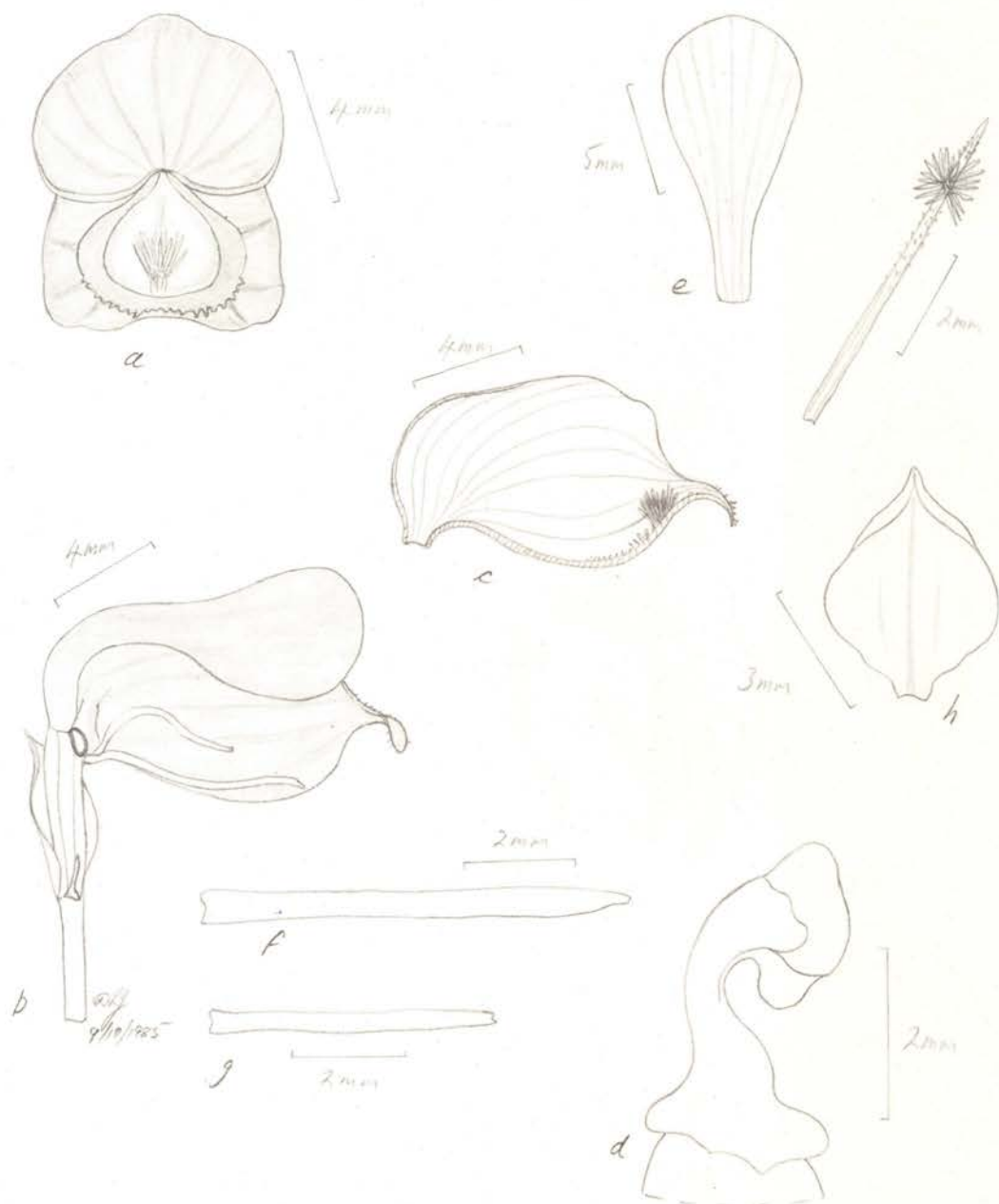


Fig. 55. *Corybas abditus* (Bakers Junction, WA, D. L. Jones 2125), a) flower from front, b) flower from side, c) longitudinal section of labellum, d) column from side, e) dorsal sepal flattened out, f) lateral sepal, g) petal, h) fertile bract.

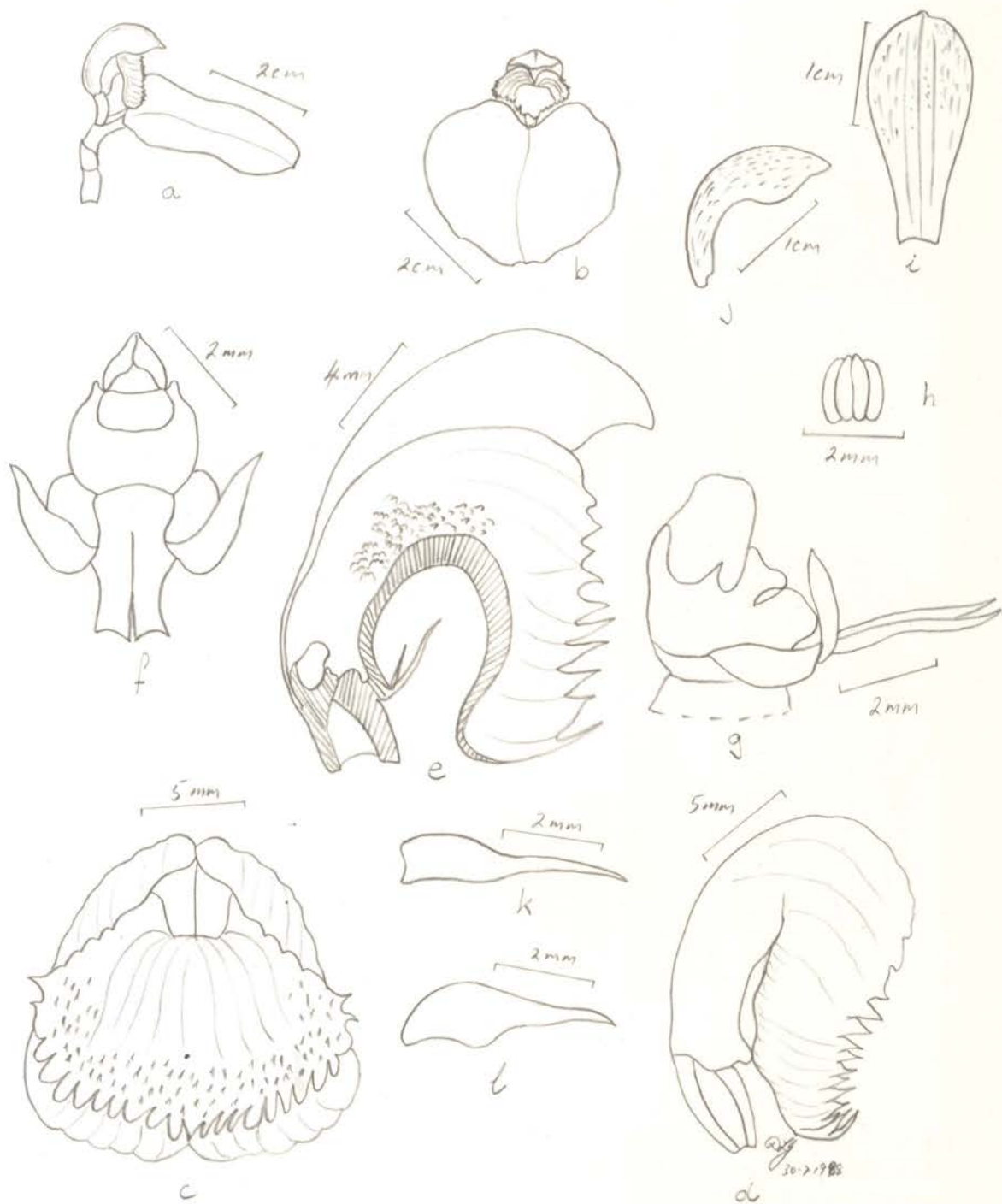


Fig. 56. *Corybas dentatus* (Sandy Ck, SA, R. Bates s.n.), a) plant from side, b) plant from front, c) labellum from front, d) labellum from side, e) longitudinal section of flower, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal flattened out j) dorsal sepal from side, k) lateral sepal, l) petal.

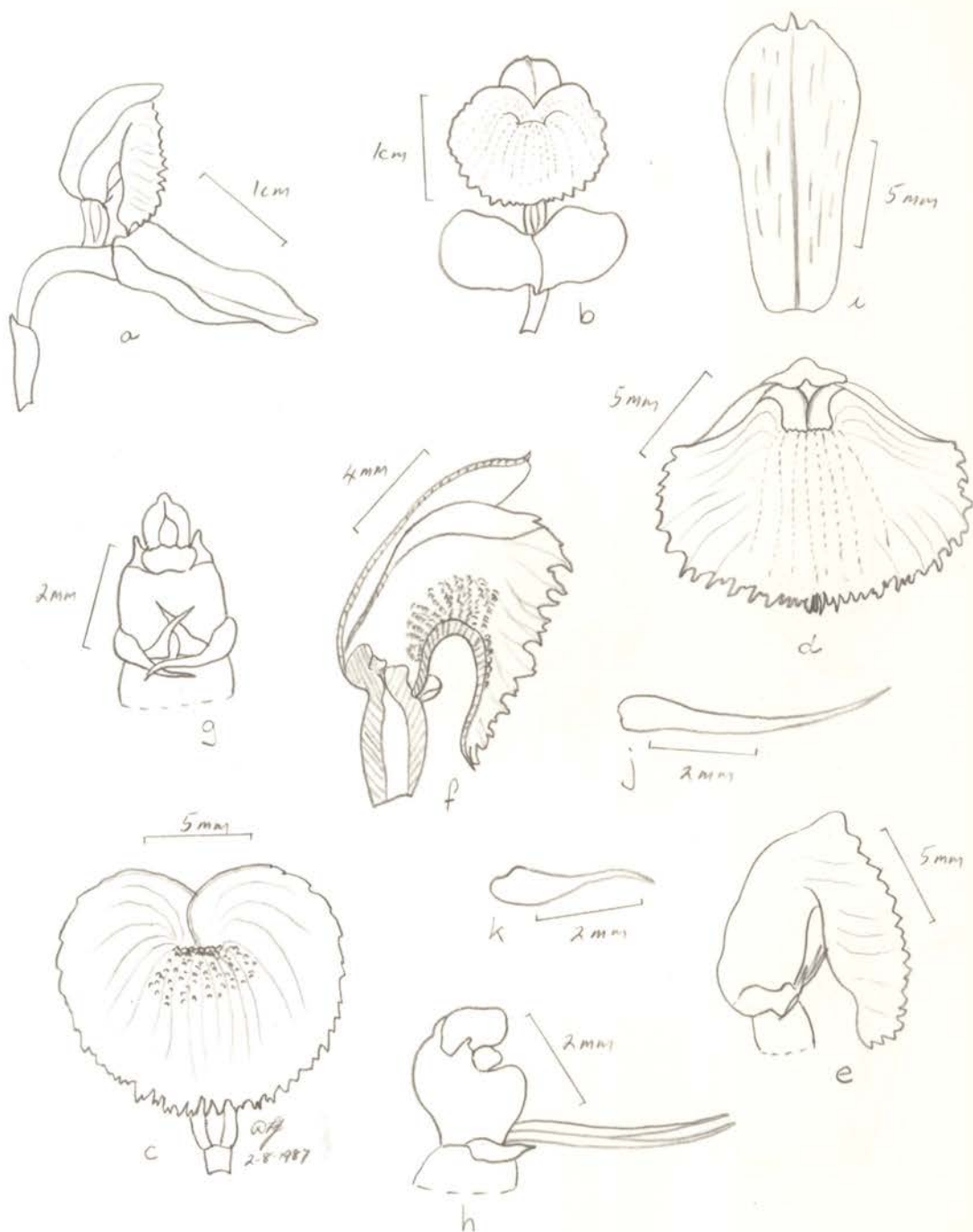


Fig. 57. *Corybas expansus* (Warrenben Conservation Park, SA, R. Bates s.n.), a) plant from side, b) plant from front, c) labellum from front, d) flower from front, e) labellum from side, f) longitudinal section of flower, g) column from front, h) column from side, i) dorsal sepal flattened out, j) lateral sepal, k) petal.

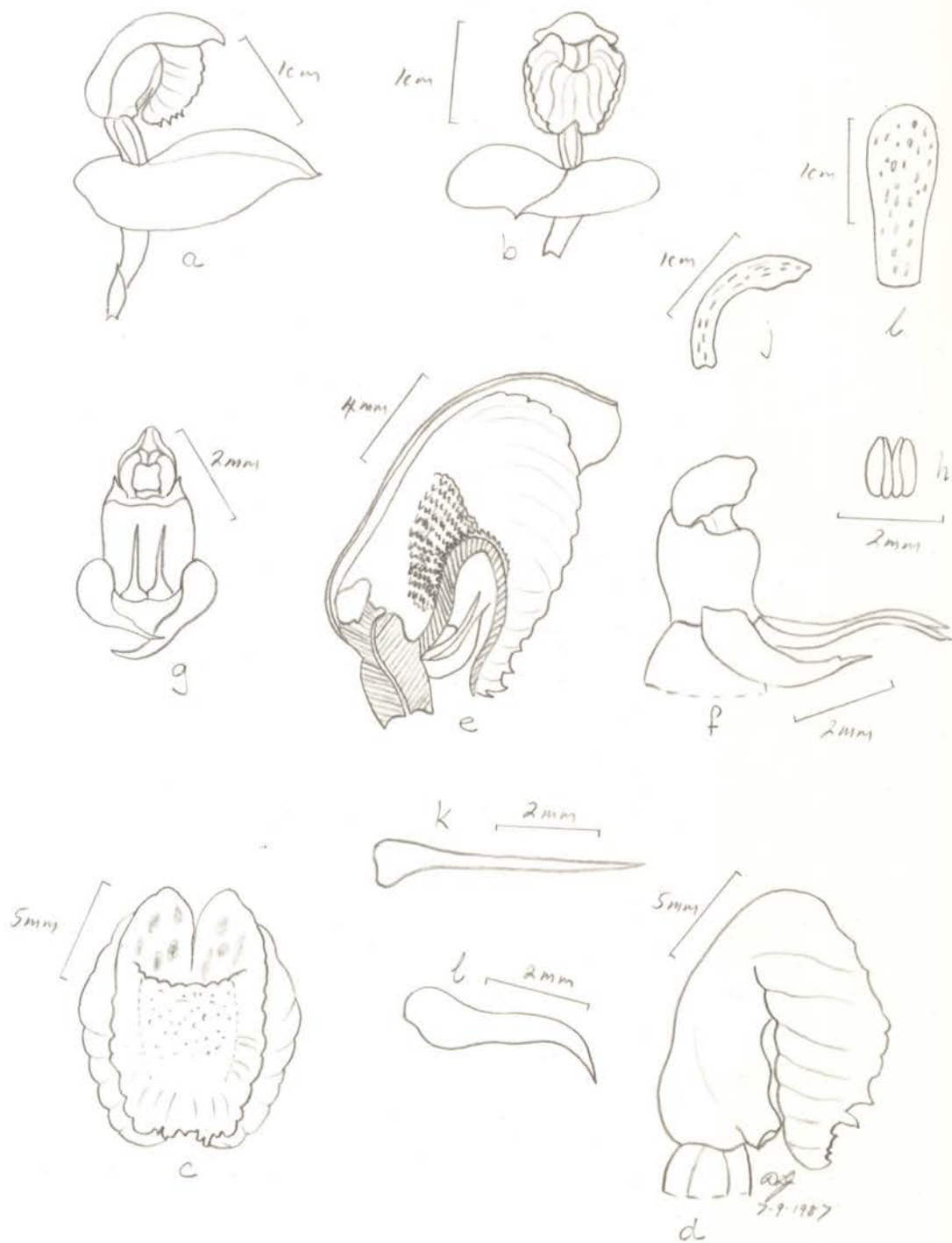


Fig. 58. *Corybas limpidus* (Ledge Beach, Albany, WA, D. L. Jones 2424), a) plant from side, b) plant from front, c) labellum from front, d) labellum from side, e) longitudinal section of flower, f) column from side, g) column from front, h) pollinarium, i) dorsal sepal flattened out, j) dorsal sepal from side, k) lateral sepal, l) petal.

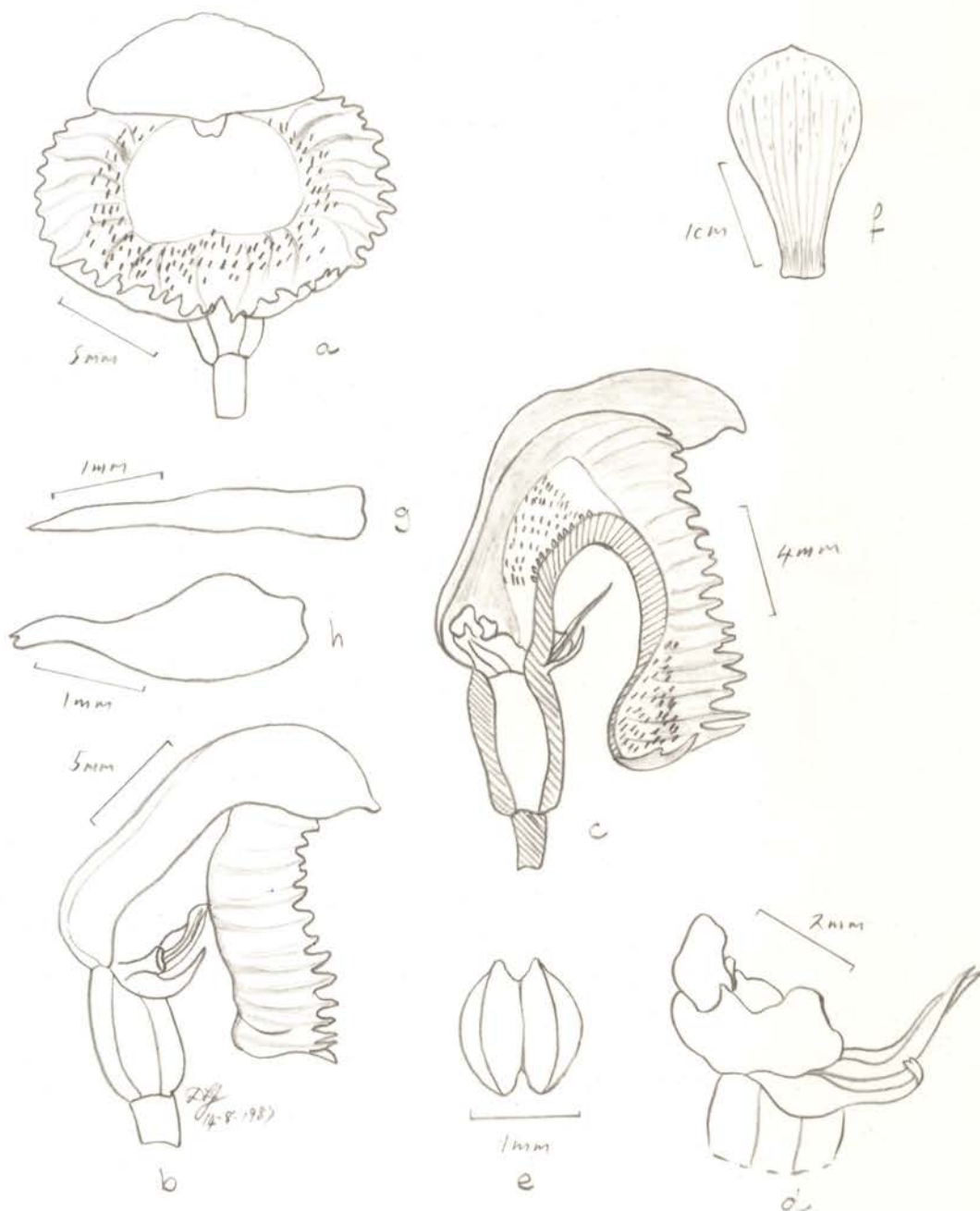


Fig. 59. *Corybas X miscellus* (Barossa Reservoir, SA, R. Bates 10095), a) flower from front, b) flower from side, c) longitudinal section of flower, d) column from side, e) pollinarium, f) dorsal sepal flattened out, g) lateral sepal, h) petal.

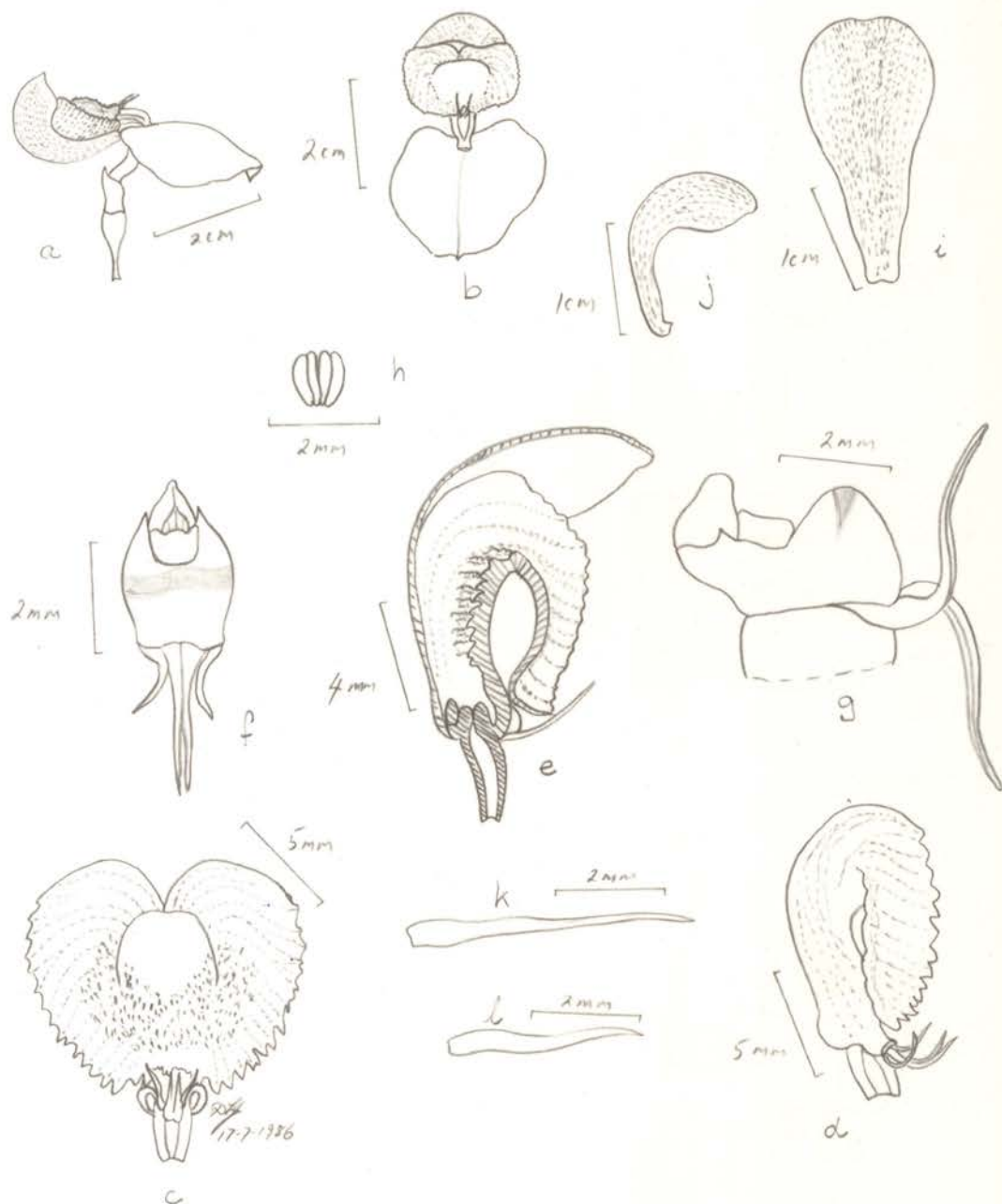


Fig. 60. *Corybas recurvus* (Toolbrunup, WA, D. L. Jones s.n.), a) plant from side, b) plant from front, c) labellum from front, d) labellum from side, e) longitudinal section of flower, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal flattened out, j) dorsal sepal from side, k) lateral sepal, l) petal.

