

## Taxonomic studies in the *Grevillea victoriae* F.Muell. species complex (Proteaceae: Grevilleoideae) I. Descriptions of nine previously segregated, and three new taxa.

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### Abstract

Nine taxa, including six new taxa erected by us (*G. brevifolia* subsp. *polychroma*, *G. epicroca*, *G. miqueliana* subsp. *moroka*, *G. monslacana*, *G. parvula*, and *G. victoriae* subsp. *nivalis*) within the *Grevillea victoriae* species complex were recently segregated in Makinson (2000). As well the name *G. victoriae* var. *leptoneura* was there reduced by us to synonymy under *G. parvula*, and *G. brevifolia* was resurrected and raised to species rank. This paper treats the above six named taxa, as well as three new taxa *G. bemboka*, *G. callichlaena*, and *G. miqueliana* subsp. *cincta*. *Grevillea brevifolia* subsp. *polychroma* is here accorded specific rank. A detailed circumscription, accompanied by a citation of representative specimens and notes on the phenology, distribution and conservation status, habitat and ecology, etymology and distinguishing characters are included for each taxon.

### Introduction

Although previous workers (Olde & Molyneux 1994; Makinson 1997; Makinson 2000, Molyneux & Stajsic in Makinson 2000) had taxonomically recognised some of the diversity present in the *Grevillea victoriae* species complex, unresolved elements of the complex nevertheless remained, and some rankings were regarded as tentative. It was deemed that additional morphological characters (including seldom used characters) and extensive field studies of all the taxa would provide useful data to assist the elucidation of the ‘races’ and the ‘unassigned specimens’ sensu McGillivray & Makinson (1993). During fieldwork a number of taxa unrepresented by herbarium specimens at the time of McGillivray & Makinson’s revisionary work were discovered or collected for the first time. Three of these taxa are described in this paper: *Grevillea bemboka*, *G. callichlaena* and *G. miqueliana* subsp. *cincta*. *G. brevifolia* subsp. *polychroma* is raised to species rank as *G. polychroma*.

The *Grevillea victoriae* species complex is here taken as being equivalent to the *Victoriae* Subgroup (one of five subgroups) within the *Linearifolia* Group sensu Makinson (2000). Makinson (2000) included fourteen named taxa within the *Victoriae* subgroup. In light of this paper seventeen named taxa are considered to be members of the subgroup. Many of the taxa in the *Victoriae* Subgroup have a rather narrow, straight erect perianth with the limb abruptly nodding or deflexed. In these taxa the style in late bud stage is always weakly exerted to the lower rear of the perianth rather than arching above the perianth curve as in the closely related *Speciosa* Subgroup (Makinson 2000).

The *Grevillea victoriae* species complex consists of a number of taxa commonly associated with montane to alpine habitats in Victoria, southeastern New South Wales, Queensland and the Australian Capital Territory. However most though occur in montane or high montane rather than alpine regions. *Grevillea parvula* is the only member of the complex found near sea level, for example on the banks of the lower Wallagaraugh River above Gipsy Point eastern Victoria. Because of the high level of morphological heterogeneity observed between many populations within this polymorphic assemblage,

the *G. victoriae* species complex has been regarded as one of the more intractable complexes still awaiting resolution within the genus.

*Grevillea victoriae* F.Muell. was described by Mueller in September 1855. Mueller based his description of *G. victoriae* on several collections made in the Victorian Alps (Mounts Buffalo, Buller, Tambo, Hotham and La Trobe and sources of the Mitta Mitta are cited by him). In the same month he described *G. miqueliana* from collections made at montane sites in central Gippsland (near Mt McMillan and on the Upper Avon River) (McGillivray & Makinson 1993; Makinson 1997). *Grevillea victoriae sens. lat.* has traditionally been characterised by having a smooth leaf upper surface and a silky  $\pm$  appressed indumentum on the branchlets, floral rachises, leaf undersurface, and perianth. *Grevillea miqueliana*, on the other hand, has been characterised by having a granulose leaf upper surface, and an indumentum of spreading hairs on the branchlets, floral rachises, leaf undersurface and perianth (Willis 1973; McGillivray & Makinson 1993; Makinson 1997).

Bentham (1870) described the material from Mt Tambo as a distinct species and named it *Grevillea brevifolia* F.Muell. ex Benth., which Maiden and Betche (1916) reduced to *G. victoriae* F.Muell. var. *brevifolia* (F.Muell. ex Benth.) F.Muell. ex Maiden & Betche. Bentham (1870) also named *G. victoriae* F.Muell. var. *leptoneura* Benth. based on collections from the source of the Genoa River, near the Victorian border with New South Wales.

Johnson (1962) moved the species complex a step closer toward a taxonomic resolution with the description of *G. diminuta*. McGillivray (1986) took a further step when he published the name *G. linsmithii* based on collections from southeastern Queensland and northern New South Wales.

Makinson (1991) in his account of *Grevillea* for the *Flora of New South Wales* recognised a broad concept of *G. victoriae* that incorporated *G. miqueliana* as a synonym, commenting that the traditionally used characters to separate *G. miqueliana* and *G. victoriae* do not provide an adequate definition of groups within the complex. He pointed out that a number of forms could be identified differing in leaf and floral morphology, flower colour, habit and ecological preferences.

McGillivray & Makinson in their (1993) revision of the genus delineated eleven informal races within a broadly circumscribed *G. victoriae*; three of these informal races being part of the *G. miqueliana* group which they relegated to synonymy under *G. victoriae*, the latter name taking priority (Aston 1984; McGillivray & Makinson 1993). Aston (1984, p. 283) indicates that both names were probably published in September 1855 and that the *Trans. Philos. Soc. Victoria* in which the name *Grevillea victoriae* appears, probably preceded the *Trans. & Proc. Victorian Inst.* in which *G. miqueliana* was published. The eleven races of McGillivray & Makinson (1993) were delineated on the basis of eight leaf characters (leaf shape, texture, length, width, indumentum on the upper and lower surface, reticulum on the upper and lower surface) and three floral characters (external perianth indumentum, shape of limb and the thickness of the ultimate peduncles). McGillivray & Makinson commented on the variation in floral density, flower number and the shape and size of the perianth below the limb, but these were not assessed quantitatively. In addition, McGillivray & Makinson designated a further eight poorly collected entities which were unassignable to any of their eleven informal races.

Olde & Molyneux (1994) delimited a further two new species, *G. hockingsii* from southeastern Queensland and *G. mollis* from the Northern Tablelands of New South Wales. They commented that McGillivray & Makinson (1993) had submerged much diversity in a broadly circumscribed *G. victoriae*. The paper by Olde and Molyneux was significant in that it illustrated the importance of using diagnostic characters such as the number of flowers per raceme, perianth length, external perianth indumentum density, internal perianth beard length, limb shape, style length, style end angle, pollen-presenter angle, pollen-presenter shape and follicle size. While McGillivray & Makinson (1993) employed these characters in their monograph generally, they did not use them when

characterising the races within the *G. victoriae* species complex. Like Olde and Molyneux (1994), Hart and Henwood (1996) also found most of these characters to be valuable in their reassessment of the *G. buxifolia* species complex.

Olde and Marriott (1995) reinstated *G. miqueliana* in a broad sense as a distinct species. However, Makinson (1996) retained McGillivray & Makinson's informal scheme for the Victorian taxa, with *G. miqueliana* placed in synonymy under *G. victoriae*, pending clarification of the variation in this group.

Makinson (1997) delineated a further two species each with two subspecies. *Grevillea oxyantha* subsp. *oxyantha* (race 'a' of McGillivray & Makinson) occurs in the Australian Capital Territory and the southern tableland areas of New South Wales from near Pipers Lookout on the Snowy Mountains Highway, to Booromba Rocks in Namadgi National Park in the north. *Grevillea oxyantha* subsp. *ecarinata* (race 'b' of McGillivray & Makinson) occurs in New South Wales from Micalong Creek area near Wee Jasper south to near Tumut and Bago State Forest near Batlow. *Grevillea rhyolitica* subsp. *rhyolitica* ('unassigned specimen 7' of McGillivray & Makinson) and *G. rhyolitica* subsp. *semivestita* (race 'g' of McGillivray and Makinson) are both endemic to Deua National Park in the South Coast and Southern Tablelands regions of New South Wales.

To facilitate resolution of the complex, eight new taxa were named in Makinson (2000). Two of these taxa, *G. irrasa* Makinson subsp. *irrasa* (race 'l' of McGillivray & Makinson) and *G. irrasa* subsp. *didymochiton* were named by Makinson, the other six being named by the authors of this paper. These six taxa include: *G. brevifolia* F.Muell. ex Benth. subsp. *polychroma* Molyneux & Stajsic (Race 'f' *pro parte* of McGillivray & Makinson), *G. epicroca* Stajsic & Molyneux ('unassigned specimen 5' of McGillivray & Makinson), *G. miqueliana* F.Muell. subsp. *moroka* Molyneux & Stajsic (Race 'k' of McGillivray & Makinson), *G. monslacana* Molyneux & Stajsic (Race 'h' of McGillivray & Makinson), *G. parvula* Molyneux & Stajsic (Race 'f' *pro parte* of McGillivray & Makinson) and *G. victoriae* F.Muell. subsp. *nivalis* Stajsic & Molyneux (Race 'd' of McGillivray & Makinson). The present paper still only partially resolves the heterogeneity evident within the *G. victoriae* species complex. This will be the subject of ongoing studies, in particular the *G. oxyantha* species subcomplex (which is part of the *G. victoriae* species complex).

For a summary of the nomenclatural history of *G. brevifolia*, *G. miqueliana*, *G. parvula*, and *G. victoriae* see Table 1. A summary of McGillivray & Makinson's (1993) 'races' and 'unassigned specimens' and their current names/taxonomic placement is given in Table 4.

## Materials and Methods

Five hundred and twenty-five specimens from MEL and NSW herbaria were examined and measured, including spirit material held at MEL collected during fieldwork by one of us (Stajsic). Herbarium specimens were augmented with material collected in the field between 1996-2003. Where possible at least five plants per site were sampled. A total of 3-5 flowers and 10 leaves per herbarium specimen were measured. Measurements of floral characters are based both on rehydrated herbarium specimens and live material collected by the authors. Spirit-preserved specimens were not employed for morphometric measurements as they become inflated due to absorption of liquid, although they were used for qualitative data such as the shape of the pollen-presenter in cross-section. Supplementary observations and measurements were made from the cultivated collections propagated in the private garden of one of us (Molyneux), and the living collections held at the Royal Botanic Gardens Melbourne. Distribution maps were generated using ArcView computer program. Descriptive terminology follows McGillivray & Makinson (1993) and Makinson (2000), except as indicated below. Conservation codes are assigned according to both ROTAP (Briggs & Leigh 1996) and IUCN (2001) systems.

**Table 1.** A nomenclatural history of *G. brevifolia*, *G. miqueliana*, *G. parvula* and *G. victoriae*.

Stajsic & Molyneux (2005)	Makinson (2000), Molyneux & Stajsic in Makinson (2000)	Makinson (1996)	Olde & Marriott (1995)	McGillivray & Makinson (1993)
<i>G. brevifolia</i> F.Muell. ex Benth.	<i>G. brevifolia</i> F.Muell. ex Benth. subsp. <i>brevifolia</i>	<i>G. victoriae</i> F.Muell. 'race e' sensu McGillivray & Makinson (1993)	<i>G. victoriae</i> F.Muell. var. <i>brevifolia</i> (F.Muell. ex Benth.) F.Muell. ex Maiden & Betche	<i>G. victoriae</i> F.Muell. 'race e'
<i>G. miqueliana</i> F.Muell. subsp. <i>miqueliana</i>	<i>G. miqueliana</i> F.Muell. subsp. <i>miqueliana</i>	<i>G. victoriae</i> F.Muell. 'race j' sensu McGillivray & Makinson (1993)	<i>G. miqueliana</i> F.Muell.	'Typical form' <i>G. victoriae</i> F.Muell. 'race j'
<i>G. miqueliana</i> F.Muell. subsp. <i>cincta</i> (2005)	Not known at the time	Not known at the time	Not known at the time	Not known at the time
<i>G. miqueliana</i> F.Muell. subsp. <i>moroka</i> Molyneux & Stajsic in Makinson (2000)	<i>G. miqueliana</i> F.Muell. subsp. <i>moroka</i> Molyneux & Stajsic in Makinson (2000)	<i>G. victoriae</i> F.Muell. 'race k' sensu McGillivray & Makinson (1993)	<i>G. miqueliana</i> F.Muell. 'Mt Wellington form'	<i>G. victoriae</i> F.Muell. 'race k'
<i>G. parvula</i> Molyneux & Stajsic in Makinson (2000)	<i>G. parvula</i> Molyneux & Stajsic in Makinson (2000)	<i>G. victoriae</i> F.Muell. 'race f' <i>pro.parte.</i> sensu McGillivray & Makinson (1993)	<i>G. victoriae</i> F.Muell. var. <i>leptoneura</i> Benth. (1870)	<i>G. victoriae</i> F.Muell. 'race f' <i>pro.parte.</i>
<i>G. polychroma</i> (Molyneux & Stajsic) Molyneux & Stajsic comb. et stat. nov. (2005)	<i>G. brevifolia</i> F.Muell. ex Benth. subsp. <i>polychroma</i> Molyneux & Stajsic in Makinson (2000)	<i>G. victoriae</i> 'race f' <i>pro.part.</i> sensu McGillivray & Makinson (1993)	<i>G. victoriae</i> F.Muell. var. <i>leptoneura</i>	<i>G. victoriae</i> F.Muell. 'race f' <i>pro.parte.</i>
<i>G. victoriae</i> F.Muell. subsp. <i>victoriae</i>	<i>G. victoriae</i> F.Muell. subsp. <i>victoriae</i>	<i>G. victoriae</i> F.Muell. 'race c' sensu McGillivray & Makinson (1993) (= <i>G. victoriae</i> F.Muell. var. <i>victoriae pro. parte.</i> sensu Olde & Marriott (1995))	<i>G. victoriae</i> F.Muell. var. <i>victoriae pro. parte.</i>	<i>G. victoriae</i> F.Muell. 'race c'
<i>G. victoriae</i> F.Muell. subsp. <i>nivalis</i> Stajsic & Molyneux (2000)	<i>G. victoriae</i> F.Muell. subsp. <i>nivalis</i> Stajsic & Molyneux (2000)	Unknown in Victoria at the time	<i>G. victoriae</i> F.Muell. var. <i>victoriae pro. parte.</i>	<i>G. victoriae</i> F.Muell. 'race d'

<b>Makinson (1991)</b>	<b>Maiden &amp; Betche (1916)</b>	<b>Bentham (1870)</b>	<b>Mueller (1855)</b>
First report for NSW in Stajsic & Molyneux (2005)	<i>G. victoriae</i> F.Muell. var. <i>brevifolia</i> (F.Muell. ex Benth.) F.Muell. ex Maiden (application unclear)	<i>G. brevifolia</i> F.Muell. ex Benth. (1870)	<i>G. victoriae</i> F.Muell. (1855)
Does not occur in NSW	<i>G. miqueliana</i> F.Muell. (application unclear) <i>G. m.</i> subsp. <i>miqueliana</i> does not occur in NSW	<i>G. miqueliana</i> F.Muell.	<i>G. miqueliana</i> F.Muell. (1855)
Does not occur in NSW	Not known at the time & does not occur in NSW	Not known at the time	Not known at the time
Does not occur in NSW	Not known at the time & does not occur in NSW	No specimens attributable to <i>G. miqueliana</i> F.Muell. subsp. <i>moroka</i> Molyneux & Stajsic cited	No specimens attributable to <i>G. miqueliana</i> F.Muell. subsp. <i>moroka</i> Molyneux & Stajsic cited
<i>G. victoriae</i> F.Muell.	? under <i>G. victoriae</i> F.Muell. var. <i>brevifolia</i> (F.Muell. ex Benth.) Maiden & Betche	<i>G. victoriae</i> F.Muell. var. <i>leptoneura</i> Benth. (1870)	No specimens attributable to <i>G. parvula</i> cited in protologue
Does not occur in NSW	Not known at the time & does not occur in NSW	Not known at the time	Not known at the time
<i>G. victoriae</i> F.Muell. sens. lat.	Does not occur in NSW	<i>G. victoriae</i> F.Muell. var. <i>victoriae</i>	<i>G. victoriae</i> F.Muell.
<i>G. victoriae</i> F.Muell. sens. lat.	? under <i>G. victoriae</i> F.Muell. var. <i>brevifolia</i> (F.Muell. ex Benth.) Maiden & Betche	NSW specimens not cited	No specimens referable to <i>G. victoriae</i> subsp. <i>nivalis</i> Stajsic & Molyneux cited in protologue of <i>G. victoriae</i>

### Terminology for descriptions and keys

- **Colour of new growth** here refers to the very early current season new growth of leaves. Very young branchlets can also often be the same colour as the very young leaves.
- **Very early flower buds** refers to the very young buds, with neither the limb or the perianth below the limb fully developed. It refers to the stage after the caducous floral bracts have fallen away, but it does not refer to the advanced flower buds just prior to tepal separation.
- **Advanced flower buds** refers to the buds with a fully developed limb and perianth below the limb just prior to tepal separation stage.
- **Acropetal** as used here is equivalent to centripetal as used by McGillivray & Makinson (1993). We follow Makinson (2000) in using the term acropetal to describe a unit conflorescence in which the basal flowers open first and then higher flowers in ascending order.
- **Bichromatic** is here defined as dorsal tepals pinkish-red in the inner half of tepal length, i.e adjacent to where the lateral margins of the dorsal tepals meet each other, yellow in the outer half of tepal length i.e. adjacent to where the lateral margins of the dorsal tepals meet the ventral tepals, ventral tepals wholly yellow on inner surface.

### Indumentum terminology

- **Subtomentose** = bearing a dense, often untidy indumentum of both appressed and ascending hairs in  $\pm$  equal proportion (the term is here defined for clarification. Makinson (2000: 258) did use the term but it did not appear in the glossary.)
- **Branchlet angularity** is usually only detectable and persistent on current-year or previous year growth.
- **Leaf characters** are based on mature leaves sampled from midpoint of a branchlet. Note that taxa with glabrous leaf upper surfaces in the mature stage are often hairy when immature.
- **Conflorescence branching** is based upon averages obtained from all the measured specimens for each taxon, and does not necessarily reflect the percentages found in any one specimen.
- **Overall colour of the primary peduncle** and floral rachis depends on the density of the indumentum, the colour of the hairs and to what degree the epidermis is exposed. In species descriptions where the overall colour of the primary peduncle is described as being greenish-white, the greenish colour is attributable to the epidermis showing through the sparse indumentum, and not the colour of the hairs.
- **Perianth outer surface colour** is also largely influenced by the colour of the epidermis if the perianth indumentum is sparse.
- **Angle of the pollen-presenter** in relation to the style and the cross-sectional shape of the pollen-presenter usually require fresh or spirit-preserved material as it cannot usually be reliably determined from dry specimens.

### Taxonomy

The arrangement of taxa in this paper is alphabetical and does not reflect phylogeny.

### Key to Species

1. Leaf upper surface distinctly finely to granulose; branchlets subvillous; leaf lower surface loosely subvillous to villous.....2
- 1a. Leaf upper surface smooth (occasionally microscopically asperulous (40x magnification) in *G. miqueliana* subsp. *miqueliana* and *G. victoriae* subsp. *nivalis*), smooth to touch, never granulose), glabrous or variably pubescent; branchlets variably pubescent; leaf lower surface variably pubescent. ....6

2. Leaves oblong to obovate or narrowly so, or occasionally elliptic, leaf l:w ratio 5-10:1, lateral veins on leaf lower surface usually not evident; pistil 14–17 mm long. ....3
- 2a. Leaves ovate to narrowly-elliptical, elliptical or broadly so, ovate, obovate to occasionally broad-obovate or slightly obovate, leaf l:w ratio 1.5–4:1, lateral veins on leaf lower surface evident to prominent; pistil 18–24 mm long.....4
3. Leaves narrowly oblong or narrowly obovate, leaf l:w ratio 5:1–10:1; leaf lower surface with all hairs ± erect or suberect, not obviously two-layered. ....*G. irrasa* subsp. *irrasa*
- 3a. Leaves obovate to narrowly so or elliptical or oblong, leaf l:w ratio 5:1–7:1; leaf lower surface with erect or suberect hairs emergent from a denser layer of appressed hairs. ....*G. irrasa* subsp. *didymochiton*
4. Leaf upper surface consistently granulose; flower buds at all developmental stages wholly reddish-ferruginous; perianth outer surface below the limb densely subvillous, epidermis usually not visible or occasionally partially visible; tepal inner surface uniformly pinkish-red.....*G. callichlaena*
- 4a. Leaf upper surface smooth, microscopically asperulous (40x magnification), or granulose; flower buds at all developmental stages never reddish-ferruginous; perianth outer surface below the limb usually loosely subvillous, epidermis visible; tepal inner surface usually bichromatic. ....5
5. Leaves ovate to elliptical or occasionally obovate (occasionally narrowly so), (22–) 30–85 mm x 15–33 mm; leaf margins rolled downwards to shortly recurved; conflorescences simple or once-branched; floral rachis 22–36 (–42) mm long .....*G. miqueliana* subsp. *miqueliana*
- 5a. Leaves elliptical to occasionally ovate, (9–) 20–35 (–50) mm x (5–) 8–16 (–25) mm; leaf margins distinctly revolute; dull; conflorescences mostly simple; floral rachis (5–) 2–20 (–25) mm long. ....*G. miqueliana* subsp. *moroka*
6. Perianth (below the limb) wholly green or green in lower half and red in the upper half (as is the limb) in both the outer and inner surfaces. ....7
- 6a. Perianth (below the limb) usually pink or pinkish-red (seldom cream, yellow or orange, but never green or half-green).....8
7. Perianth pale-green; stigma prominent, 0.6–0.8 mm long. ....*G. cyranostigma*
- 7a. Perianth mid-green in the lower half, orange-pink to bright-red in the upper half (limb included); stigma < 0.5 mm long. ....*G. linsmithii*
8. Leaf upper surface with a tangible velvety indumentum.....*G. mollis*
- 8a. Leaf upper surface glabrous or with sparse appressed hairs, the hairs rarely ascending, never velvety.....9
9. Floral rachis and perianth outer surface below the limb all with both biramous non-glandular hairs and simple, erect glandular hairs (the latter sometimes few and inconspicuous). ....*G. rhyolitica* subsp. *rhyolitica*
- 9a. Floral rachis and perianth outer surface below the limb with biramous non-glandular hairs only (seldom the base of perianth outer surface with occasional microscopic erect glandular hairs in *G. epicroca* and *G. parvula*). ....10
10. Conflorescence predominantly axillary or cauline, rarely terminal, unit conflorescence 2–10 flowered; floral rachis 2–8 mm long. ....*G. hockingsii*
- 10a. Conflorescence usually terminal, or terminal and axillary, never predominantly axillary or seldom cauline, unit conflorescence with > 10 flowered; floral rachis (5–) 10–50 mm long. ....11

11. Branchlets densely subvillous, densely tomentose or subtomentose; leaf lower surface indumentum various; pollen-presenter lateral or oblique to style, flat, convex or concave in cross-section.....12
- 11a. Branchlets densely to sericeous or subsericeous; leaf lower surface indumentum usually sericeous; pollen-presenter oblique to style, flat or slightly convex in cross-section. ....18
12. Pollen-presenter lateral to style end; face of pollen-presenter usually strongly concave (rarely flattened) in cross-section, base concurrent with the style. ...13
- 12a. Pollen-presenter strongly oblique to style-end; face of pollen-presenter convex in cross-section, base not concurrent with the style.....14
13. Branchlets usually tomentose or occasionally subvillous, young branchlets usually apricot-coloured; colour of new growth ferruginous, leaf upper surface consistently glossy; colour of very early flower buds wholly apricot-coloured; perianth-limb obtuse or subacute, slightly to moderately keeled. ....*G. bamboka*
- 13a. Branchlets consistently densely subvillous, young branchlets usually purplish-pink or pink; colour of new growth purplish-pink or pink (seldom green); leaf upper surface usually dull (seldom glossy); colour of very early flower buds wholly reddish-purple perianth-limb not keeled (seldom obscurely keeled). .....*G. parvula*
14. Leaf lower surface densely subsericeous or occasionally densely subtomentose (epidermis not visible); the inner surface of the recurved portion of the perianth below the limb in open flower usually monochromatic. ....*G. victoriae* subsp. *ivalis*
- 14a. Leaf lower surface loosely sericeous or with scattered mutually aligned appressed hairs (epidermis usually clearly visible), or loosely to moderately subtomentose (epidermis visible), or loosely subvillous (epidermis visible); the inner surface of the recurved portion of the perianth below the limb in an open flower usually monochromatic or bichromatic. ....15
15. Leaf l:w ratio (3.6:1–) 4.0– 6.0:1 (-8.0:1); floral bracts 1.0–1.5 (–2) mm long; the inner surface of the recurved portion of the perianth below the limb of an open flower monochromatic, the outer surface of ventral tepals uniformly coloured, without a central blotch. ....*G. monslacana*
- 15a. Leaf l:w ratio 1.5–4.0:1; floral bracts 2.0– 4.2 mm long; the inner surface of the recurved portion of the perianth below the limb in an open flower usually bichromatic, outer surface usually with a central blotch and usually red or pinkish-red towards base and apex of the perianth. ....16
16. Branchlets densely subtomentose or subvillous; leaf lower surface subsericeous with predominantly mutually aligned, appressed hairs with scattered ascending hairs, or occasionally subtomentose with a lower layer of predominantly mutually aligned, appressed hairs with an overlayer of scattered ascending and suberect hairs or slightly ascending hairs.....*G. miqueliana* subsp. *cincta*
- 16a. Branchlets densely subvillous; leaf lower surface villous, the hairs erect or suberect hairs. ....17
17. Leaves ovate to elliptical or occasionally obovate (occasionally narrowly so), (22–) 30–85 mm x 15–33 mm; leaf margins rolled downwards to shortly recurved; conflorescences typically simple or once-branched; floral rachis 22–36 (–42) mm long.....*G. miqueliana* subsp. *miqueliana*
- 17a. Leaves elliptical to occasionally ovate, (9–) 20–35 (–50) mm x (5–) 8–16 (–25) mm; leaf margins distinctly revolute; conflorescences typically simple; floral rachis (5–) 12–20 (–25) mm long. .... *G. miqueliana* subsp. *moroka*

