CALADENIA IN WESTERN AUSTRALIA AND NATURAL HYBRIDISATION

by R. L. Heberle

The genus *Caladenia* in Western Australia has been widely and lavishly distributed over about 34,000,000 hectares within a rough triangle bounded by Shark Bay in the north, Augusta in the south-west corner and Israelite Bay in the south-east. Within this vast area grow the 40 species and 10 varieties that have been named and described.

The genus reflects a tremendous diversifiaction and a high degree of specialisation and adaptability and flourishes over a wide variation of geographic, climatic and ever-changing habitats. *Caladenia* plants seem equally at home in the high rainfall areas in the south-west corner and in the drier north and east and in the arid inland goldfields up to 600km from the coast.

My personal interest in terrestrial orchids comes from many years of exhibition and display to the public, visiting the same colonies at the same time each year and being constantly confronted with problems of identification. It seems to me that many of the problem forms of *Caladenia* are more likely to be hybrids than un-named species.

Five years ago I decided to make a project of attempting to isolate these "presumed" hybrids and match them to parent combinations, to record relevant information, to press and photograph the specimens in the hope that this work might assist in the future naming of new species. Although I had previously seen "presumed" hybrids as far north as the Murchison River, eastward to the east of Esperance and inland to Coolgardie, I decided to concentrate this work in the extreme south-west corner with the expectation that hybridisation would be more abundant in the integrated colonies there than elsewhere. As I live in Albany I could visit these colonies throughout the flowering periods.

So far, the most productive colonies have been those that grow adjacent to rivers, streams, lakes and swamps — and on, and around, granite rocks where the insects are very active. I hope to study the specific fertilising insects in the future and possibly other species isolating mechanisms which may have broken down to produce hybrid swarms.

The project was undertaken with the expectation that hybrid progeny would generally exhibit prominent structural features of one parent rather than the other and that possibly the pod-parent or the pollen-parent would be dominant, but this is not always the case. Apparent indications that the cross between pod-parent and pollen-parent (A x B) and the reverse (B x A) produce two distinct and different hybrids may well be evidence merely that one parent is more dominant than the other, or that some back-crossing has occurred, or that the hybrid has "selfed" and thrown to one parent or the other. These are distinct possibilities in hybrid "swarms". However, in the cross between *C. multiclavia* and *C. filamentosa var. filifera* (fig. 1) each flower has dominant structural features from each of the parents!

Other pointers noted are that uneven and irregular calli rows, wavy and angular lateral sepals can assist in identifying hybrids. I also note that if either of the parents is a fire-stimulated flowerer the hybrids will be likewise.

The presence of a number of un-named species together with the so-called "complexes" such as that of *patersonii - huegelii - filamentosa* and *doutchae* (which contains numerous variations, races and possible hybrids) further complicates a complex issue. Nevertheless I have enjoyed some successes as preliminary findings suggest that apart from the isolation of early and late flowering species, most caladenias hybridise naturally. Some are capable of crossing with a number of others, this being demonstrated by *Caladenia flava - latifolia - reptans - marginata - filamentosa - doutchae - patersonii - huegelii - radiata - lobata* and *calmsiana*.

At this early stage I note that certain hybrids have established stabilised colonies in the areas east of Esperance, Jerramungup and Manjimup, these being the crosses

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Figure 1. *C. multiclavia x C. filamentosa var. filifera.* This hybrid is rare even though both parents are plentiful. The photograph (Fig. 7) shows how closely the hybrid reflects the united tepals and the labellum of *C. multiclavia*; while the other parent is seen in the calli and the tepal filaments. Colouring is a beautiful shade of pink diffused through orange to red — from both parents.