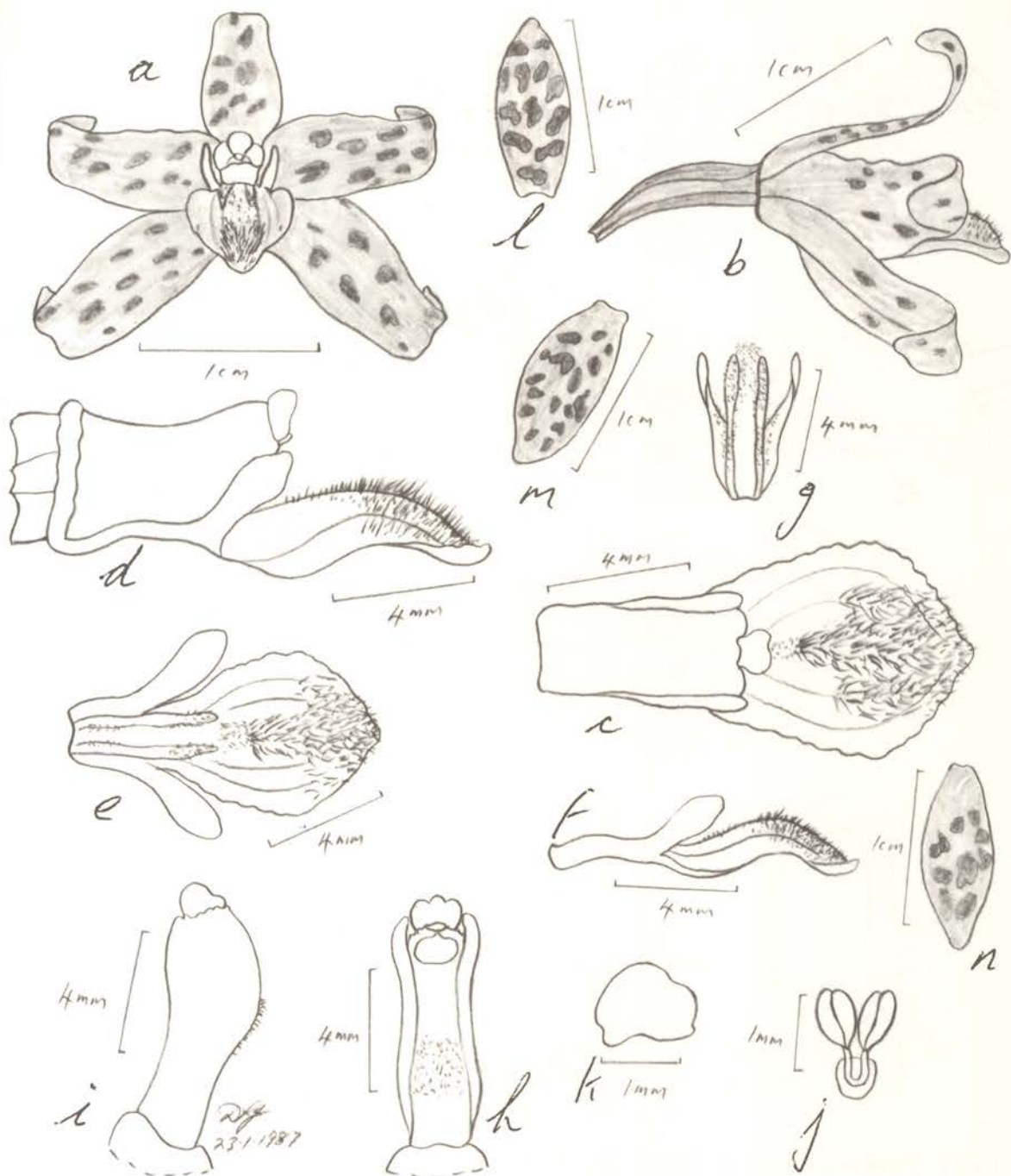


Fig. 61. *Dipodium atropurpureum* (Youdales Trail, NSW, D. L. Jones 2551), a) flower from front, b) flower from side, c) column and labellum from above, d) column and labellum from side, e) labellum from above, f) labellum from side, g) lamina callus from above, h) column from front, i) column from side, j) pollinarium, k) anther cap from side, l) dorsal sepal, m) lateral sepal, n) petal.

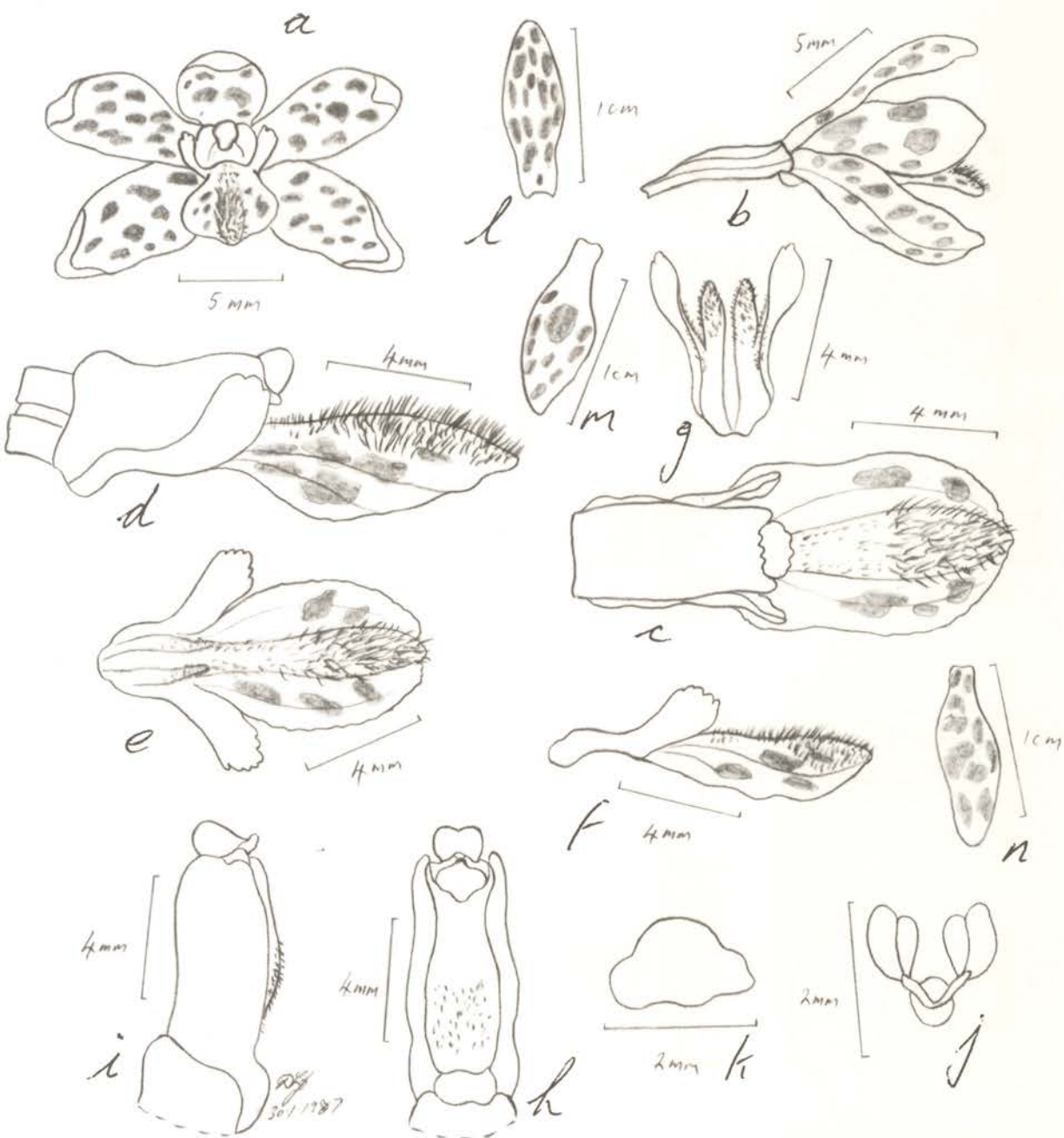


Fig. 62. *Dipodium campanulatum* (Naracoorte, SA, K. Alcock s.n.), a) flower from front, b) flower from side, c) column and labellum from above, d) column and labellum from side, e) labellum from above, f) labellum from side, g) lamina callus from above, h) column from front, i) column from side, j) pollinarium, k) anther cap from side, l) dorsal sepal, m) lateral sepal, n) petal.

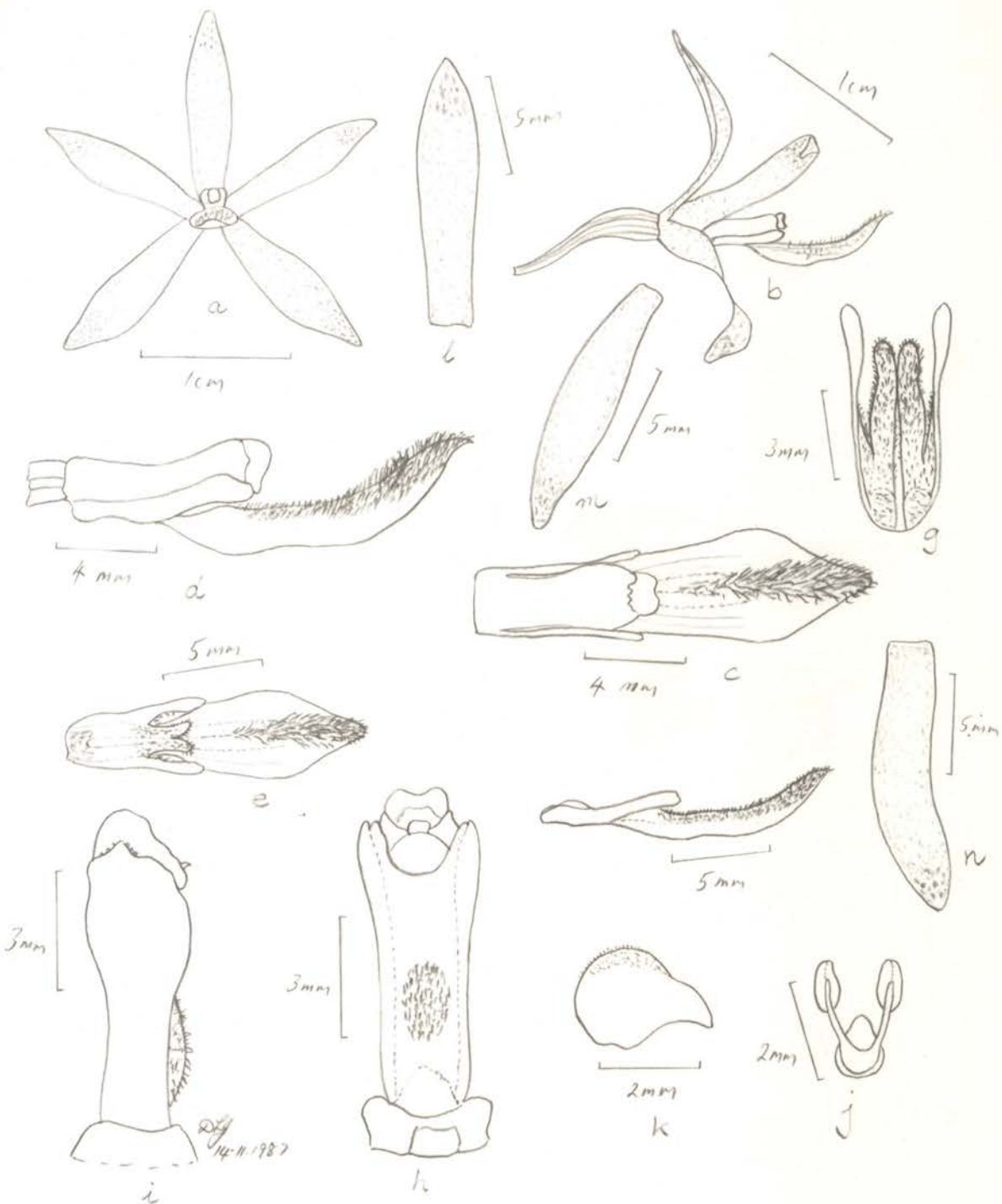


Fig. 63. *Dipodium elegantulum* (Mareeba-Atherton Rd. Qld, L. Lawler s.n.), a) flower from front, b) flower from side, c) column and labellum from above, d) column and labellum from side, e) labellum from above, f) labellum from side, g) lamina callus from above, h) column from front, i) column from side, j) pollinarium, k) anther cap from side, l) dorsal sepal, m) lateral sepal, n) petal.

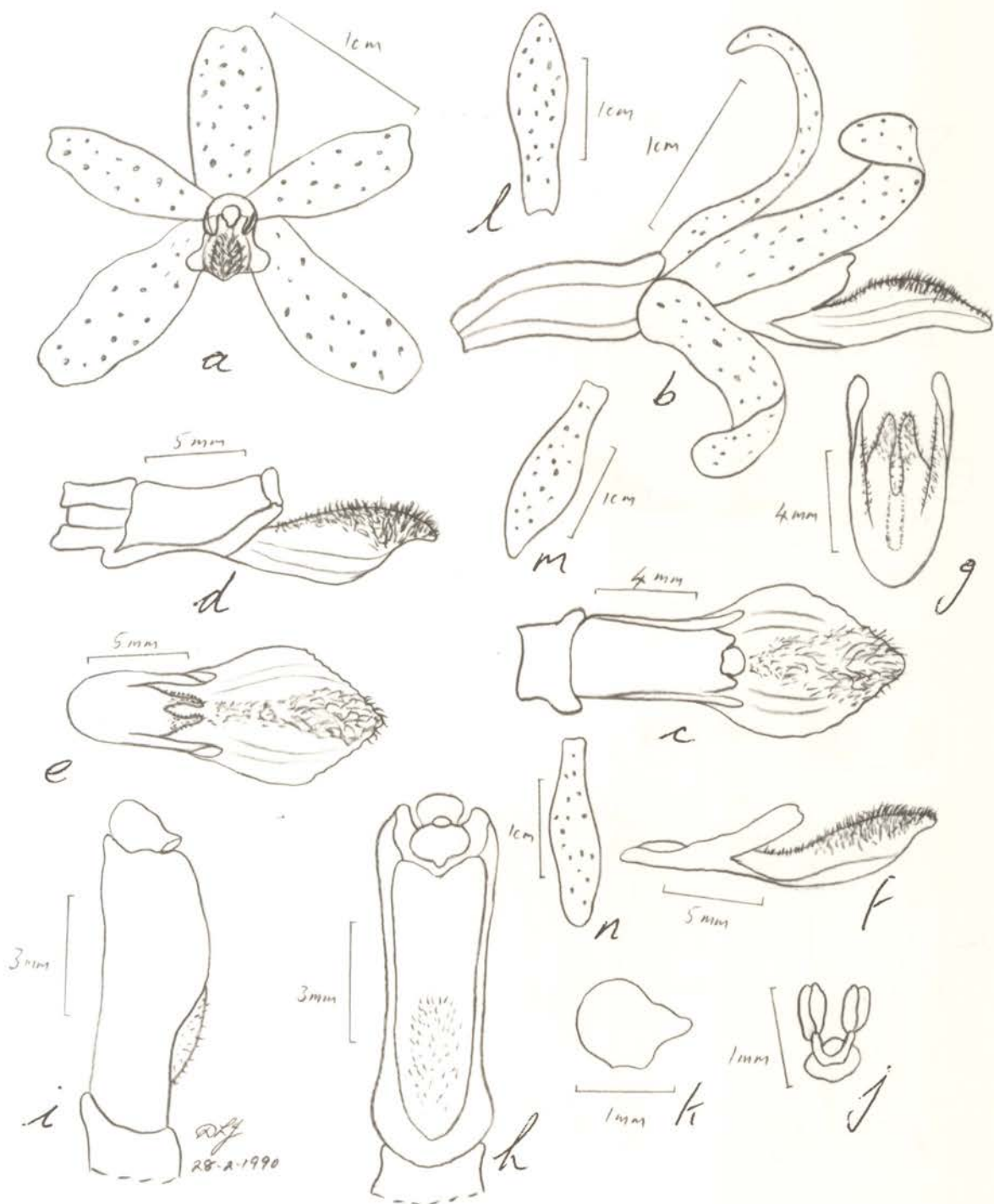


Fig. 64. *Dipodium roseum* (Montrose, Vic, H. Richards 211), a) flower from front, b) flower from side, c) column and labellum from above, d) column and labellum from side, e) labellum from above, f) labellum from side, g) lamina callus from above, h) column from front, i) column from side, j) pollinarium, k) anther cap from side, l) dorsal sepal, m) lateral sepal, n) petal.

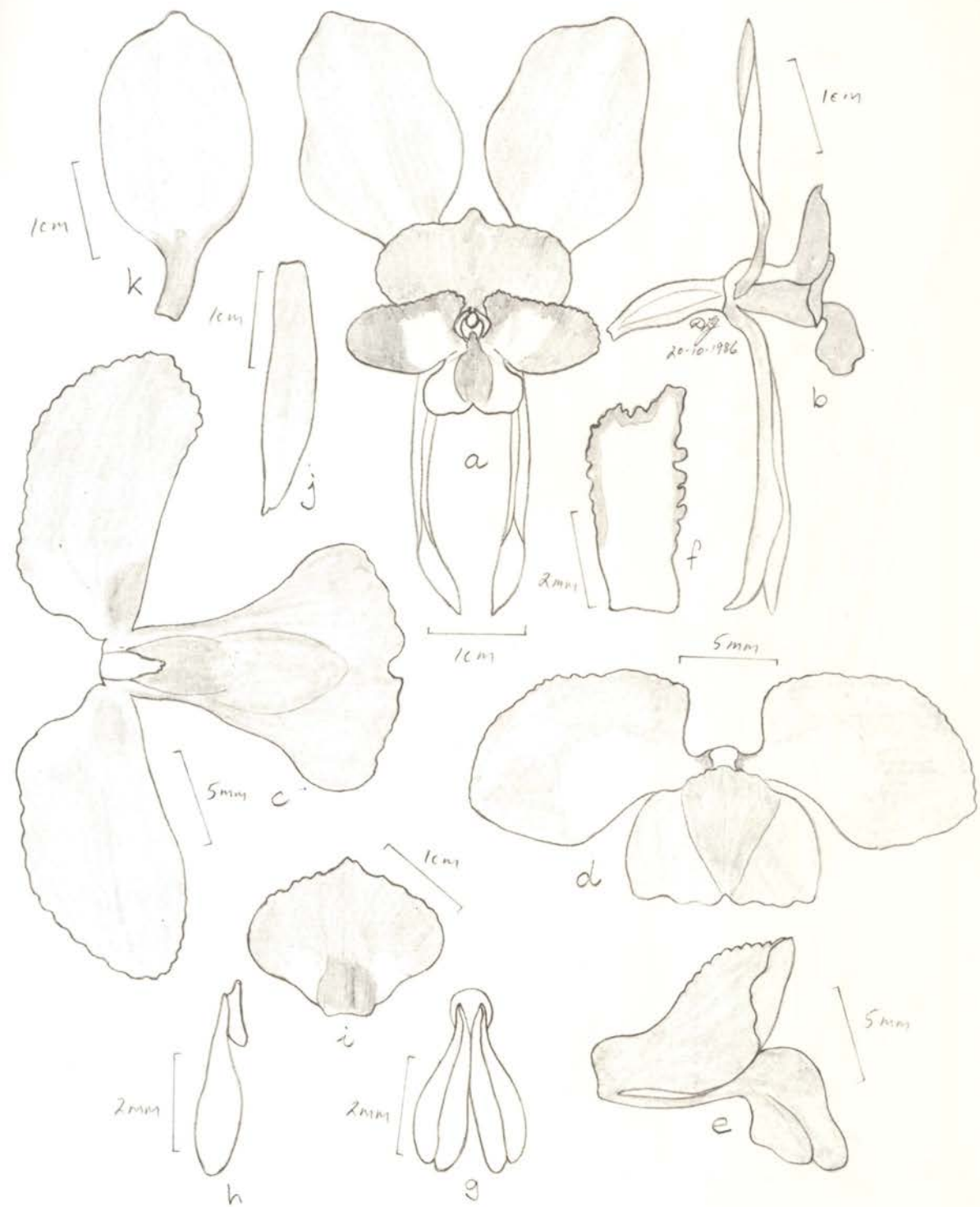


Fig. 65. *Diuris amplissima* (Lake Muir, WA, H. Richards s.n.), a) flower from front, b) flower from side, c) labellum flattened out from above, d) labellum from front, e) labellum from side, f) column wing, g) pollinarium from front, h) pollinarium from side, i) dorsal sepal, j) lateral sepal, k) petal.

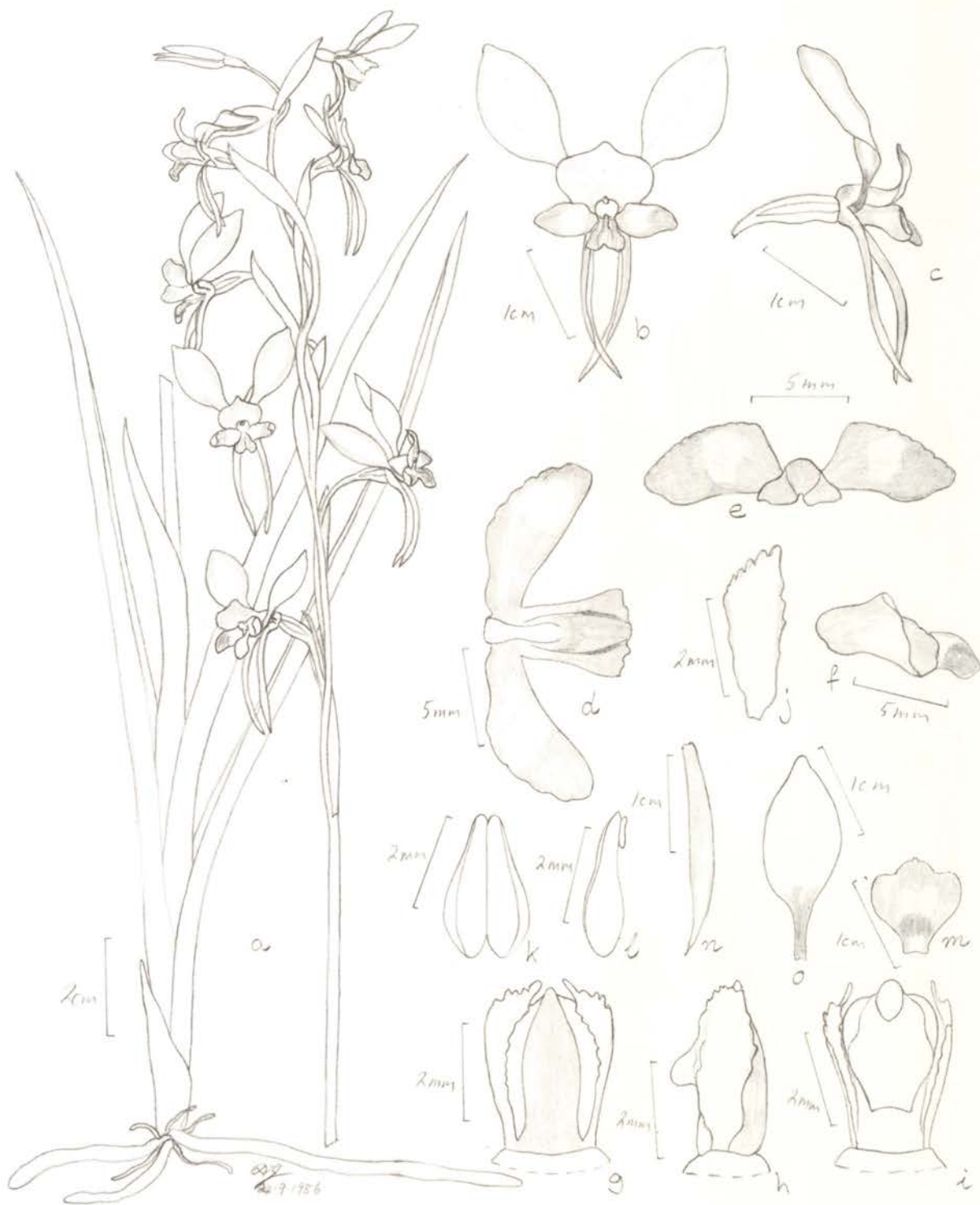


Fig. 66. *Diuris brumalis* (Kalamunda, WA, D. L. Jones, 2338), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) column from rear, h) column from side, i) column from front, j) column wing, k) pollinarium from front, l) pollinarium from side, m) dorsal sepal, n) lateral sepal, o) petal.