18. Peduncle, floral rachis, pedicel and perianth outer surface with both biramous non-glandular hairs and simple erect minute glandular hairs. ....  
.....**G. rhyolitica** subsp. **semivestita**
- 18a. Peduncle, floral rachis, pedicel and perianth outer surface with biramous non-glandular hairs only (seldom with microscopic simple erect hairs at base of perianth in *G. epicroca* and *G. parvula*). ....19
19. Pistil 10–11 mm long. ....**G. diminuta**
- 19a. Pistil (16–) 18–25 mm long. ....20
20. Very early flower buds with a purplish-pink, lilac or pale-pink perianth below the limb, limb pale-brown or dirty greyish-brown; the inner surface of the recurved portion of the perianth below the limb in an open flower usually bichromatic. ....**G. miqueliana** subsp. **cincta**
- 20a. Very early flower buds wholly ferruginous or perianth below the limb occasionally reddish or limb occasionally tan-coloured; the inner surface of the recurved portion of the perianth below the limb in an open flower monochromatic, the outer surface of ventral tepals uniformly coloured, without a central blotch. ....21
21. Pollen-presenter lateral to style; face of pollen-presenter strongly concave in cross-section (seldom lower margins incurved giving appearance of being slightly concave in cross-section as in some plants of the Mt Elizabeth population of *G. polychroma*). ....22
- 21a. Pollen-presenter oblique to style; face of pollen-presenter flat or convex in cross-section. ....24
22. Branchlets strongly angular in cross-section (tending to become subangular or subterete away from branchlet apices), loosely sericeous or with scattered mutually aligned, appressed, silvery-white hairs; leaf lower surface loosely sericeous or with scattered mutually aligned, appressed hairs, epidermis clearly visible. ....**G. epicroca**
- 22a. Branchlets terete, subterete, biconvex (or seldom subangular in *G. polychroma*), densely sericeous or subsericeous, epidermis not visible; leaf lower surface densely sericeous or subsericeous, epidermis not visible. ....23
23. Branchlets densely tomentose or subvillous; leaf lower surface subsericeous to subtomentose, lateral veins evident to conspicuous; perianth-limb obtuse or subacute, slightly to moderately midline-keeled, face of pollen-presenter concave in cross-section, perianth below the limb red or pinkish-red. ....**G. bamboka**
- 23a. Branchlets densely subsericeous or occasionally subtomentose; leaf lower surface sericeous or subsericeous, lateral veins obscure to evident; perianth-limb obtuse and not keeled; face of pollen-presenter flat (seldom lower margins incurved giving appearance of being slightly concave in cross-section as in some plants of the Mt Elizabeth population of *G. polychroma*); perianth below the limb creamish, pale-yellow, pink, pinkish-red or red. ....**G. polychroma**
24. Perianth-limb acute to strongly acute. ....25
- 24a. Perianth-limb obtuse (or if seldom subacute as in the Merryangaah Peak population of *G. brevifolia* then leaves < 50 mm long and < 20 mm wide). ...26
25. Perianth-limb strongly midline-keeled on outer surface; leaf lower surface densely tomentose to subtomentose (rarely almost subsericeous) with short tightly curled to wavy hairs; floral rachises 8–13 mm long. ....**G. oxyantha** subsp. **oxyantha**
- 25a. Perianth-limb slightly to moderately midline-keeled on outer surface; leaf lower surface densely subsericeous to subtomentose with mutually aligned appressed and slightly ascending straight hairs; floral rachises (12–) 20–45 mm long. ....  
.....**G. oxyantha** subsp. **ecarinata**

26. Leaves (8–) 21–38 (–49) mm x 6–16 (–20) mm wide; leaf l:w ratio 2:1; floral rachis (7–) 15–20 (–35) mm long; unit conflorescence with (14–) 20–22 (–30) flowers. .... *G. brevifolia*
- 26a. Leaves (20–) 35–120 (–200) mm x (7–) 10–35 (–50) mm wide, leaf l:w ratio 2:1– 5:1 (–6:1); floral rachis (8–) 17–66 (–87) mm long; unit conflorescence with (16–) 22–48 (– 68) flowers. ....27
27. Leaves usually narrowly elliptical to lanceolate (rarely oblanceolate), (30–) 40–120 mm long, (8–) 10–25 (–50) mm wide, l:w ratio (3:1–) 4:1–5:1 (–6:1); leaf margins shortly recurved; leaf upper surface not microscopically asperulous, usually dull; leaf lower surface usually densely sericeous or occasionally subsericeous, usually ‘tidy’ with mutually-aligned, appressed hairs (only with the occasional ascending or suberect ferruginous hairs; leaf lower surface reticulum absent or obscure; floral rachises (17–) 40–90 mm long. .... *G. victoriae* subsp. *victoriae*
- 27a. Leaves usually elliptic to narrowly-elliptical or rarely ovate, (20–) 35–100 (–135) mm long, (7–) 15–37 mm wide, l:w ratio 2.25:1–4:1 (–5:1); leaf margins flat or very shortly recurved (occasionally rolled or revolute); leaf upper surface glabrous/smooth or occasionally microscopically asperulous (smooth to touch), semi-glossy; leaf lower surface very densely subsericeous, or subtomentose, slightly ‘messy’; leaf lower surface reticulum usually conspicuous or prominent; floral rachises (8–) 10–50 (–60) mm long. .... *G. victoriae* subsp. *nivalis*

*Grevillea bemboka* Stajsic & Molyneux, *sp. nov.*

A *G. parvula* Stajsic & Molyneux ramulis plerumque tomentosis (interdum subvillosis), ramulis junioribus saepe armeniaticis, surculis novis ferrugineis (raro viridibus), lamina supra nitenti, alabastris junioribus omnino armeniaticis, limbo perianthii obtuso vel subacuto, segmentis limbi extra leviter vel moderate costatis differt.

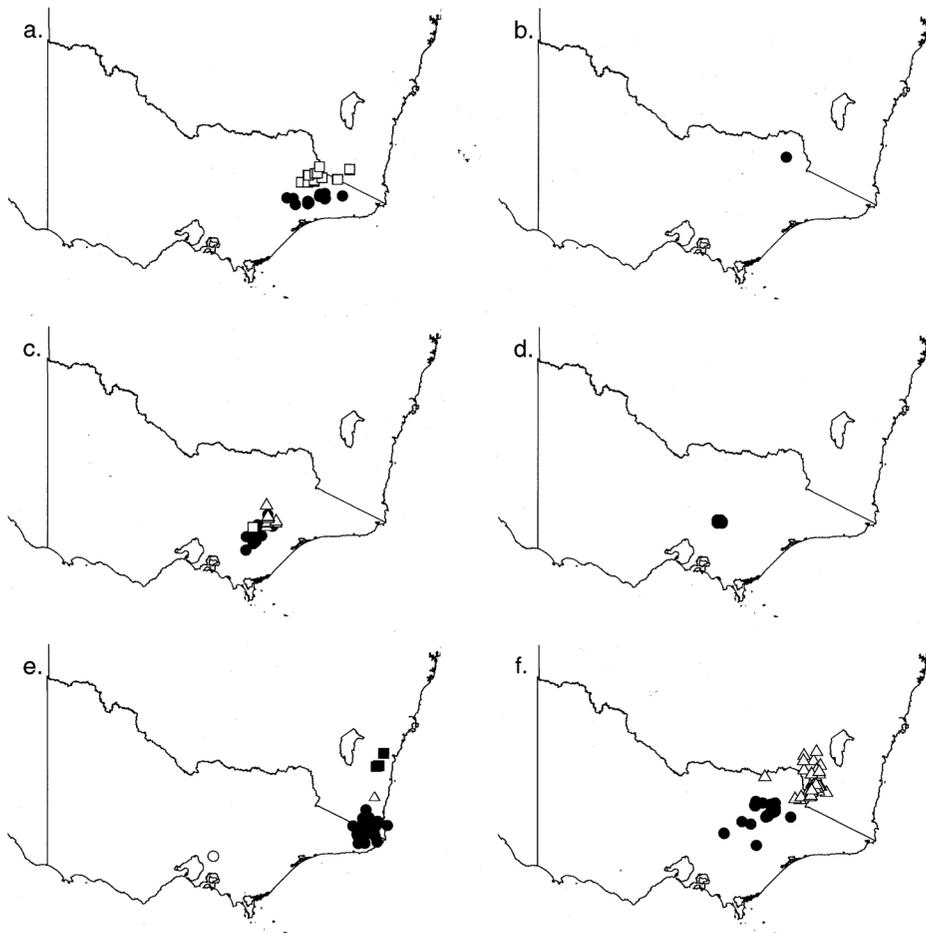
*Type:* New South Wales, South Coast, Bemboka State Forest, 2.6 km at 80 degrees from Bemboka Peak, 26 March 1992, I.R. Telford 11565 & I. Crawford (holo: MEL 1617093!; iso: AD *n.v.*, CANB *n.v.*, BRI *n.v.*, NSW!, BISH *n.v.*).

Spreading to erect *shrub* to 4 m high, to 7 m across, plants from mesic sites more open and straggly than those from more exposed cliff-top sites. *Branchlets* terete to subterete or biconvex in cross-section, with several longitudinal ridges; densely tomentose or occasionally densely subvillosus, of biramous non-glandular hairs, epidermis not visible, with a lower layer of predominantly mutually aligned, ascending and appressed, predominantly straight hairs with scattered  $\pm$  slightly wavy hairs, off-white and tan-coloured, with scattered ferruginous hairs, with an overlayer of predominantly irregularly aligned, ascending, suberect and erect, predominantly straight hairs with scattered  $\pm$  slightly wavy, off-white, tan-coloured and ferruginous hairs. *Colour of new growth* ferruginous or apricot-coloured soon becoming green, young branchlets often remaining pale apricot-coloured. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, ovate to elliptical to occasionally obovate, (17–) 35–60 (–85) mm long, (8.5–) 10–20 (–25) mm wide, apex usually acute with a short blunt mucro or obtuse, *margins* rolled; leaf length to width ratio (2.35:1–) 3.0:1–5.0:1; *leaf upper surface* minutely foveolate, glabrous except for mutually aligned, appressed, biramous non-glandular, silvery-white hairs just above petiole, with occasional irregularly aligned tan-coloured or ferruginous overlying hairs, distinctly glossy, mid-green; *lateral veins* obscure to occasionally evident, *reticulum* absent; *leaf lower surface* densely subsericeous or subtomentose, of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed, straight with occasional  $\pm$  slightly wavy hairs, and an overlayer of irregularly aligned, ascending, suberect hairs, off-white or silvery-white, with occasional tan-coloured and ferruginous hairs, predominantly appressed, or scattered irregularly aligned, appressed and ascending hairs, *lateral veins*

evident to occasionally conspicuous, *reticulum* absent; thin-textured (mesic sites) to relatively thick leathery-textured (xeric sites). *Conflorescence* terminal or axillary, decurved to pendulous, pedunculate, simple to twice-branched, simple 81%, once-branched 17%, twice-branched 2%; *unit conflorescence* cylindrical or a dome shaped cluster, acropetal; number of flowers 16–28 per unit conflorescence; *primary peduncles* (0–) 5–20 (–40) mm long, 1.0–1.4 mm wide, indumentum (as in rachises) moderately densely subsericeous or tomentose of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, straight with occasional  $\pm$  slightly wavy hairs, appressed, off-white or silvery-white, with scattered irregularly aligned, appressed, straight or occasionally  $\pm$  slightly wavy hairs, ascending and occasionally suberect tan-coloured and ferruginous hairs, overall colour (as in rachises) whitish or greenish-white; *floral rachises* 10–31 mm long; *floral bracts* narrowly-triangular, crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.0–1.2 mm long, 0.2–0.3 mm wide, outer surface densely subsericeous or subtomentose of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, predominantly straight, appressed, tan-coloured or ferruginous, with scattered slightly ascending hairs, the inner surface glabrous except in the upper 1/3–1/4, greenish-white, bracts persistent until buds 1.2 mm long; *pedicels* 3–5.5 mm long; *torus* oblique at 20–30°, squarish in plane-view with rounded angles; *very early flower buds* wholly apricot-coloured, perianth below the limb maturing to red or reddish-pink, limb maturing to apricot-coloured, brownish-grey or light-ferruginous; *advanced buds* acroscopic, maturing to  $\pm$  acroscopic to variably retrorse; *perianth below the limb* squarish with rounded angles in cross-section; *perianth outer surface below the limb* moderately densely subsericeous or subtomentose, of biramous non-glandular hairs, epidermis visible, the hairs predominantly mutually aligned, straight with scattered  $\pm$  slightly wavy hairs, appressed with scattered, slightly ascending hairs, predominantly tan-coloured and ferruginous with scattered off-white or silvery-white hairs, epidermis red or reddish-pink, overall perianth colour red; *perianth inner surface epidermis below the limb* minutely papillate below beard, glabrous except for beard, red or reddish-pink; *perianth-limb* subglobose in side-view, squarish face-on, obtuse or subacute, limb-segments slightly to moderately midline-keeled on outer surface, densely subsericeous or subtomentose, of biramous non-glandular hairs, epidermis not visible the hairs predominantly mutually aligned, appressed, straight with occasional  $\pm$  slightly wavy hairs, predominantly tan-coloured and ferruginous, with or without off-white and dark reddish-ferruginous, scattered slightly ascending hairs, epidermis red or reddish-pink; *dorsal tepal beard* commencing 1.5–2.3 mm above toral rim, extending for 5.7–6.5 mm, hairs 1.2–1.3 mm long; *ventral tepal beard* commencing 4.5–6.5 mm above toral rim, extending for 2.2–3.5 mm, hairs 1.2 mm long; *dorsal tepals* 19–21 mm long, 1.7–2.3 mm wide; *nectary* half-annular, projecting 0.3–0.5 mm above toral rim, margins entire, pale-yellow; *pistil* (16.2–) 18–20.5 mm long; *stipe* 1.0–3.0 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth before release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs in the upper 1/4–1/5 of style length, particularly at back of style-end, red or reddish-pink; *pollen-presenter* lateral to style, 2.8–3.2 mm long, 2.3–2.5 mm wide; *face of pollen-presenter* concave in cross-section, base concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, (17–) 20–23 mm long, 5–7 mm deep, wall 0.5–0.7 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1e.)

*Representative specimens examined:* **NEW SOUTH WALES.** South Coast: Bemboka State Forest, Bemboka Peak Fire Trail, ca. 12 km by car from Ryans crossing of the Snowy Mountains Highway, knob at 80° to and 2.75 km ENE from Bemboka Peak, ca. 9.8 km from Bemboka at 50°, 21. viii. 1999, W.M. Molyneux s.n. & J. Knight (MEL 2115771, MEL 2115772, Spirit: MEL 2115773, Seedling: MEL 2115775); South East Forests National Park, Bemboka Section, low cliff

at mouth of north-running gully at confluence with Desert Creek, 900 m SW of Mistake Fire Trail ford, 1. vi. 2001, *J. Miles s.n.* (MEL 2121514); South East Forests National Park, Bemboka Section, point of cliff (where it turns from S to E-facing), 1 km SE of Bemboka Peak/Mistake Fire Trails, junction (ca. 9 km NE of town of Bemboka), 24. ix. 2001, *J. Miles s.n.* (MEL 2121516, NSW); South East Forests National Park, Bemboka Section, lower N-facing bank of Desert Creek, ca. 1.1 km NE of junction of Bemboka Peak and Mistake Fire Trails (ca. 9 km NE of Bemboka), 24. ix. 2001, *J. Miles s.n.* (AD, CANB, MEL 2116949, NSW; MEL 2116950); South East Forests National Park, Bemboka Section, a bit below cliff base, down steep S-facing soil slope to bank of Desert Creek, ca. 1.1 km SE of Bemboka Peak/Mistake Fire Trail junction, 24. ix. 2001, *J. Miles s.n.* (AD, CANB, MEL 2121517, 2121818, 2121519, 2121520, NSW); South East Forests National Park, Bemboka Section, N of tight bend in Desert Creek ca. 1.5 km SE of junction of Bemboka Peak and Mistake Fire Trails, 3. x. 2001, *J. Miles s.n.* (AD, CANB, NSW; MEL 2123241, 2123242); South East Forests National Park, Bemboka Section, Bemboka Peak Fire Trail, ca. 12 km by car from Ryans crossing of the Snowy Mountains Highway, knob at 80° to and 2.75 km ENE from Bemboka Peak, ca. 9.8 km from Bemboka at 50°, 29. ix. 2002, *V. Stajsic 3030, J. Miles, R.G. Coveny & A.E. Orme* (MEL 2240005, 2240006); South East Forests National Park, Bemboka



**Figure 1.** Geographic distribution of a.) *Grevillea brevifolia* (□), *G. polychroma* (●); b.) *G. callichlaena*; c.) *G. miqueliana* (● ssp. *miqueliana*; □ ssp. *cincta*; Δ ssp. *moroka*); d.) *G. monslacana*; e.) *G. parvula* (●; ○ naturalised), *G. bemboka* (Δ), and *G. epicroca* (■); f.) *G. victoriae* (● ssp. *victoriae*; Δ ssp. *nivalis*).

Section, in a north flowing tributary of Desert Creek, ca. 1.5 km SE of junction of Bemboka Peak and Mistake Fire Trails, 29. ix. 2002, *V. Stajsic* 3031-3033, *J. Miles, R.G. Coveny & A.E. Orme* (AD, CANB, MEL 2240007, 2240008, 2240009, NSW); South East Forests National Park, Bemboka Section, ca. 1.1 km NE of junction of Bemboka Peak and Mistake Fire Trails, *V. Stajsic* 3034, *J. Miles, R.G. Coveny & A.E. Orme* (CANB, MEL 2240112, NSW); South East Forests National Park, Bemboka Section, down steep S-facing slope to bank of Desert Creek, ca. 1.1 km SE of Bemboka Peak/Mistake Fire Trail junction, *V. Stajsic* 3040 & *J. Miles* (CANB, MEL 2240114, NSW)

*Phenology*: Flowering has been recorded between August and March, but can occur sporadically throughout the year. Nectarivorous birds, in particular honeyeaters of various species visit the flowers and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status*: *Grevillea bemboka* is endemic to New South Wales, where it is currently known from four to six sites within the Bemboka section of the South East Forests National Park, in the Southern Tablelands of New South Wales, in the vicinity of Desert Creek and the Bemboka Peak Fire Trail. At the type-site there are approximately 30 mature plants, with only occasional seedlings seen (*Stajsic* pers. observ. 2002). The largest population (steep S-facing of Desert Creek, ca. 1.1 km SE of Bemboka Peak/Mistake Fire Trail junction) consisting of between 100–200 plants. The total known number of mature plants between the known (and vouchered) sites is within the range of 150–250. However, it appears to be scattered along Desert Creek, from near the type-site to where Desert Creek enters cleared land, a distance of approximately 7 km in a straight-line (*J. Miles* pers. comm. 2001). A conservation status of Endangered (2ECi *sensu* Briggs & Leigh 1996) or Endangered (EN *sensu* IUCN 2001) is suggested.

*Habitat and Ecology*: On the Bemboka Peak Fire Trail it grows on a conglomerate knob with *Eucalyptus agglomerata*, *E. elata*, *E. sieberi* and *E. spectatrix*. At one exposed cliff-top site above Desert Creek it grows among *Eucalyptus wilcoxii*. At more mesic sites it grows in *Eucalyptus cypellocarpa* and *E. muelleriana* dominated forest, associated with *Angophora floribunda* and *Elaeocarpus reticulatus*.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that a part of one of the populations also occurs along a four-wheel drive track, care must be taken not to eliminate these plants through road works.

*Etymology*: The epithet is derived from the place name Bemboka and the prominence Mount Bemboka in reference to the occurrence of this species in the Bemboka section of the South East Forests National Park, in the South Coast region of New South Wales. The name Bemboka is a corruption of the Aboriginal nation term 'bumbooke', which means 'moon rising in the sky'.

*Notes*: *Grevillea bemboka* is a somewhat difficult species to characterise due to the variability of some morphological characters. We feel that it cannot be accommodated comfortably into any closely related species without destabilising the concept of the other species.

In Makinson (2000) it was commented that the 'Bemboka population' either constituted a distinct taxon allied to *G. parvula* or an intergrade between it and *G. oxyantha*. Subsequent to Makinson (2000), Jackie Miles from Brogo discovered several new populations in the Bemboka section of South East Forests National Park, which have greatly aided the resolution of this entity. Detailed fieldwork and assessment of all the known populations has confirmed the distinctness of this taxon as a species with close affinities with *G. parvula* as well as *G. polychroma*. Similarity between *G. bemboka* and

*G. oxyantha* could not be seen except perhaps in the fact that some populations have a subacute, slightly to moderately midline-keeled perianth-limb, although other populations of *G. bemboka* have an obtuse perianth-limb. It is worth noting that other taxa outside the *G. oxyantha* group may also have a subacute perianth-limb such as the Merryangaah Peak (in New South Wales) population of *G. brevifolia* (see also notes for *G. brevifolia*).

*G. bemboka* differs from *G. parvula* in the colour of the young branchlets which are often apricot-coloured, the new growth being ferruginous not pink or purplish-pink (seldom green) as in *G. parvula*. The branchlet indumentum in *G. bemboka* is usually tomentose but in the type population it is subvillous as in *G. parvula* (occasional specimens from Mt Wog Wog tomentose). The leaf upper surfaces in *G. bemboka* are consistently glossy, whereas in *G. parvula* they are usually dull. The very early flower buds in *G. bemboka* are wholly apricot-coloured, whereas in *G. parvula* they are reddish-purple. The perianth-limb is either obtuse or subacute in *G. bemboka* and the limb segments are slightly to moderately midline-keeled on the outer surface. *Grevillea parvula* has a subglobose perianth-limb and the limb-segments are not midline-keeled. Both *G. bemboka* and *G. parvula* have a lateral pollen-presenter, the face of the pollen-presenter is distinctly concave in cross-section and the base concurrent with the style.

*Grevillea bemboka* is also similar to *G. polychroma*. The branchlets in *G. polychroma* are usually subsericeous or subtomentose, never subvillous. The leaf lower surface in *G. polychroma* is usually sericeous occasionally subsericeous compared with the usually subsericeous or tomentose indumentum in *G. bemboka*. The lateral veins in *G. polychroma* are either obscure or evident, compared with the usually evident to conspicuous lateral veins in *G. bemboka*. The primary peduncles of *G. polychroma* are 0.8–1 mm wide, compared with 1.0–1.4 mm wide in *G. bemboka*. In *G. polychroma* the perianth-limb is always obtuse and not keeled, the face of the pollen-presenter is flat (seldom lower margins incurved giving appearance of being slightly concave in cross-section as in some plants of the Mt Elizabeth population) and perianth outer surface below the limb is creamish, pale- yellow, pink, pinkish-red or red. In *G. bemboka* the perianth-limb is either obtuse or subacute and slightly to moderately midline-keeled, and the face of the pollen-presenter is usually distinctly concave in cross-section, never flat. The perianth outer surface below the limb in *G. polychroma* varies from red, pink, orange, yellow or cream, sometimes several colour forms are present in the same population.