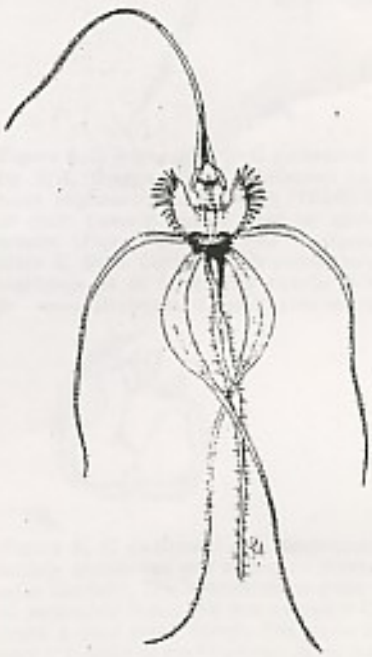


Figure 2. *C. patersonii x C. dilatata var. falcata.* A common and widely distributed hybrid — stabilised into colonies in some areas. *Var. falcata* shows little variation over a wide range but *C. patersonii* is very variable; hence the hybrid varies considerably. Colour is whitish to cream (rarely pale green). Tepals follow the structure of *C. patersonii*. The dilated labellum fringe and purple tip favour the other parent. This hybrid occurs also in most eastern States.

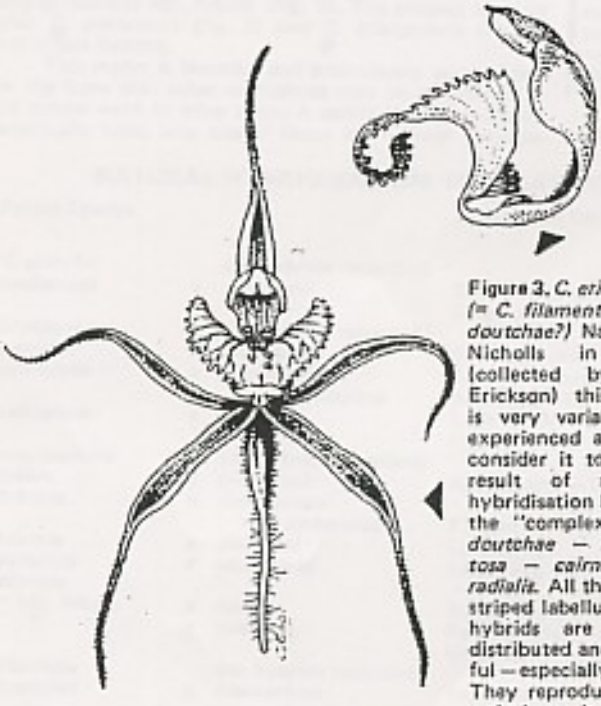


Figure 3. *C. ericksonae* (= *C. filamentosa x C. doutchae?)* Named by Nicholls in 1950 (collected by Rica Erickson) this taxon is very variable but experienced amateurs consider it to be the result of multiple hybridisation between the "complexes": *C. doutchae — filamentosa — cairnsiana — radialis.* All these have striped labellums. The hybrids are widely distributed and plentiful — especially inland. They reproduce vegetatively as do most of the parents.