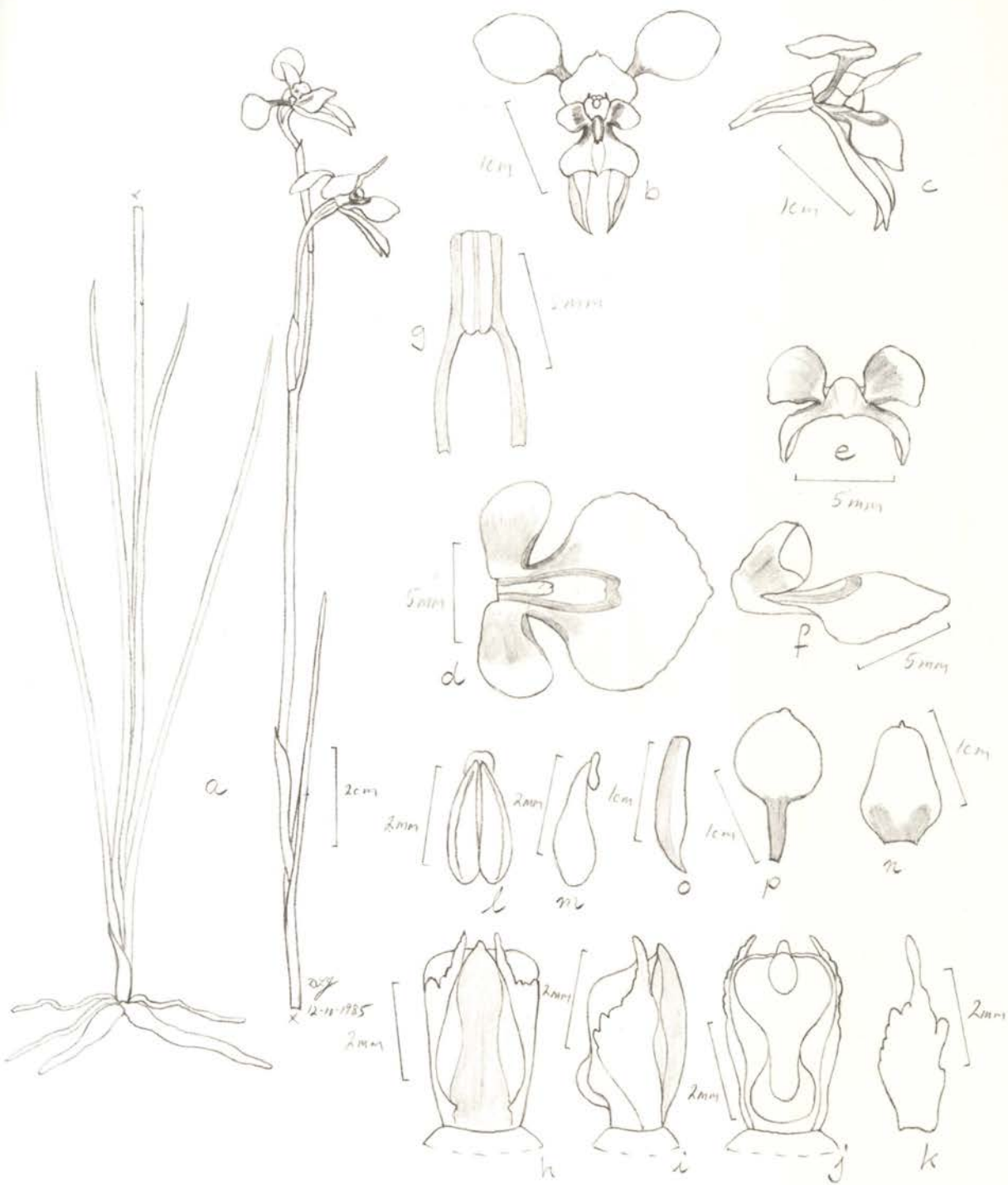


Fig. 67. *Diuris concinna* (Helms Arboretum, WA, D. L. Jones 2186), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.



Fig. 68. *Diuris conspicillata* (Dempster Head, Esperance, WA, R. Bates 15063), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) column from rear, h) column from side, i) column from front, j) column wing, k) pollinarium from front, l) dorsal sepal, m) lateral sepal, n) petal.

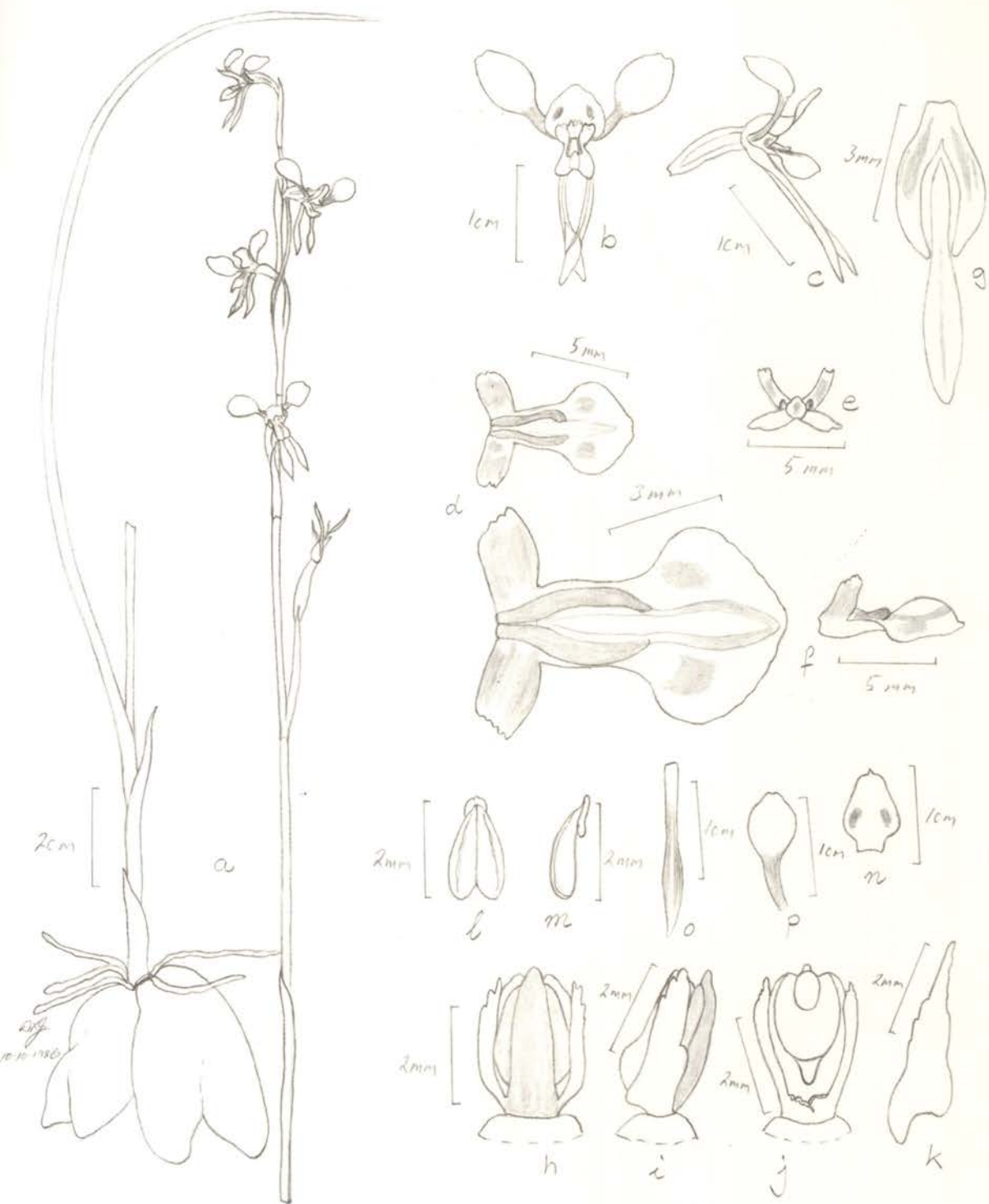


Fig. 69. *Diuris disposita* (west of Kempsey, NSW, D. L. Jones 2475), a) plant, b) flower from front, c) flower from side, d) labella flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

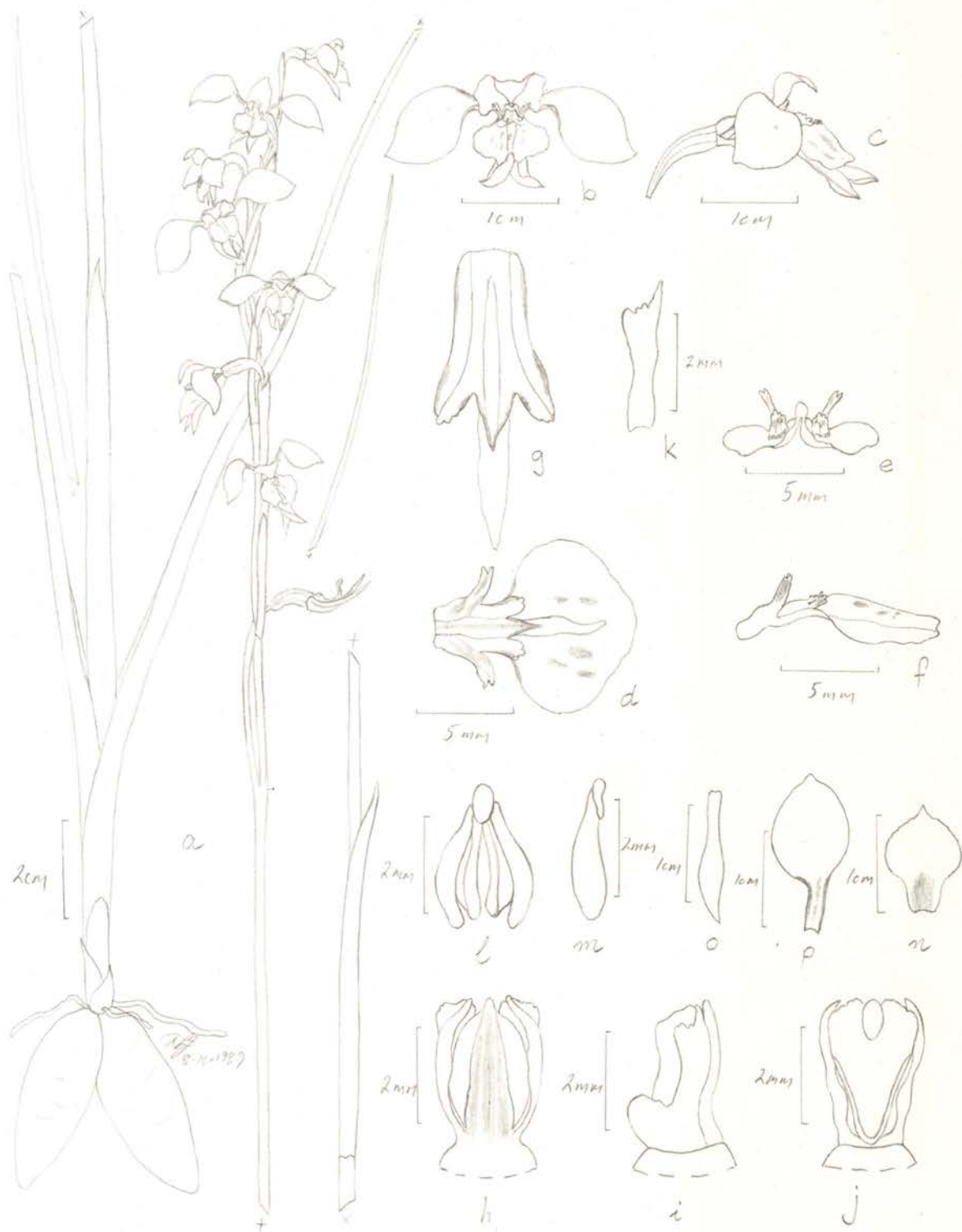


Fig. 70. *Diuris exitela* (Mt Moffat, Qld, D. L. Jones 5208), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

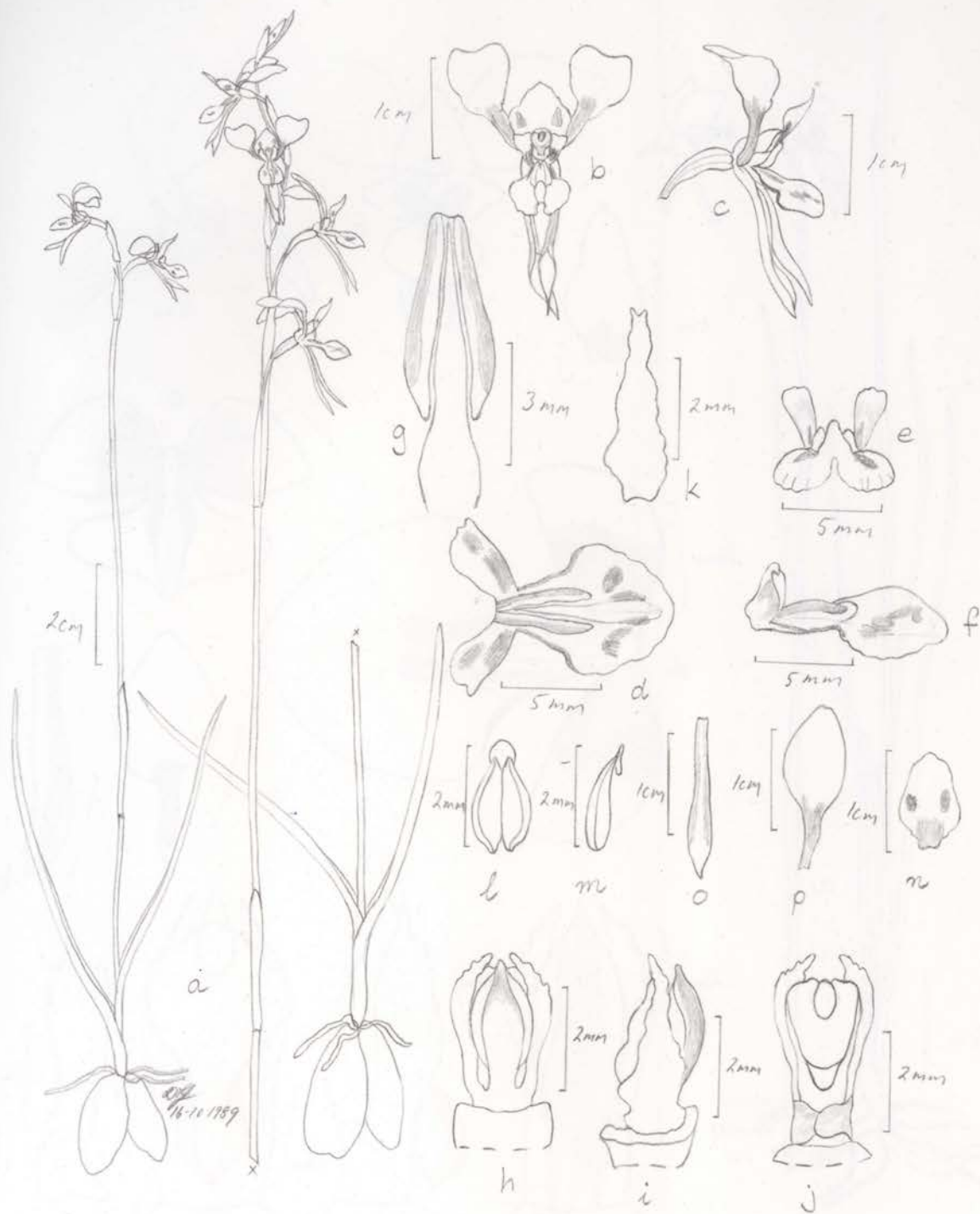


Fig. 71. *Diuris flavescens* (The Bight Cemetery, NSW, D. L. Jones 4925), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

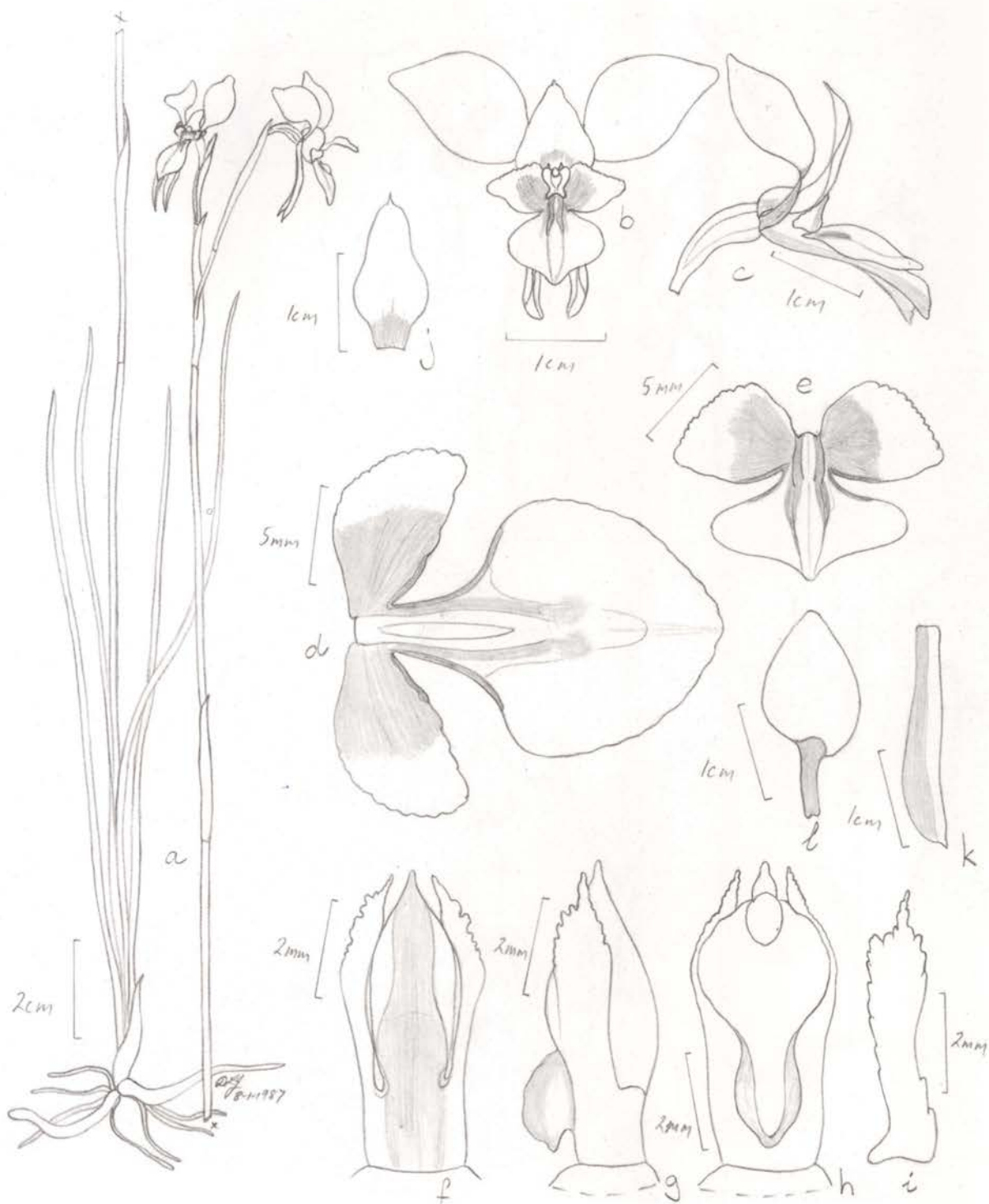


Fig. 72. *Diuris heberlei* (Nannarup to Moates Lagoon, WA, R. Heberle s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) column from rear, g) column side, h) column front, i) column wing, j) dorsal sepal, k) lateral sepal, l) petal.

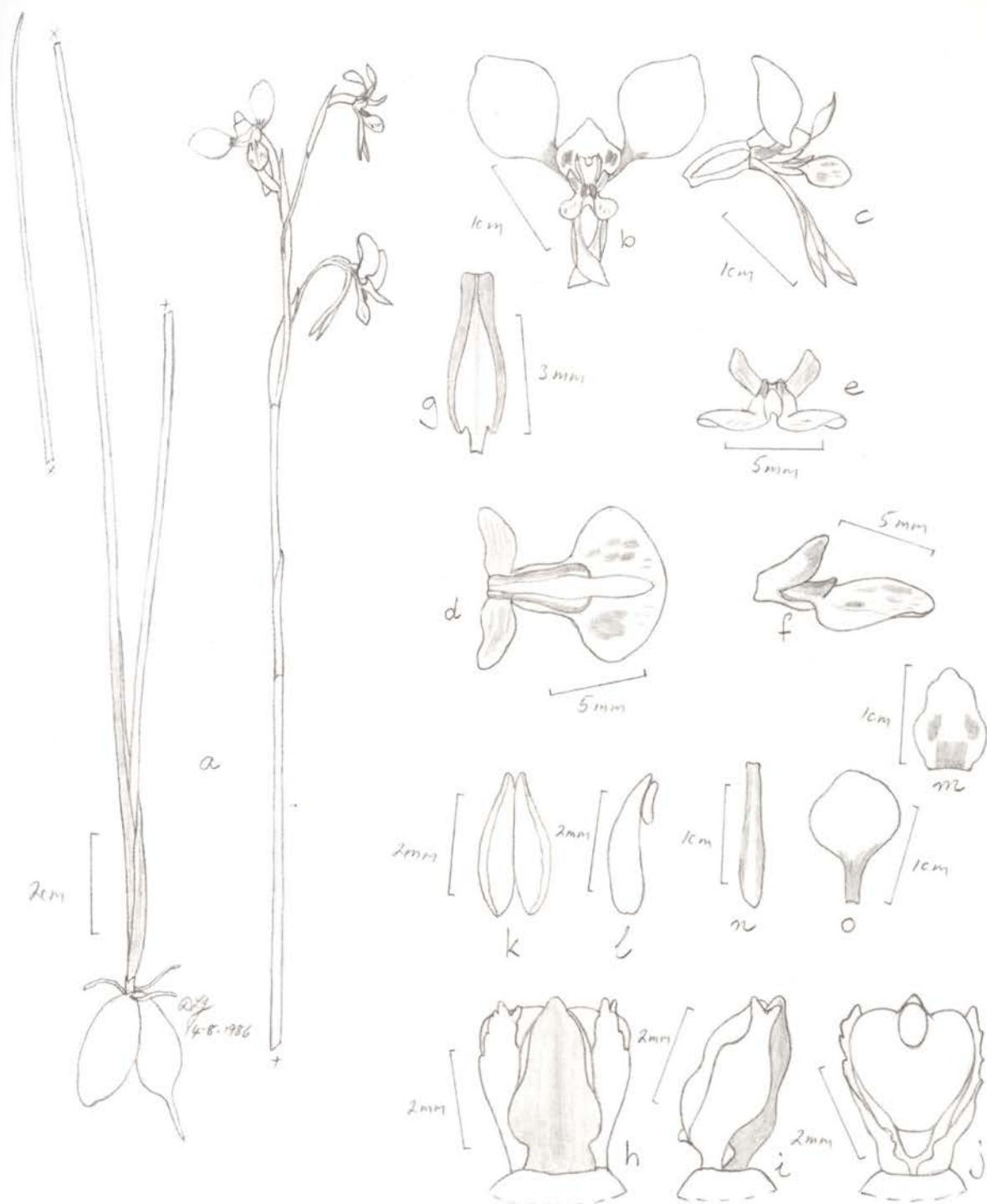


Fig. 73. *Diuris luteola* (Herberton Range, Qld, T. Wolff s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) pollinarium from front, l) pollinarium from side, m) dorsal sepal, n) lateral sepal. o) petal.

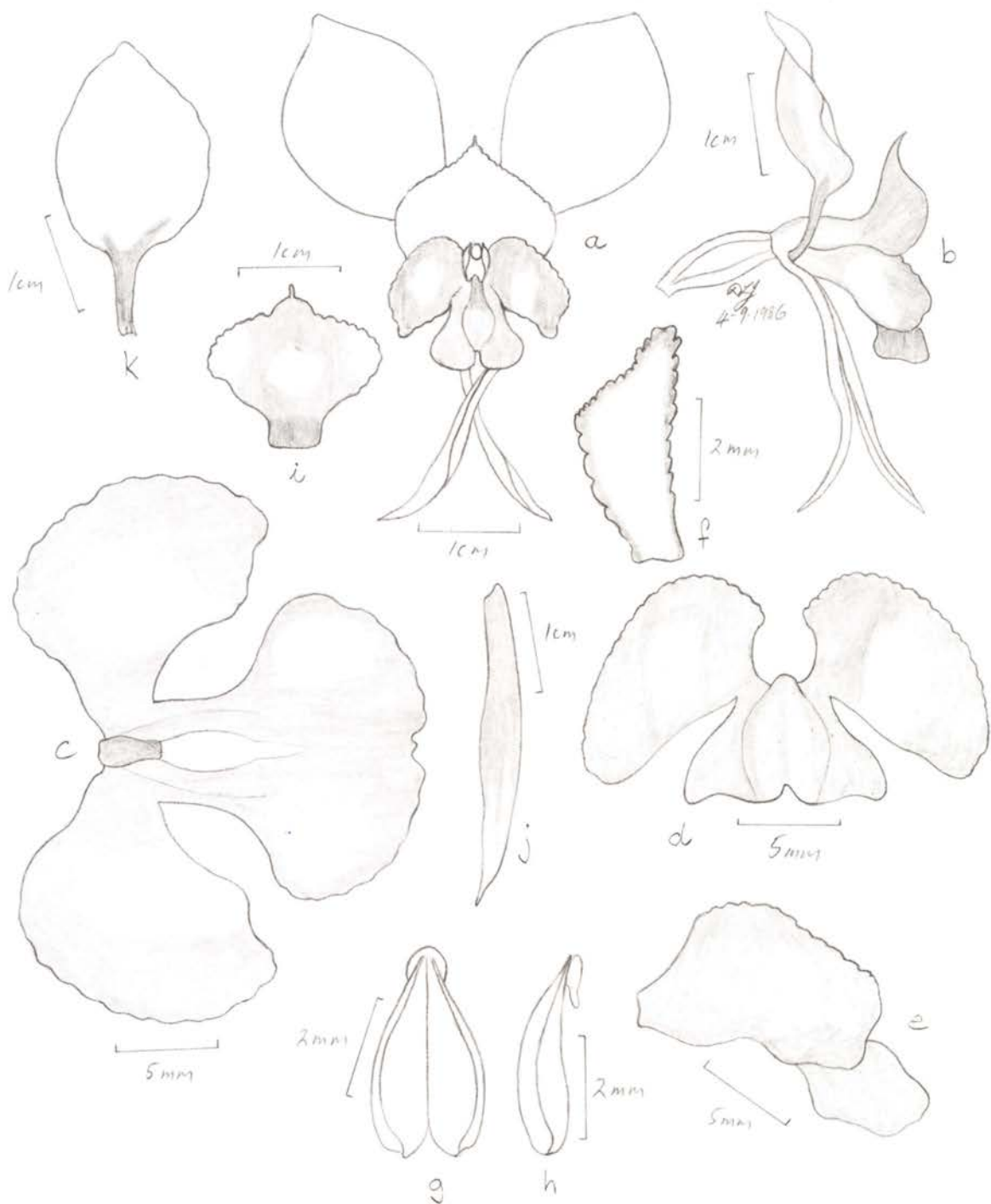


Fig. 74. *Diuris magnifica* (Mandogalup, WA, D. L. Jones 2473), a) flower from front, b) flower from side, c) labellum flattened out from above, d) labellum from front, e) labellum from side, f) column wing, g) pollinarium from front, h) pollinarium from side, i) dorsal sepal, j) lateral sepal, k) petal.

