

**GREVILLEA CELATA (PROTEACEAE), A NEW SPECIES FROM CENTRAL  
EASTERN GIPPSLAND, VICTORIA**

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ABSTRACT

Molyneux, W.M. *Grevillea celata* (Proteaceae), a new species from central eastern Gippsland, Victoria. *Muelleria* 8(3): 311–316 (1995). — *Grevillea celata* is described and named and distinguished from *G. alpina* Lindley and *G. chrysophaea* F.Mueller ex Meisner, species with which it has been confused by various authors. Morphological variation, affinities, ecology, and conservation status are discussed.

INTRODUCTION

Several authors have noted the existence of a distinctive *Grevillea* in the Bruthen region, assigning it to either *G. alpina* Lindley (e.g. Willis 1972: 46) or to *G. chrysophaea* F.Mueller ex Meisner (e.g. McGillivray 1993: 270–1), or to both taxa (Costermans 1981: 162, in circumscription and maps). The taxon has been informally known for some years as “*G. sp. nov. Nowa Nowa*”, from a nearby locality.

The author has made observations of this taxon in the field since 1978, observing especially its modes of regeneration, and polymorphism in flower morphology and flower colour, and in leaf shape and size. These observations, together with detailed measurements of live and herbarium material of all three species, are detailed below and provide evidence for recognition of this taxon as a distinct species. Some diagnostic features are not readily apparent from dried herbarium specimens and their label data; this difficulty probably underlies the uncertainty of diagnosis and assignment of this taxon in the past.

Polymorphism within the taxon does exist, with some apparently unstable character states; it is possible that this species is of relatively recent hybrid origin. The most typical form has red and yellow flowers, and type material has been selected from a large population of this form as being the most representative.

Definition of morphological characters and states follows that of McGillivray (1993).

TAXONOMY

***Grevillea celata* Molyneux, *sp. nov.***

*G. alpinae* Lindley et *G. chrysophaea* F.Mueller ex Meisner affinis sed surculis radicibus, conflorescentiis magis ramosis, forma amplitudine stato nectarium, et pistillis longioribus saepe differt.

TYPUS: Victoria: East Gippsland Botanical Region: Colquhoun State Forest, 13.15 km east north east along Dead Horse Creek Road, from the turnoff on the Bruthen-Buchan Road, c. 5.5 km south east of Bruthen; Map reference: Bairnsdale 8422, 840306; 13 Oct. 1993, W.M. Molyneux (HOLOTYPE: MEL; ISOTYPE: AD, BRI, CANB, K, NSW, PERTH)

*Upright and open to low and dense shrub* 0.4–1.8 m tall, suckering from roots; branchlets shortly tomentose with mixed white and fawn hairs. *Juvenile leaves* pink or tan, soon becoming green. *Adult leaves* mostly spreading or rarely ascending, shortly petiolate, simple and entire, oblong-elliptical to broadly elliptical or broadly linear, often subconvex upwards in cross section, (15–)20–44(–58) mm long, (4–)7–18 mm wide; petiole 0.5–1.5 mm long; base attenuate; apex softly mucronate to apiculate; margins irregularly wavy, recurved to loosely revolute, seldom obscuring the lower surface; upper surface tuberculate with a scattering of short hairs, dull green or yellow-