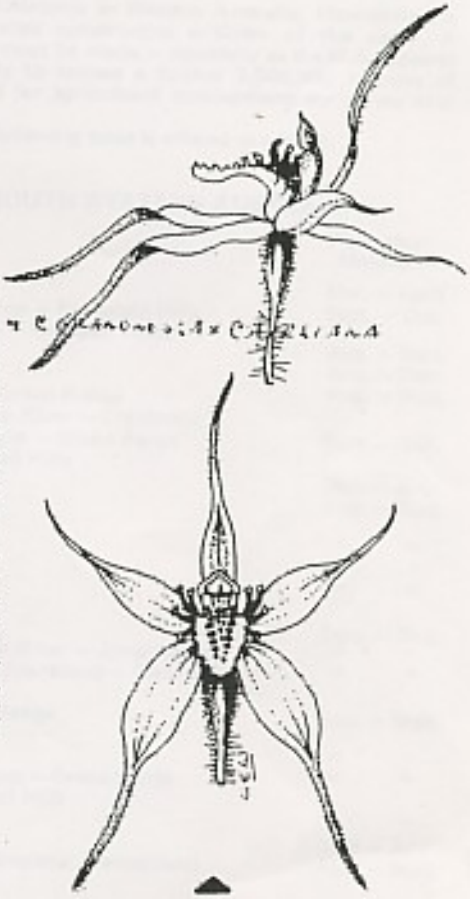


Figure 4. *C. triangularis* (= *C. patersonii x flava*). Named by R.S. Rogers (1927). Collected by Colonel Goadby from Highbury near Narrogin (1924). Structural features of both parents can be seen by comparing the photographs (Figs. 6 and 8). The triangular labellum comes from *C. flava.* Colour is pale yellow to cream with the red markings of *C. flava.* The hybrid is widely distributed but never abundant. It reproduces vegetatively.

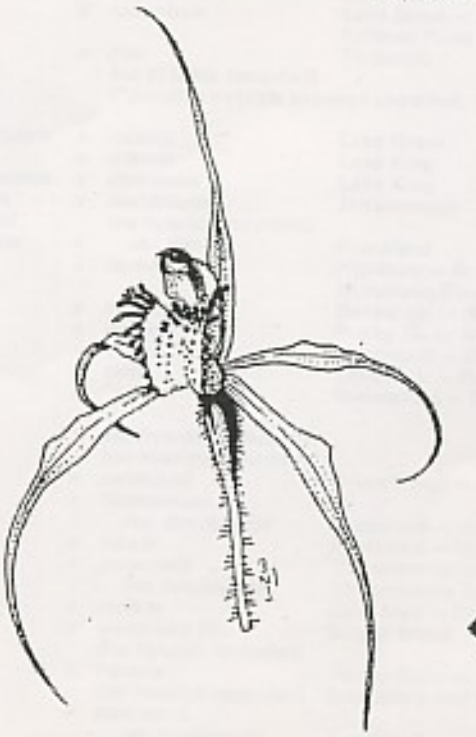


Figure 5. *C. patersonii x C. barbarossa* Both parents are widely distributed and abundant throughout the "South-west Corner". The hybrids show great variation — as does *C. patersonii* — but this is not so with *C. barbarossa* (apart from a pure green form). The name *barbarossa* (= "red-beard") refers to the dense mat of red hairs on the labellum. Its colour is pale green to yellowish, the purple stalked calli rising from the base of the labellum and at an angle on each side with reddish hairs on the tip. Tepals are short and angular. This is reflected in the (quite common) hybrids.

All drawings by C. Woolcock.

between *C. flava* and *C. latifolia* and between *C. patersonii* and *C. dilatata var. falcata* (fig. 2). The project suggests that *C. ericksonae* (fig. 3) and *C. triangularis* (fig. 4) are in fact hybrids.

This report is tentative and preliminary and is made in the hope that other enthusiasts may be influenced to do similar work in other areas. A combined effort should eventually bring into clearer focus the natural hybridisation of *Caladenia* in Western Australia. Meanwhile the author invites constructive criticism of this paper. A beginning must be made — especially as the W.A. Government plans to release a further 3,000,000 hectares of virgin land for agricultural development during the next ten years.

The following table is offered as a basis:

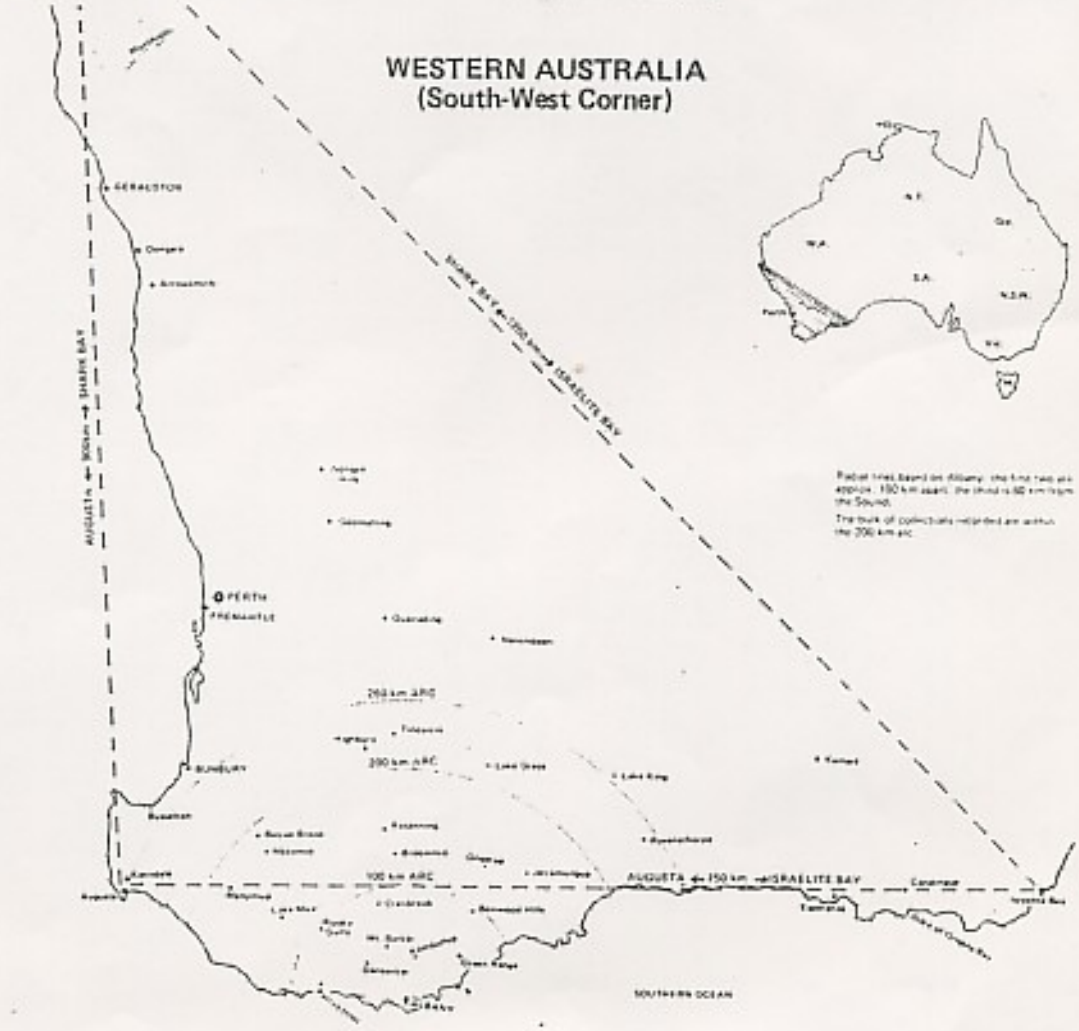
NATURAL HYBRIDISATION IN *CALADENIA* IN SOUTH WESTERN AUSTRALIA