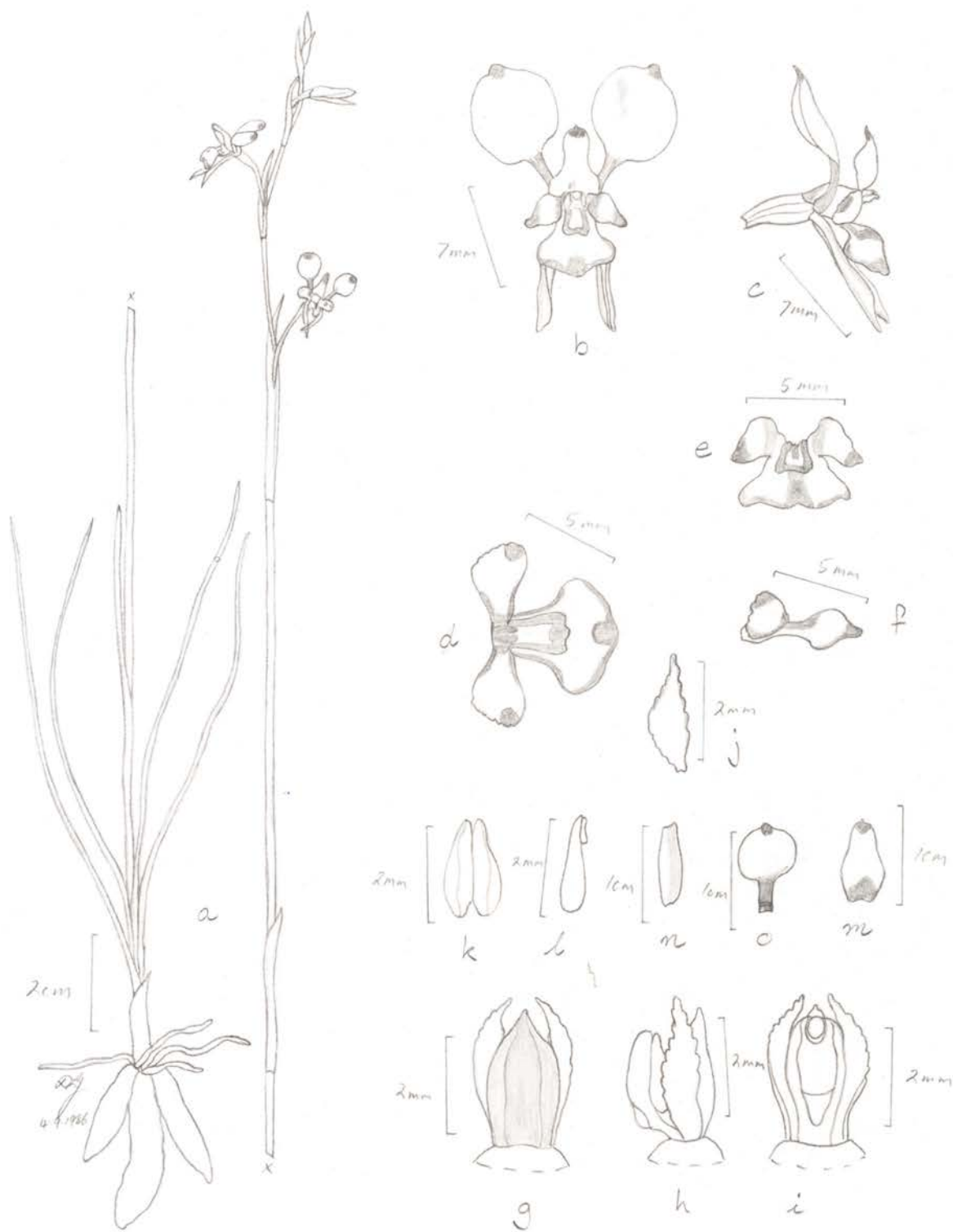


Fig. 75. *Diuris micrantha* (Mandogalup, WA, D. L. Jones 2474), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) column from rear, h) column from side, i) column from front, j) column wing, k) pollinarium from front, l) pollinarium from side, m) dorsal sepal, n) lateral sepal, o) petal.



Fig. 76. *Diuris X nebulosa* (Lake Burrill, NSW, M. A. Clements 2384), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) dorsal sepal, n) lateral sepal, o) petal.

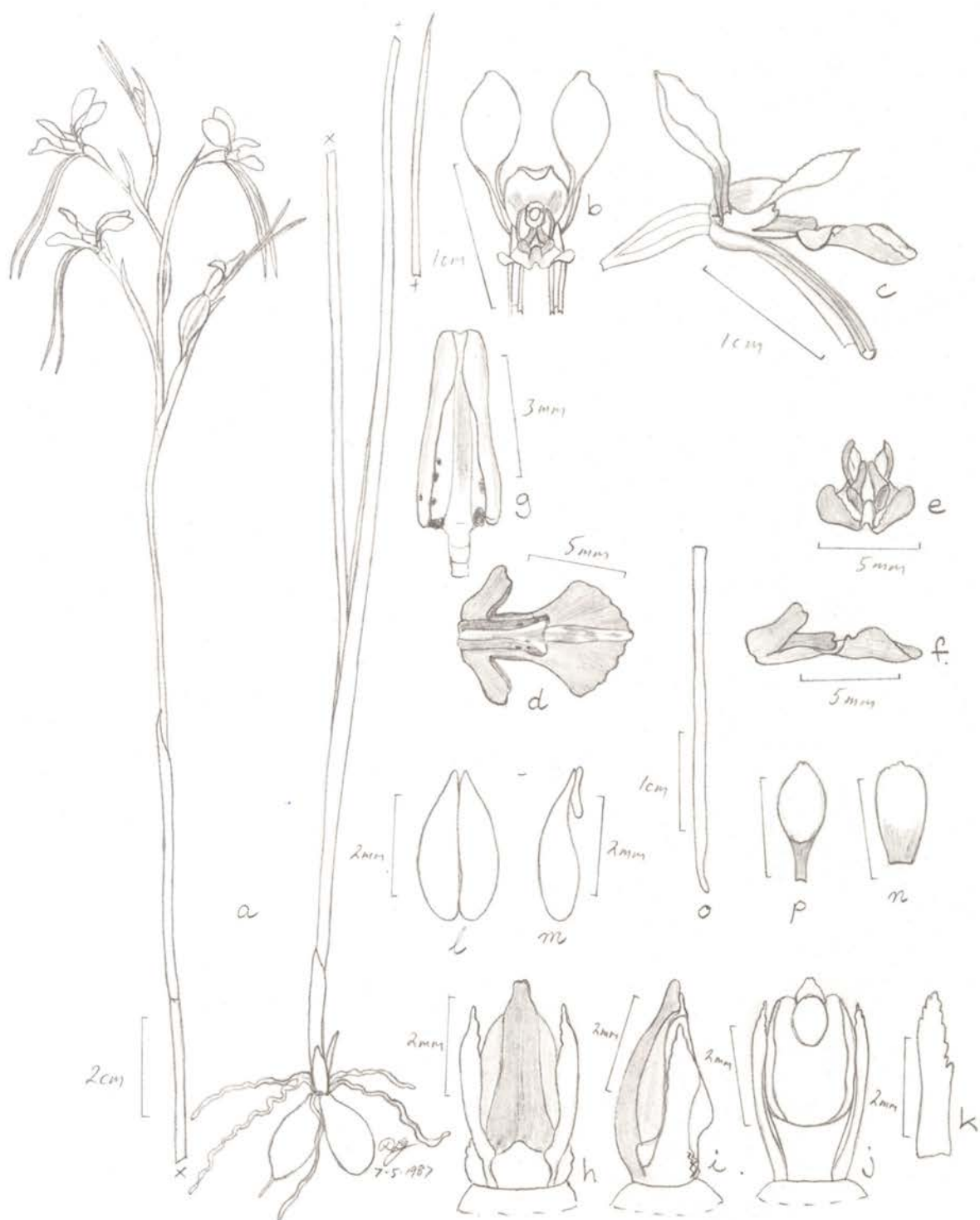


Fig. 77. *Diuris oporina* (Herberton Range, Qld, L. Lawler s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

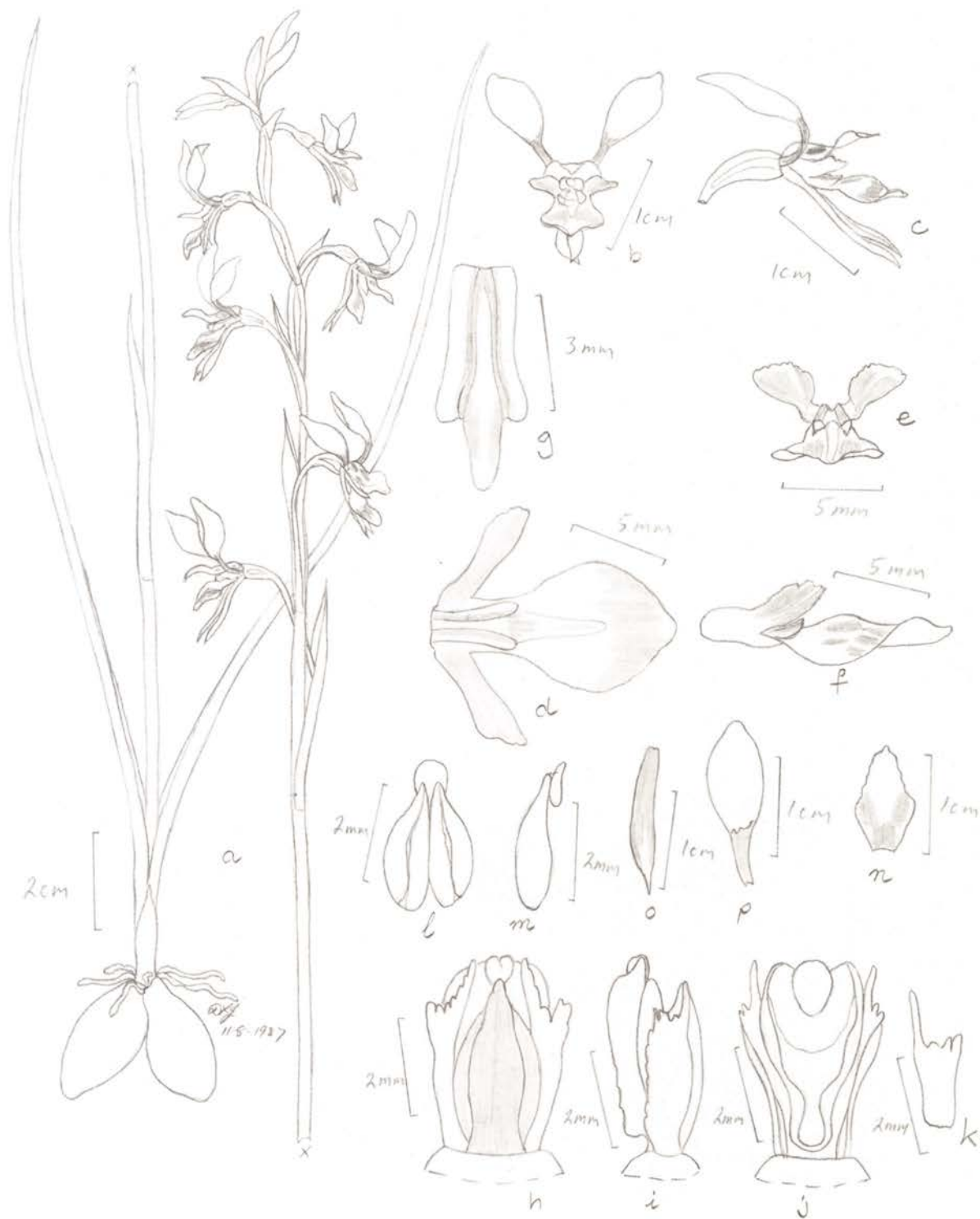


Fig. 78. *Diuris praecox* (Merewether Heights, NSW, B. Whitehead s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

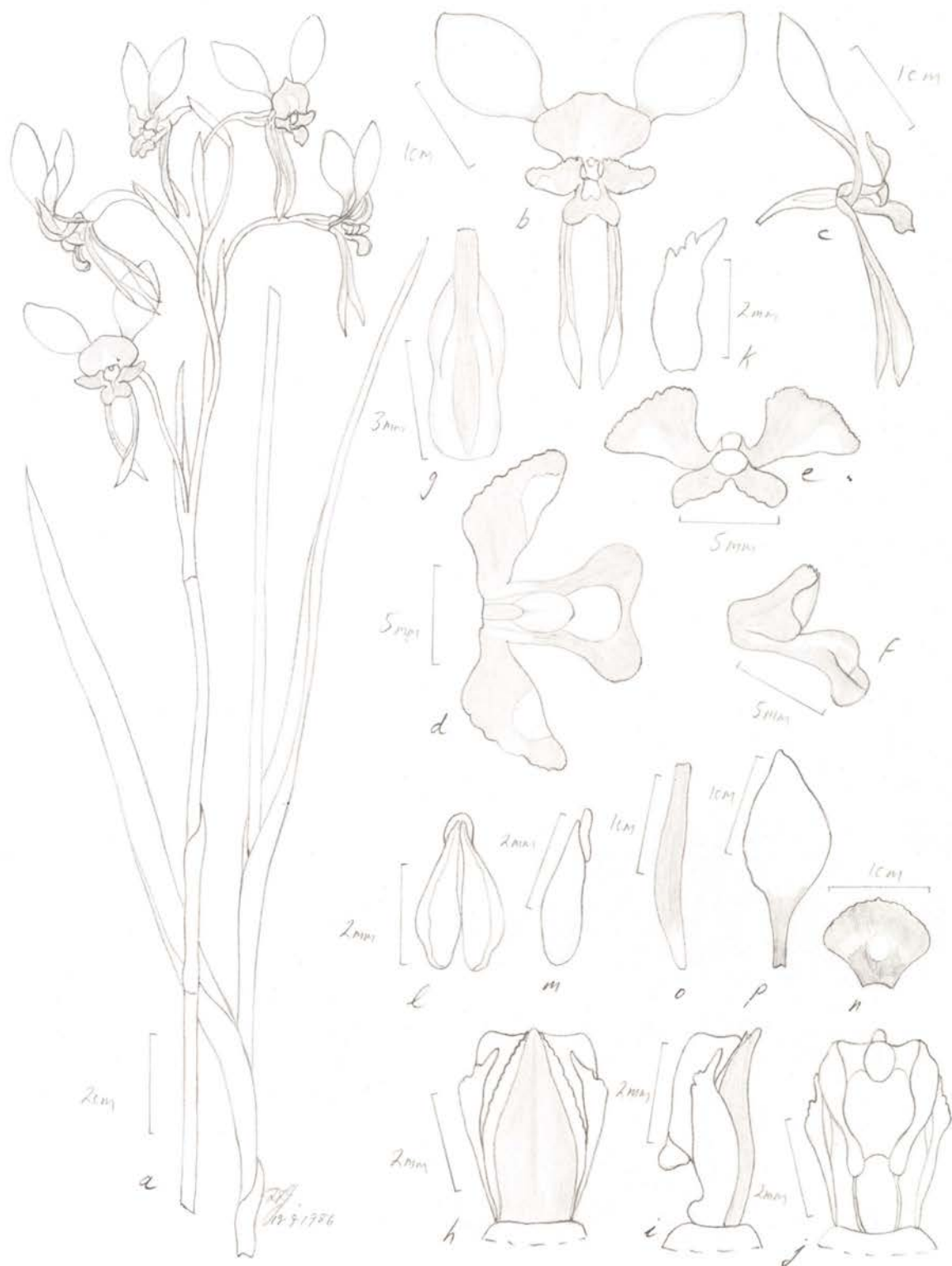


Fig. 79. *Diuris pulchella* (Mt Boyatup, WA, M. A. Clements 2062), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) labellum from side, g) lamina callus from above, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

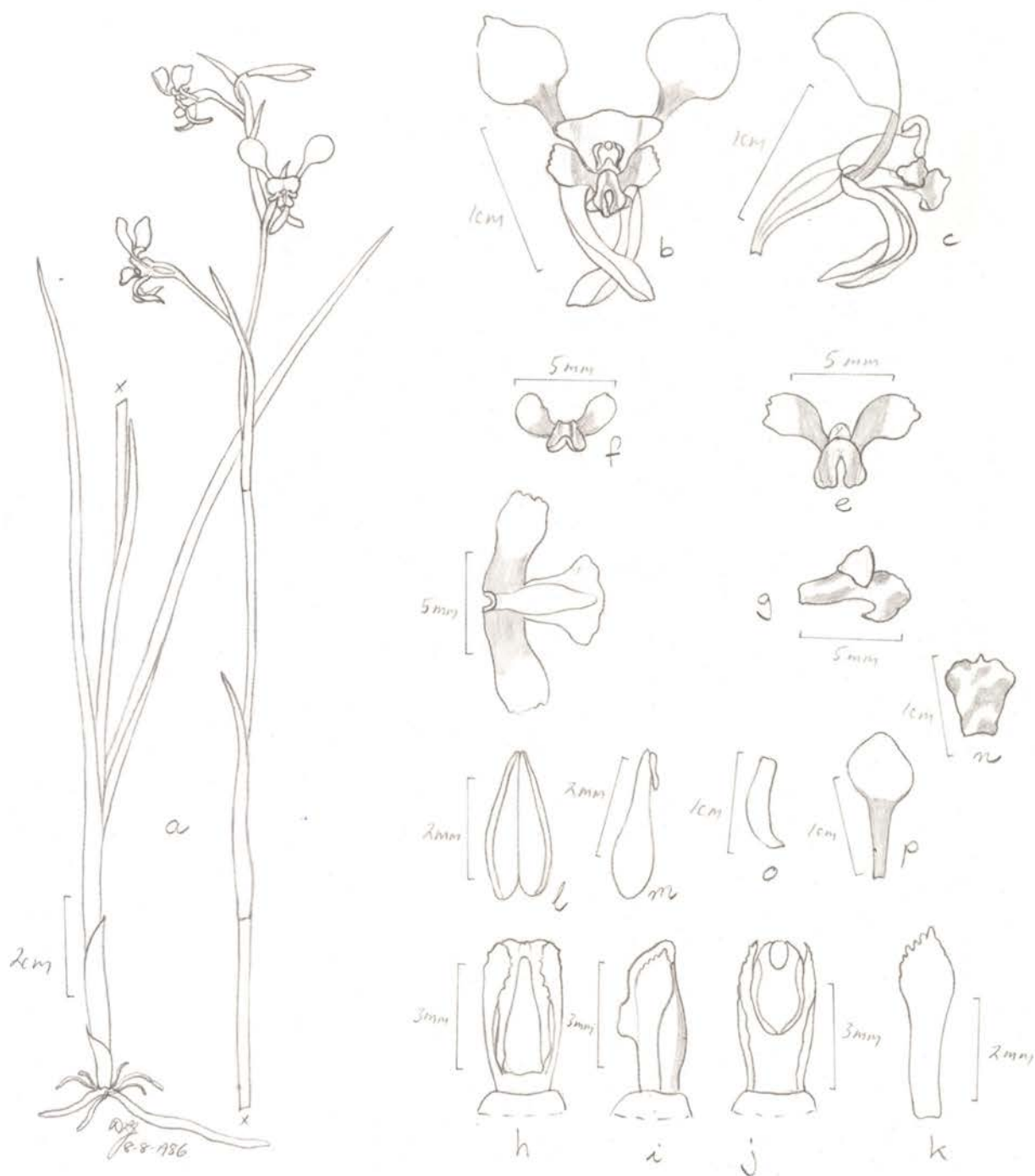


Fig. 80. *Diuris recurva* (north-west of Northampton, WA, A. P. Brown 315), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from front, f) another labellum from front, g) labellum from side, h) column from rear, i) column from side, j) column from front, k) column wing, l) pollinarium from front, m) pollinarium from side, n) dorsal sepal, o) lateral sepal, p) petal.

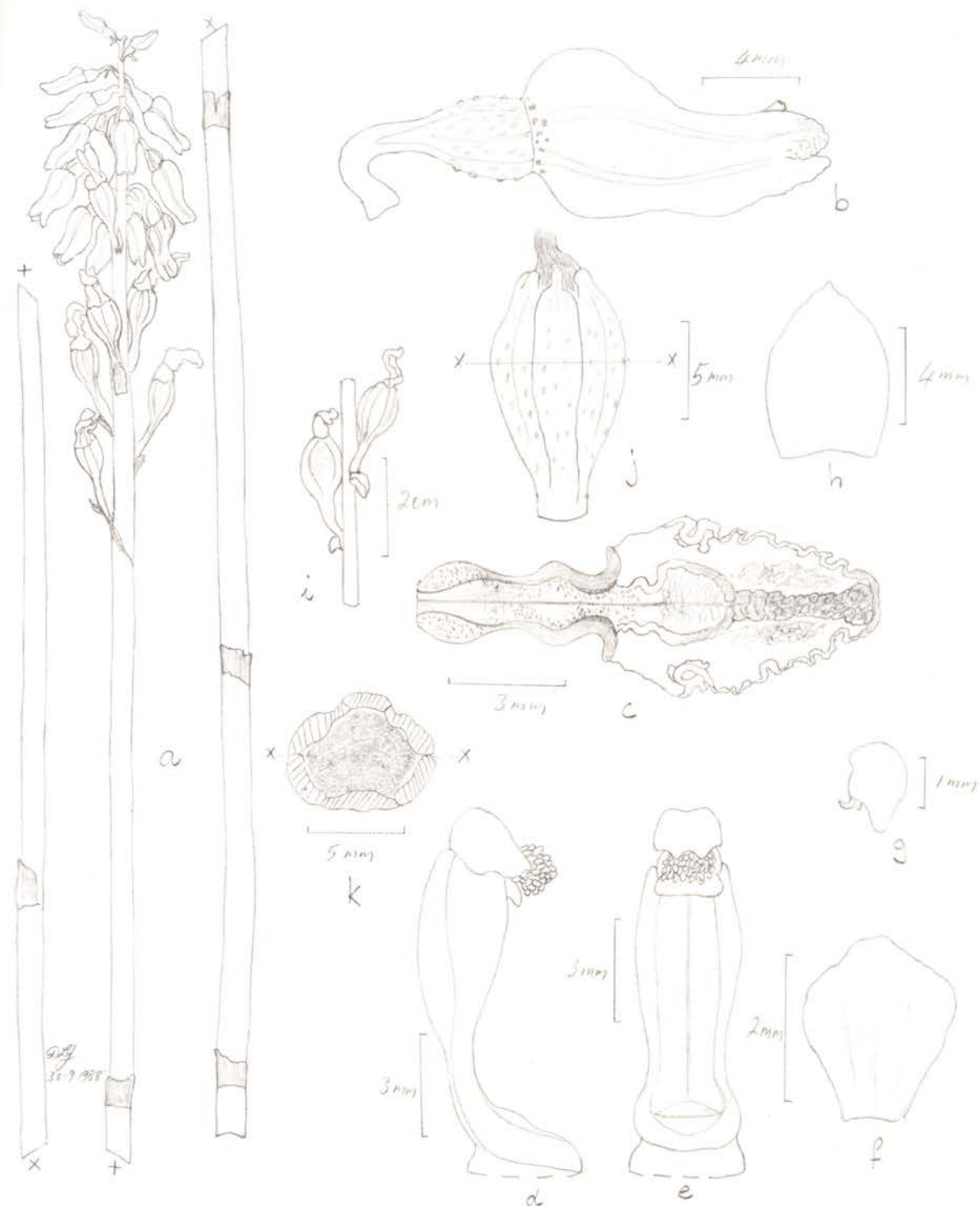


Fig. 81. *Gastrodia crebriflora* (Blackdown Tableland, Qld, D. L. Jones 2934), a) plant, b) flower from side, c) labellum flattened out from above, d) column from side, e) column from front, f) petal, g) anther cap, h) fertile bract, i) capsules, j) capsule, k) cross-section of capsule.