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green; lower surface tomentose, the hairs mainly white with an admixture of lightly ferruginous ones, hairs variably straight or twisted; venation brochididromous, obvious on upper surface, less so below due to indumentum. *Conflorescences* mainly terminal, usually on short lateral branchlets, or occasionally axillary on older wood, floral rachis apically decurved or deflexed or rarely straight, simple or up to 3-branched with no common peduncle, (2-)4-8-flowered, forming a loose cluster, centrifugal (basipetal); peduncles (1-)2-3(-7) mm long, rachis 1-5 mm long, both with an open indumentum of short mixed hairs, the hairs mainly white with some lightly ferruginous; *bracts* triangular to broadly linear, 1.8-2.5 mm long, 1.2-1.4 mm wide, tomentose outside with white hairs overlain by more erect lightly ferruginous hairs on and near the margins and mid-line, glabrous inside except along the margins and at the tip, deciduous when buds are c. 3 mm long. *Pedicels* 4-9 mm long, tomentose with white and lightly ferruginous hairs (the proportions variable), pedicels ascending at c. 35°-45° to the rachis. *Torus* oblique at 25°-40°, more or less square in plan view (i.e. distinctly angled below the tepal sutures), 1.7-2.2 mm across. *Perianth* often tardily deciduous, dilated at the base, obliquely oblong to ovate, often with pronounced ribbing of the tepal mid-lines especially below the curve, (3-)4.8-7.0(-8) mm across, outer surface with an open short irregular indumentum of white and lightly ferruginous hairs, inner surface glabrous in the basal 2-3 mm then densely bearded for c. 2 mm towards the curve with retrorse white hairs distributed evenly on the dorsal and ventral tepals, then with scattered white hairs above the beard; limb obliquely ovoid, 2-3 mm long, 2.2-4 mm wide, tepals (often only the dorsal pair) variably horned with a short villous appendage (sometimes scarcely apparent); dorsal tepals (13-)14-16(-18) mm long. *Nectary* conspicuous, at c. 45° to the pedicel, arcuate-rectangular to oblong in plan view, 1.3-2.5 mm long, 1.8-2.5 mm wide, 0.2-0.7 mm thick, margin entire or irregular, sometimes concave and cupping the base of the ovary. *Pistil* 18-20(-25) mm long; *ovary* sessile, 2-2.5 mm long, villous; ovules attached at about the midpoint between the basal and medial positions; *style* dorsally villous in the lower half with mixed white and ferruginous hairs and with the distribution and density of indumentum somewhat variable, ventral side glabrous or with a few scattered hairs; style-end lateral, 1.4-1.9 mm thick, tapering gradually into the style, base not concurrent with the style. *Pollen-presenter* elliptical to almost round, 2.8-4.0 mm long, 2.0-3.2 mm wide, face shallowly concave to slightly convex, with the margins often thickened; stigma slightly and distally off-centre. *Fruits* follicular, obliquely oblong-ellipsoid to ovoid-ellipsoid, 12-14 mm long, 5-8 mm wide, tomentose, surface beneath indumentum usually granulose and irregularly longitudinally ribbed; style persistent; pericarp c. 0.25 mm thick; suture opening to 4-6 mm wide; opened fruits often retained until following flowering season. *Seeds* narrowly elliptical, c. 9 mm long, 3 mm wide, 1.9 mm thick; outer face convex, irregularly rugose and granulate; inner face more or less flat; seed curved inwards to both ends, each end with a prominent pulvinus 0.9-1.5 mm long; elaiosome irregularly triangular, c. 2 mm long, c. 1.3 mm wide at base. (Fig. 1)

#### SPECIMENS EXAMINED

Victoria — East Gippsland Natural Region: Bruthen-Buchan Road c. 8 miles [13 km] from Bruthen, July 1942, *W. Hunter* (MEL); West of Nowa Nowa, 15 Nov. 1992, *W. Molyneux* (MEL, NSW 117361); Stony Creek on Bruthen-Buchan Road, 23 Sep. 1969, *K.C. Rogers* (MEL); "Foggy" [Boggy?] Creek, c. 13 km east of Bruthen, c. 1937, *F. Robbins* (MEL); Reformatory Road, c. 1.55 km north from junction with Bruthen-Buchan Road, c. 14.5 km east of Bruthen, 13 Oct. 1989, *W. Molyneux* (MEL); west side of Stony Creek, west of Nowa Nowa, 13 Dec. 1991, *W. Molyneux* (MEL).

#### ETYMOLOGY

The specific epithet is from the Latin *celatus*, hidden or concealed within, referring to the previous confusion of the taxon with both *G. alpina* and *G. chrysophaea*.