*G. bemboka* is also somewhat similar to *G. epicroca* which has strongly angular or subangular branchlets in cross-section, which are sericeous or loosely sericeous or with scattered mutually aligned, appressed, short, silvery-white hairs. The leaf lower surface is also loosely sericeous or with scattered, mutually aligned appressed, short, silvery-white hairs. The new growth in *G. epicroca* is usually salmon-pink not ferruginous as in *G. bemboka*. The perianth-limb is obtuse in side-view never subacute as sometimes in *G. bemboka*.

A number of collections (*Olsen* s.n. NSW 128904; *Crisp* 2389, *D.J. Cummings* & *A. Tyrrel* NSW 452938; *D.J. Cummings* 41, *M.D. Crisp* & *A. Tyrrel* NSW 450183; *D.J. Cummings* 42, *M.D. Crisp* & *A. Tyrrel* NSW 450181) east of Big Badja at the southern extension of the Minuma Range in the Southern Tablelands escarpment of New South Wales appear to be similar to *G. bemboka*. These collections are congruent with the 'unassigned specimen 4' of *McGillivray* & *Makinson* (1993). These collections share some points of similarity between *G. bemboka*, *G. parvula* and *G. epicroca*. The specimens have obovate or narrow-obovate leaves, 25–65 mm long x 8–20 mm wide, the leaf upper surface venation is obscure or evident, the leaf lower surface is subsericeous, the perianth-limb obtuse and slightly keeled. The remoteness and difficulty of access to these populations precluded us seeing these populations in the field. Additional collections and fieldwork is required to ascertain the taxonomic status of these populations and their relationship with closely related species. As such, these populations are treated here as unassignable to any of the known taxa in the *G. victoriae* species complex.

***Grevillea brevifolia*** F.Muell. ex Benth., *Fl. Austral.* 5: 423, 467 (1870).

*Type*: (whole sheet): [Victoria], Mount Tambo at an elevation of 5000 ft., *s.d.*, *Dr. ferd. Mueller* (holo: K–Neg.No.Kew 2282!); iso: Mount Tambo 5000', *s.d.*, [*F. Mueller*] (MEL 75156!); iso: Mount Tambo. 5000', *s.d.*, *Dr. ferd. Mueller* (MEL 75157!); probable iso: Mount Tambo 5000', *s.d.*, [*F. Mueller*] (NSW 93318!).

*G. victoriae* F. Muell. var. *brevifolia* (F. Muell. ex Benth.) F. Muell. ex Maiden & Betche, *Census New South Wales Pl.*: 60 (1916).

*G. victoriae* F.Muell. 'race e', 'unassigned 3' and 'unassigned 6', of D.J. McGillivray & R.O. Makinson, *Grevillea*:321 (1993).

*G. victoriae* F.Muell. var. *brevifolia* (F.Muell. ex Benth.) F.Muell. ex Maiden & Betche, of P.M. Olde & N.R. Marriott (1995), *The Grevillea Book* 3: 224.

*G. victoriae* F.Muell. 'race e', of R.O. Makinson, *Flora of Victoria* 3: 852 (1996).

*G. brevifolia* F.Muell. ex Benth. subsp. *brevifolia*, of Molyneux & Stajsic in Makinson (2000).

A low dense spreading to erect open *shrub*, 0.5–2.5 m high, 2–3.5 m across. *Branchlets* terete or subterete in cross-section, with several longitudinal ridges, moderately densely subsericeous or subtomentose, of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually-aligned, appressed and slightly ascending, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white with scattered, irregularly aligned, slightly ascending silvery white hairs and/or with scattered irregularly aligned appressed ferruginous hairs which often overlie the silvery-white hairs. *Colour of new growth* ferruginous, soon becoming green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, elliptical, narrowly-elliptical, ovate or obovate, (8–) 21–38 (–49.5) mm long, 6–16 (–20) mm wide, apex acute or obtuse with a short blunt mucro, *margins* tightly and shortly recurved; *leaf length to width ratio* (1.92:1–) 2.0–2.5:1 (–3.2:1); *leaf upper surface* glabrous or with scattered mutually-aligned, appressed and ascending biramous non-glandular hairs just above petiole, minutely foveolate, glossy, mid-green; *lateral veins* obscure to evident, reticulum absent; *leaf lower surface* densely sericeous or subsericeous, of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight with occasional  $\pm$  slightly wavy hairs, silvery-white with occasional irregularly aligned appressed and slightly ascending hairs, with or without irregularly aligned appressed ferruginous hairs; *lateral veins* obscure to evident, *reticulum* absent; leathery-textured. *Conflorescences* terminal, less often axillary, decurved, pedunculate, simple to twice branched, simple 77%, once-branched 21%, twice-branched 2%, *unit conflorescence* a shortly conico-cylindrical cluster, acropetal; number of flowers (14–) 20–22 (–30) per unit conflorescence; *primary peduncles* (0–) 3–7 (–11) mm long, (1.0–) 1.2–1.4 (–1.8) mm wide, indumentum (as in rachises) densely sericeous or densely subsericeous, of biramous non-glandular hairs, epidermis visible, the hairs predominantly mutually aligned, appressed, predominantly straight or with occasional  $\pm$  slightly wavy hairs, silvery-white or off-white, with or without scattered irregularly aligned, ascending and often overlying ferruginous hairs, *overall colour* (as in rachises) off-white or greenish-white; *floral rachises* (7–) 15–20 (–35) mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.3–1.7 (–2.0) mm long, 0.3–0.5 mm wide, outer surface densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight, predominantly ferruginous with occasional tan-coloured hairs, with scattered irregularly aligned, slightly ascending hairs, inner surface glabrous, brownish-black, bracts persistent until buds 1.5–1.7 mm long; *pedicels* 3–4.7 mm long; *torus* oblique to pedicel at 15–45°, squarish in plane-view with rounded angles; *very early flower buds* wholly ferruginous, perianth below the limb maturing to red, limb maturing to ferruginous; *advanced buds (pre-anthesis)* acroscopic, maturing to  $\pm$  acroscopic to variably retrorse; *perianth outer surface below the limb* moderately densely

subtomentose or tomentose, of biramous non-glandular hairs, epidermis visible, the hairs predominantly mutually aligned, appressed and slightly ascending or predominantly ascending, straight and  $\pm$  slightly wavy, ferruginous and tan-coloured, mixed with scattered irregularly aligned and ascending hairs, epidermis red, overall perianth colour red or red-ferruginous; *perianth inner surface epidermis below the limb* minutely papillate below beard, papillae particularly conspicuous along tepal margins where they are often larger and form minute simple hairs, glabrous except for beard, red or reddish-pink; *perianth-limb* subglobose in side-view, squarish with rounded angles face-on, obtuse (or seldom subacute as in plants in the Merryangaah Peak population), limb-segments not keeled or obscurely midline-keeled on outer surface, densely sericeous or subsericeous, of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned with scattered irregularly aligned, appressed or slightly ascending hairs, appressed, predominantly straight with occasional  $\pm$  slightly wavy hairs, ferruginous to red; *perianth below the limb* squarish with rounded angles in cross-section; *dorsal tepal beard* commencing 1.5–2.3 mm above toral rim, beard extending for 4.5–6 mm, hairs 1.2–1.5 mm long; *ventral tepal beard* commencing 3.2–6 mm above toral rim, beard extending for 2–3.5 mm, hairs 1–1.5 mm long; *dorsal tepals* 17.5–22 mm long, 1.7–2.2 mm wide; *nectary* half-annular, entire or tridentate, projecting 0.3–0.5 mm above toral rim, pale-yellow; *pistil* 18–22 (–24) mm long; *stipe* (1.8–) 2 (–3) mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture prior to release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs predominantly in the upper 1/2 to 1/4 of style (occasionally in the upper 3/4 of style length) length, particularly at back of style-end, red or reddish-pink; *pollen-presenter* oblique to style, 2.5–3.5 mm long, 1.7–2.8 mm wide; *face of pollen-presenter* flat or convex in cross-section, base not concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, 18 mm long, 6–8 mm deep, wall 0.5–0.9 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1a.)

*Representative specimens examined:* **NEW SOUTH WALES.** South Coast: Mearangaah [Merryangaah], viii. 1949, A.B. Costin s.n. (NSW 93308); on ridge 0.5 km W of Merriangaah [Merryangaah] Peak, 8. ix. 1981, S.J. Forbes 606 (MEL 603586). **VICTORIA.** East Gippsland: Mt Tingiringi [Tingaringy], s.d., W. Bauerlen s.n. (NSW 93310); Tinkirinki Mountain [Mount Tingiringy], v. 1887, W. Bauerlen [Bauerlen] 529 (MEL); Mt. Tingiringi [Tingaringy], viii. 1949, A.B. Costin s.n. (NSW 93311); summit of Tingiringi [Tingaringy], 0.5 ml W of geodetic borderline with N.S.W., 30. xi. 1962, J.H. Willis s.n. & K.C. Rogers (MEL 75142); Wombargo Range, 8 mls NNW of Black Mountain Station, Wulgulmerang, 4. xii. 1962, J.H. Willis s.n. (MEL 75143); Mount Tingaringy summit, 15. ix. 1979, N.G. Walsh 295 (MEL 595483); Mount Tingaringy summit, 17. ix. 1979, H. Van Rees 051 (MEL 559189); Alpine National Park, Mount Tingaringy summit, 22. v. 1993, A.M. & J. Lyne 1216 (CBG, MEL 713662.). Snowfields: Gorge below Native Dog Flat, Upper Buchan River, 29. i. 1949, N.A. Wakefield 2953 (MEL 1510628); Reedy River valley below Brumby Point, Nunniong Plateau region, 13. xi. 1964, J.H. Willis s.n. & K.C. Rogers (MEL 75141); Buchan River Gorge below Native Dog Plain, 9. i. 1971, A.C. Beauglehole 35950 (MEL 2146651); Cobberas No. 1, 28. i. 1971, A.C. Beauglehole 36005 & E.W. Finck (MEL 2146647); Mount Leinster, S side, 18. ii. 1971, A.C. Beauglehole 36825 (MEL 2146648); Tambo River, c. 17 mls E of Omeo, Hells Hate [Gate] Hole area, 18. ii. 1973, A.C. Beauglehole 41546 (MEL 559197, NSW); slopes of Mount Leinster, Benambra region, 10. xii. 1986, G.E. Earl 531 (MEL 220310); Nunniong Plateau, c. 43 km (direct) just N of E of Omeo, Brumby, Point, c. 200 m straight downslope from terminus of 4WD track, 4. xii. 1991, R.O. Makinson 941 & P. Carmen (CBG, MEL 1617065, NE); Bowen Track, 1 km NE of Splitters Range Track junction E of Omeo, 24. i. 1984, D. Parkes EG157 (MEL 1543216); Nunniong Plateau, Forlorn Hope Ck, beside the upper part of the cascade, c. 1.5 km S from Forlorn Hope Plain, 2. i. 1985, N.G. Walsh 1481 (MEL 1540191).

*Phenology:* Flowering has been recorded from August to May, but in the absence of snow can occur sporadically throughout the year. Nectarivorous birds, in particular honeyeaters of various species visit the flowers and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status:* *Grevillea brevifolia* is confined predominantly to the subalpine and alpine regions of Victoria between 1000–1500 m above sea-level. In New South Wales it is known from two sites, at Merryangaah Peak (ca. 25 km NW from Bombala) in the Southern Tablelands of New South Wales at approximately 780 m above sea level, and on the western slopes of The Pilot in Kosciuszko National Park at approximately 1800 m above sea level. The Pilot population was seen by one of us (Molyneux) about twenty years ago, but was not vouchered and is unrepresented in herbaria. The Pilot site is particularly interesting in that it is a site where *G. brevifolia* is sympatric with *G. victoriae* subsp. *navalis*. Most of the Victorian populations occur within the Alpine National Park, however, the population at the type-site at Mt Tambo is not protected within a reserve system, nor is the Mt Leinster population. The species is not considered to be under any threat in Victoria.

The Merryangaah Peak site in New South Wales is not protected within a reserve system. Although Maiden & Betche (1916) list *Grevillea victoriae* F.Muell. var. *brevifolia* F.Muell. ex Benth. (having reduced it from *G. brevifolia* F.Muell. ex Benth.) in their *A Census of New South Wales Plants* it is unclear as to what taxon they were referring to. Given that the earliest herbarium voucher specimens from Merryangaah Peak are from 1949 and the fact that the species has a very limited distribution in New South Wales, it appears unlikely that the listing in Maiden & Betche (1916) refers to *G. brevifolia*. No other workers since Maiden & Betche have listed *G. brevifolia* as being present in New South Wales. Fieldwork is required at both The Pilot and the Merryangaah sites to determine the number of populations present, the number of individual plants, degree of recruitment and to note any possible threats. A conservation status of Poorly Known (2KC- *sensu* Briggs & Leigh 1996) or Data Deficient (DD *sensu* IUCN 2001) for the New South Wales populations is suggested.

*Habitat and Ecology:* *Grevillea brevifolia* is usually found in subalpine and alpine woodlands, typically on rocky sites, slopes, ridges and outcrops. At Mt Tingaringy it grows in soils and rock derived from Ordovician siltstone in an open *Eucalyptus glaucescens* and *E. pauciflora* woodland. At Brumby Point it grows on an almost treeless scree slope derived from Ordovician slates and mudstones, with *Polyscias sambucifolia* and *Podolobium alpestre*, and above Reedy Creek below the gorge. At Mt Leinster it occurs among outcropping granite with sparse tree cover with *Eucalyptus dives*, *E. mannifera*, *E. pauciflora*, *Kunzea ericoides* and *Prostanthera phyllicifolia*, while in the Wombargo Range area it occurs among rhyodacite outcrops, as it does in the nearby Cobberas Mountains. At Merryangaah Peak it is found on a rocky ridge in *Eucalyptus glaucescens* woodland with *Acacia glaucescens*, *A. silvestris* and *Philothea trachyphylla*.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *Grevillea brevifolia* was described by Bentham (1870) with no infraspecific taxa recognised. Maiden & Betche (1916) reduced *G. brevifolia* to varietal rank under *G. victoriae*. McGillivray & Makinson (1993) relegated *G. brevifolia* into synonymy with *G. victoriae*. Olde & Marriott (1995) treated *G. brevifolia* as a variety of *G. victoriae*. Makinson (1996) in his account of *Grevillea* in *Flora of Victoria* followed McGillivray and Makinson (1993) in treating *G. brevifolia* as part of the broader concept of *G. victoriae*, under race 'e'. Molyneux and Stajsic (2000) re-instated *G. brevifolia* to specific rank, with two subspecies recognised. Subsequent to Makinson (2000), additional data has come forth about both *G. brevifolia* and *G. polychroma*, notably information about

the nature of the angle of pollen-presenter in relation to the style and the shape of the pollen-presenter in cross-section, which was either poorly known or unavailable when we published the name *G. brevifolia* subsp. *polychroma*. A new population of *G. polychroma* from near Mt Hoad was only recently discovered which further showed the consistency of the pollen-presenter character differences between *G. brevifolia* and *G. polychroma*. We feel that *G. brevifolia* subsp. *polychroma* is better accorded species rank as we have done in this paper.

*Grevillea brevifolia* is congruent with 'race e' of McGillivray & Makinson (1993) and Makinson (1996) and 'unassigned' specimens 3 and 'unassigned' 6 of McGillivray & Makinson (1993). McGillivray & Makinson cite the Wakefield 2953 (MEL 1510628) specimen from Native Dog Flat ('unassigned 3' of McGillivray & Makinson) as sharing features with their races 'e' (*Grevillea brevifolia*) and race 'f', commenting that the leaves are mostly narrowly elliptical-ovate and glossy on the upper surface. However McGillivray & Makinson's concept of race 'f' encompasses both *G. polychroma* and *G. parvula*. Both *G. brevifolia* and *G. polychroma* have a glossy leaf upper surface. We consider that McGillivray & Makinson's 'unassigned 3' to be a part of the variation exhibited within *G. brevifolia*. McGillivray & Makinson's 'unassigned 6' from Merryangaah based on Costin *s.n.* (NSW 93308) differs from other populations of *G. brevifolia* in having a subacute perianth-limb. The Forbes 606 (MEL 603586) collection from Merryangaah Peak also has a more or less subacute perianth-limb. Until further field studies are undertaken we place unassigned 6 within the broader concept of *G. brevifolia*. The Costin and the Forbes specimens are the only vouchered specimens of *G. brevifolia* in New South Wales.

Olde & Marriott (1995) treated *G. brevifolia* under the name *G. victoriae* F.Muell. var. *brevifolia* (F.Muell. ex Benth.)

The D. Parkes EG157 (MEL 1543216) specimen from Bowen Track (1 km northeast of Splitter's Range track junction, east of Omeo) has relatively larger leaves (up to 49 mm long) and longer floral rachises (up to 35 mm long) than any other populations. In December 2003 one of us (Molyneux) visited the Bowen Track site but was unable to locate any populations of *G. brevifolia*. The absence of *G. brevifolia* from the Bowen Track could not be explained by the recent fires, but is more likely explained by an incorrect locality citation by the original collector (D. Parkes pers.comm. 2004). The most likely correct site for this population is on the Scrubby Track (C. Smith pers.comm. 2004). The taxon does occur on a northeast branch track leading to the type locality Mt Tambo further along the Splitters Range Track.

*Grevillea brevifolia* can be confused with *G. polychroma*, but is separated by the following characters: *G. brevifolia* often tends to be a dense, rigid spreading shrub, whereas *G. polychroma* is generally more open (also spreading) in habit, but it can reach 3 m high. *Grevillea brevifolia* typically has thicker-textured, smaller, more leathery leaves, than *G. polychroma*, and the leaf length to width ratio is also slightly lower (1.92–) 2.0–2.5:1 (–3.2:1) versus (2.0–) 2.4–3.0:1 (–4.22:1). *Grevillea brevifolia* tends to have shorter (0–) 3–7 (–11) mm long, and thicker (1.0–) 1.2–1.4 (–1.8) mm wide, primary peduncles than *G. polychroma* (0–) 6–15 (–21) mm long and 0.8–1.0 mm wide. The perianth outer surface below the limb in *G. brevifolia* is red or reddish-pink, whereas the perianth colour in *G. brevifolia* varies from red or reddish-pink, pink, orange, yellow or cream. Perhaps the most notable difference between *G. brevifolia* and *G. polychroma* is the nature of the pollen-presenter. In *G. brevifolia* the pollen-presenter is oblique to the style, not concurrent with the style and the face of the pollen-presenter is flat or slightly convex in cross-section. In contrast, the pollen-presenter in *G. polychroma* is lateral to the style, concurrent with the style and the face of the pollen-presenter is flat (or in some plants from the Mt Elizabeth population the lower margins of the pollen-presenter face are slightly incurved giving appearance of being slightly concave). The differences between the two species and *G. victoriae* are summarised in Table 2.

Table 2. A summary of the diagnostic characters for *G. victoriae* subsp. *victoriae*, *G. victoriae* subsp. *navalis*, *G. brevipolia* and *G. polychroma*.

Character	<i>G. victoriae</i> subsp. <i>victoriae</i>	<i>G. victoriae</i> subsp. <i>navalis</i>	<i>G. brevipolia</i>	<i>G. polychroma</i>
Branchlet indumentum	Subsericeous	Subsericeous to subtomentose	Subsericeous to subtomentose	Subsericeous to subtomentose
Leaf length & width (mm)	(30-)40-120(-200) x (8-)10-25(-50)	(20-)35-100(-135) x (7-)15-35	(8-)21-38(-49) x 6-16(-20)	(11-)33-68(-70) x (6-)12-23(-30)
Leaf length:width ratio	4.0:1-5.0:1 (-6.0:1)	2.25-4.0:1 (-5.0:1)	(1.92:1-) 2.0-2.5:1 (-3.2:1)	(2.0:1-) 2.3-3.0:1 (-4.3:1)
Leaf upper surface lateral veins	Conspicuous	Conspicuous to prominent	Obscure	Obscure to evident
Leaf texture	Leathery, thick	Leathery, thick	Leathery, thick	Soft (thin), flexible
Leaf lower-surface indumentum	Densely sericeous or occasionally densely subsericeous, epidermis not visible	Densely subsericeous or densely subtomentose, epidermis not visible	Densely sericeous or subsericeous, epidermis not visible	Densely sericeous or subsericeous, epidermis not visible or partially visible
Leaf lower-surface venation	Lateral veins usually conspicuous, reticulum absent	Lateral veins conspicuous or occasionally evident, reticulum conspicuous or rarely obscure or absent	Lateral veins obscure to evident, reticulum absent	Lateral veins obscure to evident, reticulum absent or obscure
# of flowers/unit-conflor.	22-48 (-60)	(16-) 24-46 (-68)	(14-) 20-22 (-30)	(12-) 28 (-44)
Primary peduncles l x w (mm)	(0-)3-17 x 1.2-1.6	(0-)3.5-13.5 x (1.0-)1.3-1.5	(0-)3-7(-11) x (1.0-)1.2-1.4(-1.8)	(0-)6-15(-21) x 0.8-1.0
Floral rachis length (mm)	(17-)40-90	(8-)10-50 (-60)	(7-)15-20 (-35)	(11)14-20 (-32)
Peduncle branching	Simple 69%; Once 20%; Twice 9%; Thrice 2 %	Simple 43.16%; Once 47%; Twice 7.84%; Thrice 2 %	Simple 77%; Once 21%; Twice 2%	Simple 69%; Once 26%; Twice 4%; Thrice 1%
Perianth outer surface below the limb colour	Red or reddish-pink	Red or reddish-pink	Red or reddish-pink	Red or reddish-pink, pink, orange, yellowish or cream
Pollen-presenter angle to style	Oblique to the style	Oblique to the style	Oblique to the style	Lateral to the style
Face of pollen-presenter	Flat or slightly convex in cross-section, base not concurrent with the style	Flat or slightly convex in cross-section, base not concurrent with the style	Flat or convex in cross-section, base not concurrent with the style	Flat or slightly concave in cross-section, base concurrent with the style

The differences in size and shape of the floral bracts between the two taxa used in Molyneux and Stajsic (2000) was based on very few specimens, and its diagnostic use required validation as we pointed out in that work. Extensive examination of herbarium specimens and live material has shown this character to be of no value, the floral bracts of the two taxa being very similar.

No intermediates between *G. brevifolia* and *G. polychroma* have been found. The two species occupy different habitats, with *G. brevifolia* being predominantly confined to subalpine and alpine woodlands, whereas *G. polychroma* is found from low riparian sites down to 80 m above sea level to montane forest.

*G. brevifolia* is distinguished from *G. victoriae* by its shorter, generally more obtuse leaves, (8–) 21–38 (–49.5) mm long x 6–16 (–20) mm wide, and the leaf to length ratio (1.92–) 2.0–2.5:1 (–3.2:1). The leaf upper surface lateral veins in *G. brevifolia* are obscure rather than conspicuous as occurs in *G. victoriae*. The unit conflorescences in *G. brevifolia* are generally fewer flowered, and the floral rachis is shorter.

***Grevillea callichlaena* Molyneux & Stajsic, sp. nov.**

A *G. miqueliana* F. Muell. surculis novis salmoneis, alabastris omnino rubro-ferrugineis, limbo perianthii majore ((3.8–) 4.0–4.8 mm e latere viso) et tepalis dorsalis latioribus (1.9–2.5) mm differt.

*Type:* Victoria, Eastern Highlands, Alpine National Park, 350 m WSW from summit of Mt Benambra, on W side of track near track edge, 22. x. 2002, V. Stajsic 3308 & W.M. Molyneux, S.G. Forrester, H. Merkel, P. Ashton (holo: MEL 2190704!; iso: AD!, BRI!, CANB!, HO!, NSW!, K!, NY!, WELT!).