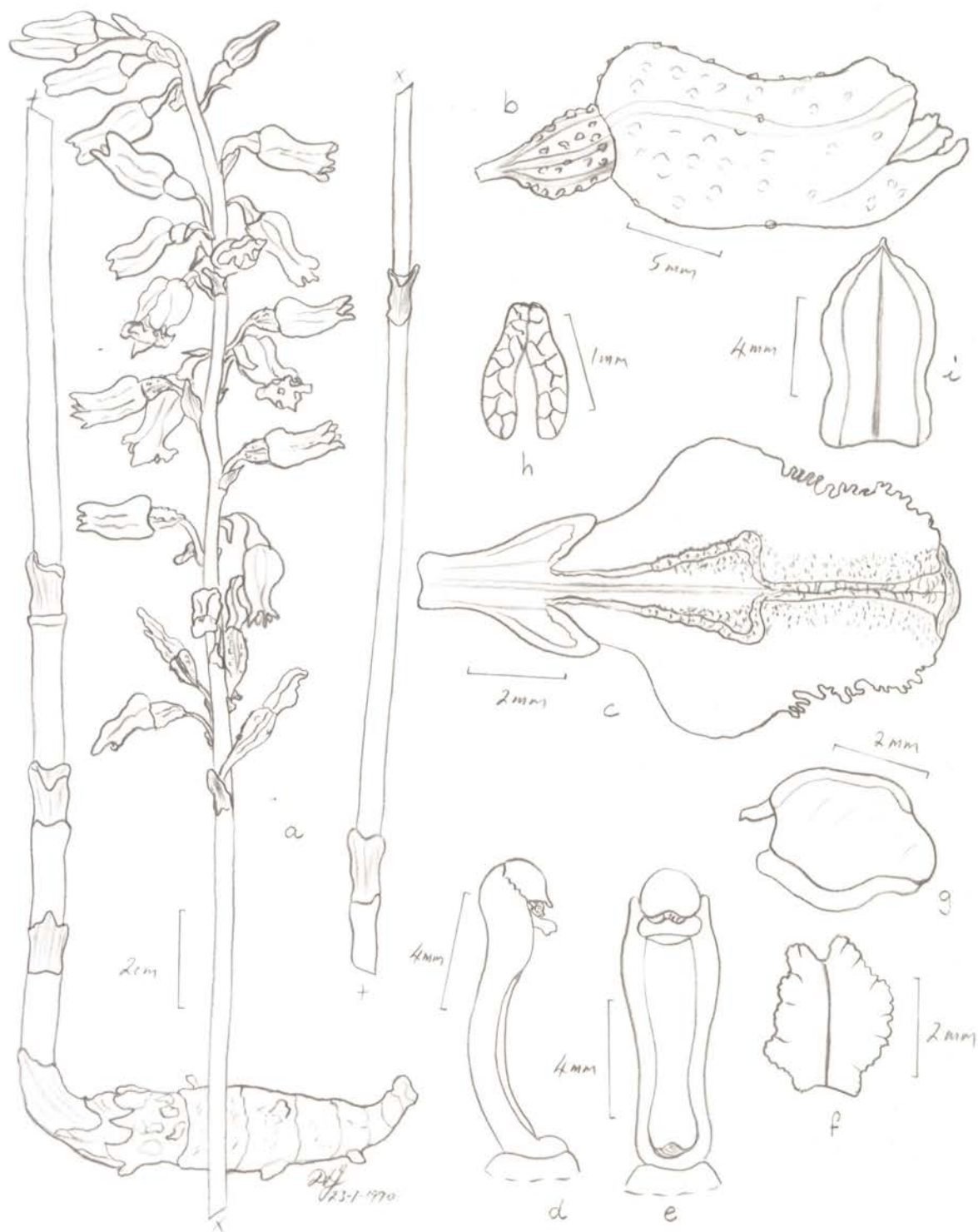


Fig. 82. *Gastrodia entomogama* (Mt Franklin, ACT, D. L. Jones 5625), a) plant, b) flower from side, c) labellum flattened out from above, d) column from side, e) column from front, f) petal, g) anther cap, h) pollinarium, i) fertile bract.

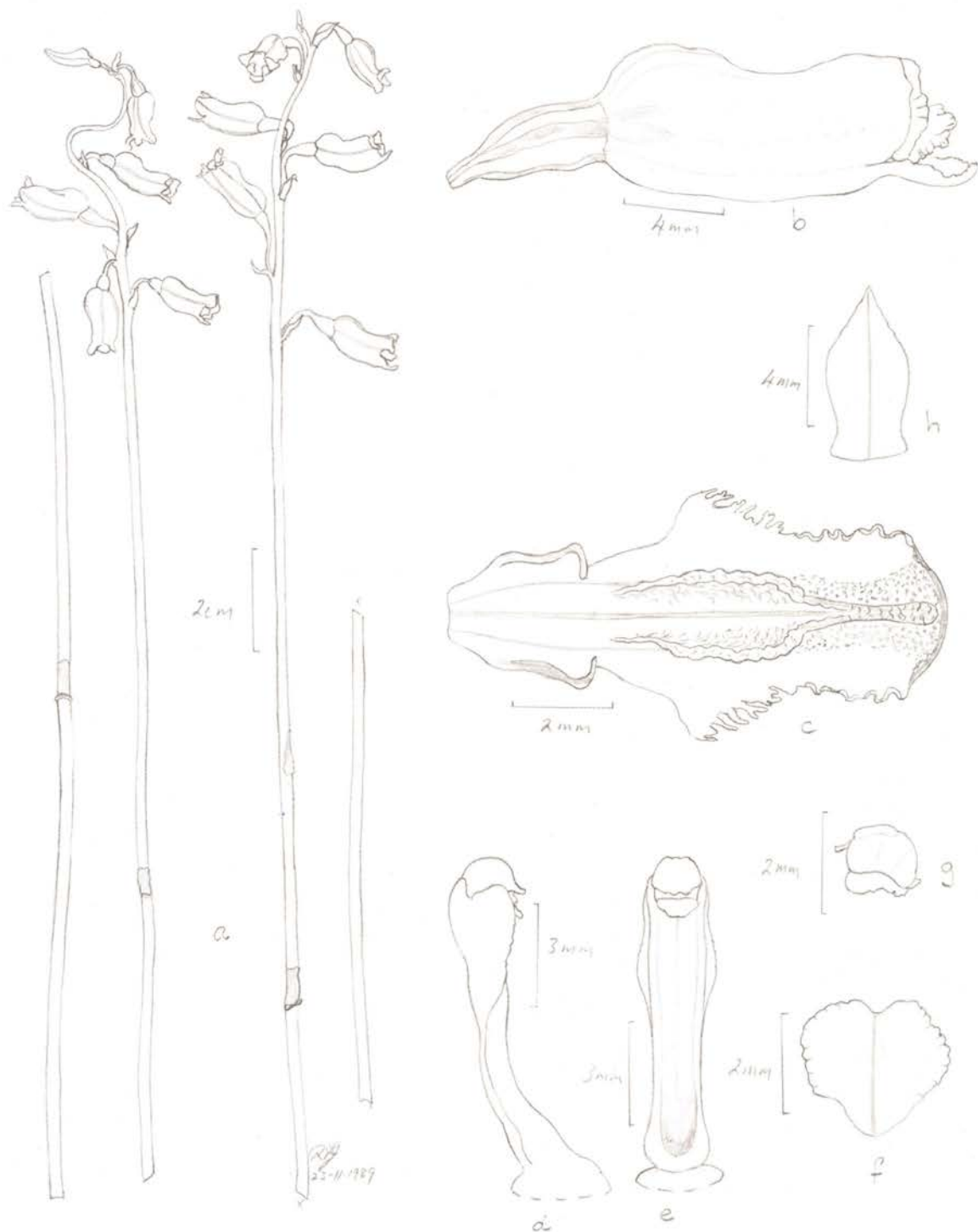


Fig. 83. *Gastrodia lacista* (near Albany, WA, D. L. Jones 5404), a) plant, b) flower from side, c) labellum flattened out from above, d) column from side, e) column from front, f) petal, g) anther cap, h) fertile bract.

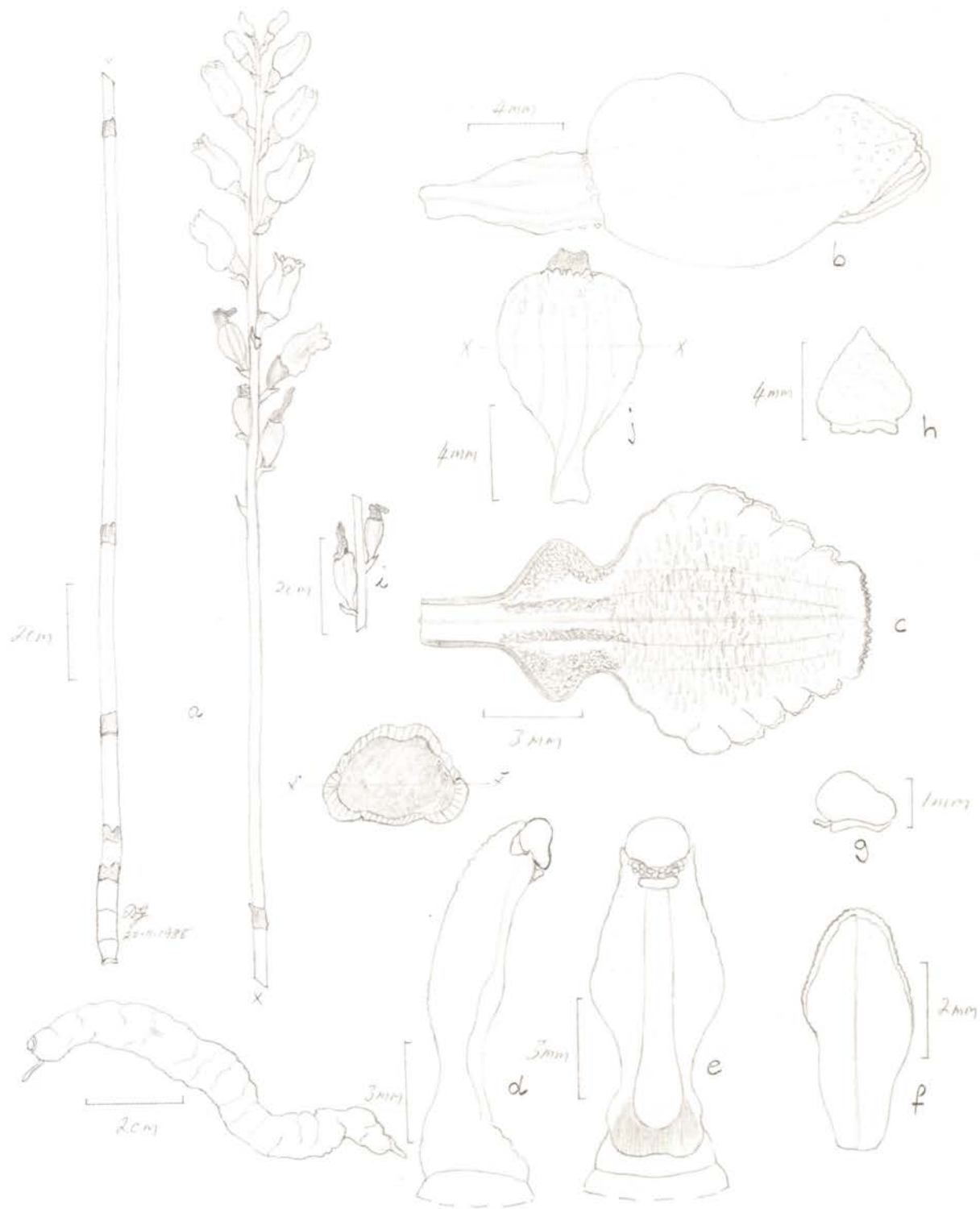


Fig. 84. *Gastrodia urceolata* (Moomin, Qld, L. Lawler 20), a) plant, b) flower from side, c) labellum flattened out from above, d) column from side, e) column from front, f) petal, g) anther cap, h) fertile bract, i) capsules, j) capsule, k) cross section of capsule.

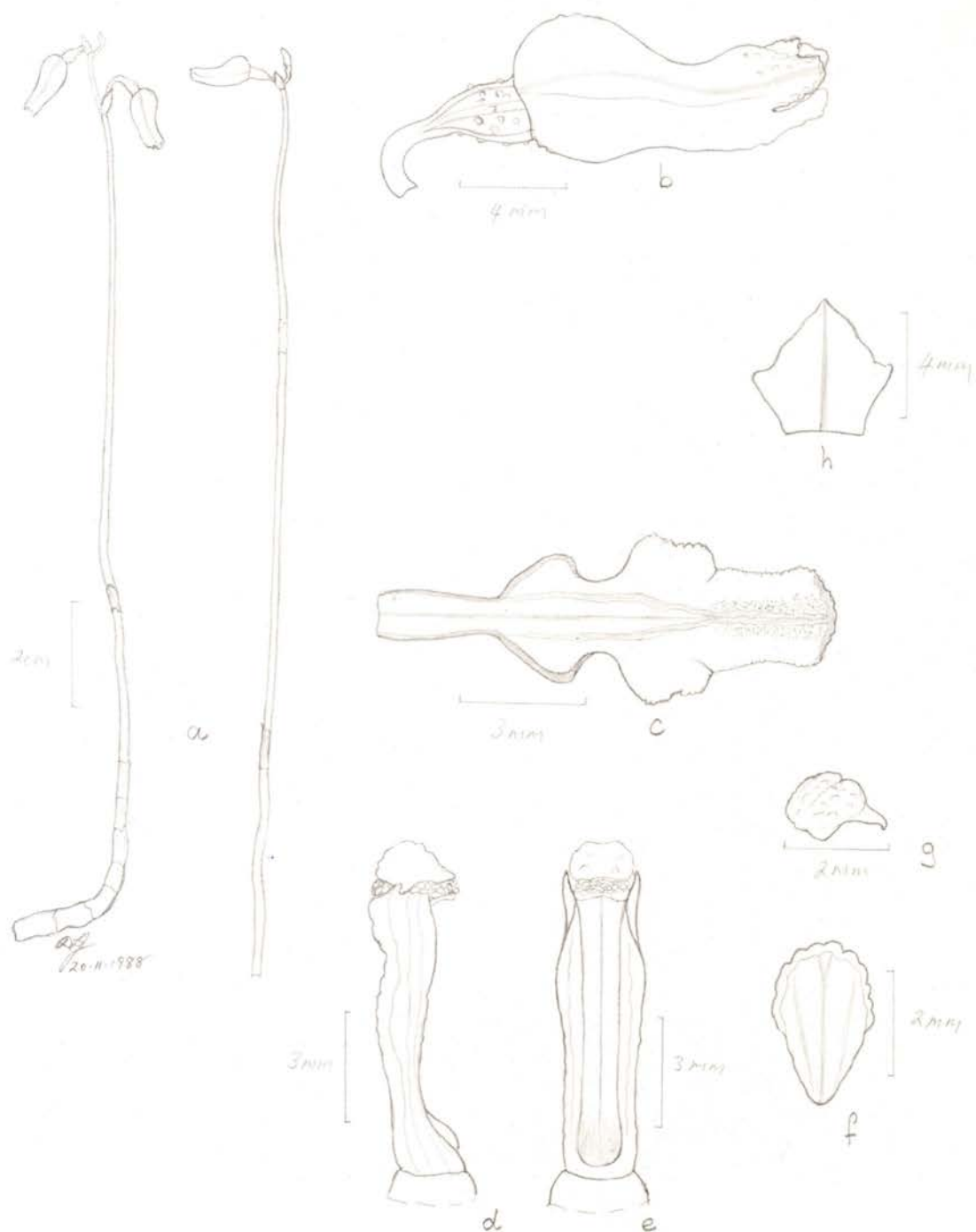


Fig. 85. *Gastrodia vescula* (Honan's Scrub, SA, R. Bates 16113), a) plant, b) flower from side, c) labellum flattened out from above, d) column from side, e) column from front, f) petal, g) anther cap, h) fertile bract.



Fig. 86. *Genoplesium alticolum* (State Forest Reserve 185, B. Gray 4956), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

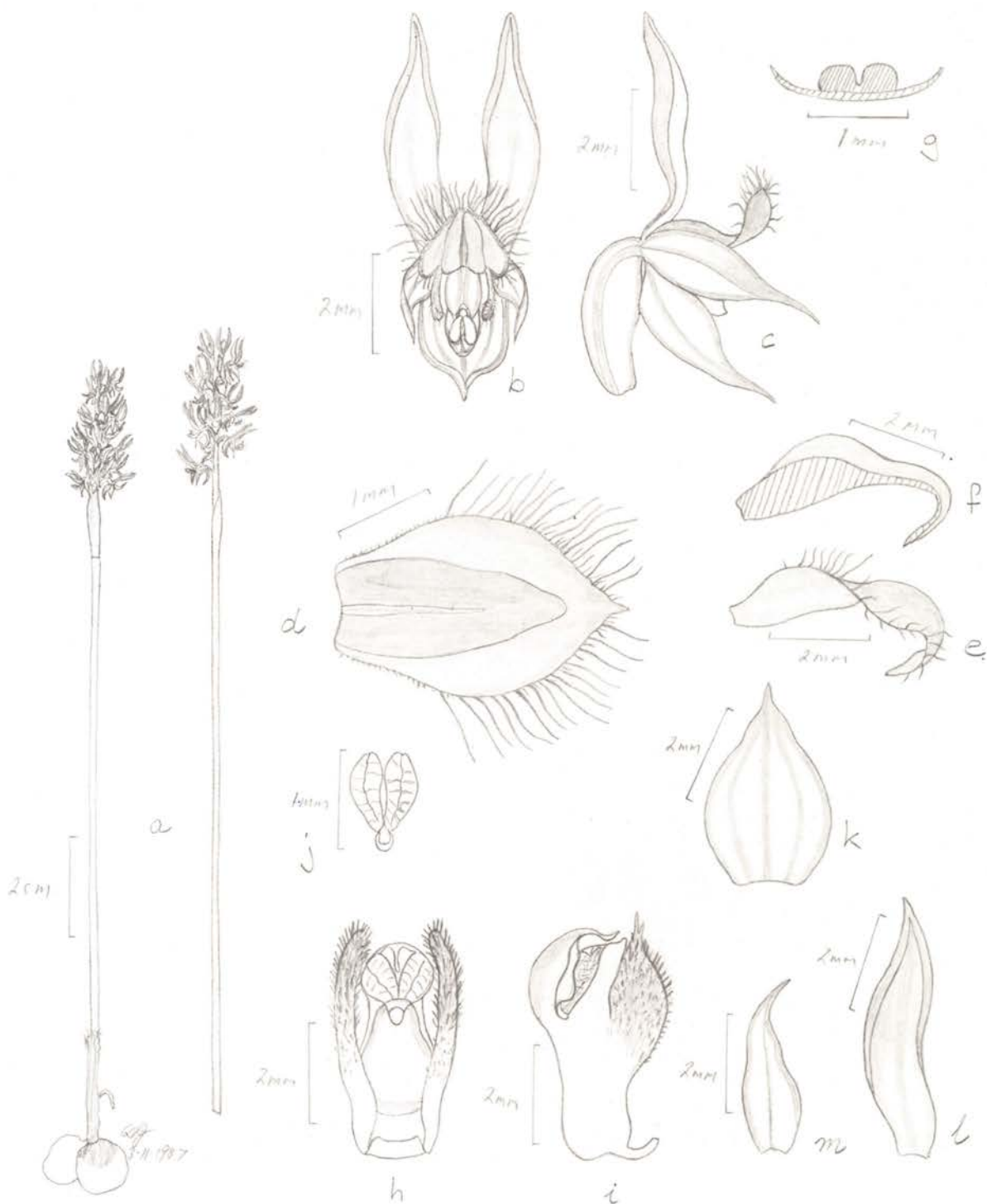


Fig. 87. *Genoplesium arrectum* (Omeo, Vic, J. Jeans s.n.), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) longitudinal section of labellum, g) cross section of labellum, h) column from front, i) column from side, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

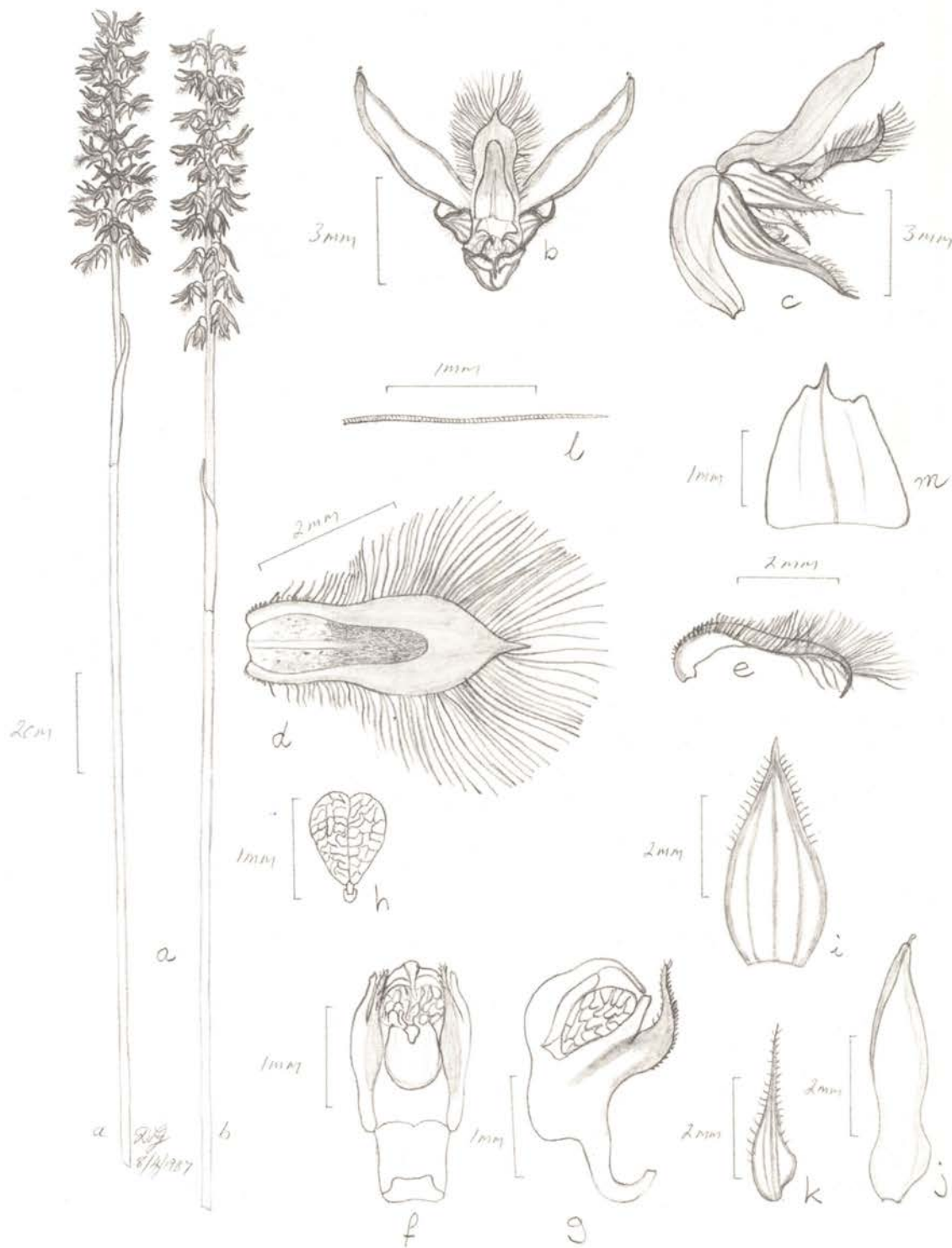


Fig. 88. *Genoplesium citriodorum* (Woodford, NSW, R. Tunstall s.n.), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal, l) labellum cilium, m) fertile bract.