Parent Species			Location of Collections	Flowering Months
C. aphylla		(no hybrids recorded)		
barbarossa	x	*patersonii*	Boyup brook — Kamballup — Boxwood Hills Ongerup — Jerramungup — Gairdner River	Mar. — April Sept. — Oct.
bryceana		(no hybrids recorded)		
caerulea	x	*saccharata*	Boxwood Hills	Aug. — Sept.
cairnsiana	x	*filamentosa* var. *denticulata*	Albany — Kamballup — Green Range Boxwood Hills — Pallinup River — Cranbrook	Aug. — Sept. Aug. — Sept.
cairnsiana	x	*doutchae*	Lake Grace — Jerramungup — Green Range Pallinup River — Boxwood Hills	Sept. — Oct.
corynephora		(no hybrids recorded)		
crebra	x	*patersonii*	Arrowsmith — Dongara	Dec. — Jan.
cristata	x	*filamentosa* var. *tentaculata*	Kumarl	Aug. — Sept. " "
cristata	x	*doutchae*	Lake King	" "
deformis	x	*saccharata*	Lake King	" "
dilatata var. *falcata*	x	*lobata*	Rocky Gully	
" "	x	*patersonii*	Pallinup River — Gairdner River — Jerramungup Ongerup — Cranbrook — Frankland — Gordon River	Sept. — Oct. " "
discoidea		(no hybrids recorded)		
doutchae	x	*filamentosa* var. *denticulata*	Boxwood Hills — Green Range	Aug. — Sept.
doutchae	x	*radialis*	Lake Grace	" "
"	x	*cairnsiana*	Lake Grace — Jerramungup — Green Range Pallinup River — Boxwood Hills	" "
"	x	*roei*	Tincurrin	" "
drummondii		(no hybrids recorded)		
* *ericksonae*		(*possible hybrids between *doutchae, radialis, cairnsiana, filamentosa*)		June — July Aug. — Sept.
filamentosa var. *denticulata*	x	*radialis*	Lake Grace	" "
" "	x	*cristata*	Lake King	" "
var. *tentaculata*	x	*sigmoidea*	Lake King	" "
var. *filifera*	x	*multiclavia*	Jerramungup	" "
var. *dorrinii*		(no hybrids recorded)		
var. *caesarea*	x	var. *filifera*	Frankland	Sept. — Oct.
flava	x	*reptans*	Highbury — Broom Hills — Manjimup — Mt Barker Murchison River — Albany	" " " "
"	x	*marginata*	Denbarker — Rocky Gully — Lake Muir — Mayanup	" "
"	x	*latifolia*	Rocky Gully — Manjimup — Broom Hills — Albany Condingup — Duke of Orleans Bay — Lake Muir	Aug/Sept/Oct
"	x	*nana*	Lake Muir — Rocky Gully — Parry's Inlet	Sept. — Oct.
gemmata	x	"?"	Goomalling — Quairading	" "
gemmata var. *lutea*		(no hybrids recorded)		" "
graminifolia		(no hybrids recorded)		
hirta	x	*patersonii*		Aug. — Sept.
hirta	x	*filamentosa* var. *denticulata*	Green Range — Jerramungup — Cranbrook — Wongan Hills	Sept. — Oct.
huegelii	x	*lobata*	Cranbrook — Amelup — Ongerup Frankland — Mayanup — Rocky Gully	Sept. — Oct. Oct. — Nov.
"	x	*patersonii* var. *longicauda*	Numerous variations both parents variable. 20+ locations from Albany to Boyup Brook	" "
"	x	*radiata*	Lake Muir — Rocky Gully — Manjimup	" "
"	x	un-named (3)	Boyup Brook — Rocky Gully — Frankland	" "
integra		(no hybrids recorded)		
latifolia	x	*reptans*	Rocky Gully — Lake Muir — Manjimup — Mayanup	Sept. — Oct.
lavandulacea		(no hybrids recorded)	(possibly a *roei* hybrid)	Sept.
lobata	x	*patersonii* var. *longicauda*	Frankland	Oct. — Nov.
"	x	*radiata*	Rocky Gully	" "
"	x	un-named (2)	Rocky Gully — Frankland	" "
	x	*barbarossa*	Rocky Gully	" "