Spreading to erect *shrub* 1.5–1.8 (–3) m high, 2–3.5 (–4) m across. *Branchlets* terete, subterete or biconvex in cross-section with several longitudinal ridges, densely subvillous of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending hairs with some appressed hairs, straight and wavy hairs, the hairs off-white and tan-coloured, with an overlayer of irregularly aligned, straight and wavy hairs, the hairs predominantly erect and suberect, Y-shaped, off-white and tan-coloured. *Colour of new growth* salmon-pink or salmon-pink and ferruginous on the same plant, soon becoming green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, ovate, elliptic, broadly elliptic or broadly lanceolate, narrow obovate to obovate, (26–) 37–75 (–92) mm long, (12–) 19–28 (–43) mm wide, apex obtuse, or with short blunt mucro, *margins* rolled downwards or shortly recurved; *leaf length to width ratio* 2.7–1; *leaf upper surface* granulose (persistent hair bases), dull, moderate-green, *lateral veins* conspicuous; *reticulum* obscure; *leaf lower surface* loosely subvillous of biramous of non-glandular hairs, epidermis visible, the hairs mutually aligned and irregularly aligned, predominantly suberect hairs with fewer ascending hairs, predominantly Y-shaped, the hairs straight and wavy, off-white or silvery-white hairs with scattered tan-coloured and ferruginous hairs predominantly on the veins, *lateral veins* conspicuous, *reticulum* conspicuous, *leathery-textured*. *Conflorescences* terminal on main branchlets or on short side branchlets, rarely subcauline, decurved to pendulous, pedunculate, simple to twice-branched, simple 86.53%, once-branched 9.62%, twice-branched 3.85%, *unit conflorescence* cylindrical or dome shaped, acropetal; *number of flowers* (8–) 20–40 (–64) per unit conflorescence; *primary peduncles* (4–) 5–22 (–35) mm long, 1.5–2 mm wide, indumentum (as in rachises) very densely subvillous of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending with some appressed hairs, straight and wavy, the hairs off-white and tan-coloured with scattered ferruginous hairs, with an overlayer of irregularly aligned, predominantly erect and suberect Y-shaped hairs, straight and wavy hairs, off-white and tan-coloured, overall

colour dirty-white, off-white or pale tan-coloured (as in rachises); *floral rachises* (5–) 35–50 (–65) mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.5–1.8 mm long, 0.3–0.5 mm wide, outer surface densely tomentose of biramous non-glandular hairs, epidermis not visible, with predominantly irregularly aligned, predominantly ascending with occasional appressed hairs, straight and wavy hairs, tan-coloured, inner surface glabrous except just below apex, reddish-brown, bracts persistent until buds 1.7–1.8 mm long; *pedicels* 2.5–4.2 mm long; *torus* oblique to pedicel at 15–45°, squarish in plane-view with rounded angles; *very early flower buds* wholly ferruginous, perianth below the limb maturing to red-ferruginous, limb maturing to ferruginous; *advanced buds (pre-anthesis)* acroscopic, maturing to ± acroscopic to variably retrorse; *perianth below the limb* roundish in cross-section; *perianth outer surface below the limb indumentum* densely subvillous of biramous non-glandular hairs, epidermis not visible or partially visible, with a lower layer of mutually and irregularly aligned, appressed and ascending hairs, the hairs straight and wavy, reddish-ferruginous, with usually an overlayer of irregularly aligned, predominantly erect, Y-shaped hairs, straight and wavy, epidermis red; *perianth inner surface epidermis below the limb* with minute papillae below beard, papillae particularly obvious along margin, glabrous except for beard, red; *dorsal tepal beard* commencing 1.5–2 mm above toral rim, beard extending for 4–5.4 mm, hairs 1–1.2 mm long; *perianth-limb* (3.8–) 4.0–4.8 mm wide in side-view, globose in side-view, round face-on, apex obtuse, limb-segments not keeled on outer surface, indumentum dense and intermediate between tomentose and villous of biramous non-glandular hairs, with a lower layer of predominantly mutually aligned, appressed and ascending red hairs with an overlayer of irregularly aligned, predominantly erect (with some ascending hairs) Y-shaped variably wavy/curled hairs ferruginous hairs, epidermis not visible, epidermis red; *ventral tepal beard* commencing 3.5–5.0 mm above toral rim, beard extending for 2.5–3.5 mm, hairs 0.8–1.5 mm long; *dorsal tepals* 20.5–22 mm long, 1.9–2.5 mm wide; *nectary* half-annular, projecting 0.4–0.6 mm above toral rim, margin with two lateral teeth and 2 obscurely raised central teeth or irregularly toothed or tridentate, pale-yellow; *pistil* 19.5–22 mm long; *stipe* 1.5–2.2 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth before release of style-end, bowed, afterwards nearly straight to incurved, with scattered minute spreading simple hairs predominantly in the upper 1/2 or upper 1/3 of style length, particularly at back of style-end, cherry-red; *pollen-presenter* strongly oblique to style, 2.5–3.2 mm long, 2–2.5 mm wide; *face of pollen-presenter* flat to slightly convex in side-view, base not concurrent with the style; stigma distally off-centre; *follicle* ovoid/ellipsoid, 18–20 mm long, to 7 mm deep, wall 0.5–0.6 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1 b.)

*Representative specimens examined: VICTORIA.* Eastern Highlands: Alpine National Park. 350 m WSW from summit of Mt Benambra, on W side of track near track edge, 6. xi. 2000, *H. Merkel s.n.* (MEL 2117811); Primarily on N side of track leading to the summit of Mount Benambra fire tower, ca. 250 m SW of the summit, 22. x. 2002, *V. Stajsic* 3309, 3310, 3311, *W.M. Molyneux, S.G. Forrester, P. Ashton & H. Merkel* (MEL 2190706, 2190708, MEL (Vic. Ref. Set), NSW; MEL 2190709, NSW); on North side of Mount Benambra fire tower, 22. x. 2002, *V. Stajsic* 3312, 3313, *W.M. Molyneux, S.G. Forrester, P. Ashton & H. Merkel* (Seedlings: MEL 2190710; CANB, MEL 2190711, NSW).

*Phenology:* Flowering has been recorded between October and March, but in the absence of snow can occur sporadically throughout the year. Nectarivorous birds, in particular honeyeaters of various species visit the flowers and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status:* A very narrow endemic, known only from two localised populations at Mt Benambra, in the Alpine National Park in Victoria. The fires

of January 2003 swept through the Mt Benambra region, killing most plants outright, severely depleting the population. Prior to the January 2003 fires, *G. callichlaena* was a co-dominant shrub in the understorey with *Oxylobium ellipticum*. Fortunately numerous seedlings have recently been observed throughout the site (H. Merkel 2004 pers. comm.). A conservation status of Endangered (2Eca *sensu* Briggs & Leigh 1996) or Endangered (EN *sensu* IUCN 2001) is suggested.

*Habitat and Ecology:* Mt Benambra is of Lower Devonian Rhyolite geology. The summit where the two populations often grow amongst scattered boulders has a dominant overstorey of *Eucalyptus pauciflora*, and a dominant lower and shrub layer of *Grevillea callichlaena* and *Oxylobium ellipticum*. Other associated species include: *Acacia rubida*, *Coprosma hirtella*, *Dianella tasmanica*, *Derwentia derwentiana*, *D. perfoliata*, *Joycea pallida*, *Leucopogon maccraei*, *Kunzea ericoides*, *Polyscias sambucifolia*, *Polystichum proliferum*, *Senecio gunnii* and *Stellaria pungens*. Prior to the devastating fires of January 2003 there was no evidence of recent fires at Mt Benambra (P. Ashton pers. comm. 2003).

There are no records of vegetative reproduction. Plants are killed outright by fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long-term survival of some populations if the period between the burns is not long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that part of the two populations at Mt Benambra also occur along the vehicle-track, care must be taken not to eliminate these plants through road works.

*Etymology:* From the Greek *callos*, beauty, and *chlaena*, a cloak or covering, refers to densely subvillous, reddish-ferruginous perianth outer surface.

*Notes:* It appears that material of *Grevillea callichlaena* was first collected and cultivated by Mr. Martin Rigg of Yackandandah in the early 1990's, but no voucher specimen was lodged at any herbarium (M. Rigg & N. Marriott pers. comm. 2005). Mrs. Heather Merkel of Tallangatta was the first person to submit a voucher specimen to MEL in November 2000. The existence of this species was unknown to botanists prior to her collection.

*Grevillea callichlaena* exhibits some variation in leaf size and shape but is generally very uniform morphologically in other characters. Vegetatively it is most similar to *G. miqueliana* subsp. *miqueliana*, but it has consistently granulose leaf upper surfaces. *G. callichlaena* differs from *G. miqueliana* in having the new growth usually salmon-pink or a combination of salmon-pink and ferruginous on the same plant, and the leaf upper surfaces are consistently granulose. The flower buds (all developmental stages) are wholly reddish-ferruginous compared with the very early flower buds in *G. miqueliana* having the perianth (below the limb) usually pale silvery-lilac which matures to pink or pinkish-red, and the perianth-limb dirty brownish-grey and maturing to dirty brownish-grey. The perianth outer surface below the limb in *G. callichlaena* never has a central blotch on the ventral tepals as is often present in *G. miqueliana*. The perianth outer surface below the limb in *G. callichlaena* is usually densely subvillous obscuring the epidermis, less often moderately densely subvillous with epidermis slightly visible. In *G. miqueliana* the perianth outer surface below the limb is usually loosely subvillous, or  $\pm$  moderately densely subvillous (in subsp. *miqueliana*), or loosely subtomentose (in subsp. *cincta*) with the epidermis clearly visible. The perianth-limb (just prior to release of style-end) is larger in *G. callichlaena*, (3.8–) 4.0–4.8 mm wide in side-view, compared with 2.5–3.2 mm wide in side-view in *G. miqueliana*. The inner surface of the recurved portion of the perianth below the limb in an open flower is uniformly pinkish-red, not bichromatic as usually occurs in *G. miqueliana*. The dorsal-tepals are also wider in *G. callichlaena*, 1.9–2.5 mm wide, compared with 1.2–2.2 mm in *G. miqueliana*.

**Grevillea epicroca** Stajsic & Molyneux, in Makinson (2000), *Flora of Australia* 17A: 502.

*Type*: New South Wales, Southern Tablelands scarp: Merricumbene Fire Trail, 18.4 km S of Bateman's Bay road, ca 19 km SW of Braidwood, 30 Mar. 1976, *M.D. Crisp* 2008 (holo: CANB (CBG 68600)!, iso: AD *n.v.*, BRI *n.v.*, L *n.v.*, NSW 450182!, PERTH *n.v.*)

*G. victoriae* F. Muell 'unassigned 5', of D.J. McGillivray & R.O. Makinson, *Grevillea*: 322 (1993).

Spreading to erect *shrub*, 1.5–2.5 m high, to 3 m across. *Branchlets* distinctly angular to subangular in cross-section becoming terete away from apex, with several longitudinal ridges, (indumentum mostly present near ends of branchlets, quickly becoming glabrescent), moderately densely or loosely sericeous or subsericeous, of biramous non-glandular hairs, epidermis not visible, partially visible or clearly visible, the hairs predominantly mutually aligned, appressed or slightly ascending, straight, off-white or silvery-white hairs, with or without occasional irregularly aligned, appressed, ferruginous hairs. *Colour of new growth* initially salmon-pink, becoming green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, oblong-ovate, elliptical to narrowly elliptical, (30–) 50–70 (–80) mm long, (8–) 10–15 (–20) mm wide, apex acute to subacute or obtuse with a short blunt mucro, *margins* very shortly recurved or revolute; *leaf length to width ratio* (3:1–) 4:1–6:1; *leaf upper surface* glabrous, obscurely to conspicuously minutely foveolate, or with occasional appressed silvery-white hairs, with tan-coloured hairs (in younger leaves), glossy, mid-green to dark-green, *lateral veins* evident to conspicuous, *reticulum* absent; *leaf lower surface* loosely sericeous, epidermis clearly visible, the hairs mutually aligned, appressed or occasionally with scattered irregularly aligned hairs, straight, short, silvery-white with occasional irregularly aligned appressed tan-coloured or ferruginous hairs, *lateral veins* obscure to evident, *reticulum* absent, *slightly leathery textured*. *Conflorescence* terminal, subterminal or axillary, decurved to pendulous, pedunculate, simple to thrice-branched, simple 57%, once-branched 27%, twice-branched 12%, thrice-branched 4%; *unit conflorescence* ovoid or a loose sometimes subsecund cluster, acropetal; *number of flowers* (14–) 16–32 per unit conflorescence; *primary peduncles* (0–) 4.5–10 mm long, 0.7–1.0 mm wide, indumentum (as in rachises) moderately loosely sericeous or loosely subsericeous, of biramous non-glandular hairs, epidermis visible, the hairs mutually aligned, predominantly appressed with scattered slightly ascending hairs, predominantly straight with occasional ± slightly wavy hairs, off-white or silvery-white hairs with occasional irregularly aligned ± overlying tan-coloured and or ferruginous hairs, overall colour (as in rachises) off-white or pale tan-coloured; *floral rachises* 10–25 mm long; *floral bracts* narrowly-triangular, crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.3–1.7 mm long, 0.4–0.5 mm wide, outer surface densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight, ferruginous, with occasional slightly ascending, mutually aligned or slightly irregularly aligned hairs, inner surface glabrous except for the upper 1/3–1/4 of bract length, bracts persistent until buds 1.2–1.3 mm long; *pedicels* 3–3.7 mm long; torus oblique to pedicel at ca. 45°, squarish in plane-view with rounded angles; *very early flower buds* wholly ferruginous or tan-coloured, perianth below the limb maturing to red, limb maturing to ferruginous, *advanced buds (pre-anthesis)* acroscopic, maturing to ± acroscopic to variably retrorse; *perianth below the limb* squarish with rounded angles in cross-section; *perianth outer surface below the limb* moderately densely subsericeous of biramous non-glandular hairs, epidermis usually partially visible or occasionally not visible, the hairs predominantly mutually aligned, appressed with scattered, irregularly aligned, appressed and slightly ascending hairs, straight with occasional ± slightly wavy hairs, occasionally with scattered minute spreading glandular hairs near base of perianth or in the lower 1/4 of perianth below the limb length (evident in fresh flowers and spirit preserved specimens only), reddish, tan-

coloured and ferruginous hairs intermixed, epidermis red or reddish-pink; *perianth inner surface epidermis below the limb* minutely papillate below beard, glabrous except for beard, pale red or reddish-pink; *perianth-limb* subglobose in side-view, squarish face-on, obtuse, limb-segments slightly midline-keeled on outer surface, densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, straight, appressed, ferruginous hairs with scattered, irregularly aligned, appressed and slightly ascending hairs, epidermis red or reddish-pink; *dorsal tepal beard* commencing 2.0–2.5 mm above toral rim, beard extending for 5.7–6.2 mm, hairs 1–1.2 mm long; *ventral tepal beard* commencing 3.0–3.5 mm above toral rim, beard extending for 3.0–3.5 mm, hairs ca. 1 mm long; *dorsal tepals* (16.7–)18–19.5 mm long, 1.4–1.8 mm wide; *nectary* half-annular, projecting 0.3–0.5 mm above the toral rim, margins entire or tridentate, pale-yellow; *pistil* 18–19.5 mm long; *stipe* 2–2.5 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth before release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs mostly occurring in the upper 1/2–3/4 of style length, particularly at back of style-end, red or reddish-pink; *pollen-presenter* lateral to style, 2.4–2.6 mm long, 2.2–2.4 mm wide; *face of pollen-presenter* concave in cross-section, base concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, 18–23 mm long, ca. 6.5 mm wide, wall 0.5–0.7 mm thick, glabrous, faintly colliculose-rugulose, with three to four longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1 e.)

*Representative specimens examined:* **NEW SOUTH WALES.** South Coast/Southern Tablelands: Downstream on Deua R [River] 1/4 mile from 'Alpine' property above junction of Deua R [River] & Curmulee Creek, 24. iv. 1966, *T. Whaite* 3088 & *J. Whaite* (NSW 82871); Merricumbene Fire Trail, c. 1 km N of Bendethera Mountain, 29. v. 1973, *R. Pullen* 4729 (CANB, MEL 647496, NSW 450195); c. 1 km NE along boundary fire trail from junction of River Forest Road and Gollarrabee Fire Trail, 14 km S of Monga, 4. xi. 1989, *P. Ollerenshaw* 1806 (CBG, MEL 273077, NSW); Deua National Park, Merricumbene Fire Trail 1.4 km N from Bendethera Trig, 24. x. 1996, *V. Stajsic* 2467-2471 (AD, CANB, HO, MEL 2116323, 2116325, 2116327, 2116329, 2116331, 2116332, NSW).

*Phenology:* Flowering has been recorded from October to May, but can occur sporadically throughout the year. Nectarivorous birds, in particular honeyeaters of various species visit the flowers and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status:* *Grevillea epicroca* is apparently confined to Deua National Park in the South Coast/Southern Tablelands region of New South Wales and may be endemic to the park. To date it is known primarily from a small number of collections made in the vicinity of Bendethera Trig on the Merricumbene Fire Trail. The only other geographically significant collections are Whaite 3088 (NSW 82871) collected downstream on the Deua River '1/4 mile' from 'Alpine' property above the junction of Deua River and Curmulee Creek (which is ca. 12–13 km north-west from the Merricumbene Fire Trail population) and Ollerenshaw 1806 (MEL 273077) collected 1 km from the junction of River Forest Rd and the Gollarrabee Fire Trail (just north of the Merricumbene settlement (ca. 30 km north-east from Bendethera Trig). The Ollerenshaw collection may just fall within the boundary of National Park or just shortly outside the park into the Monga State Forest or the Quart Pot State Forest. A cursory count of the number of plants at the type-site in 1996 by one of us (Stajsic) revealed only 24 plants ranging from juvenile under 1 m high to mature shrubs to 2.5 m high. Deua National Park is very rugged topographically and it is very likely that other populations exist in more remote and inaccessible places. The collecting notes of the Whaite 3088 (NSW 82871) specimen comment that the plants were frequent in a limited area. A conservation status of Endangered (2ECi *sensu* Briggs & Leigh 1996) or Endangered (EN *sensu* IUCN 2001) is suggested.

*Habitat and Ecology:* This rarely collected species is known from only a small number of herbarium specimens that provide relatively little ecological information. The geology at the type-site is Comerong Volcanics rhyolite, and the plants grow in grey loam

soil derived from this. The plants grow on a ridge top in dry open forest dominated by *Eucalyptus sieberi*, which grades sharply to *Eucalyptus fraxinoides* on the slopes below the ridge (Stajsic pers. observ. 1996). The collection notes on Whaite 3088 (NSW 82871) comment that the plants were collected on a phyllite ridge. This site is at a much lower altitude approximately between 250–300 m above sea level. The collecting notes on the Ollerenshaw specimen comment that the plants were growing on a very steep ridge, somewhere between 400–600 m above sea level.

There are no records of vegetative reproduction. Plants are killed outright by fire and regeneration is from seed only, as demonstrated by the December 2001/January 2002 fires that swept through extensive areas of Deua National Park, killing all the plants at the type-site. A visit by one of us (Stajsic) with Bob Coveny and Andrew Orme (both of NSW) to the type-site in September 2002 failed to find any regeneration, but on a later visit in October 2003 by Andrew Orme (NSW) and Peter Olde seedlings were observed (A. Orme pers. comm. 2003). The Gollarrabee site, which apparently escaped the fires at the time, was also visited in Sept 2002 by one of us (Stajsic) with Bob Coveny and Andrew Orme but no plants of *G. epicroca* were found. Long-term fire regimes may be significant for local populations. Given that at least part of one population (i.e. type-site population) occurs along the four-wheel drive track, care must be taken not to eliminate these plants through road works.

*Notes:* *Grevillea epicroca* corresponds with the ‘unassigned specimen 5’ in McGillivray & Makinson (1993). Given the superficial similarity of *G. epicroca* with the previously understood concept of *G. victoriae* var. *leptoneura* it is likely that *G. epicroca* would have been placed with var. *leptoneura* as indicated by Crisp 2008 specimen (holotype), determined as *Grevillea* aff. *victoriae* F.Muell. var. *leptoneura* Benth.

*G. epicroca* is similar to *G. parvula* and can be separated by the following characters: the branchlets of *G. epicroca* are distinctly angular or subangular compared with terete, subterete, concavo-convex or plano-convex in cross-section, seldom subangular branchlets in *G. parvula*. The branchlets in *G. epicroca* are sericeous, loosely sericeous or glabrescent with scattered mutually aligned, appressed silvery-white hairs, in contrast to the densely subvillous branchlets in *G. parvula*. The loosely sericeous indumentum of the leaf lower surface in *G. epicroca* distinguishes it from *G. bemboka*, *G. brevifolia*, most populations of *G. parvula* (for exceptions, see that species), *G. oxyantha*, *G. polychroma* and *G. victoriae*. Taxa with a similar lower leaf surface indumentum include *G. monslacana* which differs in having branchlets terete, subterete or biconvex in cross-section and densely tomentose. *G. monslacana* also differs in perianth-line not being midline-keeled on the outer surface, the pollen-presenter is convex in cross-section, at an oblique angle to the style, and not concurrent with the style.

*G. rhyolitica* may have an open indumentum on the leaf lower surface, but either has spreading hairs (in *G. r.* subsp. *rhyolitica*), or the hairs are appressed but very short and almost rhombic in shape (in *G. r.* subsp. *semivestita*), and in either case the perianth outer surface is tomentose.

A number of collections (Olsen s.n. NSW 128904; Crisp 2389, D.J. Cummings & A. Tyrrel NSW 452938; D.J. Cummings 41, M.D. Crisp & A. Tyrrel NSW 450183; D.J. Cummings 42, M.D. Crisp, & A. Tyrrel NSW 450181) east of Big Badja at the southern extension of the Minuma Range in the Southern Tablelands escarpment of New South Wales appear to be similar to *G. epicroca*. These collections are congruent with the ‘unassigned specimen 4’ of McGillivray & Makinson (1993). These collections share some points of similarity between *G. bemboka*, *G. parvula* and *G. epicroca*. The specimens have obovate or narrow-obovate leaves, 25–65 mm long x 8–20 mm wide, the leaf upper surface venation is obscure or evident, the leaf lower surface is subsericeous, the perianth-limb obtuse and slightly keeled. They are here treated as unassigned. See also Notes section for *G. bemboka*.

***Grevillea miqueliana*** F.Muell., *Trans. & Proc. Victorian Inst.* 1: 132 (1855)

*Type*: [Victoria], ‘...near Mt McMillan, and along the upper valleys of the Avon in Gipp’s Land.’ [protologue]; *lecto*: [Victoria], In montibus 3–4000’ altis dumosis petraeis inter Castle hill & Mount Angus.fr. [frutex] 4–5’ alt., *Dr. M. [F. Mueller] s.n.* Nov 54 [in error ? probably xi. 1853] (*lecto*: *fide* D.J. McGillivray & R.O. Makinson *Grevillea*: 447 (1993), MEL 65738!); *residual syntypes*: Avon Ranges, *s.d.*, *F. Mueller s.n.* (syn.: A *n.v.*, K–Neg.No.Kew 2281!, syn.: MEL 65736!, 65737!, 65739!, 65743!); Avon River 4000 ft Gipps Land, *n.d.*, [F. Mueller] (TCD *n.v.*); Mount Angus *s.d.*, *F. Mueller* (NSW 93343; the specimen labeled ‘no locality’, *F. Mueller* [NSW 93345] appears to be part of the same collection as NSW 93343); probable part of a syntype collection: Gipps Land, *s.d.*, *Dr. Mueller* (K– ‘Presented by the Linnean Society, 1915’, *n.v.*).