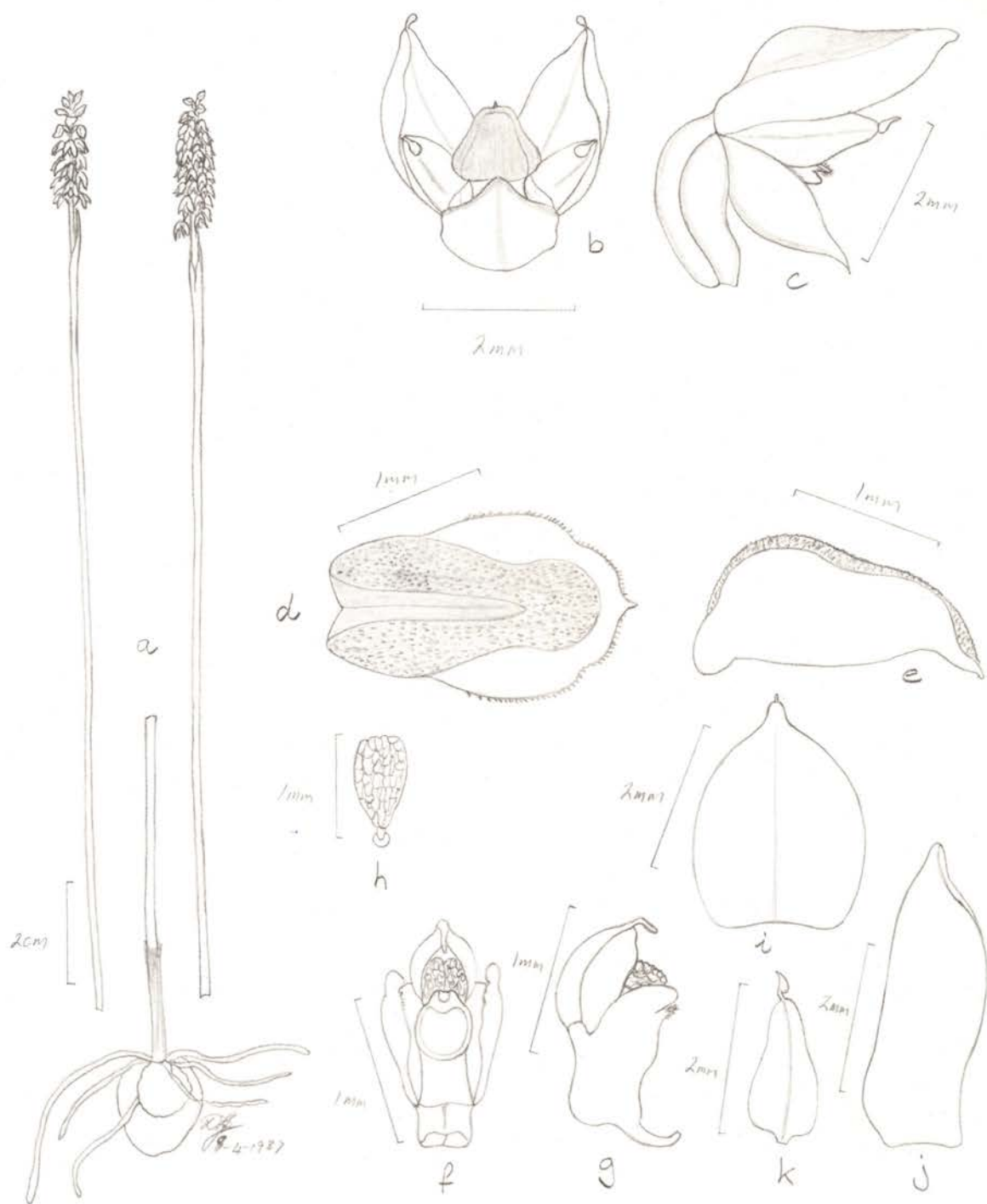


Fig. 89. *Genoplesium confertum* (near Webers Plains, Qld, D. L. Jones 2589), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

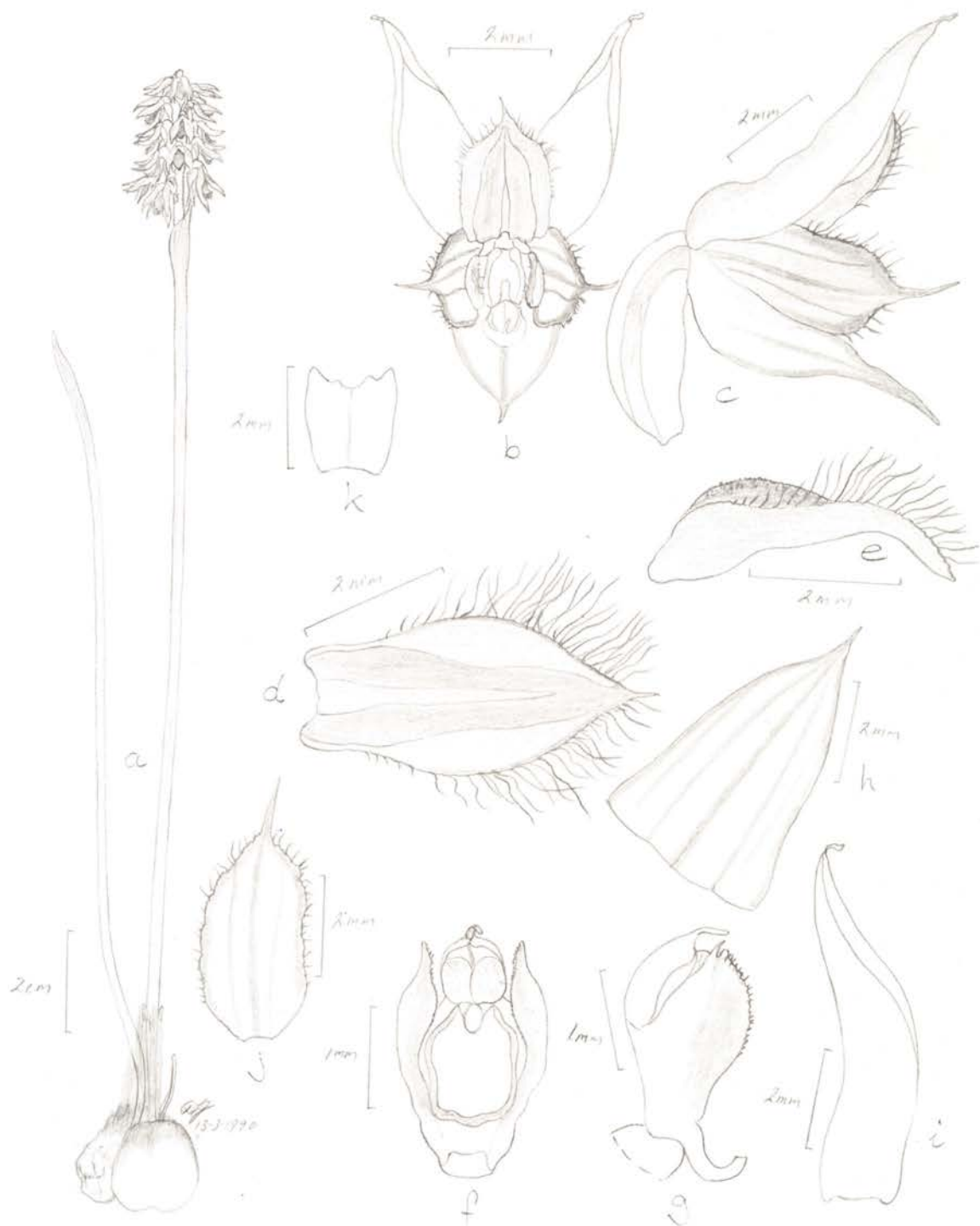


Fig. 90. *Genoplesium morinum* (Kanangra Boyd, NSW, J. Riley s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, g) column from side, h) dorsal sepal, i) lateral sepal, j) petal, k) fertile bract.

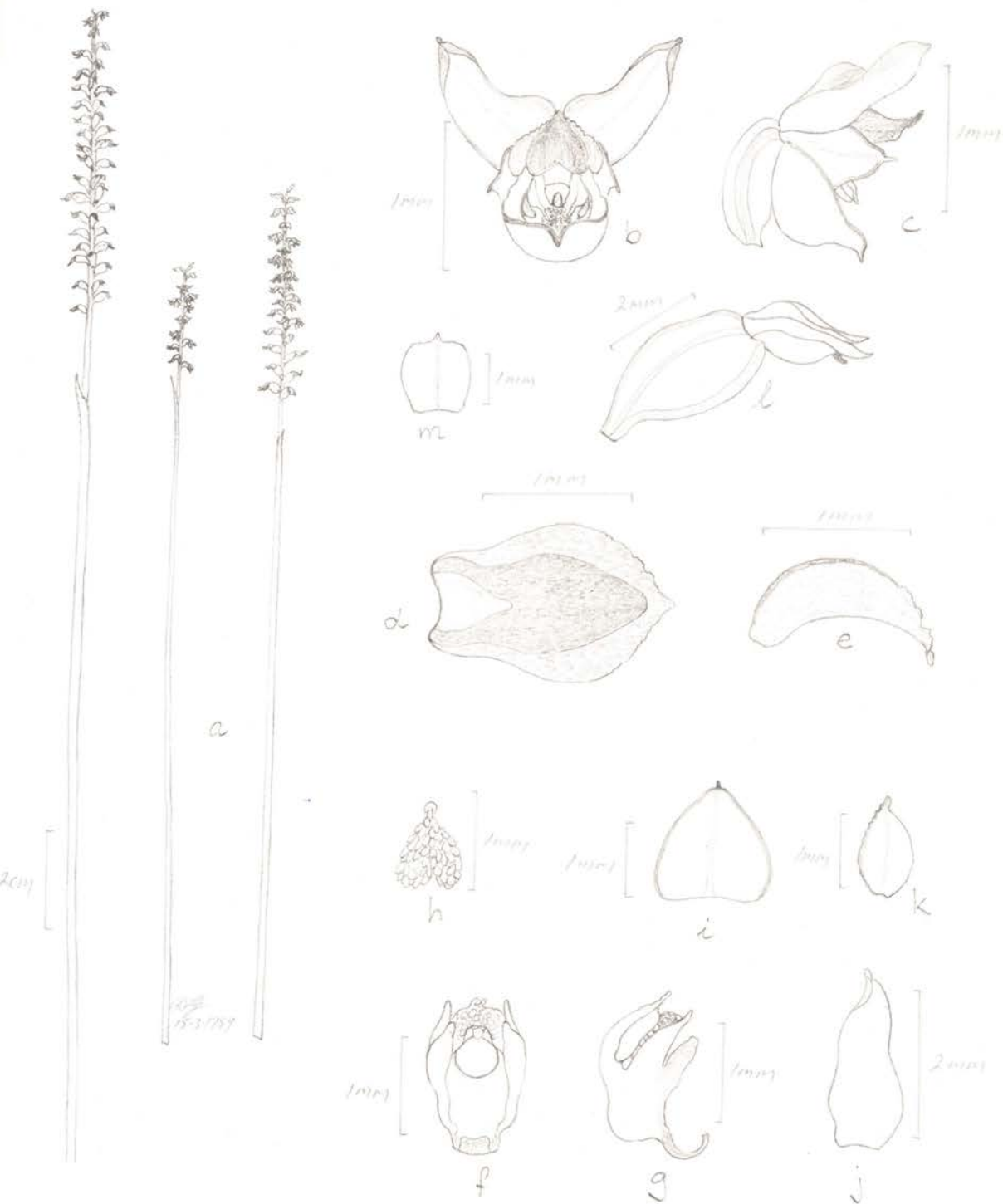


Fig. 91. *Genoplesium pedersonii* (Blackdown Tableland, Qld, D.L. Jones 3810), a) plants, b) flowers from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal, l) capsule, m) fertile bract.

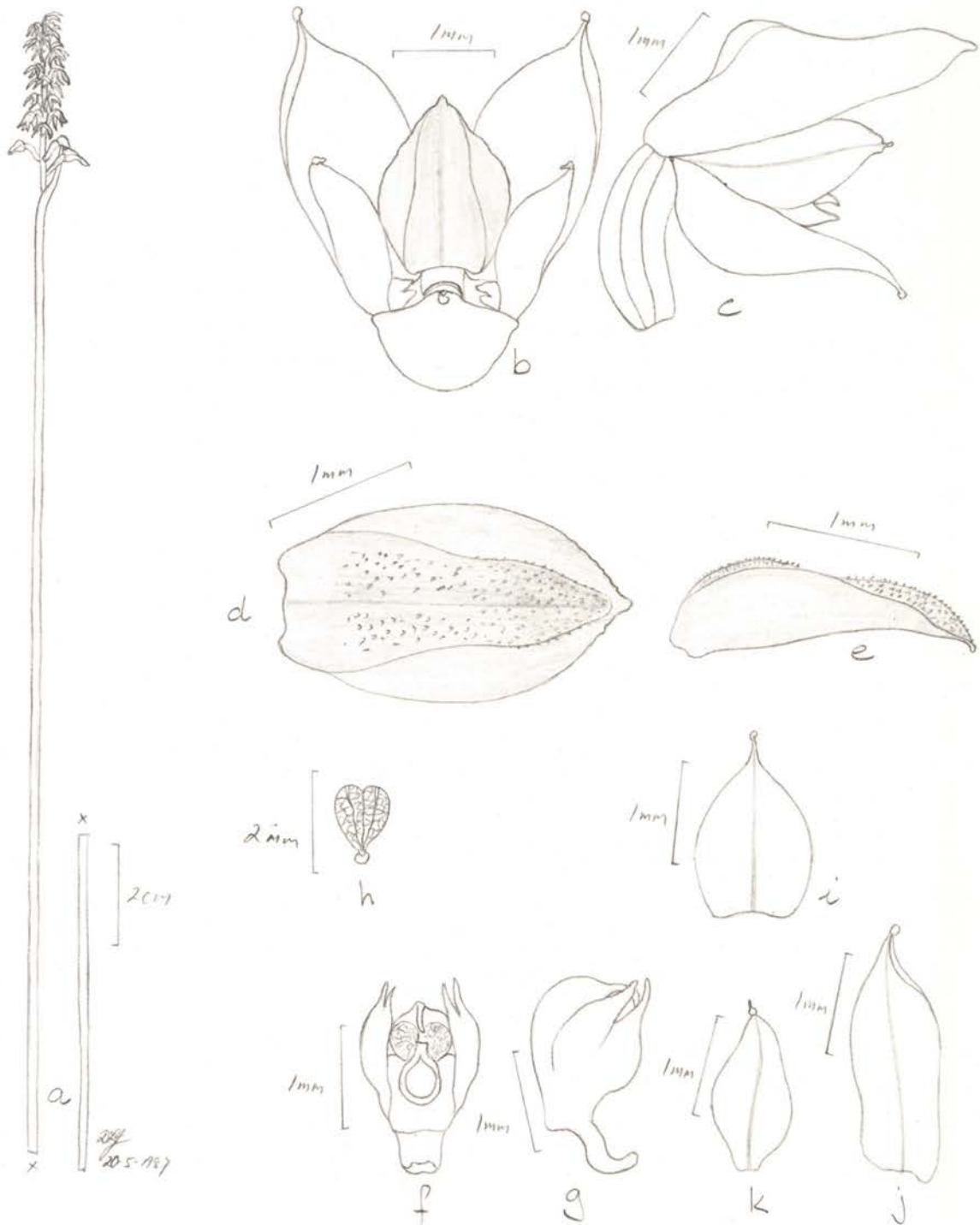


Fig. 92. *Genoplesium psammophilum* (Stradbroke Island, Qld, D. L. Jones 2558), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

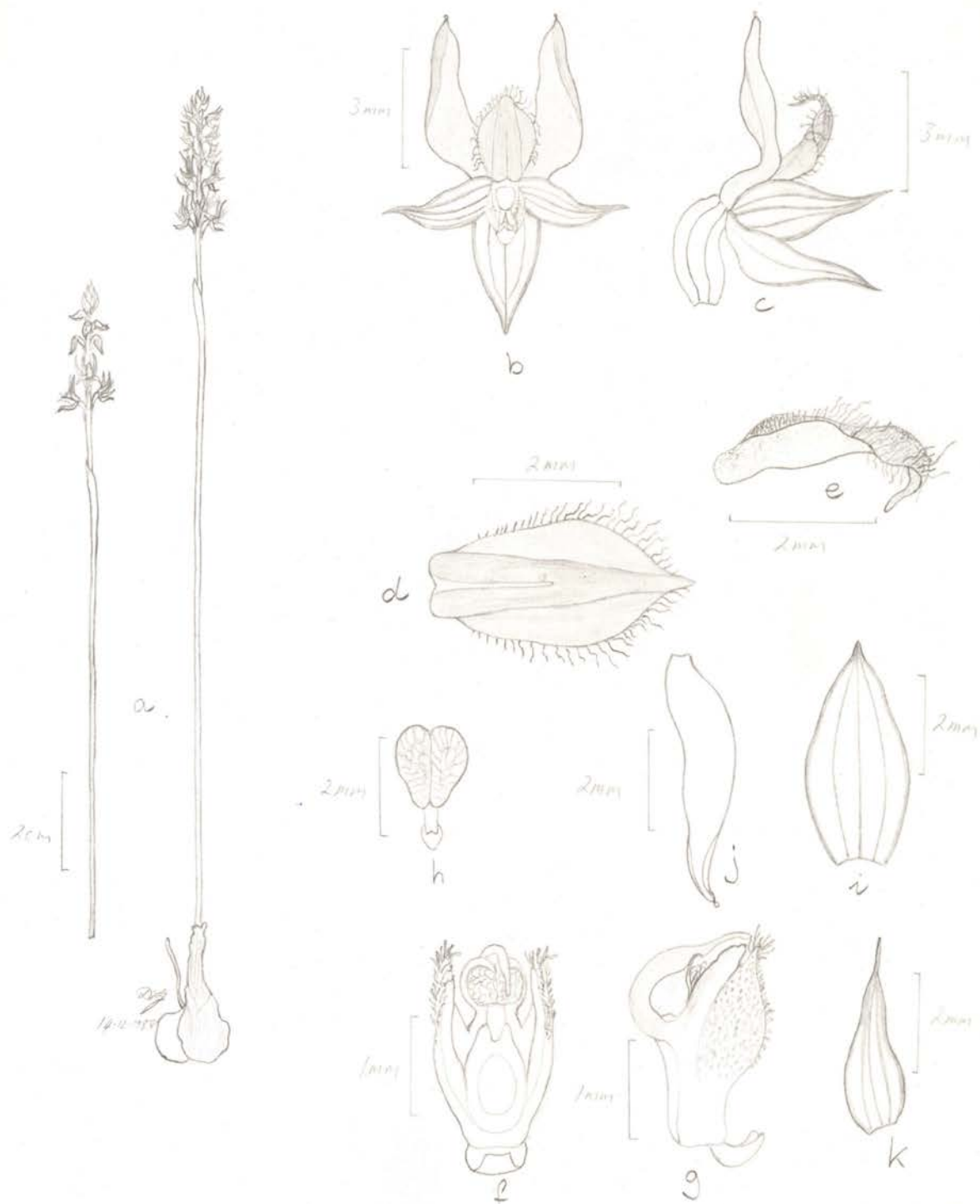


Fig. 93. *Genoplesium rhyoliticum* (Pambula, NSW, M. S. Parris 9577), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

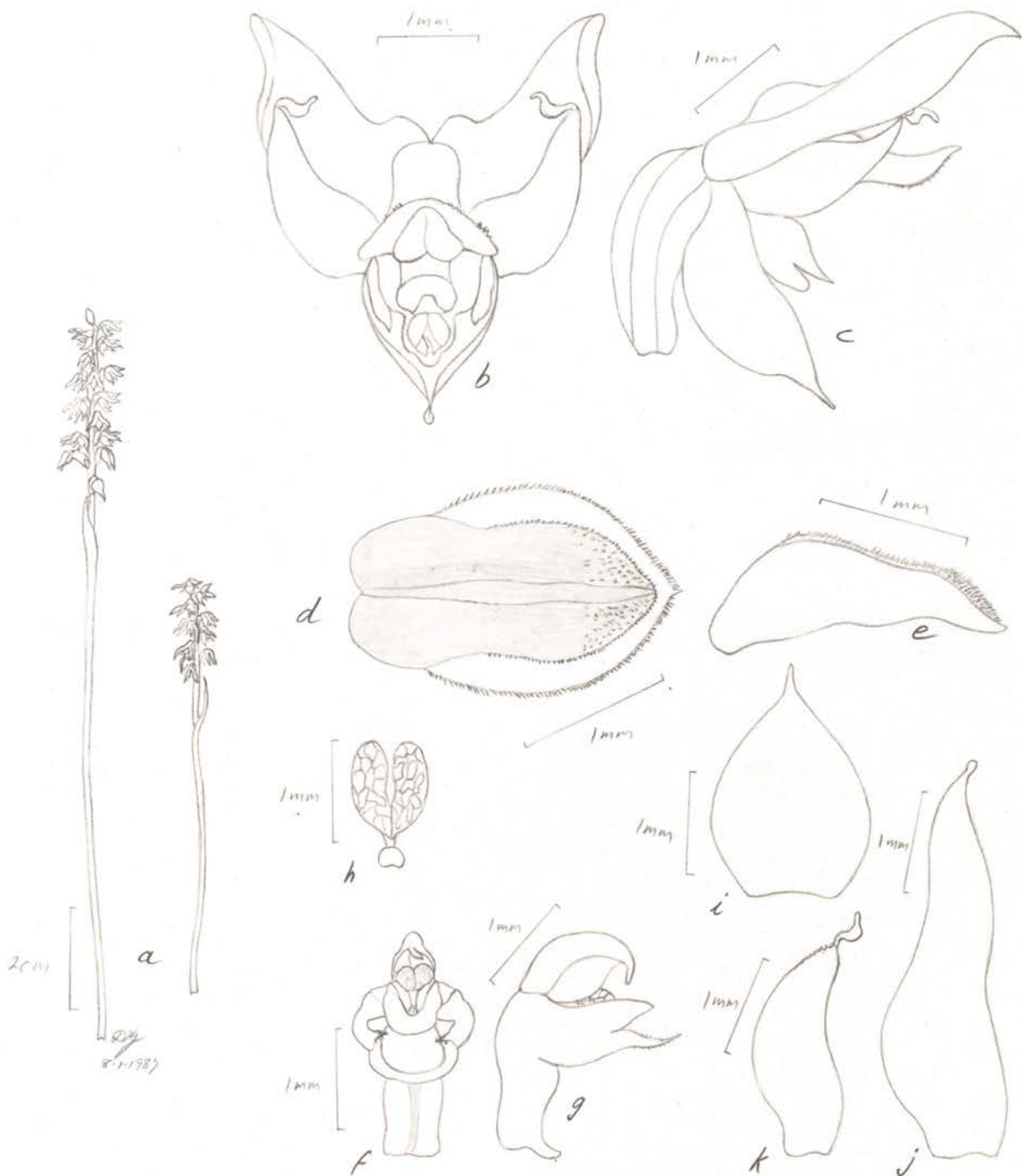


Fig. 94. *Genoplesium sigmoideum* (Daves Ck, Lamington, Qld, D. L. Jones s.n.), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

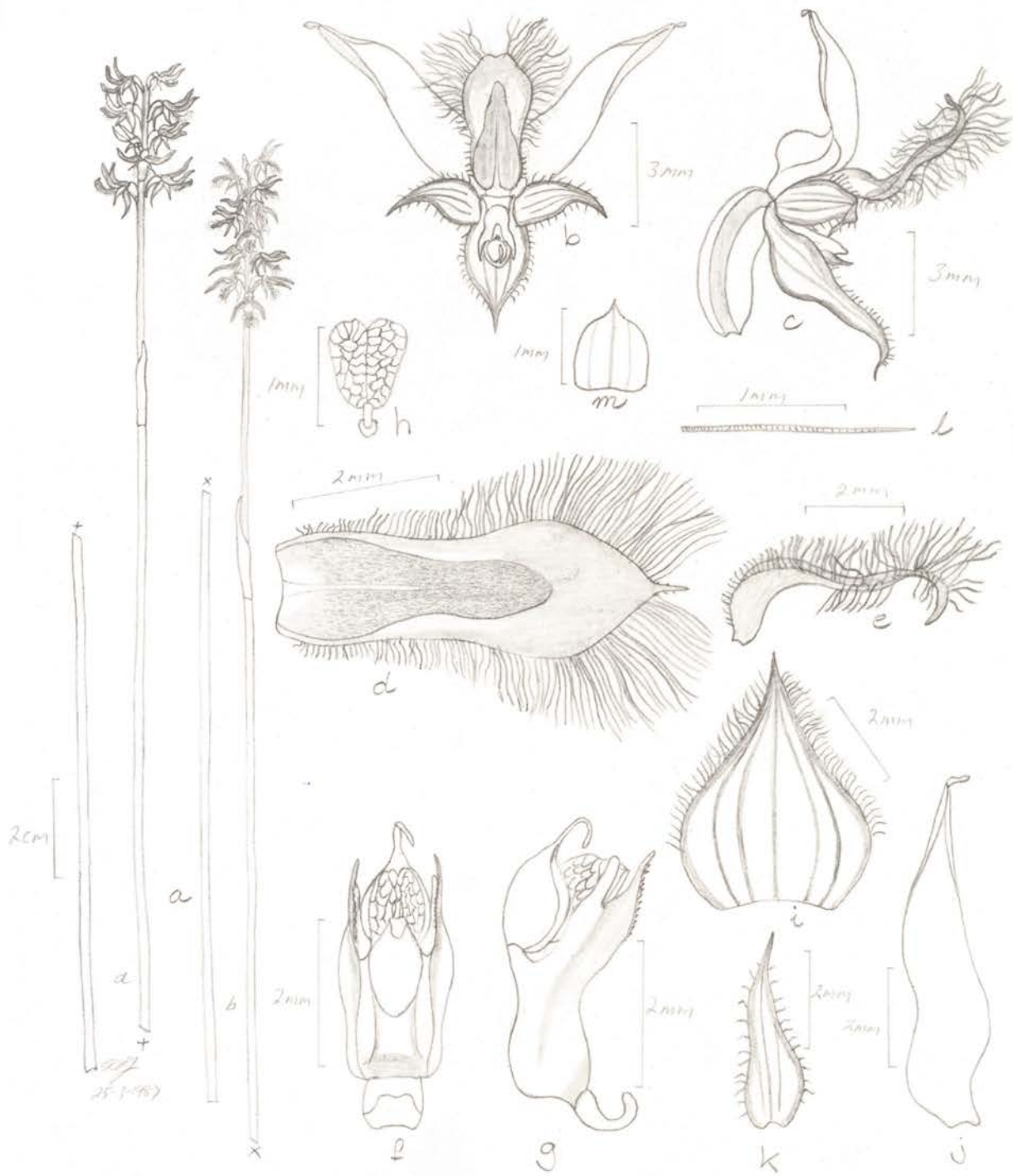


Fig. 95. *Genoplesium simulans* (Clarence, NSW, R. G. Tunstall s.n.), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal, l) labellum cilium, m) fertile bract.