longiclavata var. *longiclavata*	x	*longiclavata* var. *rhomboidiformis*	Karridale	Sept. – Oct.
longiclavata var. *magniclavata*		(no hybrids recorded)		
marginata	x	*nana*	Rocky Gully – Parry's Inlet	" "
"	x	*reptans*	Mayanup	" "
macrostylis		(no hybrids recorded)		" "
menziesii		(no hybrids recorded)		" "
patersonii	x	*flava*	(= *C. triangularis* possible hybrid)	Sept. – Oct.
var. *longicauda*	x	un-named (2)	Rocky Gully – Frankland	Oct. – Nov.
plicata		(no hybrids recorded)		Sept. – Oct.
radialis	x	*roei*	Lake Grace	Aug. – Sept.
radiata	x	un-named (2)	Boyup Brook – Mayanup	Oct. – Nov.
reptans		(see above – *flava*, *latifolia* and *marginata*)		" "
roei	x	*filamentosa* var. *denticulata*	Tincurrin	Aug. – Sept.
saccharata		(see *deformis* above)		" "
sericea		(no hybrids recorded)		" "
sigmoidea		(see above *filamentosa* var. *tentaculata*)		
* *triangularis*		*Possible hybrid *flava* x *patersonii*		" "

SUMMARY OF TABLE

Interim and preliminary figures suggest that out of the 40 *Caladenia* species named at least 26 hybridise and out of the 10 varieties seven do likewise. There remain at least 19 collections of possible hybrids where further research is required to determine parentage. The collections have been made from approximately 180 locations. The bulk of collections fall within the 200 km radius from Albany as shown on the map.



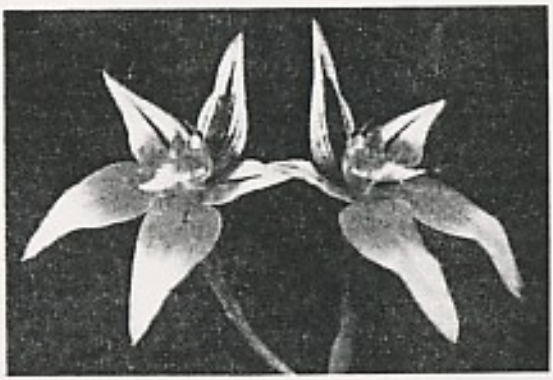


Figure 6. *Caladenia flava* R. Br is one of W.A.'s most common orchids. Handsome pale to vivid yellow with dorsal sepal and petals streaked or spotted with crimson. The stem, up to 30cm high, may carry up to five flowers. Variation is considerable in both colour and form. From Geraldton north the dorsal sepal is pink spotted. To the south and east most have red to crimson marks. There are pure white specimens with pink striped dorsal sepals; and white tipped segments diffusing into yellow are common in some southern areas. The hybrids of *C. flava* all exhibit the distinctive labellum fringe (see Fig. 4). This species was named by Robert Brown (1810) from a collection by Archibald Menzies near Frenchman's Bay, King George's Sound, Albany. (Menzies was surgeon-botanist on the Vancouver expedition that annexed the west coast for England in 1791.)

Figure 7. *C. multiclavia* Reichb.f. The dorsal sepal and petals are united almost to the tips. Colour is greenish yellow streaked with red. The labellum, striped with yellow and dark red bands, is the focal point. Being rhomboid in shape and very pendulous the calli are dark red and clubbed (multiclavate). The tepals are on a horizontal plane with the column cradled by the united segments. Once common between Pingelly and Katanning, it is still abundant between Borden and Ravensthorpe and there are outlying colonies as far north as Narembeen. Little variation has been observed except for a pale green form (varying in colour only). It seldom exceeds 20 cm in height and is mostly one-flowered. Plants reproduce vegetatively as well as from seed.

Figure 8. *C. patersonii* R. Br. *var. longicauda* (Lindl.) R.S. Rogers. This is W.A.'s most spectacular and robust terrestrial orchid often exceeding one metre in height and bearing 1-5 flowers 35 cm across the sepals. Colour pure white to pale yellow with a long pink to red combed fringe to the labellum and golf-stick-like calli of similar colouring in 4 rows (rarely 6). See Figure 9 (close up). The dilated tepals terminate in long caudate dusky tips covered in fine hairs. Reproduction is vegetative and by seed. Hybridises readily with a number of other species.