Spreading to erect *shrub* (0.5–) 1.5–2.0 (–3) m high, (1.0–) 2–4 (–7) m across. *Branchlets* terete, subterete or biconvex in cross-section, with several longitudinal ridges, densely subvillous or subtomentose (in subsp. *cincta*), of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending or appressed hairs, straight and wavy hairs, the hairs off-white or silvery-white, with an overlayer of irregularly aligned, predominantly erect and suberect or predominantly ascending Y-shaped hairs, straight and wavy hairs, off-white or silvery-white. *Colour of new growth* ferruginous, soon becoming green. *Leaves* ascending (towards apex of shoot), petiolate, simple, entire, narrowly elliptical to broadly elliptical, ovate, obovate to occasionally broad-obovate (only occasional leaves in subsp. *miqueliana*), (9–) 20–80 (–95) mm long, (5–) 8–23 (–36) mm wide, apex acute or obtuse with a short blunt mucro or occasionally emarginate, *margins* more or less flat, rolled downwards, slightly revolute, or strongly revolute (in subsp. *moroka*); *leaf length to width ratio* 1.70:1–3.80:1; *leaf upper surface* glabrous and minutely foveolate or distinctly granulate (persistent hair bases, ca. 0.1 mm high) and or with longer biramous non-glandular hairs 0.2–0.3 mm high, often glossy (in subsp. *miqueliana* and *cincta*) or dull (in subsp. *moroka*), mid to dark-green, *lateral veins* obscure to evident, *reticulum* absent; *leaf lower surface* loosely villous of biramous non-glandular hairs (in subsp. *miqueliana* and subsp. *moroka*), epidermis clearly visible, the hairs irregularly aligned, predominantly erect and suberect, predominantly Y-shaped, straight and wavy, off-white or silvery-white with scattered tan-coloured hairs with occasional ferruginous hairs predominantly on the veins, OR subtomentose or loosely subsericeous (in subsp. *cincta*), of biramous non-glandular hairs, epidermis clearly visible, the hairs predominantly mutually aligned, appressed and ascending, straight with occasional ± slightly wavy, off-white and silvery-white hairs with or without tan-coloured and ferruginous hairs predominantly on the veins, *lateral veins* conspicuous to prominent, *reticulum* evident or absent, usually *soft-textured* in subsp. *cincta* and subsp. *miqueliana*, ± *leathery-textured* in subsp. *moroka*. *Conflorescences* terminal on main branchlets, rarely axillary on short side branchlets or subcauline, decurved to pendulous, pedunculate, simple to three branched; *unit conflorescence* a loose ovoid to shortly cylindrical cluster, acropetal; *number of flowers* (12–) 18–36 (–40) per unit conflorescence; *primary peduncles* (0–) 5–12 (–20) mm long, (0.8–) 1.0–1.5 (–1.7) mm wide, loosely to densely subvillous or tomentose (in subsp. *miqueliana* and subsp. *moroka*), of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs irregularly or mutually aligned, erect and suberect or ascending, straight and wavy predominantly Y-shaped hairs, off-white or silvery-white, with or without scattered tan-coloured and ferruginous hairs, OR subtomentose (in subsp. *cincta*) of biramous non-glandular hairs, epidermis visible or not visible, the hairs predominantly mutually aligned, appressed and ascending, predominantly straight with occasional ± slightly wavy hairs, off-white or silvery-white, *overall colour (as in rachises)* off-white, dirty-whitish or greenish-white; *floral rachises* (5–) 12–42 mm long; *floral bracts* narrowly-triangular, crescentic in side-view, basally truncate, apex acute but blunt-tipped, 2–4.2 mm long, 0.3–0.6 mm wide, outer surface

densely subvillous hairs (in subsp. *miqueliana* and subsp. *moroka*) or tomentose, of biramous non-glandular, epidermis not visible, with a lower layer of predominantly mutually aligned, predominantly ascending, straight and wavy hairs, off-white and tan-coloured, with an overlayer of irregularly aligned, predominantly erect and suberect, straight and wavy hairs, off-white and tan-coloured, with scattered ferruginous hairs, persistent until buds 1.5–2 mm long; *pedicels* 3–5.2 mm long; torus oblique at a 15–45° angle to the pedicel, squarish in plane-view with rounded angles; *very early flower buds* with the perianth below the limb usually pale silvery-lilac, the limb dirty brownish-grey, perianth outer surface below the limb maturing to pink or pinkish-red, ventral tepals wholly pink or pinkish-red, or pink or pinkish-red at apex and near base of the tepals and with a yellowish or pale yellowish-orange or orange blotch in the centre of tepals, limb maturing to dirty brownish-grey; *advanced buds (pre-anthesis)* acroscopic, maturing to ± acroscopic to variably retrorse; *perianth below the limb* squarish in cross-section; *perianth outer surface below the limb* loosely subvillous (in subsp. *miqueliana* and *moroka*) or loosely subtomentose of biramous non-glandular hairs (in subsp. *cincta*), epidermis clearly visible, the hairs irregularly or mutually aligned, suberect and erect or appressed Y-shaped or straight hairs, with scattered irregularly aligned, ascending hairs, predominantly wavy, predominantly ferruginous with scattered tan-coloured hairs, epidermis red or reddish-pink (except for central blotch on ventral tepals); *perianth inner surface epidermis below the limb* minutely papillate, with papillae usually larger and becoming minute simple hairs at or near margins, papillae rarely extending above beard, glabrous except for beard, the recurved portion of the perianth in an open flower usually bichromatic, dorsal tepals pinkish-red in the inner half of tepal length (i.e. adjacent to where the lateral margins of the dorsal tepals meet each other), yellow in the outer half of tepal length (i.e. adjacent where the lateral margins of the dorsal tepals meet the ventral tepals), the inner surface of ventral tepals wholly yellow, the outer surface usually with a central blotch and usually red or pinkish-red towards base and apex of the perianth; *perianth-limb* 2.5–3.2 mm wide in side-view, subglobose in side-view, squarish with rounded angles face-on, apex obtuse, tepals not keeled or obscurely midline-keeled on outer surface, loosely subvillous (in subsp. *miqueliana* and *moroka*) or tomentose (in subsp. *miqueliana*) of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs irregularly or mutually aligned, suberect and erect Y-shaped hairs or predominantly ascending, with occasional suberect wavy hairs, with scattered irregularly aligned ascending hairs, wavy, predominantly ferruginous, OR subtomentose or subericeous (in subsp. *cincta*) biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed and ascending with occasional irregularly aligned ascending hairs, straight with occasional ± slightly wavy hairs, predominantly ferruginous, with occasional tan-coloured hairs; *dorsal tepal beard* commencing 1.8–2.7 mm above toral rim, beard extending for (4.5–) 5.5–6.5 (–7) mm, hairs 1.2–1.5 mm long; *ventral tepal beard* commencing 3–6.5 mm above toral rim, beard extending for 1.8–3.5 (–4.5) mm, hairs 0.6–1.3 mm long; *dorsal tepals* (15–) 16–23.5 mm long, 1.2–2.2 mm wide; *nectary* half-annular, projecting (0.2–) 0.3–0.5 mm above toral rim, margins entire or tridentate, pale-yellow; *pistil* 18.2–22.5 (–23.5) mm long; *stipe* 1.5–3.2 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth prior to release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs in the upper 1/2 to 1/4 of style length, particularly at the back of the style-end, very seldom with a dense indumentum of sessile biramous non-glandular hairs near the apex (an aberrant state), pink, pinkish-red or red; *pollen-presenter* oblique to style, 1.8–2.8 mm long, 2.0–3 mm wide; *face of pollen-presenter* flat to convex in cross-section, base not concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid 15–21 mm long, 5–8 mm deep, wall 0.8–1.6 mm thick, glabrous, faintly colliculose-rugulose, with up to five longitudinal ridges on each side, firmly crustaceous, style persistent.

*Notes:* *G. miqueliana* has a chequered taxonomic history having been erected and subsumed and then subsequently resurrected and then again subsumed under *G. victoriae*.

*G. miqueliana* was first described by Mueller in 1855. Willis (1973) recognised *G. miqueliana*, citing Victorian populations from Walhalla, Mt Useful, heads of Macallister [Macalister] River, Moroka River, Mt Wellington, Mt Angus and Castle Hill, Back Creek in Cann River district, Ingeegoodbee River below Cobberas Mountains at 5000 ft. alt., and a single New South Wales population from the Upper Tuross River in New South Wales. Several taxa are encompassed by Willis's concept of *G. miqueliana*: *G. brevifolia* (probably, no specimens from Ingeegoodbee River are held at any herbaria, but the site is within the known distribution and elevation range for the species), *G. irrasa* subsp. *irrasa* (Upper Tuross River in New South Wales), *G. miqueliana* subsp. *miqueliana* (Walhalla, Mt Useful, heads of Macallister [Macalister] River, Moroka River, Mt Angus and Castle Hill), *G. miqueliana* subsp. *moroka* (Mt Wellington) and *G. parvula* (Back Creek in Cann River district). Makinson (1991) in the account of *Grevillea* for the *Flora of New South Wales* recognised a broad concept of *G. victoriae* with *G. miqueliana* relegated to synonymy under *G. victoriae*.

McGillivray & Makinson (1993) again treated the species as a synonym under a broad concept *G. victoriae* in their *Grevillea* monograph. Olde & Marriott (1995) resurrected *G. miqueliana*, with no infraspecific taxa recognized. They recognised three informal taxa: 'Typical form' (*G. miqueliana* F.Muell. subsp. *miqueliana*), 'Mt Wellington form' (*G. miqueliana* F. Muell. subsp. *moroka* Molyneux & Stajsic in Makinson (2000)) and *G. sp. aff. miqueliana* (*G. irrasa* Makinson subsp. *irrasa*, 2000). They also alluded to the possibility that the 'form from Yowrie' may represent a further undescribed taxon (*G. irrasa* subsp. *didymochiton* Makinson, 2000). Makinson (1996) followed McGillivray and Makinson's treatment. Molyneux & Stajsic reinstated *G. miqueliana* at species rank, but additionally described *G. miqueliana* F.Muell. subsp. *moroka* Molyneux & Stajsic. In this paper we describe another new subspecies, *G. miqueliana* F.Muell. subsp. *cincta*.

*G. miqueliana* is distinguished from all other southern members of the *G. victoriae* species complex by its bichromatic flowers (*i.e.* dorsal tepals pinkish-red in the inner half of tepal length, yellow in the outer half of tepal, ventral tepals wholly yellow on inner surface, outer surface usually with a central blotch and usually red or pinkish-red towards base and apex of the perianth). This character is also usually manifested as a ventral blotch on the perianth outer surface below the limb.

*G. miqueliana* is distinguished from *G. victoriae* and *G. brevifolia* by its densely subvillous branchlets (except *G. miqueliana* subsp. *cincta*), the leaf upper surface often being granulose (except in *G. miqueliana* subsp. *cincta* where never granulose), the leaf lower surface is subvillous (except in *G. miqueliana* subsp. *cincta* which is loosely subsericeous or loosely subtomentose) the very early flower buds have a pale silvery-lilac perianth (below the limb) and a dirty brownish-grey limb (wholly ferruginous or perianth below the limb reddish and limb ferruginous). The floral bracts also tend to be generally longer in *G. miqueliana*, (1.7–) 2–4.2 mm long. The perianth (below the limb) inner surface in *G. miqueliana* is also bichromatic as mentioned above. See Table 3 for a summary of the differences between *G. miqueliana* and *G. victoriae*.

The northern species *G. linsmithii* and *G. mollis* both differ from *G. miqueliana* in possessing a tangible velvety indumentum on their leaf upper surface, and the unit confluence being 2–8 flowered. *G. linsmithii* further differs in the perianth (below the body) outer surface being mid-green in the lower half, orange-pink to bright-red in the upper half. *G. mollis* has monochromatic flowers both on the inner and outer surface.

*Grevillea irrasa* (both subspecies) differs in its oblong to narrowly obovate leaves, with obscure venation on both leaf surfaces, the perianth (below the limb) inner surface being monochromatic and in its lateral, concave pollen-presenter in cross-section.

*Grevillea callichlaena* differs in having the new growth usually salmon-pink or a combination of salmon-pink and ferruginous on the same plant, and the leaf upper

surfaces are consistently granulose. The flower buds (all developmental stages) are wholly reddish-ferruginous compared with the very early flower buds in *G. miqueliana* having the perianth (below the limb) usually pale silvery-lilac which matures to pink or pinkish-red, and the perianth-limb dirty brownish-grey and maturing to dirty brownish-grey. The perianth outer surface below the limb in *G. callichlaena* never has a central blotch on the ventral tepals as is often present in *G. miqueliana*. The perianth outer

**Table 3.** A summary of the diagnostic characters which distinguish *Grevillea miqueliana* and *Grevillea victoriae*.

<i>Character</i>	<i>Grevillea miqueliana</i>	<i>Grevillea victoriae</i>
Branchlet indumentum	Densely subvillous, or subtomentose of biramous non-glandular hairs (in subsp. <i>cincta</i> ).	Densely sericeous (in subsp. <i>victoriae</i> & <i>nivalis</i> ), or occasionally densely subtomentose (in subsp. <i>nivalis</i> ).
Leaf length to width ratio	1.70–3.40:1	Leaf length to width ratio 2.25–5:1 (–6.0:1)
Leaf upper surface	Distinctly granulose or microscopically asperulous (40x magnification) and smooth to touch, or glabrous.	Usually glabrous, never granulose, occasionally microscopically asperulous (40 x magnification) and smooth to touch in <i>G. victoriae</i> subsp. <i>nivalis</i> .
Leaf lower surface indumentum	Villous or subvillous (or sericeous to tomentose in subsp. <i>cincta</i> ).	Sericeous, appressed, mutually aligned hairs or sericeous, the hairs predominantly appressed mixed with irregularly aligned ascending hairs in subsp. <i>nivalis</i> .
Number of flowers per unit confluence	(12–) 20–34 (–46) flowers.	(16–) 22–68 flowers.
Floral rachis length (mm)	(5–) 15–42	(8–) 10–90
Floral bract length (mm)	(1.7–) 2–4.2	(1–) 1.5–2.7
Perianth inner surface below the limb colour	Usually bichromatic (seldom monochromatic).	Monochromatic.
Very early flower bud colour	Perianth (below the limb) usually pale silvery-lilac, maturing to pink or pinkish-red, perianth-limb dirty brownish-grey, remaining dirty brownish-grey at anthesis.	Wholly ferruginous or perianth (below the limb) ferruginous, or perianth (below the limb) ferruginous and the perianth-limb tan at anthesis, perianth maturing to red or reddish-pink, perianth-limb remaining ferruginous or tan.

surface below the limb in *G. callichlaena* is usually densely subvillous obscuring the epidermis, less often moderately densely subvillous with epidermis slightly visible. In *G. miqueliana* the perianth outer surface below the limb is usually loosely subvillous,  $\pm$  moderately densely subvillous (subsp. *miqueliana*), or loosely subtomentose (in subsp. *cincta*), with the epidermis clearly visible. The perianth-limb (just prior to release of style-end) is larger in *G. callichlaena*, (3.8–) 4.0–4.8 mm wide, compared with 2.5–3.2 mm wide in side-view in *G. miqueliana*. The inner surface of the recurved portion of the perianth below the limb in an open flower is uniformly pinkish-red in *G. callichlaena*, not bichromatic as usually occurs in *G. miqueliana*. The dorsal-tepals are also wider in *G. callichlaena*, 1.9–2.5 mm wide, compared with 1.2–2.2 mm in *G. miqueliana*.

***Grevillea miqueliana* F.Muell. subsp. *miqueliana***

*G. victoriae* ‘race j’ of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 (1993).

*G. miqueliana* ‘Typical form’ of P.M. Olde & N.R. Marriott, *Grevillea Book 3*: 31 (1995).

*G. victoriae* ‘race j’ of R.O. Makinson, *Flora of Victoria 3*: 852 (1996).

Spreading to erect *shrub* 1.5–3 m high, 1.5–4 m across. *Branchlets* densely subvillous of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending hairs with some appressed hairs, straight and wavy hairs, the hairs off-white or silvery-white, with an overlayer of irregularly aligned, predominantly erect and suberect Y-shaped hairs, straight and wavy hairs, off-white or silvery-white; *internodes* usually distant. *Leaves* ovate to elliptical to occasionally obovate, (22–) 30–85 mm long, 15–33 mm wide; *margins* rolled downwards to shortly recurved; *leaf length to width ratio* 1.8–3.0:1 (–4.0:1); *leaf upper surface* glabrous and minutely foveolate or asperulous and  $\pm$  smooth to touch or distinctly granulate and or with longer biramous non-glandular hairs 0.2–0.3 mm high (predominantly in immature leaves) or both, usually glossy, mid to dark-green; *leaf lower surface* loosely villous of biramous non-glandular hairs, epidermis clearly visible, the hairs irregularly aligned, predominantly erect and suberect Y-shaped, straight and wavy, off-white or silvery-white with scattered tan-coloured hairs, with occasional ferruginous hairs predominantly on the veins, epidermis clearly visible, *lateral veins* conspicuous to prominent, *reticulum* absent to evident; usually *soft-textured*. *Conflorescences* simple to twice-branched, simple 61.54%, once-branched 34.62%, twice-branched 3.84%; *number of flowers* (12–) 18–36 (–40) per unit conflorescence; *primary peduncles* (0–) 5–12 (–16) mm long, (0.6–) 1.0–1.5 (–1.7) mm wide, indumentum (as in rachises) loosely to densely subvillous or densely tomentose, epidermis not visible or partially visible, of irregularly or mutually aligned, erect and suberect or predominantly ascending, straight and wavy predominantly Y-shaped hairs, off-white or silvery-white, with or without scattered tan-coloured and ferruginous hairs, *overall colour* (as in rachises) off-white, dirty-whitish or greenish-white, sometimes the peduncle has a denser indumentum than the rachis (like that of the branchlets); *floral rachises* 22–36 (–42) mm long; *perianth outer surface below the limb* loosely subvillous, epidermis clearly visible, the hairs irregularly aligned, predominantly wavy, predominantly suberect and erect with scattered irregularly aligned, ascending hairs, the hairs Y-shaped, predominantly ferruginous. (Fig. 1 c.)

*Representative specimens examined*: **VICTORIA**. Eastern Highlands: Goulburne [Goulburn] River, 1892, W.[F.] Gates 19 (MEL 65747); Head of the Macalister River, iii. 1861, F. Mueller s.n. (MEL 65741); Tangil [Tanjil], 1895, C. Collyer 2 (MEL 65746); Walhalla District, x. 1903, H.T.N. Tisdall s.n. (MEL 65750); Walhalla District, vii. 1904, C. Walter s.n. (MEL 65744); Tali Karng, 31. xii. 1963, T.B. Muir 2961 (MEL 1510168); Valencia Creek Road, 7 km N of Esteppey Yards,  $\pm$  16 km SE of Mt Wellington, 1. xi. 1973, A.C. Beauglehole 43464 (MEL 517504, NSW); 1.5 km from Walhalla on road to Moe, 20. xi. 1973, D.J. McGillivray 3199 & C. Bartlett (G, K, MEL 65754, NSW); Barkly-Goulburn State Forest, Morning Star Creek, 25. iv. 1985, A.C. Beauglehole 79290

(MEL 673207); Walhalla, 0.6 km S of township on main road S of Walhalla, 24. vi. 1996, *V. Stajsic* 2164-2168 & *P. Włodarczyk* (AD, CANB, HO, MEL 2115725, 2115727, 2115729, 2115733, NSW). Snowfields: At Mount Baw Baw, *s.d.*, *W.H. Pearson s.n.* (MEL 65752); Summit and higher regions of Mt Useful, i. 1863, *F. Mueller s.n.* (MEL 65748); Mount Useful Natural Feature-Scenic Reserve, 24. iv. 1985, *A.C. Beauglehole* 79272 (MEL 673170); Neilson Crag (The Watchtower), c. 7 km E of Snowy Range airport, 1. i. 1987, *D.E. Albrecht* 2976 (MEL 2017447); Moroka River crossing of track from Millers Gap to Moroka Road, 2. i. 1987, *D.E. Albrecht* 2979 (MEL 688976); Mount Useful area, 3 km before summit on Mount Useful Spur Road, 30. viii. 1996, *V. Stajsic* 2404-2407 (AD, CANB, HO, MEL 2115735, 2115737, 2115739, 2115741, NSW); Mount Useful area, 2.5 km before the summit on Mount Useful Spur Road, 31. viii. 1996, *V. Stajsic* 2420 (AD, CANB, HO, MEL 2115745, NSW); Summit of Mount Useful on N side of the firetower, on road between Mount Selma and Mount Useful, 28. ix. 1996, *V. Stajsic* 2421, 2422, *W.M. Molyneux & S.G. Forrester* (AD, CANB, HO, MEL 2115747, 2115750, NSW); Mount Wellington Track, 2.3 km from Tamboritha Road, beside ford at the river crossing, 6. xi. 2002, *P.M. Olde 02/302, P. Madden, D. Fraser & Grevillea Study Group* (BRI, MEL 2233954).

*Phenology*: Flowering has been recorded almost throughout the year especially at lower altitude sites such as Walhalla. At higher altitudes in the absence of snow flowering can occur sporadically throughout the year. Nectarivorous birds, in particular honeyeaters of various species visit the flowers and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status*: *Grevillea miqueliana* subsp. *miqueliana* is endemic to Victoria in the Walhalla, Avon Wilderness, Mt Useful, Caledonia River, and Moroka regions, from low montane to alpine regions of central Gippsland, occurring from 300-1400 m above sea level.

Populations are disjunct, and plants are never common at any site. At some localities, in particular at Walhalla, it is at risk of becoming extinct due to the very small number of plants and landslides. A conservation status of Vulnerable (3VCI *sensu* Briggs & Leigh 1996) or Vulnerable (VU *sensu* IUCN 2001) is suggested.

*Habitat and Ecology*: At Walhalla the plants grow on a vertical rocky slope above the road, as well as on a very steep slope below the road, in *Eucalyptus cypellocarpa* and *E. radiata* subsp. *radiata* forest at approximately 300 m above sea level. Along the Mt Useful Spur it is found among granitic boulders and beside the road in a *Eucalyptus kybeanensis* and *E. pauciflora* association. At the summit of Mt Useful it grows in *Eucalyptus pauciflora* woodland, with *Acacia alpina* and *Leionema phyllicifolium*, on Tertiary basalts at about 1430 m above sea level. At Neilson Crag it occurs on cliff edges along a narrow ridge, on Ordovician sedimentary rock, in *Eucalyptus glaucescens* woodland, with *Callistemon pallidus*, *Derwentia perfoliata*, *Leptospermum brevipes*, *Nematolepis squamea* subsp. *coriacea*, *Oxylobium ellipticum* and *Westringia senifolia*, at 1350 m above sea level. At the Moroka River crossing of track from Millers Gap to Moroka Road it grows in tall wet sclerophyll forest dominated by *Eucalyptus delegatensis* and *E. nitens* at approximately 1200 m above sea level.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes*: An 1892 specimen from the 'Goulbourne River' (MEL 65747) (presumably from near the headwaters of the Goulburn River) and an 1895 specimen from 'Tangil' (MEL 65746) are held at MEL, both collections congruent with *G. miqueliana* subsp. *miqueliana*. MEL also holds another historical specimen of *G. miqueliana* subsp. *miqueliana* collected by W.H. Pearson (no date of collection on the label, MEL 65752),

the specimen labeled as 'At Mt Baw Baw'. This is the only specimen of any member of the *G. victoriae* species complex that is labeled as having been collected from Mt Baw Baw. The locality was either recorded in error, specimens mixed-up or the specimen may have possibly been collected in the Tanjil district or in the vicinity of the headwaters of the Thomson River (see also Notes for *G. parvula*).

There is slight morphological variation present within *G. miqueliana* subsp. *miqueliana*, both intra and inter-populationally. For example, at the summit at Mt Useful there are occasional plants with smaller leaf dimensions in sites that are more exposed to the elements, which approach those of subsp. *moroka* (e.g. V. Stajsic 2405, 2407 & 2420). The leaves of these specimens differ from subsp. *moroka* in being consistently smooth on the upper surface and the margins being rolled or recurved. While the example of the Mt Useful plants can be seen as ecotypic variation, occasional herbarium specimens may sometimes be difficult to assign to subspecies. The Walhalla population tends to have narrower primary peduncles, (0.6–) 0.8–1.0 mm wide compared with other populations of *G. miqueliana* subsp. *miqueliana* which vary from 0.9–1.5 (–1.7), however no other morphological characters could be found to justify the recognition of the Walhalla population as another subspecies of *G. miqueliana*.

The leaves of *G. miqueliana* subsp. *miqueliana* are similar to those of *G. callichlaena*, but the leaf upper surfaces in *G. callichlaena* are consistently granulose.

***Grevillea miqueliana* subsp. *cincta* Molyneux & Stajsic, subsp. nov.**

A subspeciebus *miqueliana* et *moroka* ramulis plerumque dense subtomentosis (interdum subvillosis) et lamina infra subsericea vel interdum subtomentosa differt.

*Type:* Victoria, Eastern Highlands, on a saddle ca. 1 km NE of summit of Mt Selma, and 500 m west of the entrance to Black River Track on the Mt Selma/Fiddlers Green Road, 9. i. 2000, W.M. Molyneux s.n. & S.G. Forrester (holo: MEL 2118603!; iso: CANB!, MEL!, NSW!).

Spreading to erect *shrub* 1.5–2.5 m high, 2.5–7 m across. *Branchlets* usually densely subtomentose or occasionally densely subvillosous of biramous non-glandular hairs, epidermis not visible, with a lower layer of predominantly mutually aligned, appressed or ascending, straight and wavy hairs, the hairs off-white or silvery-white, with an overlayer of irregularly aligned, predominantly ascending or erect hairs with scattered suberect Y-shaped, straight and wavy hairs, off-white or silvery-white; internodes often distant. *Leaves* narrowly to broadly elliptical, less often obovate, (20–) 40–90 (–102) mm long, (8–) 16–30 (–38) mm wide, usually acute or occasionally obtuse, with a short blunt mucro, *margins* rolled downwards to slightly recurved; *leaf length to width ratio* 2.5–3.6:1 (–3.8:1); *leaf upper surface* glabrous and minutely foveolate, usually glossy, mid to dark-green, *lateral veins* obscure or evident, *reticulum* absent; *leaf lower surface* usually loosely to moderately subsericeous or occasionally loosely subtomentose, of biramous non-glandular hairs, epidermis visible, with a lower layer of predominantly mutually aligned appressed hairs, predominantly straight with occasional ± slightly wavy hairs, off-white and silvery-white hairs, if subtomentose with an overlayer of scattered irregularly aligned ascending and suberect, predominantly tan and ferruginous hairs, *lateral veins* conspicuous, *reticulum* evident; *soft-textured*. *Conflouescences* simple to twice branched, simple 67%, once-branched 25%, twice-branched 8%; *number of flowers* (12–) 18–34 (–40) per unit conflouescence; *primary peduncles* (0–) 6–12 (–20) mm long, 0.9–1.1 mm wide, indumentum (as in rachises) subtomentose of biramous non-glandular hairs, epidermis visible or not visible, the hairs predominantly mutually aligned, the hairs appressed and ascending, predominantly straight with occasional ± slightly wavy hairs, the hairs off-white or silvery-white, overall *colour* (as in rachises) off-white, dirty-whitish or

greenish-white, often the peduncle has a denser indumentum (like that of branchlets); floral rachises (12–) 17–20 (–28) mm long. (Fig. 1 c.)