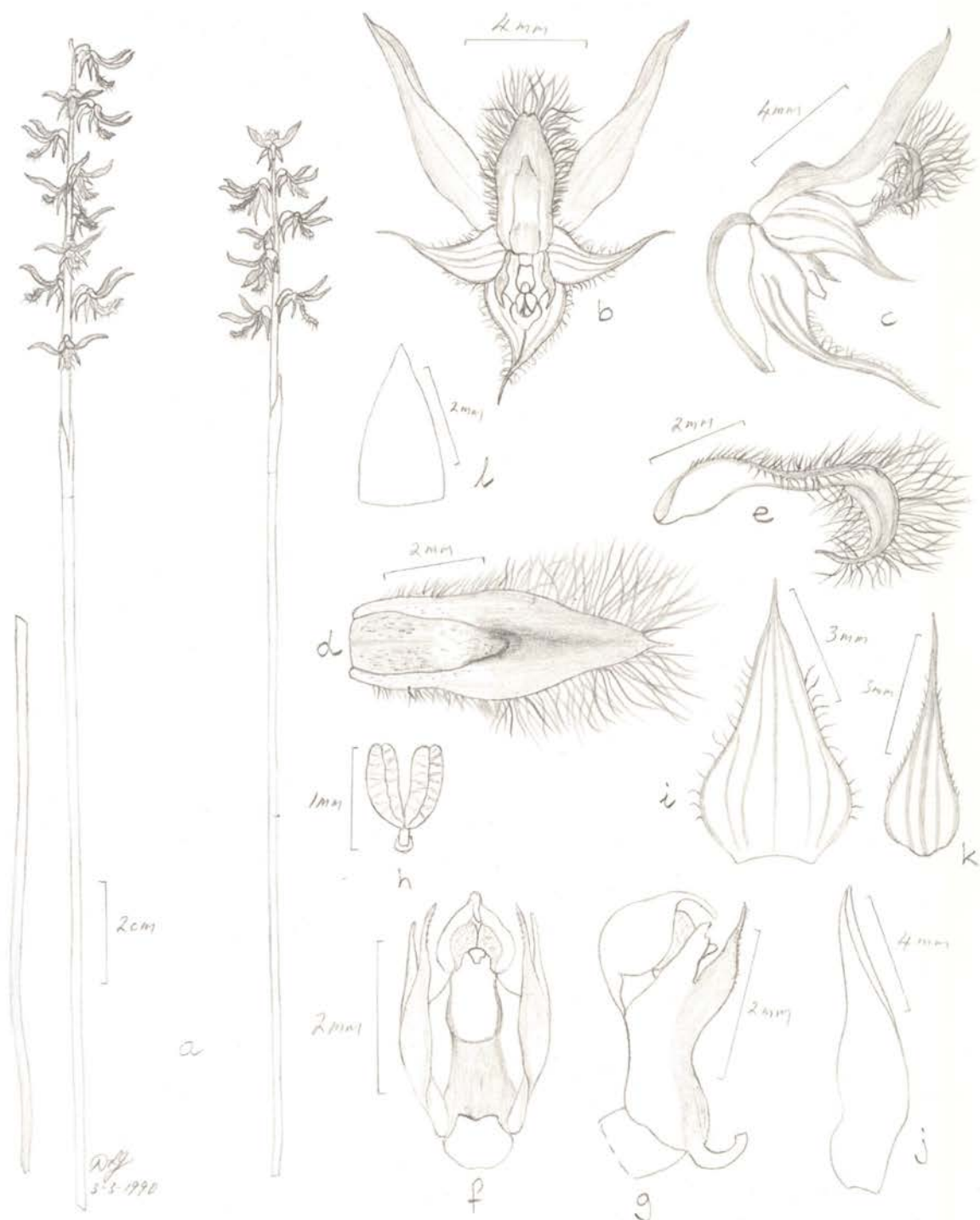


Fig. 96. *Genoplesium superbum* (Morton National Park, NSW, D. L. Jones 5695), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal, l) fertile bract.



Fig. 97. *Genoplesium systenum* (Conimbla National Park, NSW, D. L. Jones 3905), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal, l) labellum cilium.

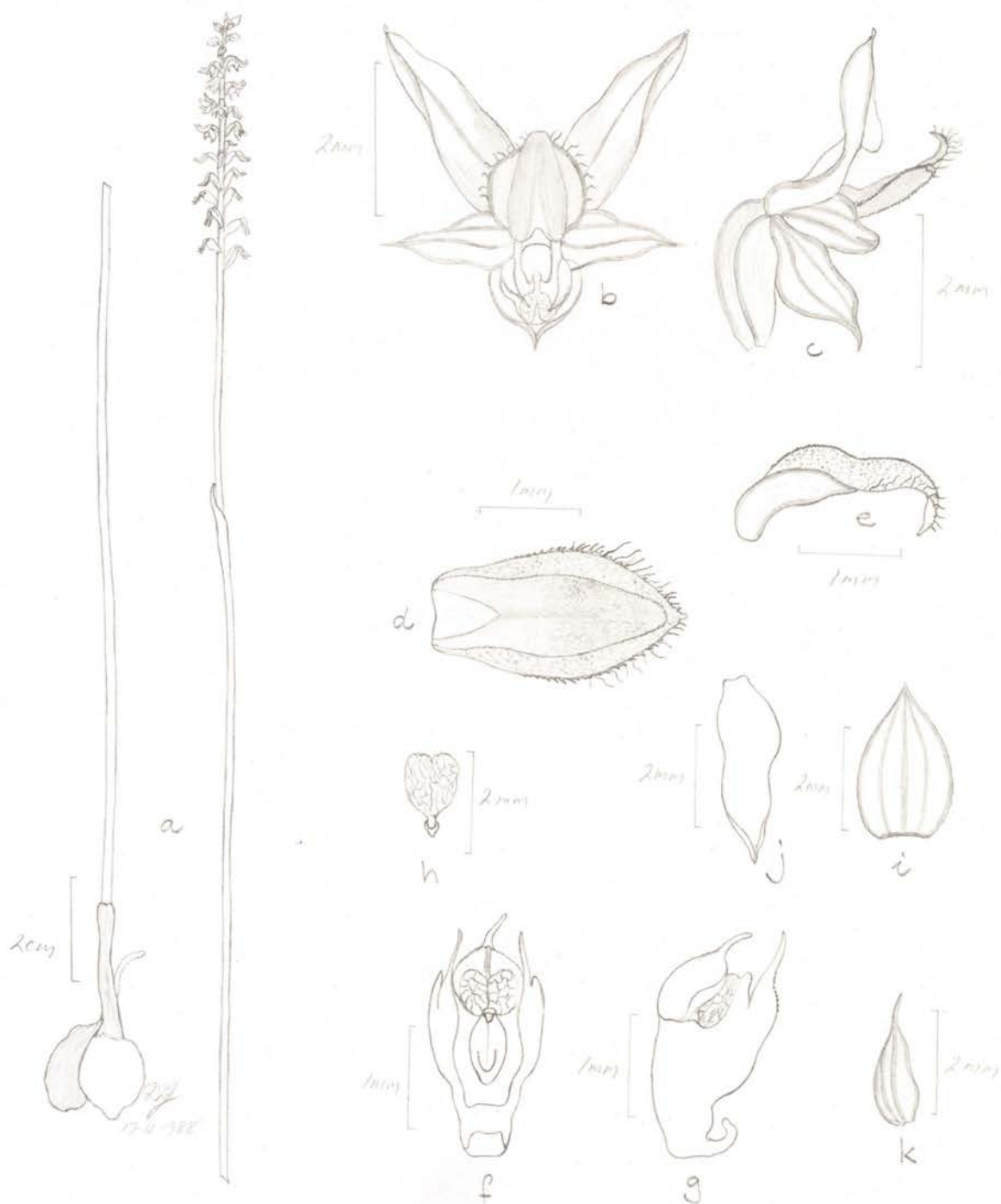


Fig. 98. *Genoplesium tectum* (Sunday Ck, Qld, P. S. Lavarack 3626), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

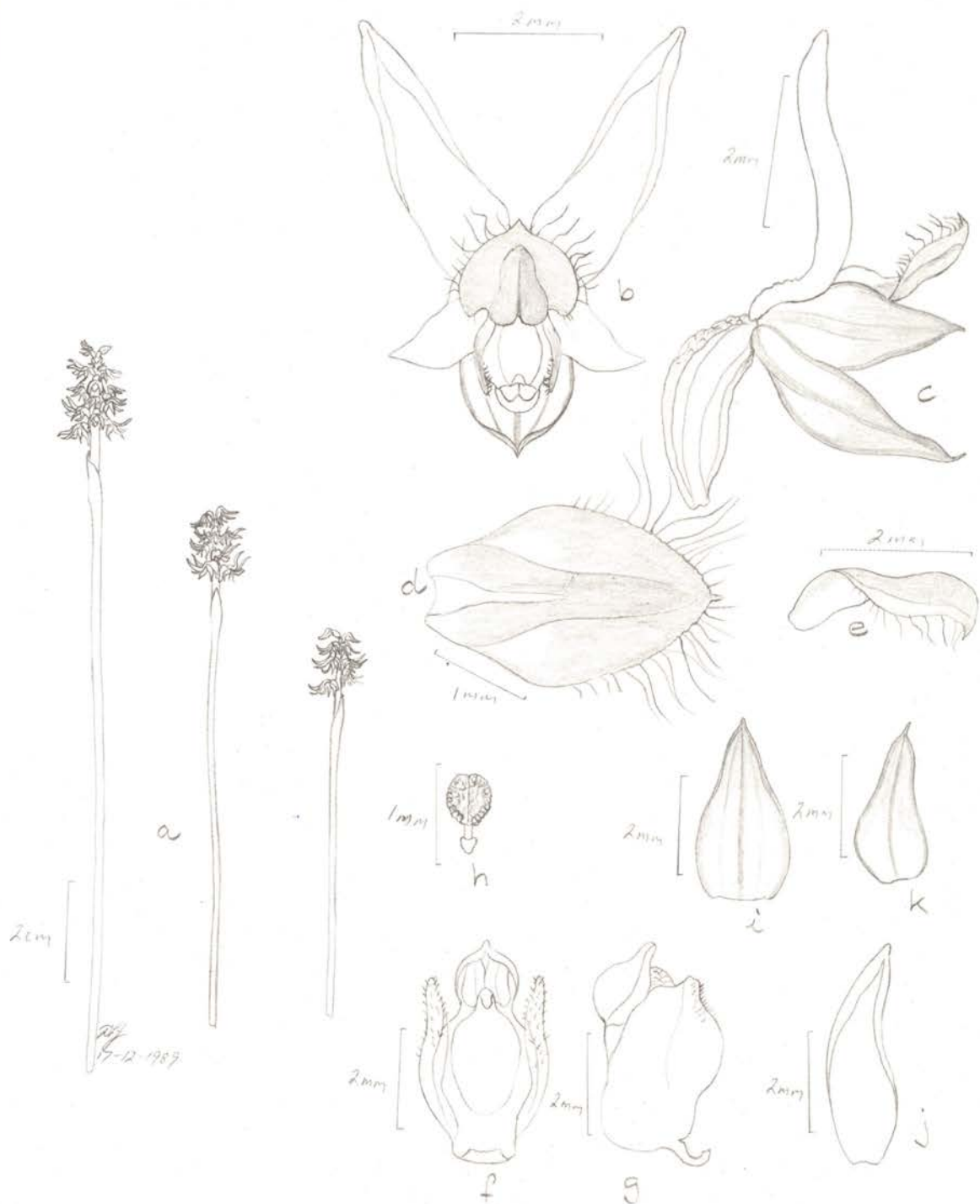


Fig. 99. *Genoplesium turfosum* (Tantangara Dam Rd, NSW, D. L. Jones 5570), a) plants, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

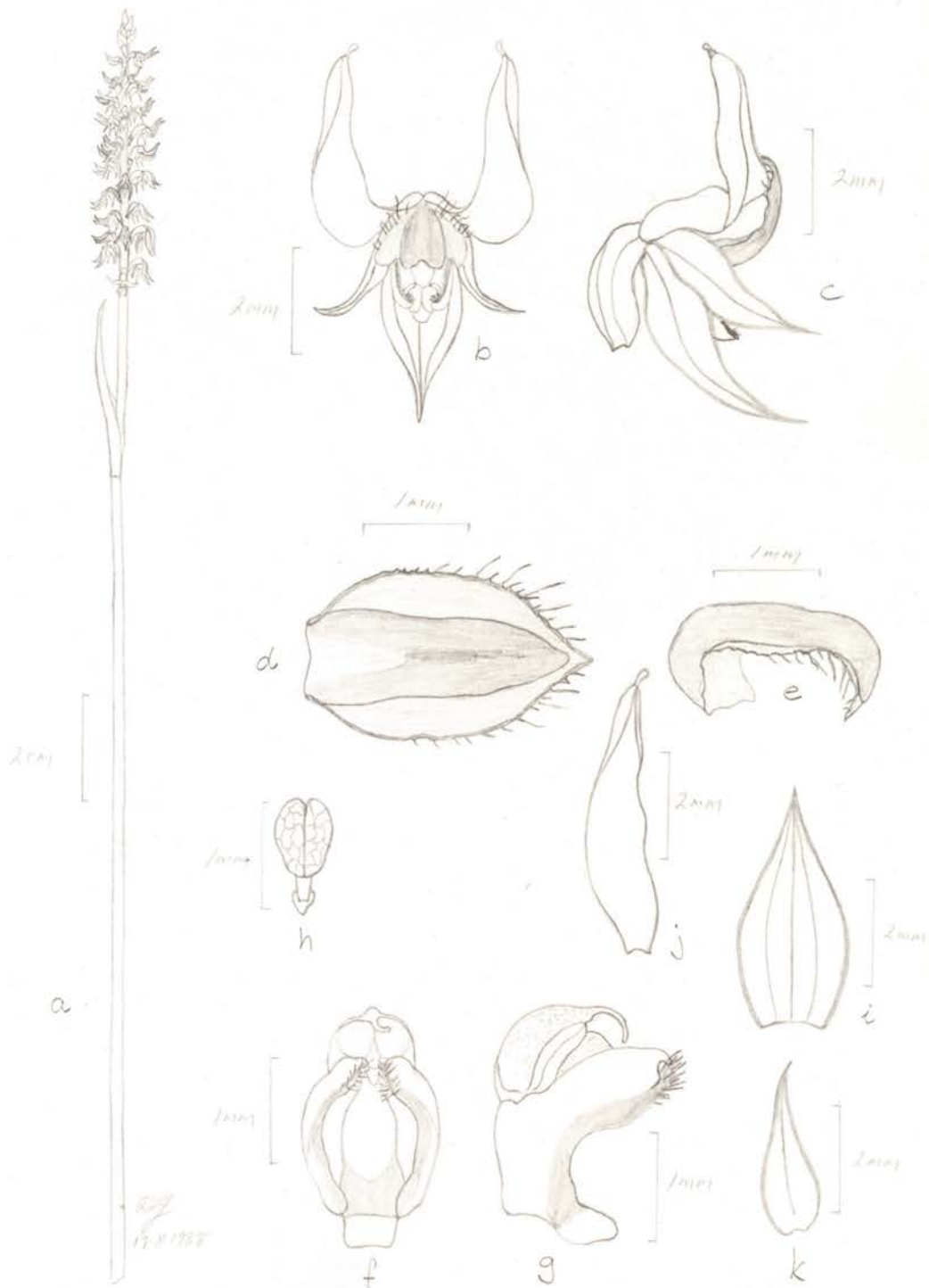


Fig. 100. *Genoplesium validum* (Blackdown Tableland, Qld, E. Pederson s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from front, g) column from side, h) pollinarium, i) dorsal sepal, j) lateral sepal, k) petal.

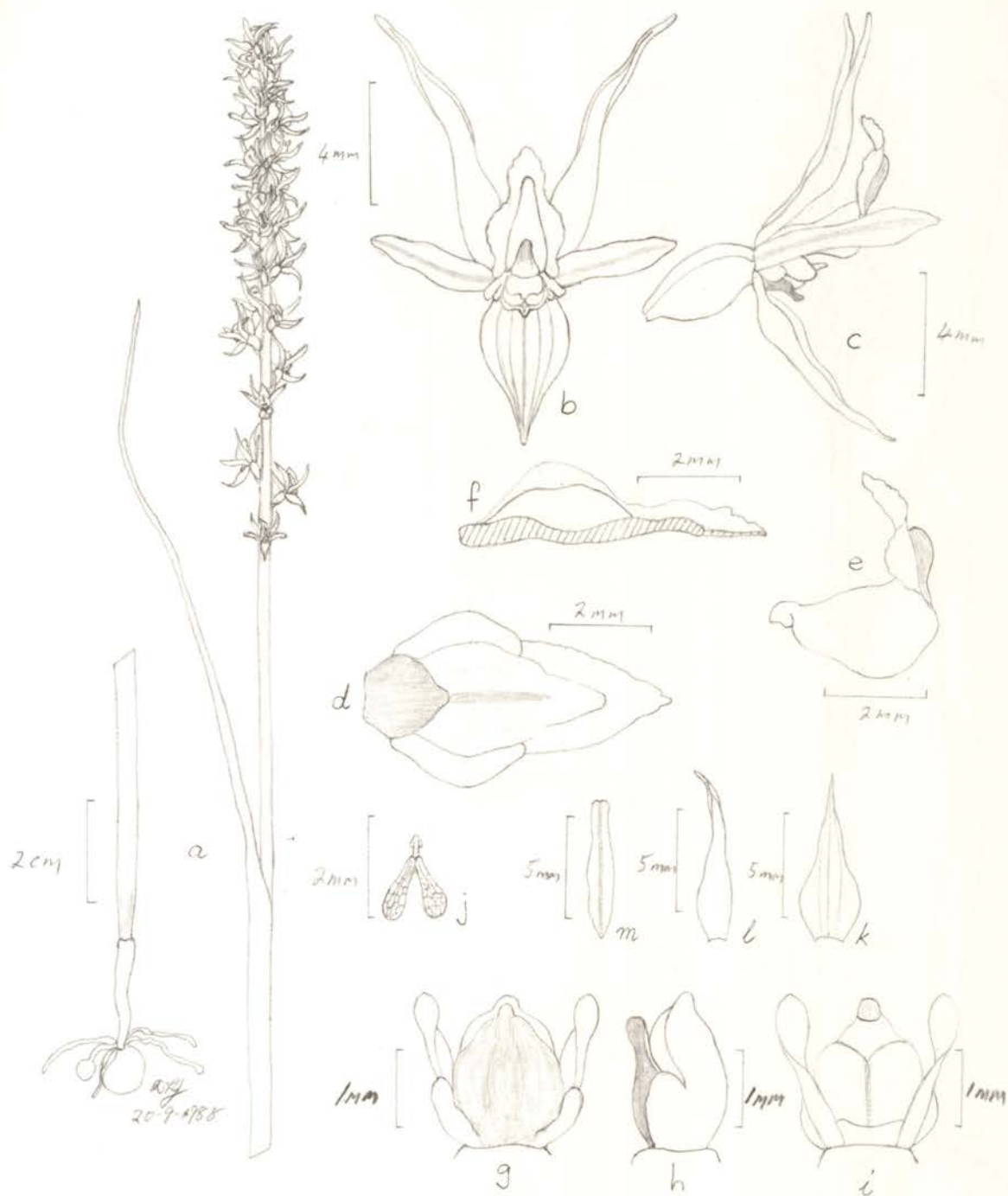


Fig. 101. *Prasophyllum campestre* (Yalgogrin North, NSW), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) longitudinal section of labellum, g) column from rear, h) column from side, i) column from front, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

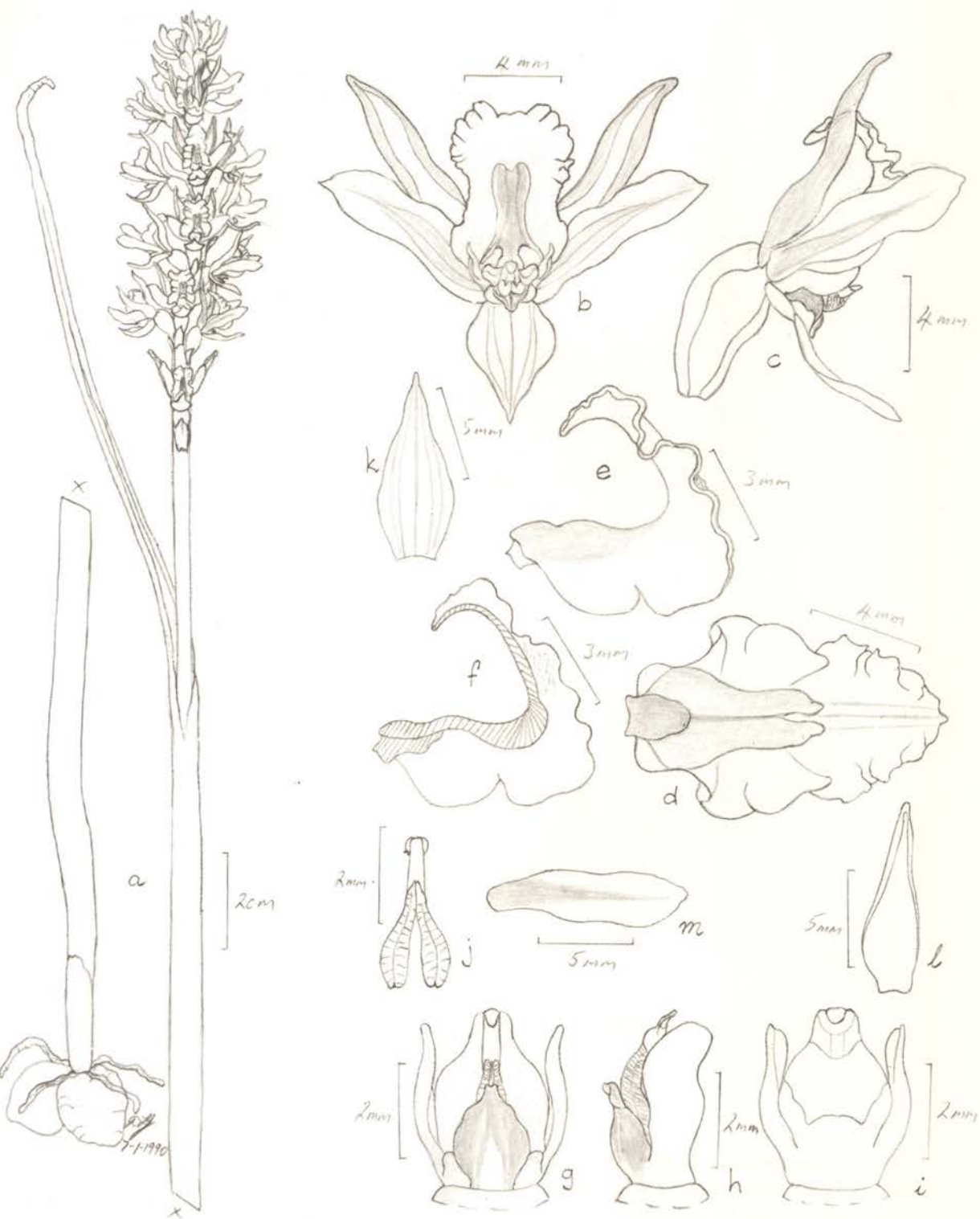


Fig. 102. *Prasophyllum candidum* (Rocky Plains Ck, NSW, D. L. Jones 5607), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) longitudinal section of labellum, g) column from rear, h) column from side, i) column from front, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

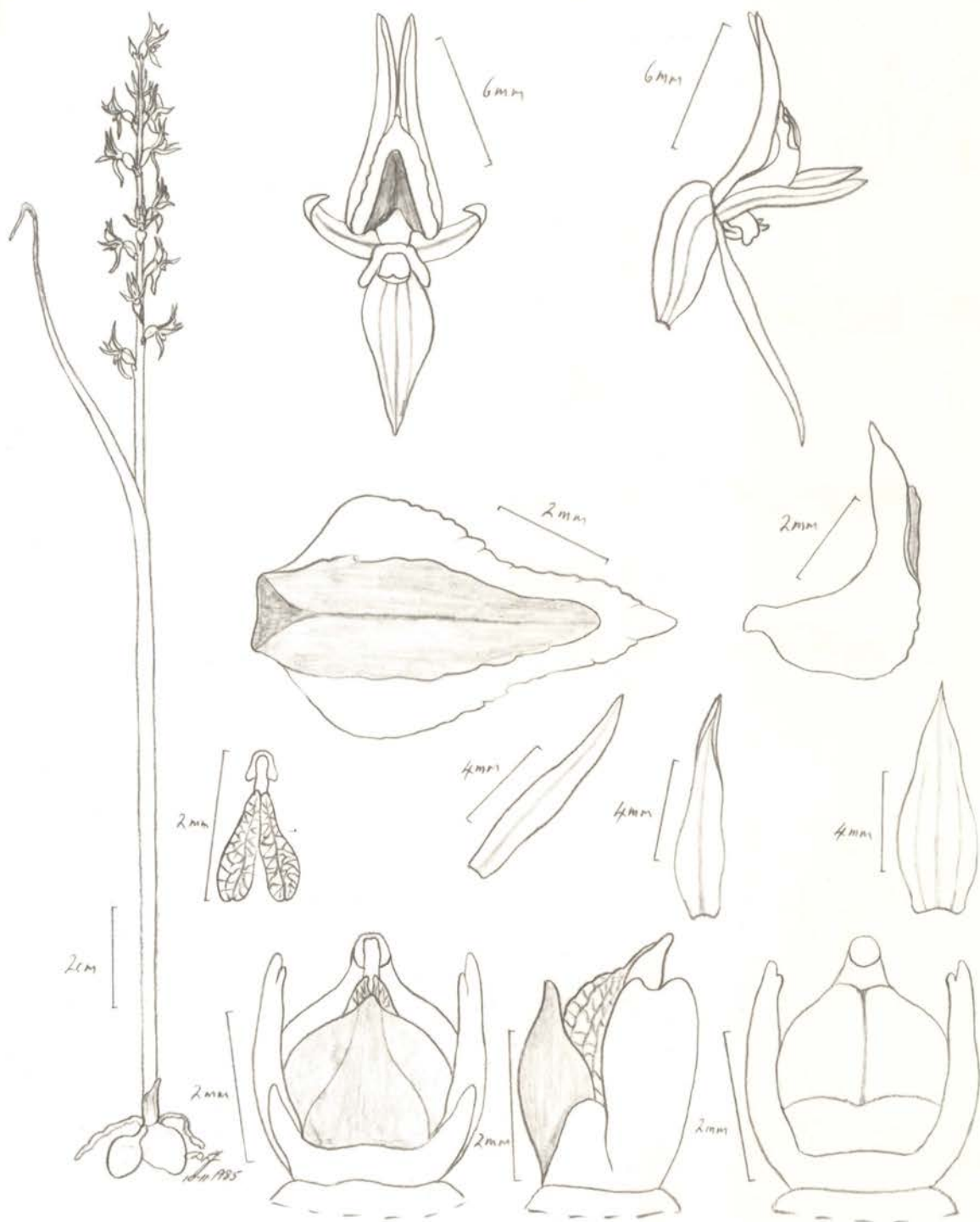


Fig. 103. *Prasophyllum chasmogamum* (Bairnsdale, Vic, D. L. Jones s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from rear, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.