#### VARIATION

Flower-colour variation appears to be a feature of the species, and is detailed under Flower Colour (below); all the colour variations there noted, except the lemon-yellow, occur in all populations surveyed. The species also shows considerable variation

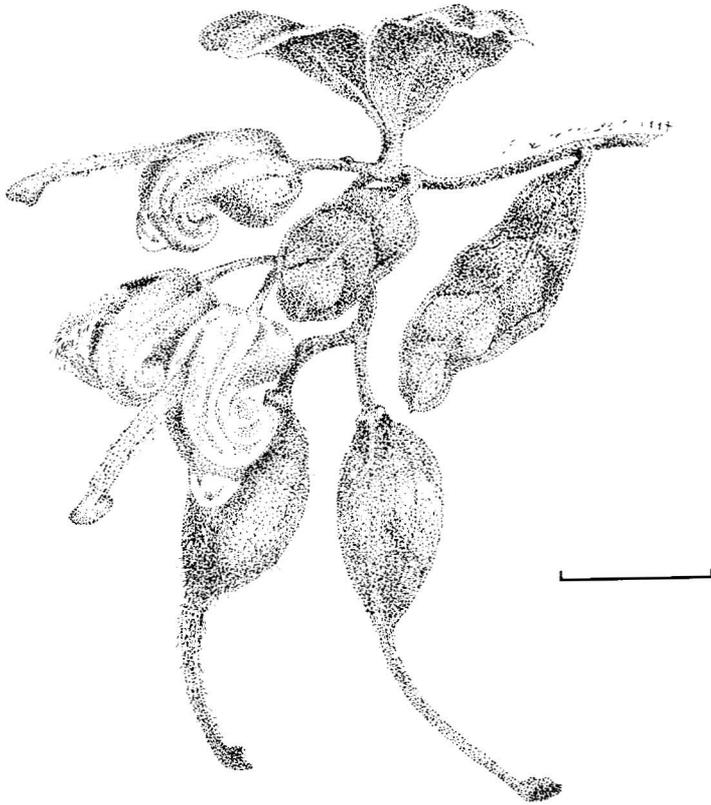


Fig. 1. Flowering and fruiting twig of *Grevillea celata* showing copious nectar flow. Scale bar = 1 cm.

(especially as compared with its presumed closest relatives — see under Affinities, below) in flower size, particularly in perianth width.

#### FLOWERING PERIOD

Flowering has been observed from July to December, and in late January and in February.

#### FLOWER COLOUR

Typically the perianth is red in the basal half, shading to yellow from the curve to the apex of the tepals, and the style is green at the base, shading to pink or cherry-red in the apical third with a green style-end. Type material was selected as having flowers of this colour pattern, as being the most representative of (and apparently dominant in) all populations observed.

Flower colour is however, variable, even within populations that appear to be wholly root-suckering and therefore probably clonal. An example of the latter is the population (measuring c. 40 m<sup>2</sup>) from which the Type material was selected; within this population, perianth colour may be red basally and yellow apically as above, or (respectively) red and white, pink and white, or apricot and white. A single plant with plain lemon-yellow perianths was found about 100 m from the Type population, the only instance seen of this colour. Style colour varies mainly in regard to the intensity and extent of reddish coloration in the apical third; the lemon-perianth variant has the style light green throughout.

Variation of this scale in flower colour is not uncommon in *Grevillea*, and comparable variation has been observed in the closely related species *G. alpina*, and in the less-closely related *G. arenaria sens. str.*, among others.

#### AFFINITIES

From comparative morphology, *G. celata* is apparently most closely related to *G. alpina* and *G. chrysophaea*. Table 1 indicates some key diagnostic character states for the three species.