*Representative specimens examined:* **VICTORIA.** Snowfields: Oriental Saddle, 2.4 km ESE from Mount Selma on Track S10, 31. viii. 1996, V. Stajsic 2489–2494 (MEL 2185841, 2185842, 2185843, 2185844, 2185845, NSW); Oriental Saddle, 2.4 km ESE from Mount Selma on Track S10, 28. ix. 1996, V. Stajsic s.n., W.M. Molyneux & S.G. Forrester (MEL 2185846); Temp Bee Track 124, 1 km NE from summit of Mount Selma, 500 m west from Black River Track entrance, 28. ix. 1996, V. Stajsic 2487, 2488, W.M. Molyneux & S.G. Forrester (MEL 2185839, 2185840).

*Phenology:* Flowering has been recorded primarily from July to February, but in the absence of snow can occur sporadically throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status:* *G. miqueliana* subsp. *cincta* is endemic to Victoria, in the subalpine region of the central Gippsland highlands, occurring at altitudes between 1200–1400 m above sea level. It is currently only known from two sites in the area between Mt Selma and the Oriental Saddle, N into the headwaters of the Black River and S into the headwaters of Oriental Creek, an area of approximately 2 km<sup>2</sup>. The taxon is not protected within any conservation reserve. At the type-site plants occurring beside the road are threatened by road works. At Oriental Saddle it is threatened by roadworks and logging operations as it occurs adjacent to a logging coupe (Stajsic pers. observ. 1996). A conservation status of Endangered (2E *sensu* Briggs & Leigh 1996) or Critically Endangered (CR *sensu* IUCN 2001) is suggested.

*Habitat and Ecology* At the type-site the plants grow partly along the road in an open position adjacent to a *Eucalyptus pauciflora* and *E. stellulata* dominated woodland, at about 1200 m above sea level. The majority of the population occurs in this woodland on the margin of a moist creek line on a north-facing slope, on soil derived from Ordovician marine sediments (shale and slate). It is associated with *Acacia obliquinervia*, *Derwentia derwentiana* subsp. *derwentiana*, *Dianella tasmanica*, *Monotoca scoparia*, *Oreomyrrhis* sp., *Poa sieberiana*, *Pultenaea muelleri*, and *Tasmannia lanceolata*. The abundance of *G. miqueliana* subsp. *cincta* quickly decreases once the understorey of *Calochlaena dubia* and *Polystichum proliferum* increases. At the Oriental Saddle site it grows in tall open forest dominated by *E. dalrympleana*, *E. delegatensis*, and *E. nitens*.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that a part of both populations occurs along vehicle-tracks, care must be taken not to eliminate these plants through road works.

*Etymology:* The specific epithet is derived from the Latin ‘*cinctus*’ = ‘encircled, ‘girdled’ or ‘enclosed’, a reference to its geographic position in relation to *G. miqueliana* subsp. *miqueliana*, *G. miqueliana* subsp. *moroka*, *G. monslacana* and *G. victoriae* subsp. *victoriae*.

*Notes:* *Grevillea miqueliana* subsp. *cincta* differs from *G. miqueliana* subsp. *miqueliana* and *G. miqueliana* subsp. *moroka* in having usually subtomentose branchlets, and only occasionally being subvillous in some plants at Oriental Saddle (V. Stajsic s.n MEL 2185846). It also differs in having a subsericeous or occasionally subtomentose leaf lower surface of predominantly appressed or slightly ascending hairs. This contrasts with the leaf lower surface indumentum being villous of erect and or suberect predominantly Y-shaped hairs in both *G. miqueliana* subsp. *miqueliana* and *G. miqueliana* subsp. *moroka*. *Grevillea miqueliana* subsp. *cincta* also has consistently smooth leaf upper surfaces that are never granulose.

***Grevillea miqueliana* subsp. *moroka*** Molyneux & Stajsic in Makinson (2000), *Flora of Australia* 17A: 502.

*Type*: Victoria, The Sentinels, 4 mls [6.4 km] SW of Mt Wellington, 2. i. 1964, *T.B. Muir* 3044 (holo: MEL 1510169!)

*G. victoriae* 'race k' of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 (1993).

*G. miqueliana* 'Mt Wellington form' of P.M. Olde and N.R. Marriott, *Grevillea Book* 3:31-32 (1995).

*G. victoriae* 'race k' of R.O. Makinson, *Flora of Victoria* 3:852 (1996).

*Illustrations*: P.M. Olde & N.R. Marriott, *Grevillea Book* 3:31 (bottom right), 32 (20A.) (1995); N.G. Walsh & T.J. Entwisle, *Flora of Victoria* 3: 853 (fig. 172g, h) (1996).

Spreading to erect compact *shrub* (0.5–) 1.5 (–2) m high, 1.2–2.5 m across. *Branchlets* densely subvillous of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending hairs with some appressed hairs, straight and wavy hairs, the hairs off-white or silvery-white, with an overlayer of irregularly aligned, predominantly erect and suberect Y-shaped, straight and wavy hairs, off-white or silvery-white; internodes often short. *Leaves* elliptical to obovate to occasionally ovate, (9–) 20–35 (–50) mm long, (5–) 8–16 (–25.2) mm wide, apex obtuse or occasionally emarginate with a short blunt mucro, *margins* shortly but distinctly revolute; *leaf length to width ratio* 1.5:1–2.2:1; *leaf upper surface* usually strongly granulose and/or occasionally with scattered longer biramous non-glandular hairs 0.2–0.3 mm long (in younger leaves), seldom only slightly granulose, dull, mid to dark-green; *leaf lower surface* loosely villous of biramous non-glandular hairs, epidermis clearly visible, the hairs irregularly aligned, predominantly erect and suberect Y-shaped, straight and wavy, off-white or silvery-white with scattered tan-coloured hairs, with occasional ferruginous hairs predominantly on the veins, epidermis clearly visible, *lateral veins* prominent, *reticulum* absent to occasionally evident; *leathery-textured*. *Conflorescence* simple to twice-branched, simple 90%, once-branched 7.5%, twice-branched 2.5%; unit *conflorescence* cylindrical or dome shaped, acropetal; *number of flowers* 22–38 per unit conflorescence; *primary peduncles* (0–) 5 (–17) mm long, (0.8–) 1.0–1.2 (–1.5) mm wide, indumentum (as in rachises) as in branchlets, *overall colour* (as is the rachis) off-white or dirty-whitish; *floral rachises* (5–) 12–20 (–25) mm long. (Fig. 1 c.)

*Representative specimens examined*: **VICTORIA**. Snowfields: Mt Wellington, iii. 1861, *F. Mueller s.n.* (MEL 65751); Mt Wellington, 25. iv. 1967, *W.M. & J. Molyneux s.n.* (NSW 98771); East Pinnacle Lookout, c. 3 km N of Castle Hill, 13. iii. 1997, *J.A. Jeanes 265 & S.A. Day* (MEL 2037429); The Watchtower, c. 8 km E of Mt Reynard, 13. iii. 1997, *J.A. Jeanes 266 & S.A. Day* (MEL 2037430); The Pinnacles Fire Tower (overlooking Wonangatta Valley), 12. iii. 1967, *K.C. Rogers s.n.* (MEL 600067); Neilson Crag (The Watchtower), c. 7 km E of Snowy Range airport, 1. i. 1987, *D.E. Albrecht 2976 & N.G. Walsh* (MEL 688974); ± 2.8 km NW of Mt Wellington, 7. i. 1973, *A.C. Beauglehole 41120 & E.A. Chesterfield* (MEL 2118604 & 559190, NSW); The Razorback between Mount Hump and The Gable End, 30. xii. 1990, *E.A. Chesterfield 3115* (MEL 2047025); Mount Hump, 11. i. 1949, *T.M. Whaité s.n.* (NSW 93344); Alpine National Park, foot of Neilson Crag (The Watchtower), 15. xii. 2000, *N.G. Walsh 5271* (MEL 2089859, MEL (Vic.Ref.Set)); Neilson's [Neilson] Crag (The Watchtower), 6. xi. 2002, *P.M. Olde 02/297*, *P. Madden, D. Fraser & Grevillea Study Group* (BRI, CANB, K, MEL 2233955).

*Phenology*: Flowering has been recorded primarily between August and January with a second flush in March–April, but in the absence of snow can occur sporadically throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status*: *Grevillea miqueliana* subsp. *moroka* is endemic to the alpine region of Victoria occurring at altitudes between 1400 and 1500 m above sea level. It occurs in The Razorback, The Pinnacles, Neilson Crag and the Moroka

River regions. The subspecies occurs within the Alpine National Park. The collecting notes from two recent collections (N.G. Walsh 5271, and P.M. Olde 02/297) from Neilson Crag comment respectively that the subspecies is common or abundant. A conservation status of Vulnerable (2VC- *sensu* Briggs & Leigh 1996) or Vulnerable (VU *sensu* IUCN 2001) is suggested.

*Habitat and Ecology:* It often grows in high-altitude dry open woodland, usually on rocky sites on ridges and slopes, on stony loam soils. The geology of the sites varies from Upper Devonian to Late Carboniferous sediments to metamorphics. At Neilson Crag *Grevillea miqueliana* subsp. *moroka* grows on cliff edges along a ridge, among scrub on metamorphosed sandstone, and in *Eucalyptus glaucescens* dry open woodland, associated with *Acacia obliquinervia*, *Acacia siculiformis*, *Callistemon pallidus*, *Euryomyrtus ramosissima*, *Leptospermum brevipes*, *Nematolepis squamea* subsp. *coriacea*, *Podolobium ellipticum*, and *Westringia senifolia*. At The Razorback it grows on a rocky exposed escarpment fringed with *Eucalyptus pauciflora* woodland, and at the type locality at The Sentinels it also grows on a rocky outcrop.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *Grevillea miqueliana* subsp. *moroka* corresponds with McGillivray & Makinson's informal race 'k'. This is a well-known taxon in the horticultural trade where it has been sold under the name *G. miqueliana* 'Mt Wellington' for many years. This taxon was first introduced into the nursery trade by one of us (Molyneux) in 1967 and remains readily available today.

*Grevillea miqueliana* subsp. *moroka* is most closely related to *G. miqueliana* subsp. *miqueliana*. It can be distinguished from *G. miqueliana* subsp. *miqueliana* by several foliar and floral characters. The most obvious differences between the two subspecies are in the nature of the leaves. *Grevillea m.* subsp. *moroka* usually has rather smaller leaves that are (9–) 20–35 (–50) mm long and (5–) 8–16 (–25) mm wide, which are elliptical to occasionally ovate with strongly revolute margins and usually a granulose leaf upper surface. A single collection from Mt Wellington (MEL 65751) has only slightly granulose leaf upper surfaces, which is unusual especially for the Mt Wellington population. In contrast *G. miqueliana* subsp. *miqueliana* generally has larger leaves, which are (22–) 30–85 mm long and 15–33 mm wide. The leaves are ovate to elliptical or occasionally obovate or narrowly obovate with margins rolled downwards or shortly recurved. The leaf upper surface is usually glabrous and smooth to touch or microscopically asperulous (40x magnification) and smooth to touch in *G. miqueliana* subsp. *miqueliana*, but occasional (possibly immature leaves) specimens such as the A.C. Beaglehole 43464 (MEL 517504) specimen from Valencia Creek Road, 16 km SE from Mt Wellington have granulose leaf upper surfaces. At Walhalla the upper leaf surface is microscopically asperulous (40x magnification) and smooth to touch. The leaf upper surfaces in *G. miqueliana* subsp. *moroka* are almost always granulose. The two subspecies also differ in the length of the floral rachis, *G. miqueliana* subsp. *miqueliana* having relatively longer rachises 22–36 (–42) mm long, compared with (5–) 12–20 (–25) mm long in *G. miqueliana* subsp. *moroka*. There is also a difference in the confluence branching between the two subspecies. In *G. miqueliana* subsp. *moroka* the proportion of simple to twice-branched unit-confluences is: simple = 90%, once-branched = 7.5%, twice-branched = 2.5%. In *G. miqueliana* subsp. *miqueliana* the proportion of simple to twice-branched unit-confluences is: simple = 61.54%, once-branched = 34.62%, twice-branched = 3.84%.

The width of the primary peduncle appears to be a variable character particularly in *G. miqueliana* subsp. *miqueliana* where it varies from being quite slender, (0.6–) 0.8–1.0 mm in the Walhalla population, to as wide as 1.7 mm in some plants in the Mt Useful population, although it is generally 0.9–1.3 mm wide in most populations. The primary peduncle in *G. miqueliana* subsp. *cincta* is 0.9–1.1 mm wide.

From specimens held at MEL it seems that *Grevillea miqueliana* subsp. *miqueliana* and *G. miqueliana* subsp. *moroka* are sympatric at Neilson Crag. Two separate collections with the same collecting number D. E. Albrecht 2976 & N.G. Walsh and all other label information are held at MEL. MEL 2017447 is congruent with *G. miqueliana* subsp. *miqueliana*, while MEL 688974 is congruent with *G. miqueliana* subsp. *moroka*. A visit to Neilson Crag in the early 1990's by one of us (Stajsic) observed a single plant of *G. miqueliana* subsp. *miqueliana*, but no voucher specimen was collected.

***Grevillea monslacana*** Molyneux & Stajsic in Makinson (2000), *Flora of Australia* 17A: 502.

*Type*: Victoria, Eastern Highlands, Rubicon State Forest, NE junction of Ruooks Rd and Boundary Trail West, Blue Ra., 10. xii. 1995, *N.H. Sinnot 3136* (holo: MEL 2028003!)

*G. victoriae* 'race h' of D.J. McGillivray & R.O. Makinson, *Grevillea* 321, 324 (1993).

*G. victoriae* 'Lake Mountain form' of P.M. Olde & N.R. Marriott, *Grevillea Book* 3:225 (1995).

*G. victoriae* 'race h' of Makinson, *Flora of Victoria* 3:852 (1996).

Spreading to erect *shrub* (1–) 1.5–3.5 m high, up to 3 m across. *Branchlets* terete, subterete to biconvex in cross-section, with several longitudinal ridges, densely tomentose, epidermis not visible, the hairs mutually and irregularly aligned, the hairs predominantly ascending, predominantly straight or with occasional  $\pm$  slightly wavy hairs, off-white with scattered tan-coloured hairs, with or without scattered ferruginous hairs. *Colour of new growth* ferruginous, soon becoming green. *Leaves* ascending (towards apex of shoot), petiolate, simple, entire, narrowly obovate or occasionally narrowly elliptic, (20–) 30–70 (–120) mm long, (4–) 8–15 (–25) mm wide; apex acute or obtuse with a short blunt mucro, *margins* distinctly but not tightly recurved; *length to width ratio* (3.6:1–) 4.0–6.0:1 (–8.0:1); *leaf upper surface* glabrous and minutely foveolate, or with scattered biramous non-glandular, mutually aligned, appressed, ascending and or  $\pm$  erect silvery-white hairs (0.1–) 0.3 mm long just above petiole on the midvein and sides of the midvein on the lamina, variably dull or glossy, mid to dark-green, *lateral veins* obscure to evident, rarely conspicuous, *reticulum* absent; *leaf lower surface* loosely sericeous of biramous non-glandular hairs, epidermis clearly visible, the hairs predominantly mutually aligned, appressed, straight, short, silvery-white, with occasional regularly and irregularly aligned, tan-coloured and ferruginous hairs, *lateral veins* obscure to evident, reticulum absent; soft and relatively thin textured. *Conflorescences* terminal or occasionally axillary or cauline, decurved to pendulous, pedunculate, simple to four- branched, simple 42%, once-branched 28%, twice-branched 19%, thrice-branched 7%, four-branched 4%, *unit conflorescence* ovoid or a loose sometimes subsecund cluster, acropetal, *number of flowers* (8–) 20–24 (–34) per unit conflorescence; *primary peduncles* (0–) 4–10 (–25) mm long, (0.8–) 1 (–1.2) mm wide, indumentum (as in rachises) tomentose of biramous non-glandular hairs, epidermis not visible or  $\pm$  partially visible, predominantly ascending with occasional suberect hairs, straight with occasional  $\pm$  slightly wavy hairs, off-white or silvery-white, with or without occasional ferruginous hairs, *overall peduncle colour* whitish (as in rachises); *floral rachises* (10–) 15–30 (–35) mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.0–1.5 (–2.0) mm long and 0.3–0.5 mm wide, outer surface densely subsericeous

of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight and slightly wavy, off-white with occasional tan-coloured hairs, with scattered, predominantly mutually aligned slightly ascending hairs particularly at apex, glabrous inside except just below apex, brown, persistent until buds ca. 0.8–1.0 mm long; *pedicels* (3.0–) 3.5–4.5 (–5) mm long; *torus* oblique at 15–25° angle to the pedicel, squarish in plane-view with rounded angles; *very early flower buds* wholly apricot-coloured or light-ferruginous, or perianth (below the limb) apricot-coloured, maturing to red, pink or creamish, limb brownish-grey and maturing to brownish-grey or apricot-coloured, *advanced buds (pre-anthesis)* acroscopic, maturing to ± acroscopic to variably retrorse; *perianth below the limb* squarish with rounded edges in cross section; *perianth outer surface below the limb* loosely subsericeous of biramous non-glandular hairs, epidermis clearly visible, the hairs predominantly mutually aligned, predominantly appressed, straight and slightly wavy, ferruginous and tan-coloured, with scattered irregularly aligned, appressed and or ascending hairs, pink, pinkish-red or rarely whitish or pink with a white blotch in the central portion of ventral tepals; *perianth inner surface below the limb epidermis* minutely papillate below beard, glabrous except for beard, pinkish-white or whitish coloured; *perianth-limb* subglobose in side-view, squarish with rounded angles face on, apex obtuse, limb-segments not keeled on outer surface, rarely obscurely midline-keeled on outer surface, indumentum densely subsericeous of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed, straight and slightly wavy, off-white and tan-coloured, with scattered irregularly aligned, appressed and slightly ascending hairs, epidermis pink or pinkish-red; *dorsal tepal beard* commencing (2.8–) 3.2–3.5 mm above toral rim, beard extending for (3.7–) 4.2–5.7 mm, hairs 1.2–1.5 (–1.7) mm long; *ventral tepal beard* commencing 4.0–6.0 mm above toral rim, beard extending for (1.5–) 2.5–2.8 (–3.7) mm, hairs 1.2–1.5 (–1.7) mm long; *dorsal tepals* (17–) 18–20 (–21.5) mm long, 2.0–2.2 mm wide; *nectary* crescentic, 3/4 annular, projecting 0.2–0.3 mm above toral rim, margin entire or tridentate, pale-yellow; *pistil* (16–) 18–20 (–23) mm long; *stipe* (1.0–) 1.2–1.8 (–2.5) mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth before release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs in the upper 1/2 to upper 3/4 of style length, particularly at back of the style-end, pink, reddish-pink or rarely whitish; *pollen-presenter* strongly oblique to style, 2.0–2.5 (–2.7) mm long, 1.6–2.1 mm wide; *face of pollen-presenter* convex in cross-section, base not concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, 18–22 mm long, 5–7 mm deep, wall 0.5–0.9 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1 d.)

*Representative specimens examined:* **VICTORIA.** Eastern Highlands: Lake Mountain, xi. 1926, *ipse legi* (MEL 75128); Keppel Falls, ix. 1927, *Miss Goldsworthy* s.n. (MEL 75121); Marysville, 1928, *M. Keppel* s.n. (MEL 75167); Lake Mountain, i. 1929, *P.F. Morris* (MEL 75122); Forests Commission Huts, on one of the heads of Taggerty River, Lake Mountain, 10 miles N.E. of Marysville, 25. i. 1948, *J.H. Willis* s.n. (MEL 75169); Lake Mountain, 26. i. 1948, *J.H. Willis* s.n. (MEL 75153); Mt Margaret Road, along Whitehouse Creek, Blue Range, 26. ix. 1964, *R. Filson* 6522 (MEL 648229); Sources of Whitehouse Ck, between Mt Margaret and Keppel's Hut, (Lake Mountain area, ca. 90 miles ENE of Melbourne), 24. ix. 1964, *J.H. Willis* s.n. (MEL 75130); Lake Mountain, 8. iv. 1973, *M.D. Tindale* 763 (CANB, K, NSW 450205); Gerratys area, Lake Mountain, 17. xii. 1981, *N.G. Walsh* 907 (MEL 628623); Lake Mountain State Park, Melbourne Study Area, Sector H, Sub-Block 41A, 23. xi. 1982, *A.C. Beauglehole* 71693 & *C.M. Beardsell* (MEL 236985); Lake Mountain, 15. x. 1985, *D.B. Foreman* 1044 & *R. Filson* (CANB, MEL 1546270, NSW); Lake Mountain Region, ca. 3 km NNE of summit on track to Mt Bullfight, 13. ii. 1993, *D.E. Albrecht* 5238, *I.C. Clarke* & *V. Stajsic* (MEL 2017356); Lake Mountain area, Gerratys carpark site, 10. vi. 1996, *V. Stajsic* 2144 & *W.M. Molyneux* (AD, CANB, MEL 2114536, NSW); Marysville State Forest, corner of Upper Taggerty Road, Goulds and Goulds No.2 Tracks, 10. vi. 1996, *V. Stajsic* 2400 & *W.M. Molyneux* (AD, CANB, HO, MEL 2114539, NSW); Marysville State Forest, 1 km

SE from Goulds No.1 Track on Upper Taggerty Road, on E side of Upper Taggerty River. 10. vi. 1996, V. Stajsic 2403 & W.M. Molyneux (AD, CANB, HO, MEL 2114533, NSW); Marysville State Forest, E side of Boundary Trail West Road, 0.38 km NW of its junction with Keppels Hut Track, 6. xii. 1998, W.M. Molyneux s.n. & S.G. Forrester (AD, CANB, HO, MEL 2061360, NSW).

*Phenology:* Flowering has been recorded primarily between August and January, but in the absence of snow can occur sporadically throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status:* *Grevillea monslacana* is endemic to Victoria occurring in a geographically restricted area to the north and northeast of Marysville, in the Mt Margaret and Lake Mountain region. It is the most westerly occurring species in the complex. The species is represented within Marysville State Forest and in the Lake Mountain area, where it occurs in scattered populations. Long-term fire regimes may be significant in local populations (see below). A conservation status of Rare (2RC- *sensu* Briggs & Leigh 1996) or Near Threatened (NT *sensu* IUCN 2001) is suggested.

*Habitat and Ecology:* *Grevillea monslacana* occurs in montane wet sclerophyll forest and subalpine open woodland, between 1100 and 1400 m above seal level. In the Marysville State Forest at the Upper Taggerty Road site it is found commonly beside roadsides as well as extending into the bushland. These sites are located at approximately 1100 m altitude, on chocolate-coloured soils of Palaeozoic granitic derivation, in *Eucalyptus delegatensis* dominated forest.

At Gerratys (i.e. Lake Mountain car-park area) *G. monslacana* grows on road batters, and extends into the bushland. This site is perhaps more subalpine than montane and the dominant overstorey species at this site are *Eucalyptus delegatensis* and *Eucalyptus pauciflora* subsp. *pauciflora*.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* Willis (1973) treated the population from near the head of the Taggerty River in the Eastern Highlands region of Victoria as part of *G. victoriae* var. *leptoneura*, but for an unknown reason placed the Lake Mountain populations into *G. victoriae* var. *victoriae*. Both the Taggerty and the Lake Mountain populations are congruent with *G. monslacana*. *Grevillea monslacana* corresponds with the informal race 'h' of McGillivray & Makinson (1993), the 'Lake Mountain form' of Olde & Marriott (1995), and race 'h' of Makinson (1996).

*Grevillea monslacana* exhibits little morphological variation, with minor variation in leaf size and shape, and flower colour.

The leaf lower surface of *G. monslacana*, like that of *G. epicroca*, is loosely sericeous of mutually aligned, short, silvery-white hairs. This distinguishes both *G. monslacana* and *G. epicroca* from *G. bemboka*, *G. brevifolia*, *G. oxyantha*, most populations of *G. parvula*, *G. polychroma* and *G. victoriae*, all of which have a densely sericeous or subsericeous leaf lower surface.