Figure 9. *C. patersonii var. longicauda.* Close up of labellum fringe, calli and column. There are two glistening yellow glands at the base.

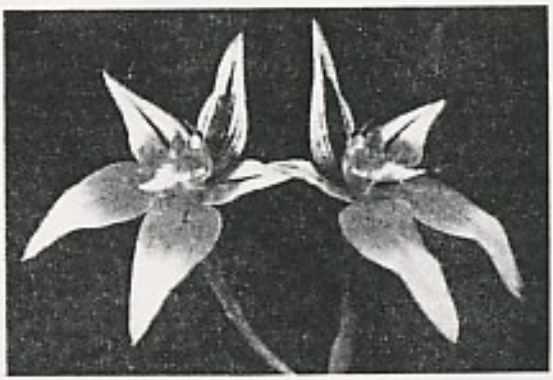


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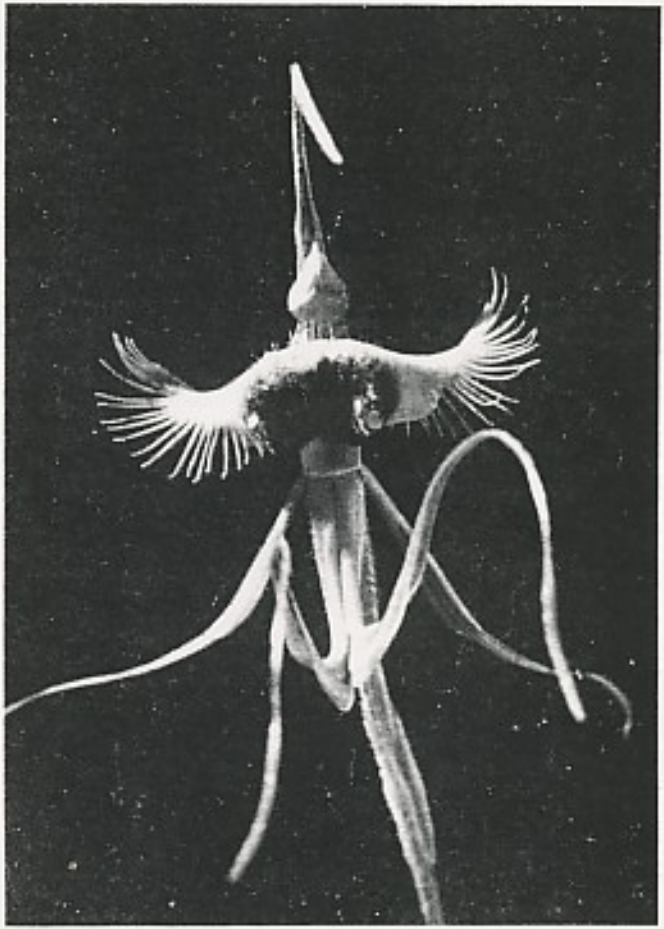
Figure 10. *C. lobata* Fitzg. Considered the "most magnificent caladenia in the West" this species was named (1882) by R.D. FitzGerald from specimens he collected at the Upper Hay River near Mt Barker about 50 km north of Albany. It bears 1-2 flowers on a long stem to 80 cm. The labellum is wide (to 3 cm) and elegantly fringed. Colour is pale green fading to yellow as it ages. The deeply dimpled tip is purple to maroon; the calli purple to dark brown and crowded from the base to the bend. The column has triangular lobes located halfway (called "very peculiar orbicular lobes" by FitzGerald; hence the name of the species). Note that the falcate lateral sepals and the incurved dorsal are delicately clubbed while the petals taper to fine points. The labellum is pendulous, vibrating up and down in every breeze, constantly attracting attention. This species shows little variation except for a pure yellow form, is distributed from Bunbury to the Sterling Ranges, is never abundant except in isolated localities near streams. Some of its hybrids with other species are magnificent.



All photographs by N. Butler.

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