It is possible that *G. celata* is a relatively recent and partially stabilised product of hybridization between these two species. It is now geographically isolated from the nearest known occurrences of both, being *c.* 120 km from *G. alpina* (on the lower northern slopes of the Victorian Alps above Mt Beauty, where forming hybrid, often root-suckering swarms with *G. lanigera*), and *c.* 70 km from *G. chrysophaea* (which appears to have its easterly limit in the area of Bullock Head Creek Road, off the Dargo Road). *G. celata* (allowing for the polymorphisms noted) breeds true from seed.

Table 1. Comparison of *G. celata* with related species.

<i>Character</i>	<i>G. celata</i>	<i>G. alpina</i>	<i>G. chrysophaea</i>
Habit	shrub, root suckering	shrub, single stemmed not root suckering, not lignotuberous	shrub, single stemmed not root suckering, not lignotuberous
Leaves: size:	15–58 mm long, 4–18 mm wide	3–30 mm long, 0.8–10 mm wide not	9–55 mm long, 3–21 mm wide
venation:	brochididromous obvious	brochididromous, mostly only midvein obvious	brochididromous obvious
Conflor- escence	simple or branching up to three times, 2 to 8 flowers	simple or branching up to 2 times, 2 to many flowers	simple or branching up to 2 times, 2 to 12 flowers
Floral bracts	triangular or broadly linear, <i>c.</i> 1.8–2.5 mm long, 1.2–1.4 mm wide, glabrous inside except for tip, deciduous when buds <i>c.</i> 3 mm long	triangular or linear, <i>c.</i> 0.5–4 mm long, 0.3–0.8 mm wide, glabrous inside except for tip, often persistent till late bud development	subovate, acute, or linear <i>c.</i> 1.8–3 mm long, 0.8–1.5 mm wide tomentose inside for <i>c.</i> top one-third, deciduous when buds <i>c.</i> 3 mm long
Flower colour	red & yellow, red & white, pink & white, apricot & white, often suffused, or lemon in one collection	red & yellow, red & white, yellow & white, pink & white, yellow, orange, mauve	primarily golden or with green patches around dorsal suture, often suffusing into the base
Nectary	conspicuous, angled at <i>c.</i> 45° to pedicel, arcuate, occasionally convex, margin entire or irregular, no nectary hairs present. <i>c.</i> 1.3–2.5 mm high, 1.8–2.5 mm wide, 0.2–0.7 mm thick	conspicuous, ± perpendicular to pedicel, arcuate, mostly linguiform and tapering, entire or tridentate, regularly curving into dilated perianth, nectary hairs present sometimes. <i>c.</i> 1.2–2.9 mm high, 0.4–2.5 mm wide, 0.2–0.4 mm thick	not conspicuous, angled at <i>c.</i> 45° to pedicel, short often thick pulvinus-like or broadly v-shaped, nectary hairs present sometimes. <i>c.</i> 0.5–1.3 mm high, 1.5–2.5 mm wide, 0.25–0.4 mm thick
Perianth: internal beard:	positioned both dorsally & ventrally with long white backward directed hairs, <i>c.</i> 5 mm across, 2 mm deep and 2–3 mm from base of perianth	less dense in the backward facing dorsal hairs, the ventral ones denser and more or less erect. <i>c.</i> 4 mm across, 2 mm deep and 2.5–4 mm from base of perianth	less dense dorsally than ventrally, both facing backward. <i>c.</i> 4 mm across, 2.5 mm deep and 2.5 mm from base of perianth
Pistil	18–25 mm long	10–20.5 mm long	15–22 mm long

Note: Regarding the distribution of *G. chrysophaea*,

McGillivray (1993: 271) mentions Tallarook and Merton as localities for that species, however, from both field work and an inspection of herbarium material this author suggests that it is *G. alpina* which occurs at these localities.

Both these related taxa are variable for certain characters, especially for flower colour in *G. alpina* as well as perianth size and shape as it is in *G. chrysophaea*. In these two species, variability of these characters tends to be between, not within, populations.

Root-suckering is not reliably recorded in either *G. alpina* or *G. chrysophaea*; McGillivray's (1993: 270) reference to occasional root-suckering in the latter species results from his inclusion of *G. celata* within it, and occasional reports of root-suckering in the former always appear to involve hybridization or intergrading with *G. lanigera*.