*Grevillea monslacana* differs from *G. epicroca* in having densely tomentose, terete, subterete or biconvex branchlets in cross-section, compared to the loosely sericeous, distinctly angular or subangular branchlets in *G. epicroca*. *Grevillea monslacana* also differs from *G. epicroca* and *G. parvula* in having the face of the pollen-presenter oblique to the style and convex (or occasionally flat) in cross-section, in contrast to the pollen-presenter being lateral to the style and concave in cross-section in *G. epicroca* and *G. parvula* (seldom flat in some flowers on occasional plants of *G. parvula* at Towamba River).

*Grevillea polychroma* differs from *G. monslacana* in the branchlets being sericeous or subsericeous, the leaf lower surface usually densely sericeous or subsericeous, with the epidermis not visible or partially visible, and the pollen-presenter lateral to the style. The leaf length to width ratio is also lower in *G. polychroma*, (2.0:1–) 2.3–3.0:1 (–4.3:1), compared with (3.6:1–) 4.0–6.0:1 (–8.0:1) in *G. monslacana*.

***Grevillea parvula*** Molyneux & Stajsic in Makinson (2000), *Flora of Australia* 17A: 502. *G. victoriae* var. *leptoneura* Benth., *Fl. Austral.* 5: 468 (1870), as var. ? *leptoneura*.

*Type*: [Victoria] Sources of the Genoa River, *F. Mueller s.n.* recd 1870 (lecto: K–specimen to the left of the sheet, Neg.No.Kew 2285 *n.v.*, (*vide* D.J. McGillivray & R.O. Makinson, *Grevillea*: 447-448 (1993)); isolecto: [collection data as for lectotype] (K–specimen to the right of the sheet Neg.No.Kew 2285); residual syntypes: Sources of the River Genoa, N.S.W., *s.d.*, *ipse legi* [*F. Mueller*], also labeled: On the gravelly [*sic*] banks of creeks between the Womboyn & Genoa Rivers (MEL 75160 incl.pkt.!); White rock mountain 3–4000', Sept. 1860, *ferd. Mueller* (MEL 75161 incl.pkt!).

*G. victoriae* F.Muell. 'race f' *p.p.*, of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 (1993).

*G. victoriae* F.Muell. var. *leptoneura* Benth. of P.M. Olde and N.R. Marriott, *Grevillea* Book 3: 224-225, (1995).

*G. victoriae* F.Muell., unassigned to race *p.p.* ('Mallacoota Inlet'), of R.O. Makinson, *Flora of Victoria* 3: 852 (1996).

*Illustrations*: J.W. Wrigley & M. Fagg, *Banksias, Waratahs & Grevilleas*: 332 (1991), as *G. victoriae* var. *leptoneura*; D.J. McGillivray & R.O. Makinson, *Grevillea*: 323 (1993), as *G. victoriae*.

P.M. Olde & N.R. Marriott, *Grevillea* Book 3: 225 (184G.) (1995), as *G. victoriae* var. *leptoneura*.

Spreading to erect *shrub* (0.5–) 1–2 (–3) m high, 1–3 m across. *Branchlets* terete, subterete, concavo-convex or plano-convex in cross-section, seldom subangular in cross-section, with several longitudinal ridges, densely subvillous or seldom tomentose (some plants collections from Mt Wog Wog), of biramous non-glandular hairs, epidermis not visible, with a lower layer of mutually aligned and irregularly aligned, predominantly ascending hairs with some appressed, straight and wavy hairs, the hairs off-white or silvery-white and tan-coloured, with an overlayer of irregularly aligned, predominantly erect and suberect Y-shaped, straight and wavy hairs, off-white or silvery-white with occasional ferruginous hairs. *Colour of new growth* usually pink or purplish-pink, occasionally green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, narrowly elliptical, oblanceolate to narrowly obovate rarely broad obovate (in some plants in the Mt Wog Wog population), (12–) 25–50 (–80) mm long, (4–) 8–15 (–19) mm wide, apex usually acute with a short blunt mucro or obtuse with or without a short blunt mucro, margins very shortly recurved; *leaf length to width ratio* 2.0–5.0:1; *leaf upper surface* glabrous, minutely foveolate, or occasionally with scattered biramous non-glandular, appressed and/or ascending irregularly aligned, silvery-white hairs mostly just above the petiole, dull (? seldom glossy), mid-green to dark green, *lateral veins* obscure or rarely evident, *reticulum* obscure; *leaf lower surface* usually moderately densely or occasionally loosely subsericeous or subtomentose of biramous non-glandular hairs, the epidermis not visible, partially visible, or clearly visible, the hairs predominantly mutually aligned, predominantly appressed or predominantly ascending, straight with occasional ± slightly wavy hairs, silvery-white, with occasional or scattered ferruginous, dark ferruginous and or tan-coloured hairs, *lateral veins* obscure or occasionally evident, *reticulum* obscure; *soft-textured* (? seldom leathery). *Conflorescences* terminal or axillary, rarely subcauline, decurved to pendulous, pedunculate, simple to thrice-branched, simple

83%, once-branched, 11.45%, twice-branched 5%, thrice-branched 0.55%, *unit conflorescence* a loose irregular occasionally subsecund cluster, cylindrical or domed, acropetal; *number of flowers* (10–) 18–30 (–36) per unit conflorescence; *primary peduncles* (0–) 5–15 (–18) mm long, 0.6–1.0 mm wide, indumentum (as in rachises) moderately densely subsericeous or subtomentose of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed and ascending, straight and  $\pm$  slightly wavy hairs, silvery-white hairs with scattered mutually and irregularly aligned, scattered overlying tan-coloured or ferruginous hairs, or sometimes subvillous (and rachis tomentose), the hairs irregularly aligned, predominantly suberect with scattered ascending hairs, straight and wavy hairs, off-white and tan-coloured, *overall colour (as in rachises)* greenish, greenish-grey, off-white or whitish; *floral rachises* (6–) 10–20 (–35) mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally truncate, apex acute but blunt-tipped, 0.9–1.2 mm long, 0.2–0.3 mm wide, outer surface indumentum densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed with occasional ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white with tan-coloured hairs at the apex, inner surface glabrous except for the upper 1/3–1/4 of bract length, brown, persistent until buds 0.8 mm long; *pedicels* 2.5–5 mm long; *torus* oblique to pedicel at ( $10^\circ$ )  $15\text{--}40^\circ$  squarish in plane-view with rounded angles; *very early flower buds* wholly reddish-purple, perianth below the limb maturing to red or pinkish-red, limb maturing to ferruginous; *advanced buds (pre-anthesis)* acroscopic, maturing to  $\pm$  acroscopic to variably retrorse; *perianth below the limb* squarish in cross-section; *perianth outer surface below the limb* moderately densely to loosely subsericeous or subtomentose, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed with scattered ascending, straight with occasional  $\pm$  slightly wavy hairs, ferruginous and tan-coloured, base of perianth occasionally with minute, spreading simple glandular hairs (evident only in fresh or spirit preserved flowers), epidermis visible, epidermis red, overall perianth colour red or reddish-pink; *perianth inner surface below the limb epidermis* minutely papillate below beard, glabrous except for beard, red or pinkish-red; *perianth-limb* subglobose in side-view, squarish with rounded angles face-on, apex obtuse, limb-segments not keeled on outer surface, rarely obscurely midline-keeled on outer surface, densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs mutually aligned, predominantly appressed with occasional slightly ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, ferruginous, epidermis red; *dorsal tepal beard* commencing (0.8–) 1.8–2.5 (–3.5) mm above toral rim, beard extending for (2.0–) 4.0–6.2 mm, hairs (1.0–) 1.2–1.3 mm long; *ventral tepal beard* commencing 4–6.5 mm above toral rim, beard extending for 1–3.2 mm, hairs (0.8–) 0.9–1.0 (–1.2) mm long; *dorsal tepals* (11.2–) 17–20 mm long, 1–1.8 (–2.0) mm wide; *nectary* generally U-shaped or half-annular, projecting 0.1–0.5 mm above the toral rim, margin entire, pale-yellow; *pistil* (11–) 17–20 mm long; *stipe* (1.0–) 1.5–2.0 (3–) mm long, glabrous; ovary glabrous, green; *style* exerted from dorsal suture of perianth before release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs over most of style length or hairs confined to the upper 1/4–1/2 or 3/4 of style length, particularly at back of style-end, red or reddish-pink; *pollen-presenter* lateral to style, 1.5–3 mm long, 0.9–2.6 mm wide; *face of pollen-presenter* concave in cross-section (seldom  $\pm$  flattened in occasional flowers in some plants in the Towamba River population), base concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, (14.5–) 17–19.5 mm long, wall 0.5–0.6 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1 e.)

*Representative specimens examined:* **NEW SOUTH WALES.** South Coast: Towamba, W of Eden, vi. 1933, *B. Pigott s.n.* (NSW 93315); 8 m. W of Pericoe, WSW of Eden, *A. Floyd* 8 (NSW 93309); Track to Mt Imlay, c. 20 km SW of Eden, 15. x. 1974, *R. Coveny* 5800 & *J. Armstrong* (B,

K, L, MEL 75134, NA, NSW 450212, NT, PERTH, RSA); Letts Mountain, ca. 36 km W of Eden, 7 km ESE of Mt Wog Wog, 24. x. 1977, *I.R. Telford* 6741 (CANB, NSW 450194); 2 km S along Yambulla Road from Eden-Bombala Road, 26. iv. 1984, *K. Hill* 728, *L.[A..S.] Johnson & L. Pryor* (NSW 450209); Upper Genoa River, Limestone caves c. 1 km upstream from the confluence of Genoa and Nungatta Creek, 6. iv. 1986, *D.E. Albrecht* 2585 (MEL 690250); Yambulla State Forest, mountain peak 2.5 km direct NE of Mt. Poole, 21. vii. 1986, *J.D. Briggs & D.E. Albrecht* 1999 (CANB, NSW 450192); Coolangubra State Forest, southern escarpment of Big Jack Mountain, overlooking Stockyard Creek, 21. x. 1986, *D.E. Albrecht* 2926 (MEL 688943); Stanley Creek, near the intersection of Yambulla Road and Water Race Road, 14. iv. 1990, *D.E. Albrecht* 3931 (MEL 580850); Timbillica State Forest, ford of Wallagaraugh River near N end of Gallery Forest Road, 22. xi. 1992, *R.O. Makinson* 1236 & *G. Butler* (CBG, MEL 713942); South East National Park, Nalbaugh Plateau, Wog Wog Trig, 11. xi. 1999, *B.J. Mole* 311 & *W.A. Gebert* (MEL 2145914); Yambulla State Forest, near bridge of Imlay Road, 10. ix. 1996, *V. Stajsic* 2424-2426 (AD, CANB, HO, MEL 2115753, 2115755, 2115757, NSW); Mount Imlay National Park, Towamba River, 15.2 km from Princes Highway on Kiah-Towamba Road, 14. xi. 1996, *V. Stajsic* 2445 (CANB, MEL 2116283, NSW); East Compartment 249, crossing of Wallagaraugh River, reached from Broadaxe Road off princes Highway via German Creek Road, 21. xi. 1997, *W.M. Molyneux s.n. & S.G. Forrester* (MEL 2061359); **VICTORIA**. East Gippsland: Nungatta Mountains, 1869, *W. Weatherhead s.n.* (MEL 75162); Mallacoota, xi. 1925, *C.L. Barrett s.n.* (MEL 688391); Upper Genoa River, 25. ix. 1948, *N.A. Wakefield* 3199 (MEL 1510404); Back Creek, Mt Kaye, 13. x. 1948, *N.A. Wakefield* 3632 (MEL 1510180); Norinbee District, Camferbar Road, 3.3 km N of Thurra Junction Road, 24. v. 1980, *D.A. Cooke* 281 (MEL 566563); 200 m above Tennyson Creek, 0.7 km upstream from confluence with Sunday Creek, 11. iii. 1986, *J.V. Yugovic* 267 & *I.D. Lunt* (MEL 685232); Bank of Genoa River, beside Wangarabell Road, 19.3 km from Princes Highway, 24. x. 1991, *N.G. Walsh* 3239 (BRI, CANB, MEL 2013494, NSW); Coopracambra National Park, bank of Genoa River, 0.5 km due S of its confluence with Yambulla Creek, 20. i. 2000, *N.G. Walsh* 5144 (MEL 2063310).

*Phenology*: Flowering has been recorded throughout the year. At higher elevations such as at Mt Wog Wog snow may affect the seasonality of flowering time. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status*: In New South Wales *G. parvula* occurs predominantly to the south and west-southwest of Eden, in an area bounded by Eden on the coast, Pericoe to the west, and extending southwest to Yambulla State Forest and Rockton. In Victoria its distribution is centred on the Wallagaraugh and the Genoa Rivers but extends west to the Tennyson/Sunday Creeks (part of the Cann River system) area c.10 km northwest from Buldah just south of the New South Wales/Victoria border. *Grevillea parvula* occurs as scattered, localised populations in New South Wales and Victoria. It is more common in New South Wales where it is represented in some conservation reserves such as Mt Imlay National Park, and Nalbaugh National Park. The population at the lower Wallagaraugh River above Gipsy Point on the Mallacoota lakes in far eastern Victoria is currently not known to be under threat and appears to be represented within the Croajingolong National Park. The Mt Kaye population is represented in the Coopracambra National Park. However, the population near Buldah ca. 40 km north of Cann River, on the west side of the Monaro Highway, which is the most westerly population of the species in Victoria, occurs within State Forest. A conservation status of Rare (3RC- *sensu* Briggs & Leigh 1996) or Near Threatened (NT *sensu* IUCN 2001) is suggested for the New South Wales populations. For the Victorian populations a conservation status of Vulnerable (2VC- *sensu* Briggs & Leigh 1996) or Vulnerable (VU *sensu* IUCN 2001) is suggested.

*Habitat and Ecology*: *Grevillea parvula* has the broadest altitudinal range in the *G. victoriae* species complex. At an isthmus in the upper Mallacoota area on the Wallagaraugh River it can be found growing in almost saline conditions among *Melaleuca armillaris*. The species is not uncommon along the banks of the Wallagaraugh

River and the Genoa River. At Stanley Creek in the South Coast region of New South Wales it grows in crevices between granite rocks in riparian forest with *Eucalyptus elata*, *Lophostemon confertus*, *Leptospermum scoparium* and *Babingtonia pluriflora*. On the Towamba Road between Kiah and Towamba in the Imlay National Park *G. parvula* grows on road batter at an elevation of about 50 m in tall forest, as well as on the slopes above the Towamba River. At another site at the Imlay Road crossing of the Imlay Creek *G. parvula* grows among the boulder strewn slopes above the creek in dry-sclerophyll woodland with an overstorey of *Eucalyptus consideniana* and *Allocasuarina littoralis*. At Mt Imlay it grows in *Eucalyptus sieberi* forest. Mt Wog Wog is the highest elevation at which *G. parvula* has been recorded, at 1139 m above sea level.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *Grevillea parvula* corresponds with *G. victoriae* var. *leptoneura* Benth. *sens. strict.* only, and corresponds with McGillivray & Makinson's informal race 'f' only in part. It corresponds again only in part with the concept of var. *leptoneura* *sensu* by Olde and Marriott (1995), as these authors excluded the Mt Kaye populations (*G. parvula*) from their concept of *G. victoriae* var. *leptoneura*. However, unlike McGillivray & Makinson (1993), they did not include the W Tree Creek and the Mt Elizabeth populations within their concept of *G. victoriae* var. *leptoneura*, these taxa belonging in *G. polychroma*.

The name *G. victoriae* var. *leptoneura* is well known both among the botanical fraternity, as well as among the horticultural industry where it is sometimes referred to as *G. victoriae* var. '*tenuinervis*.' *G. victoriae* var. '*tenuinervis*' is a latinised form of the epithet *leptoneura* and has no formal nomenclatural status except perhaps as a *nomen nudum* (McGillivray & Makinson 1993).

Since the publication of *Grevillea victoriae* var. *leptoneura* by Bentham (1870), the name has been applied with varying degrees of consistency to a range of populations in Victoria, and the area between Eden in New South Wales and the Victorian border that have a combination of thin leaves, a sparser leaf lower surface indumentum and smaller floral features than present in the other populations of *G. victoriae sens. strict.* All are clearly very closely related but differ from one another in either strong or subtle vegetative and floral attributes. Willis (1973) treated the populations from the Taggerty, Thomson, Cann, Genoa and the Wallagaraugh Rivers as all belonging to *G. victoriae* var. *leptoneura*. The first of these populations corresponds with *G. monslacana*. No specimens from the Thompson River area are held at CANB, MEL or NSW herbaria. One can therefore merely speculate as to the identity of Thompson River taxon, it may belong to *Grevillea miqueliana* subsp. *miqueliana* (see also Notes for *G. miqueliana* subsp. *miqueliana*).

The Back Creek population of *G. parvula* in the Cann River district was treated by Willis (1973) as part of *G. miqueliana*. McGillivray & Makinson (1993) in their delineation of the informal races delimited race 'f' which was an even more heterogeneous assemblage that included the populations from W Tree Creek and Mt Elizabeth within race 'f'. Olde and Marriott (1995) however, appear to be the first workers to treat the populations from the W- Tree Creek and Mt Elizabeth as representing a distinct taxon separate from *G. victoriae* var. *leptoneura*. However, the Mt Kaye population that belongs to *G. parvula* should not have been excluded from their concept of *G. victoriae* var. *leptoneura*. While these three populations do not constitute one taxon,

what is significant is that the segregation by Olde and Marriott of these three populations, in particular the W Tree Creek and the Mt Elizabeth populations, represented an important step towards an elucidation of the *G. victoriae* var. *leptoneura* amalgam and the formation of a concept of *G. polychroma*.

In Makinson (2000) we restricted the concept of *G. victoriae* var. *leptoneura* to those populations of McGillivray & Makinson's race 'f' in part, that lie in New South Wales and in Victoria, on the catchment of the Wallagaraugh and Genoa Rivers (i.e. those mapped as east of 149° longitude in McGillivray & Makinson (1993): 322, map 90)).

The lectotype of *G. victoriae* var. *leptoneura* was collected by F. Mueller at the 'sources of the Genoa River' (probably near White Rock Mountain in the South Coast region of New South Wales) in 1870.

Due to the history of broad/loose application of the name *G. victoriae* var. *leptoneura* to several discrete taxa which we described in Makinson (2000) (i.e. *G. brevifolia* subsp. *polychroma*, *G. epicroca* and *G. monslacana*) we renamed *G. victoriae* var. *leptoneura* as *G. parvula*.

*G. parvula* often has smaller leaves, flowers and follicles compared to some of its close relatives.

*G. parvula* has affinities with *G. epicroca* which differs in having angular or subangular branchlets in cross-section, which are sericeous, loosely sericeous or have scattered, mutually aligned, appressed, silvery-white hairs. The branchlets in *G. parvula* are terete, subterete, concavo-convex or plano-convex in cross-section, seldom subangular, and densely subvillous (seldom tomentose). *G. epicroca* has a loosely sericeous or sparse indumentum of scattered short appressed hairs on the leaf lower surface which differentiates it from most populations of *G. parvula*. Occasional specimens of *G. parvula* from the Upper Genoa River (MEL 1510404) and a single collection from near the confluence of Tennyson and Sunday Creeks (MEL 685232) (both sites located in the East Gippsland region of Victoria) have a rather loosely sericeous leaf lower surface, but the hairs are longer than those of *G. epicroca*.

*G. parvula* differs from *G. polychroma* in having subvillous (seldom subtomentose as in occasional specimens from Mt Wog Wog) rather than subsericeous or subtomentose branchlets. The new growth in *G. polychroma* is ferruginous, not pink or purplish-pink (seldom green) as in *G. parvula*. The leaf upper surface in *G. polychroma* is glossy, not dull as in *G. parvula*. The very early flower buds in *G. polychroma* are wholly ferruginous or tan, not wholly reddish-purple as in *G. parvula*. The overall colour of the perianth outer surface below the limb in *G. polychroma* varies from red, pink, orange, yellowish to cream, compared with red or pinkish-red in *G. parvula*. The pollen-presenter is lateral and concurrent in both species, but in *G. polychroma* the face of the pollen-presenter is flat (or the lower margins incurved giving an appearance of being slightly concave as in some plants in the Mt Elizabeth population), not distinctly concave as in *G. parvula* (seldom flat as in occasional flowers on some plants at Towamba River).

A number of collections (Olsen s.n. NSW 128904; M.D. Crisp 2389, D.J. Cummings & A. Tyrrel NSW 452938; D.J. Cummings 41, M.D. Crisp & A. Tyrrel NSW 450183; D.J. Cummings 42, M.D. Crisp & A. Tyrrel NSW 450181) east of Big Badja at the southern extension of the Minuma Range in the Southern Tablelands escarpment of New South Wales appear to be similar to *G. parvula*. These collections are congruent with the 'unassigned specimen 4' of McGillivray & Makinson (1993). These collections share some points of similarity between *G. bemboka*, *G. parvula* and *G. epicroca*. The specimens have obovate or narrow-obovate leaves, 25-65 mm long x 8-20 mm wide, the leaf upper surface venation is obscure or evident, the leaf lower surface is subsericeous, the perianth-limb obtuse and slightly keeled. They are here treated as unassigned. See also Notes section for *G. bemboka*.

***Grevillea polychroma*** (Molyneux & Stajsic) Molyneux & Stajsic *comb. et stat. nov.*

*Grevillea brevifolia* F.Muell. ex Benth. subsp. *polychroma* Molyneux & Stajsic in Makinson (2000), *Flora of Australia* 17A: 502.

*Type*: Betts Creek Track, 12 [1.2] km E of Tulloch Ard Road, 9.5 km E of Mt Murrindal, Victoria, 9. ii. 1980, *S.J. Forbes* 264 (holo: MEL 594978!; iso: NSW!)

*G. victoriae* F.Muell. 'race f' *p.p.* of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 & 322 (1993).

*G. victoriae* F.Muell. 'race f' (Victorian populations only) of R.O. Makinson, *Flora of Victoria* 3: 852 (1996).

Spreading to erect open *shrub* 1–3 m high, to 5 m across; *branchlets* subangular becoming terete, with several longitudinal ridges, densely subsericeous or subtomentose of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, predominantly appressed, with scattered mutually aligned and irregularly aligned slightly ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white. *Colour of new growth* ferruginous soon becoming green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, usually obovate, less often elliptical or narrowly elliptical, (11–) 33–68 (–70) mm long, (6–) 12–23.5 (–30.5) mm wide, apex acute with a short blunt mucro, or occasionally obtuse; *margins* tightly and shortly recurved; *leaf length to width ratio* (2.0:1–) 2.3–3.0:1 (–4.3:1); *leaf upper surface* glabrous and minutely foveolate, except for scattered hairs on midvein just above petiole, glossy, mid-green, *lateral veins* obscure or evident, *reticulum* absent; *leaf lower surface* moderately densely sericeous of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed with occasional irregularly aligned, appressed hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white, with or without occasional irregularly aligned often overlying tan-coloured and or ferruginous hairs, *lateral veins* evident or obscure, *reticulum* obscure or absent; thin-textured. *Conflorescences* terminal or subterminal, decurved to pendulous, pedunculate, simple to thrice-branched, simple 69%, once-branched 26%, twice-branched 4%, thrice-branched 1%, *unit conflorescence* a loose subregular cluster, acropetal; *number of flowers* (12–) 28 (–44) per unit conflorescence; *primary peduncles* (0–) 6–15 (–21) mm long, 0.8–1.0 mm wide, indumentum (as in rachises) usually moderately densely subsericeous, epidermis not visible or partially visible, the hairs predominantly mutually aligned, predominantly appressed with occasional mutually aligned and irregularly aligned appressed and ascending silvery-white/off-white tan-coloured and ferruginous hairs, overall colour (as in rachises) whitish or greenish-white; *floral rachises* (11–) 14–20 (–32) mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally truncate, apex acute but blunt-tipped, 1.5–2.0 mm long, 0.4–0.5 mm wide, outer surface densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, predominantly appressed, straight and slightly wavy hairs, off-white and ferruginous with scattered irregularly aligned, ascending, tan-coloured and ferruginous hairs, inner surface glabrous except in upper 1/4 of bract length, persistent until buds 0.8–1.0 mm long; *pedicels* 2.8–7 mm long; *torus* oblique at 20–35°, squarish in plane-view with rounded angles or roundish; *very early flower buds* wholly ferruginous or tan-coloured, perianth below the limb maturing to creamish, pale-yellow, pink, pinkish-red or red, limb maturing to tan-coloured or light-ferruginous; *advanced buds (pre-anthesis)* acroscopic, maturing to  $\pm$  acroscopic to variably retrorse; *perianth outer surface below the limb* moderately densely subsericeous or  $\pm$  subtomentose of biramous non-glandular hairs, epidermis visible, the hairs predominantly mutually aligned, predominantly appressed with scattered irregularly aligned, appressed and ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, ferruginous and tan-coloured, epidermis red, pink, orange, yellowish or cream, overall perianth colour red, pink, orange, yellowish or cream;

*perianth inner surface epidermis below the limb* usually minutely papillate below beard, papillae particularly conspicuous along tepal margins where they are often larger and form minute simple hairs, glabrous except for beard, red, pink, orange, yellow or cream; *perianth-limb* subglobose in side-view, squarish in plane-view with rounded angles, apex obtuse, limb-segments not keeled on outer surface, densely sericeous or subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight with occasional  $\pm$  slightly wavy hairs, ferruginous and tan-coloured, epidermis red, pink, orange, yellow or cream; *perianth* below the limb squarish in plane-view or roundish in cross-section; *dorsal tepal beard* commencing 2–2.7 mm above toral rim, beard extending for 4.5–7 mm, hairs 0.8–1.5 mm long; *ventral tepal beard* commencing 4–6.6 mm above toral rim, beard extending for 1.8–3.5 mm, hairs 0.8–1.2 mm long; *dorsal tepals* 18–20 mm long, 1.3–2.3 mm wide; *nectary*  $\pm$  half-annular, projecting 0.2–0.5 mm above toral rim, margins entire or irregularly toothed, pale-yellow; *pistil* 19.2–21.5 mm long; *stipe* 2–3 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture prior to release of style-end, bowed, afterwards nearly straight to slightly incurved, with scattered minute spreading simple hairs in the upper 1/2–1/4 of style-end, particularly at back of style-end, red, pink, yellow, orange or cream; *pollen-presenter* lateral, 2.8–3.5 mm long, 2.2–3 mm wide; *face of pollen-presenter* flat in side-view (or seldom lower margins slightly incurved, giving appearance of pollen-presenter being shallowly concave as in plants from Mt Elizabeth), base concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, 18–23 mm long, 5–6 mm deep, wall 0.3–0.5 mm thick, glabrous, faintly colliculose-rugulose, with 3–5 longitudinal ridges on each side, firmly crustaceous, style persistent. (Fig. 1 a.)