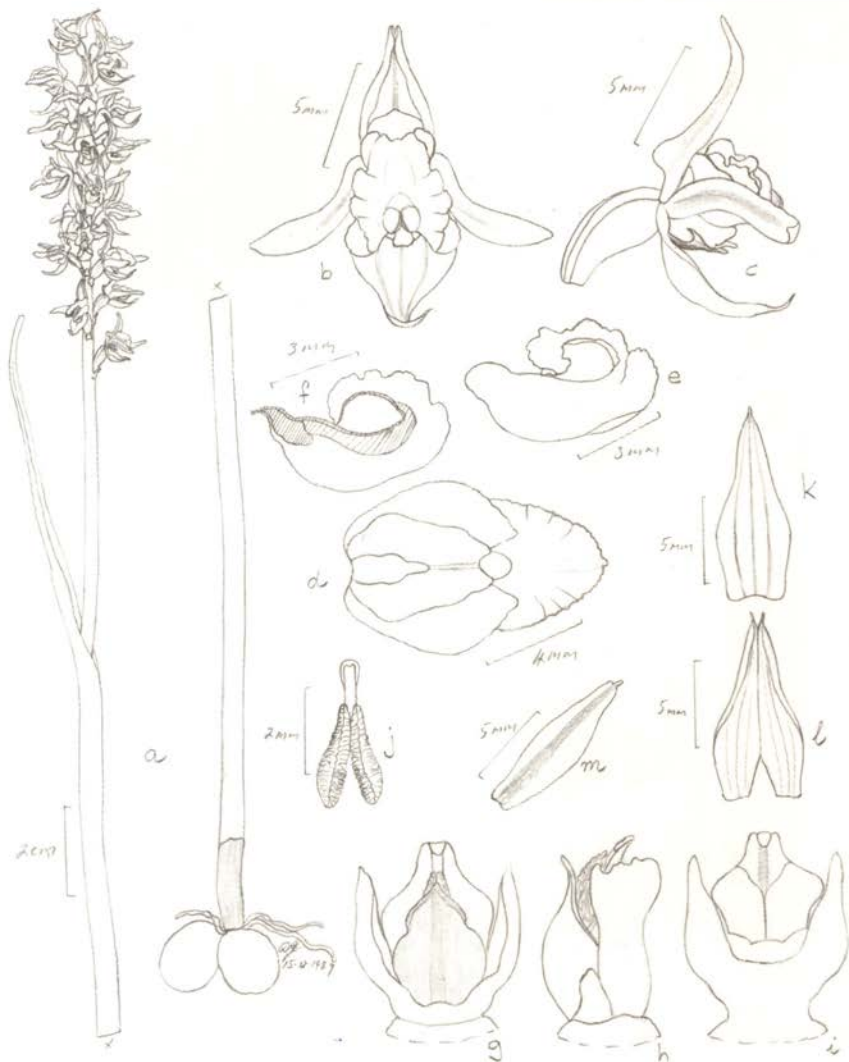


Fig. 104. *Prasophyllum dossenum* (Ben Lomond, NSW, D. L. Jones 5514), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) longitudinal section of labellum, g) column from rear, h) column from side, i) column from front, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

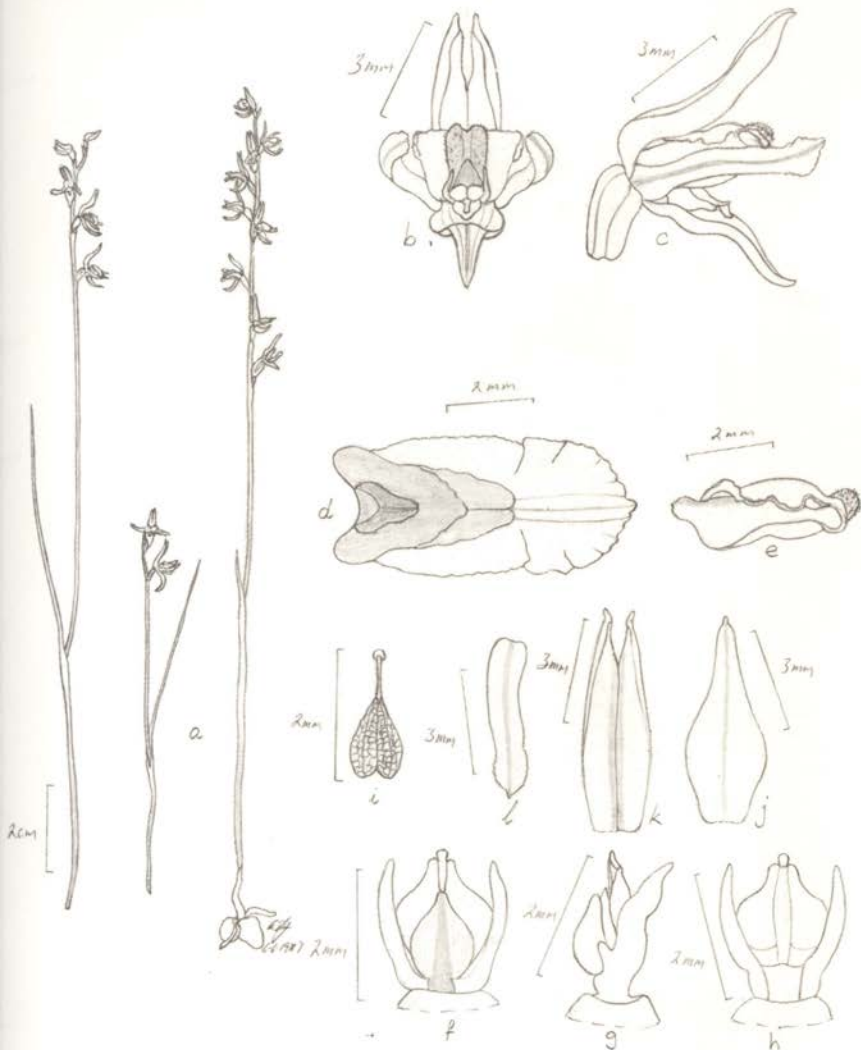


Fig. 105. *Prasophyllum exilis* (Torbanlea, Qld, L. Barton s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from rear, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.

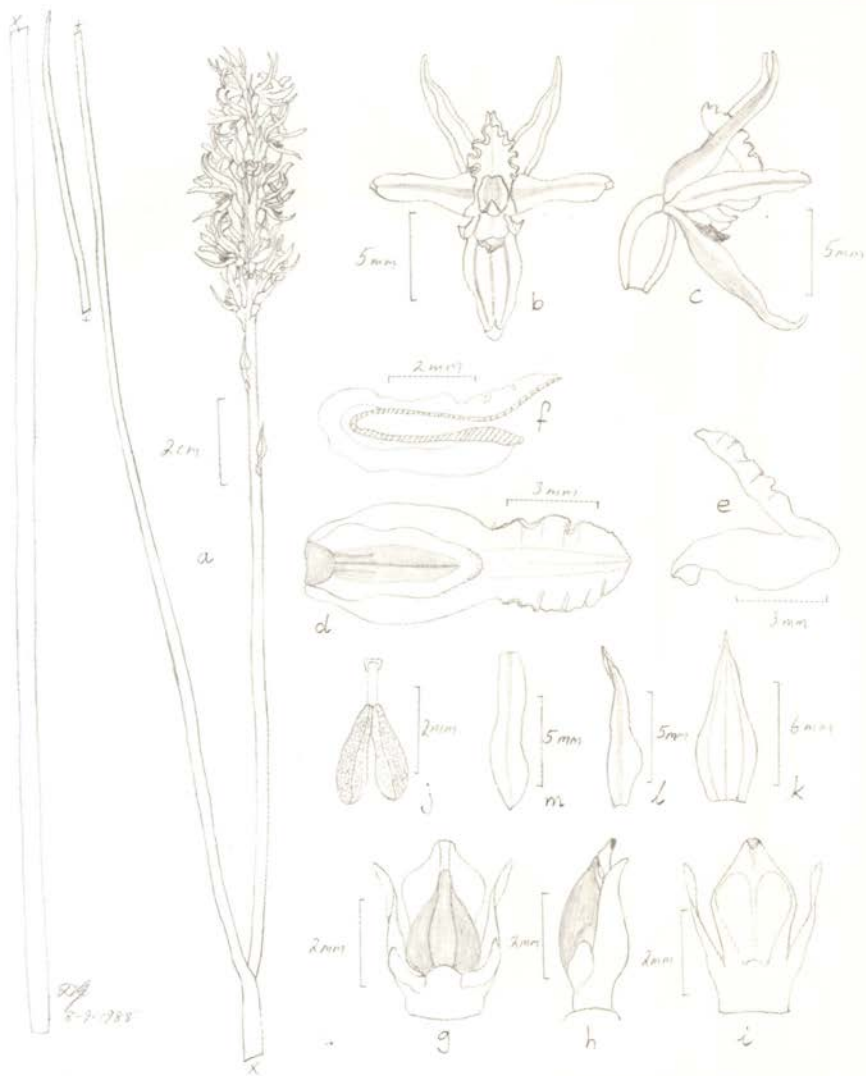


Fig. 106 *Prasophyllum incompositum* (Carnarvon Range, Qld, D. L. Jones 2891), a) plant, b) flower from front, c) flower from side, d) labellum flattened from above, e) labellum from side, f) longitudinal section of labellum, g) column from rear, h) column from side, i) column from front, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

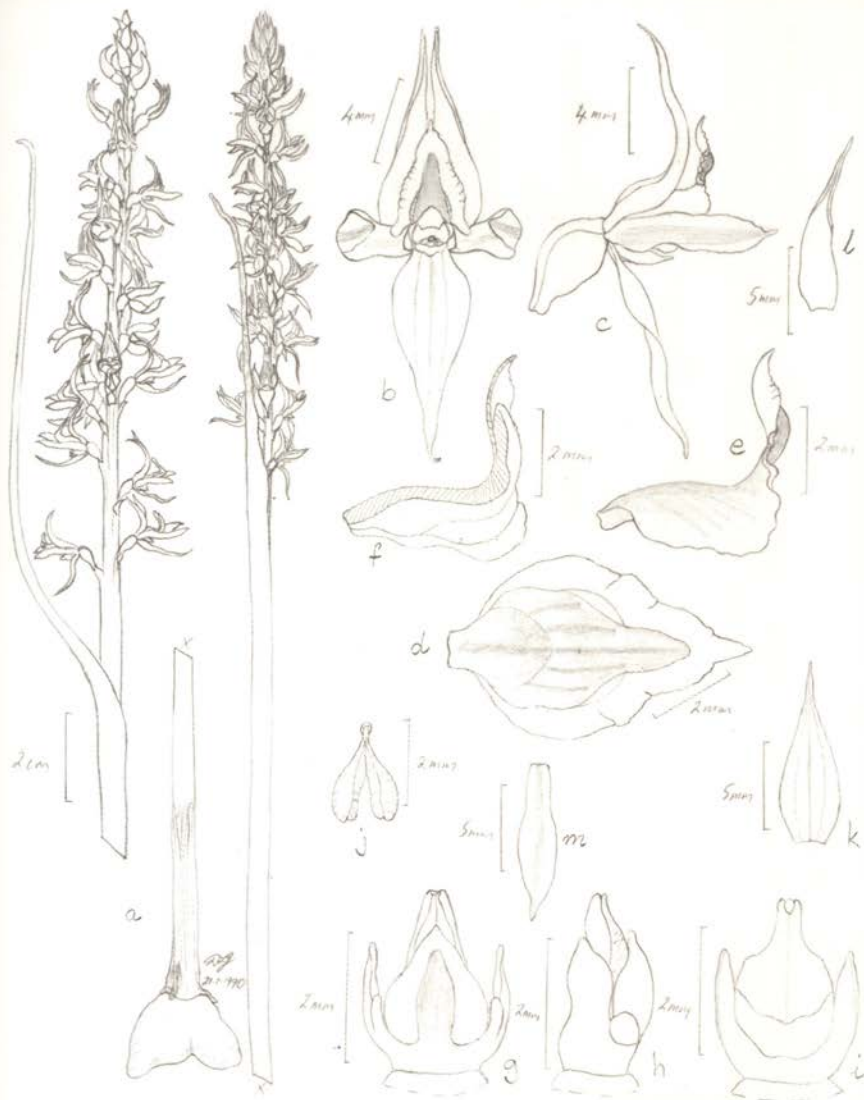


Fig. 107. *Prasophyllum montanum* (Mt Franklin, ACT, D. L. Jones 5627), a) plant, b) flower from front, c) flower from side, d) labellum flattened out, e) labellum from side, f) longitudinal section of labellum, g) column from rear, h) column from side, i) column from front, j) pollinarium, k) dorsal sepal, l) lateral sepal, m) petal.

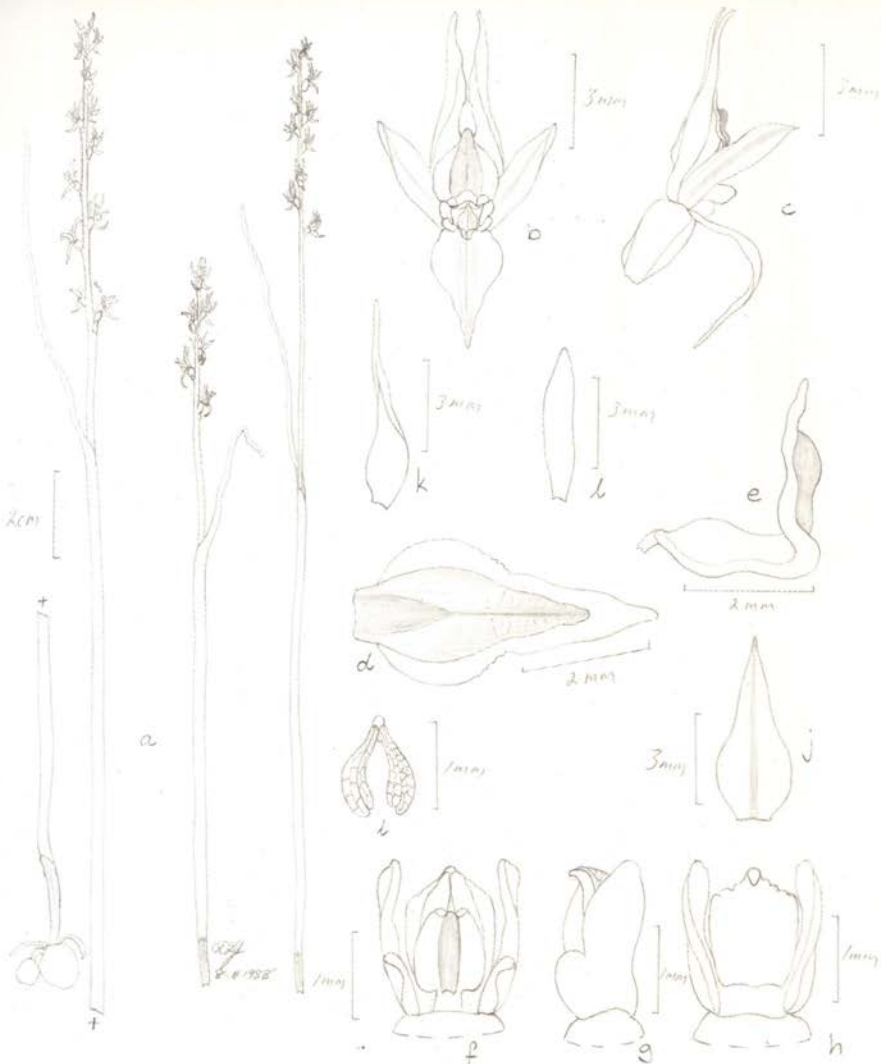


Fig. 108. *Prasopphyllum petilum* (Hall, ACT, D. L. Jones 3431), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.

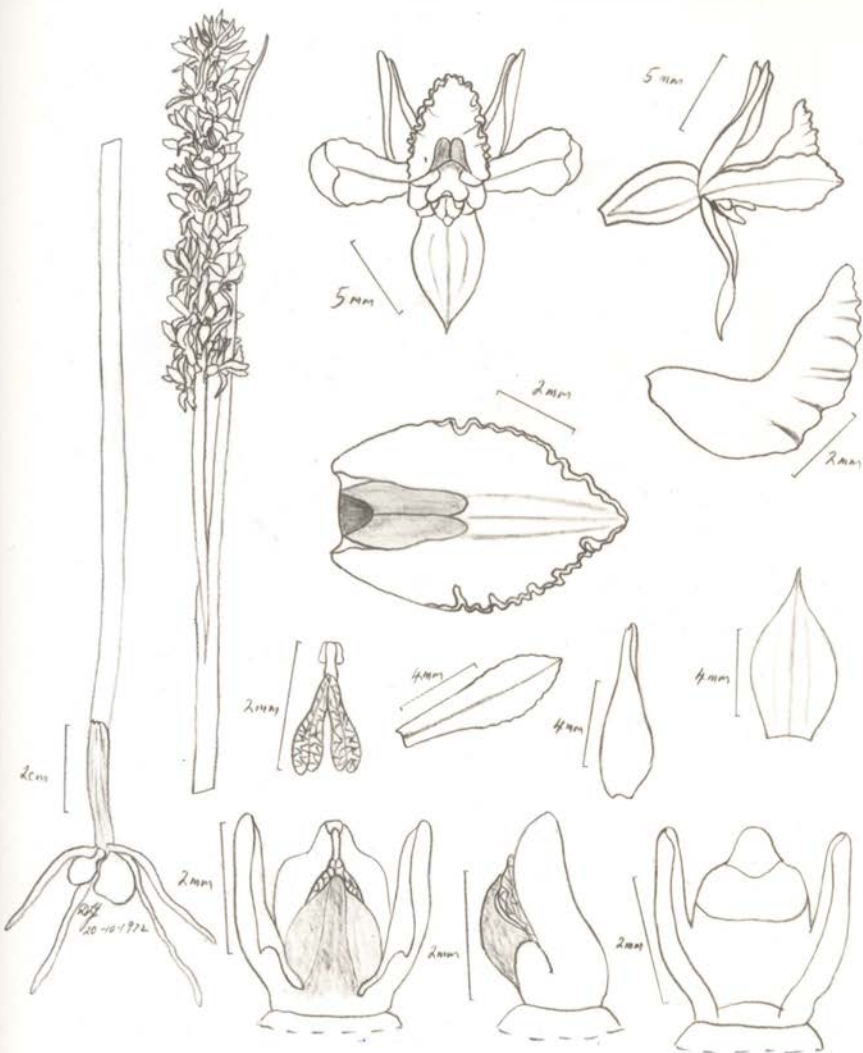


Fig. 109. *Prasophyllum spicatum* (Stony Point, Vic, D. L. Jones s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from rear, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.

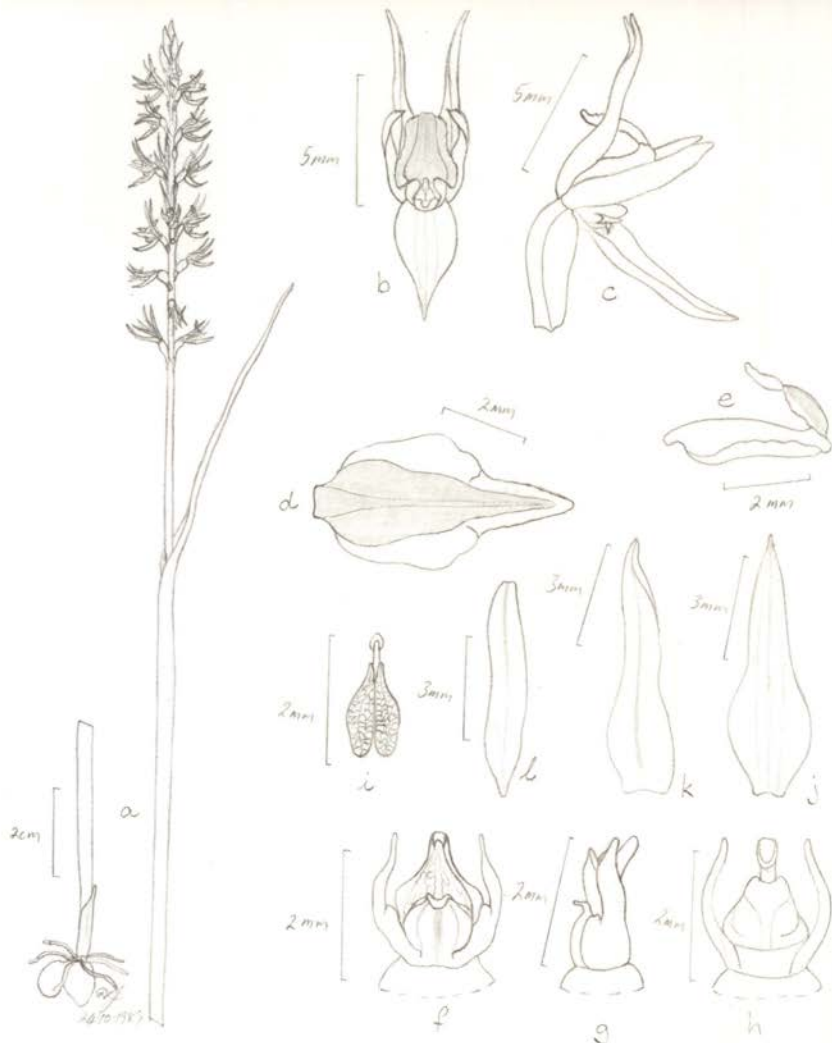


Fig. 110. *Prasophyllum sylvestre* (north of Bateman's Bay, NSW, M. A. Clements s.n.), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from rear, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.



Fig. 111. *Prasophyllum wallum* (Coolum, Qld, P. Sharpe 2067), a) plant, b) flower from front, c) flower from side, d) labellum flattened out from above, e) labellum from side, f) column from rear, g) column from side, h) column from front, i) pollinarium, j) dorsal sepal, k) lateral sepal, l) petal.