#### DISTRIBUTION

Known only from Victoria from the Colquhoun State Forest in central eastern Gippsland, east and south-east of Bruthen. (Fig. 2)

#### HABITAT AND ECOLOGY

The species grows on orange-red capping siliceous sands of apparently Tertiary age (McAndrew & Marsden, 1973) with low humus levels, and on and around small, low-relief Devonian-Silurian granite outcrops in granitic sand. The species is apparently absent from the black, high-humus Tertiary sands that often abut the preferred soils. Not all granite outcrops in the area carry the species, and it is apparently absent from more southerly outcrops of the same granite formation at lower altitudes; these however are more fire-prone and heavily colonised by denser, taller species such as *Kunzea ericoides* and *Pomaderris* spp.

Known populations of *G. celata* range in elevation from 240 to 290 m a.s.l.

The forests in which *Grevillea celata* is found are classifiable as dry sclerophyll, with *Eucalyptus* and *Acacia* being the dominant genera. Proteaceae is also well represented, and there is a broad understorey of small to medium and ground-covering sclerophyllous plants by a number of genera.

A comprehensive list accompanies the holotype at MEL.



Fig. 2. Distribution of *Grevillea alpina* (★), *Grevillea celata* (+) and *Grevillea chrysophaea* (●). Major waterways separating the most easterly populations of *G. chrysophaea* from *G. celata* are 1 Mitchell and Dargo Rivers, 2 Nicholson River and 3 Tambo River

#### REPRODUCTION

Recent observations (Molyneux, Sept. and Oct. 1993), of areas burnt the previous summer, show new growth from root-suckers, and this appears to be a common means of regeneration in all populations, possibly as a selected response to high fire frequencies. Mature fruits and seedlings are also not uncommon.

Pollination is probably both ornithophilous (White-naped Honeyeaters, *Meliphreptus lunatus* Veillot, were observed in the vicinity), and entomophilous (numbers of unidentified native bees were seen). The flowers produce copious nectar.

The author has noted several instances of a number of seedlings growing within a few millimetres of each other. It is likely that these are germinating within an ants nest. Similar observations are noted by Makinson (1993: 357) for *G. wilkinsonii*.

The author has noted, in a number of *Grevillea* species, that the seed is avidly collected by ants. Seed and elaiosome predation in *Grevillea* is poorly documented, but in the case of *G. ramosissima* near Goulburn, N.S.W., the author observed ants probing half-open fruits and removing the seeds before they fell, and transporting the seeds to their nest. Clumped new seedlings emerging from ant nests were observed at the same site. It seems probable that ant-mediated seed transport and burial is significant for reproduction in the case of *G. celata* also. Successful germination would suggest that the ants do not damage the testa, but are perhaps using the waxy margins and elaiosome as a food source or for other purposes.

#### CONSERVATION STATUS

Currently known populations are scattered through, and confined to, Colquhoun State Forest. The area is subject to rotational logging and wild and controlled fires. A conservation code of 2Vi is recommended, following Briggs and Leigh (1989), meaning that the species is of restricted distribution with a total range of less than 100 km, should be considered vulnerable, and is inadequately represented in conservation reserve (since the State Forest is a multiple-use regime with the possibility of significant disturbance).

#### ACKNOWLEDGEMENTS

My thanks to Don McGillivray for his encouragement and advice in determining the status of *G. celata*; Bob Makinson of the Australian National Herbarium, Canberra for numerous discussions based on his experience with the genus, and for suggesting substantial amendments to improve the original MS; Neville Walsh of the National Herbarium of Victoria for the Latin diagnosis and assistance in finding a suitable epithet; Jenny Pena and Ben Millbourne for assistance with proof-reading and mark-up; Peter Zimmermann for preparing the map; and Sue Forrester who typed the original MS, prepared the drawing, and spent much time with me on field work.

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