*Representative specimens examined: VICTORIA.* East Gippsland: Murrindal Falls, 1937, *F. Robbins* s.n. (ACB 7760) (MEL 2146655); Murrindal Falls, 1937, *F. Robbins* s.n. (ACB 7935) (MEL 2146653); W Tree, near Buchan, x. 1947, *L. Hodge* s.n. (MEL 75168); Murrindal, W Tree Creek Buchan, 19. x. 1947, *N.A. Wakefield* 4127 (MEL 1510405); W-Tree Creek Falls, 14 mls N of Buchan, 15. i. 1948, *J.H. Willis* s.n. (MEL 75159); Mount Elizabeth No. 2, 28. ii. 1971, *A.C. Beauglehole* 37115 (MEL 2146656); Rodger River, 2.4 km, 90 degrees E Rodger River/Snowy River junction, 16. ix. 1979, *S.J. Forbes* 177 (MEL 2146652); Museum Spur Track, 1.6 km WSW of Helipad, 12 km ENE of Mount, Murrindal, 8. ii. 1980, *N.G. Walsh* 360 (MEL 596073); Mount Elizabeth, 48 km due NE from Bairnsdale, 26. i. 1987, *N.G. Walsh* 1700 (CBG, MEL 1556351, NSW); Orbost Region, Brodrribb Forest Management Block, 17. ii. 1986, *E.A. Chesterfield* 857 (MEL 1555987); 7.0 km NE along Collins Track on road to Mount Elizabeth summit, 14. x. 1986, *D.E. Albrecht* 2874 (AD, BRI, CBG, HO, MEL 2146654, NSW); Tabby forest block, c. 600 m on 35° T from confluence of Musk Creek and Rodger River, bluff 50 m above W bank of river, 11. ii. 1990, *J. Westaway* 752 (MEL 1589547); Buchan area, Tulloch Ard Road, c. 20 km NE of Buchan, 28. xii. 1990, *C. Le Breton* s.n. (MEL 698377); Mount Elizabeth, 1 km below summit on Collins Road, 23. vi. 1996, *V. Stajsic* 2159 & *P. Włodarczyk* (AD, CANB, HO, MEL 2115715, NSW); Mount Elizabeth, c. 2 km before the summit, 23. vi. 1996, *V. Stajsic* 2160 & *P. Włodarczyk* (AD, CANB, HO, MEL 2115717, NSW); Tulloch Ard, NW facing rocky slope above road to south near New Guinea, 8. v. 1997, *W.M. Molyneux* s.n. & *S.G. Forrester* (MEL 2115769 & 2115770); Yalmy River at Varneys Track Ford, 10 m upstream on N bank, 26. ix. 1999, *P. Geary* s.n. (MEL 2089239, MEL (Vic. Ref. Set)). Eastern Highlands: Jones Rd, c. 4 km E of Wentworth River, 30. xi. 1977, *N.G. Walsh* s.n. (MEL 524953); ‘Seldom Seen’ at S end of Jones’s Rd. S of Wentworth River, 14. xii. 1978, *N.G. Walsh* 142 (MEL 1513834); ca. 2.7 km NW from Mt Hoad (as the crow flies) on Yahoo Road, about 500 m E from junction with Bullumwaal-Mt Baldhead Road, 10. viii. 2003, *J. Stephens* s.n. (MEL 2218201).

*Phenology:* Flowering has been recorded from July to March. In cultivation it can flower sporadically throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status:* *Grevillea polychroma* is endemic to Victoria, the eastern limit of its range being in the Brodrribb Forest Block (in Errinundra National

Park), and the western extent of its range being Seldom Seen near Dargo (not to be confused with Mt Seldom Seen which is near Wulgulmerang). Its distribution is mainly centred between Buchan and Gelantipy in East Gippsland. The type-site at Betts Creek Track, as well as the site near the confluence of the Snowy River with Rodger River are within the boundary of Snowy River National Park. The species is locally common at Mt Elizabeth but rather localised. On Yahoo Road near Mt Hoad there are about 50 plants. The Seldom Seen, Mt Hoad, W Tree, and Mt Elizabeth sites are not protected within conservation reserves. Most populations cited above are small and localised. A conservation status of Vulnerable (3VC- sensu Briggs & Leigh 1996) or Vulnerable (VU sensu IUCN 2001) is suggested.

*Habitat and Ecology:* *Grevillea polychroma* has a much broader altitudinal range and ecological amplitude than *G. brevifolia*. It is found down to as low as 80 m above sea-level at the confluence of the Snowy and the Rodger Rivers in East Gippsland, where it grows as a riparian shrub among granite tors, with *Tristaniopsis laurina* and *Acacia floribunda*, as it also does at Yalmy River at Varneys Track Ford. At Tulloch Ard at the type-site it is associated with *Xanthorrhoea australis* and *Leucopogon lanceolatus* at about 400 m above sea level. In the Tabby Forest block it is found in *Eucalyptus macrorhyncha* dominated forest.

At Mt Elizabeth it grows in different forest types on rhyolite at an elevation between 800-940 m above sea level, on dry rocky slopes beside the track. It is found in rather dry forest dominated by *Eucalyptus sieberi*. At the summit it is also associated with *Eucalyptus regnans*.

In the Brodribb Forest Block it is found in *Eucalyptus obliqua* forest at an altitude between 1000-1100 m above sea level, the highest recorded for *G. polychroma*, occurring with *Westringia glabra* amongst granitic tors in a dense scrub association of *Acacia obliquinervia* and *Oxylobium arborescens* (Chesterfield et al. 1988).

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *G. polychroma* corresponds only in part with race 'f' of McGillivray & Makinson (1993). In their delineation of race 'f' they included populations which are now regarded as part of *G. parvula*, as well as including the W Tree Creek and Mt Elizabeth populations which correspond with *G. polychroma*. Olde and Marriott (1995) however, appear to be the first workers to treat the populations from the W Tree Creek and Mt Elizabeth as representing a separate taxon from *G. victoriae* var. *leptoneura*. However, the Mt Kaye population which they excluded from their concept of *G. victoriae* var. *leptoneura* should not have been excluded, as it is part of *G. parvula*. While these three populations do not constitute one taxon, what is significant is that the exclusion by Olde and Marriott of the W Tree Creek and the Mt Elizabeth populations in particular, from their concept of *G. victoriae* subsp. *leptoneura* represented an important step towards an elucidation of the *G. victoriae* var. *leptoneura* amalgam and the formation of a concept of *G. polychroma*. However, the colour illustration of '*G. victoriae*, form from W Tree Falls' in Olde & Marriott (*Grevillea Book 3: 225* (1995)) is unlikely to be *G. polychroma*. The plant depicted has flower buds with an acute perianth-limb, a character of *G. oxyantha*, which does not occur naturally at W Tree Falls. *Grevillea* enthusiast Leo Hodge (1904-?) bred grevilleas on his property 'Poorinda' at W Tree; the photo may be of a cultivated plant.

Separating *G. polychroma* from *G. parvula* based on herbarium specimens only may on occasions be difficult. Makinson (2000) comments that some specimens of *G.*

*polychroma* approach some populations (Mt Kaye) of *G. parvula* very closely in most features, and that there may be some intergradation. The specimens from the Mt Kaye area are variable in the size and shape of the leaves, some being obovate and within the dimensions of *G. polychroma*. However, leaf size and shape in *G. parvula* is variable. Field examination of the Mt Kaye population by one of us (Molyneux) confirmed that the Mt Kaye population is congruent with *G. parvula*. The branchlets of the Mt Kaye plants are subvillous, and the pollen-presenter distinctly concave in cross-section.

*G. polychroma* differs from *G. bemboka* in that the branchlets in *G. polychroma* are usually subsericeous or subtomentose, never subvillous. The leaf lower surface in *G. polychroma* is usually sericeous or occasionally subsericeous compared with the usually subsericeous or tomentose indumentum in *G. bemboka*. The lateral veins in *G. polychroma* are either obscure or evident, compared with the usually evident to conspicuous lateral veins in *G. bemboka*. In *G. polychroma* the primary peduncles are 0.8–1 mm wide, compared with 1.0–1.4 mm wide in *G. bemboka*. In *G. polychroma* the perianth-limb is always obtuse and not keeled, the face of the pollen-presenter is flat (seldom lower margins incurved giving appearance of being slightly concave in cross-section as in some plants of the Mt Elizabeth population) and the perianth outer surface below the limb is creamish, pale- yellow, pink, pinkish-red or red. In *G. bemboka* the perianth-limb is either obtuse or subacute and slightly to moderately midline-keeled, the pollen-presenter is usually distinctly concave in cross-section, never flat, and the perianth outer surface below the limb in *G. polychroma* varies from red, pink, orange, yellow or cream, sometimes several colour forms present in the same population.

*G. polychroma* differs from *G. parvula* in having branchlets that are subsericeous or subtomentose, never subvillous as in *G. parvula* (seldom subtomentose as in occasional specimens from Mt Wog Wog). The new growth in *G. polychroma* is ferruginous, not pink or purplish-pink (seldom green) as in *G. parvula*. The leaf upper surface in *G. polychroma* is glossy, not dull as in *G. parvula*. The very early flower buds in *G. polychroma* are wholly ferruginous or tan, not wholly reddish-purple as in *G. parvula*. The overall colour of the perianth outer surface below the limb in *G. polychroma* varies from red, pink, orange, yellowish to cream, compared with the red or pinkish-red in *G. parvula*. The pollen-presenter is lateral and concurrent in both species, but in *G. polychroma* the face of the pollen-presenter is flat (or the lower margins incurved giving an appearance of being slightly concave as in some plants in the Mt Elizabeth population), not distinctly concave as in *G. parvula* (seldom flat as in occasional flowers on some plants at Towamba River).

A summary of the differences between *G. brevifolia*, *G. polychroma* and *G. victoriae* is given in Table 2.

***Grevillea victoriae*** F.Muell., *Trans. Philos. Soc. Victoria* 1: 107 (1855).

*Type*: [Victoria] ‘Along the waters of the Buffalo Range, on the summits of Mt Buller and Mt Tambo, on the sources of the Mitta Mitta, at Mt Hotham and Mt Latrobe.’ [protologue]; lecto: MEL 75105!, the specimen at the left of the sheet. The sheet bears three specimens and two adjacent labels, the label at the left reading: ‘Grevillea Victoriae ferd Mueller Frutex biorygalis [2 fathoms = 12 feet] speciosus... Very rare on the shady banks of the Buffaloe creek 28 febr.53’; the label at the lower right of the sheet reading: ‘Ad rivum Buffaloe creek in densis Corraeae and leptospermorum virgultis 8.Mart 53....’ (lecto: fide D.J. McGillivray & R.O. Makinson, *Grevillea*, 447 (1993)) [This specimen conforms more closely to the protologue than the other syntypes]; isolecto: MEL 75105 [for label details see lectotype citation]—excluding the specimen at the left of the sheet and including the contents of the packet at the upper left of the sheet [although some of the contents have come from other type specimens]; Buffalo Creek Buffalo Range Victoria [Victoria] *Type* (NSW *n.v.*— paper envelope containing 2 leaves, at least one of which fits neatly on a leaf-scar of the lectotype); residual syntypes: On the Buffalo creek. In moist gravely [*sic*] places. March 1853. *Baron Dr. Mueller* (MEL 75102!); Gravely [*sic*] bed of

the Buffalo Creek. March 1853. (MEL 75104!); Mount La Trobe. *s.d.*, *Baron Dr. Mueller*. (MEL 75107!); Mount Aberdeen *ferd. Mueller*, 1853 (K–Neg.No.Kew 2283 [Mount Aberdeen is now known as ‘The Horn’ and is part of the ‘Buffalo Range’ cited by Mueller in the protologue]); Buffalo range. Victoria. *s.d.*, *ferd. Mueller* (K–Neg.No.Kew 2284!, excluding the 2-branched inflorescence at the top left of the sheet); In summis clivis rupestribus montis Buller & in ejusdem vertice. 22. martii 53. *Dr. M* [*F. Mueller*] (MEL 75106!); Buffalo range. 1853. *ferd. Mueller* (MEL 75101!); Buffalo range, *s.d.*, *ferd. Mueller* (NSW 93281); Mount Latrobe. *s.d.*, *F. Mueller* (MEL 75103!).

*Possible residual syntypes*: Buffalo Range (A *n.v.*, LE *n.v.*, MEL 75108!, NY *n.v.*); Victoria. *s.d.*, *Dr. Mueller* (NSW 93283); Australian Alps. *s.d.*, *Dr. ferd. Mueller* (K–presented by Linnean Society, 1915); Victoria leg. *Diels* 7484 [*F. Mueller*] (B *n.v.*).

[some of these collections may belong to taxa that were recognised in Makinson (2000) and here as distinct, e.g. the Mt Tambo syntype locality almost certainly relates to *G. brevifolia*, and to the Type collection of that species].

Spreading to erect *shrub* (1–) 1.5–3 m (–5) high, 1.5–4.5 m (–6 m) across. *Branchlets* usually subterete, terete or biconvex, with up to eight longitudinal ridges, densely subsericeous (in subsp. *victoriae* & *nivalis*) or densely subtomentose (in subsp. *nivalis*), of biramous non-glandular hairs, epidermis not visible, the hairs mutually aligned, appressed with scattered irregularly aligned, appressed and some ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white with scattered ferruginous hairs. *Colour of new growth* ferruginous soon becoming green. *Leaves* ascending (towards apex of branchlets), petiolate, simple, entire, usually narrowly elliptical to lanceolate (rarely oblanceolate) (in subsp. *victoriae*) or usually elliptic to narrowly-elliptical, occasionally ovate, rarely lanceolate or oblanceolate (in subsp. *nivalis*), (20–) 35–120 (–200) mm long, (7–) 10–35 (–50) mm wide, apex usually acute or obtuse with a short blunt mucro, *margins* flat to revolute, but can be variable in the same plant in subsp. *nivalis*; *leaf length to width ratio* 2.25:1–5:1 (–6.0:1); *leaf upper surface* minutely foveolate, glabrous or occasionally with scattered biramous non-glandular appressed, mutually aligned, silvery-white hairs (particularly in immature leaves) or occasionally microscopically asperulous (40x magnification), with microscopic T-shaped or triangular asperities or occasionally with irregularly aligned, ascending to erect, silvery-white hairs predominantly along the midvein and the lower part of lamina or just above petiole, occasionally mixed with appressed to ascending hairs or with erect irregularly aligned, ferruginous hairs, dull or glossy, mid-green to dark-green, *lateral veins* usually conspicuous to prominent but occasionally variable in the same plant, varying from evident to conspicuous (in subsp. *nivalis*); *reticulum* obscure to conspicuous, but occasionally obscure to conspicuous in the same plant and rarely absent (in subsp. *nivalis*); *leaf lower surface* densely sericeous (in subsp. *victoriae*), densely subsericeous (in subsp. *victoriae* & *nivalis*), or subtomentose (in subsp. *nivalis*), of biramous non-glandular hairs epidermis not visible, the hairs predominantly mutually aligned, appressed with scattered mutually and irregularly aligned, appressed and ascending, straight with occasional  $\pm$  slightly wavy, silvery-white hairs, with occasional tan-coloured and ferruginous hairs, *lateral veins* evident to prominent, *reticulum* absent (in subsp. *victoriae*) to prominent (in subsp. *nivalis*). *Conflorescences* terminal, subterminal or axillary, decurved to pendulous, pedunculate, simple to four branched; unit conflorescence shortly conico-cylindrical or a loose ovoid cluster, acropetal; *number of flowers* (16–) 22–48 (–68) per unit conflorescence; *primary peduncles* (0–) 3–17 mm long, (1.0–) 1.2–1.6 mm wide, indumentum (as in rachises) moderately densely subsericeous of biramous non-glandular hairs, epidermis not visible or partially visible, the hairs predominantly mutually aligned, appressed, straight with occasional  $\pm$  slightly wavy hairs, off-white or silvery-white, often with scattered irregularly aligned, appressed and occasional ascending tan-coloured or ferruginous hairs (in subsp. *nivalis*), *overall colour* (as in rachises) often dead-white white, or off-white; *floral rachises* (8–) 17–90 mm long; *floral bracts* narrowly-triangular, linear-crescentic in side-view, basally

truncate, apex acute but blunt-tipped, (1.0–) 1.5–2.7 mm long, 0.6–0.8 mm wide, outer surface densely subsericeous or subtomentose (in subsp. *nivalis*), epidermis not visible, predominantly mutually aligned, appressed with scattered ascending, straight with occasional  $\pm$  slightly wavy hairs, ferruginous and scattered tan-coloured hairs distributed over entire length of bract or in the upper 1/2 of bract length, inner surface glabrous except just below apex, tan-coloured; *pedicels* 3–7 mm long; *torus* oblique, at 15–40° to pedicel, squarish with rounded angles; *very early flower buds* wholly ferruginous or pale-ferruginous (in subsp. *nivalis*), or perianth below the limb ferruginous and limb tan-coloured (in subsp. *victoriae*), perianth below the limb maturing to red or pinkish-red, limb maturing to ferruginous; *advanced buds (pre-anthesis)* acroscopic, maturing to  $\pm$  acroscopic to variably retrorse; *perianth below the limb* squarish in cross-section with rounded angles; *perianth outer surface below the limb* moderately densely subsericeous (in subsp. *victoriae*), subtomentose (in subsp. *victoriae* and *nivalis*), or tomentose (in subsp. *victoriae* and *nivalis*) of biramous non-glandular hairs, epidermis partially visible or not visible, the hairs predominantly mutually aligned, appressed and ascending, with scattered irregularly aligned appressed and ascending hairs, straight and slightly wavy, ferruginous with occasional tan-coloured hairs, epidermis red or pinkish-red, overall perianth colour red or reddish-pink; *perianth inner surface epidermis below the limb* usually minutely papillate below beard, papillae particularly conspicuous along tepal margins where they are often larger and form minute simple hairs, glabrous except for beard, red or reddish-pink; *perianth-limb* subglobose in side-view, squarish with rounded angles face-on, apex obtuse, limb-segments not keeled or seldom slightly to moderately midline-keeled on outer surface, densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed with scattered mutually and irregularly aligned appressed and ascending hairs, straight and slightly wavy, ferruginous, epidermis red or reddish-pink, overall perianth colour red or pinkish-red; *dorsal tepal beard* commencing 1.5–3 mm above toral rim, beard extending for 4.2–5.7 mm, hairs 1.2–1.5 mm long; *ventral tepal beard* commencing (4.3–) 5–6 mm above toral rim, beard extending for 1.3–3 mm, hairs 1.2–1.5 mm long; *dorsal tepals* 18.2–22 (–23.5) mm long, 1.9–2.5 mm; *nectary* half-annular, projecting 0.4–0.6 mm above toral rim, margin entire or tridentate, pale-yellow; *stipe* 1.5–3 mm long, glabrous; *ovary* glabrous, green; *style* exerted from dorsal suture of perianth prior to release of style-end, bowed, afterwards nearly straight to slightly incurved, indumentum sparse, with scattered minute spreading simple hairs in upper 3/4 to 1/4 of style length, particularly at back of style-end, red or reddish-pink; *pistil* (18–) 19.7–22.5 (–25) mm long; *pollen-presenter* oblique to style, 2.5–3.1 mm long, (1.7–) 2.2–2.7 mm wide; *face of pollen-presenter*  $\pm$  flat or slightly convex, base not concurrent with the style; *stigma* distally off-centre; *follicle* ovoid/ellipsoid, (16–) 20–25 mm long, 5–7 mm deep, wall 0.5–0.7 mm thick, glabrous, faintly colliculose-rugulose, with several longitudinal ridges on each side, firmly crustaceous, style persistent.

*Notes:* Willis (1973) recognised two varieties within *G. victoriae*, *G. victoriae* var. *victoriae* and *G. victoriae* var. *leptoneura*. Under *G. victoriae* he cited specimens from Lake Mountain and Mt. Torbreck, Mts. Buller & Stirling, Barry Mts., Mt Buffalo, Bogong High Plains, Mt. Hotham, Mt. Tambo, Cobboras [Cobberas], Wombargo Range, Nunniong Plateau, near W Tree, and Mt Tingaringy. Several different taxa are encompassed here: *G. brevifolia* (Mt. Tambo, Cobboras [Cobberas], Wombargo Range, Nunniong Plateau, Mt Tingaringy), *G. monslacana* (Lake Mountain), *G. polychroma* (near W Tree), and *G. victoriae* subsp. *victoriae* (Mt. Torbreck, Mts. Buller & Stirling, Barry Mts., Mt Buffalo, Bogong High Plains, Mt. Hotham). New South Wales is mentioned only in vague terms ‘southern parts of the Dividing Range’.

Makinson (1991) in his account of the *Grevillea* in *Flora of New South Wales* recognised a broad concept of *G. victoriae*, which included *G. miqueliana*. McGillivray and Makinson (1993) also recognised a broad concept of *G. victoriae*, which included *G. miqueliana*, but additionally delineated eleven informal ‘races’ and identified an

additional eight specimens as being unassignable. See Table 4 for a summary of McGillivray & Makinson's (1993) 'races' and 'unassigned specimens' and their current names/taxonomic placement.

Olde & Marriott (1995) recognised three varieties: *G. victoriae* var. *victoriae* (which encompasses *G. victoriae* F.Muell. subsp. *victoriae* and *G. victoriae* subsp. *nivalis* Stajsic & Molyneux), *G. victoriae* F.Muell. var. *brevifolia* (F.Muell. ex Benth.) F.Muell. ex Maiden & Betche (*G. brevifolia* F.Muell. ex Benth.) and *G. victoriae* var. *leptoneura* Benth. (*G. parvula*, 2000). They also recognised the 'Lake Mountain form' (*G. monslacana* Molyneux & Stajsic in Makinson (2000)), *G. sp. aff. victoriae* 'A' (*G. oxyantha* Makinson subsp. *oxyantha* and *G. oxyantha* subsp. *ecarinata* Makinson 1998), and *G. sp. aff. victoriae* 'B' (*G. rhyolitica* Makinson subsp. *rhyolitica* and *G. rhyolitica* subsp. *semivestita* Makinson).

*Grevillea victoriae* occurs in the subalpine and alpine regions of the Southern Tablelands of New South Wales, and high montane, subalpine and alpine regions of Victoria. Two subspecies are recognised. References in McGillivray & Makinson (1993) to occurrences of *G. victoriae* in Queensland refer to the taxon now recognised as *G. hockingsii*.

The floral rachis indumentum of *G. victoriae* is often dead-white, contrasting strongly with the ferruginous flower buds. Other taxa sharing this feature are *G. diminuta*, which has much smaller leaves  $\leq 2$  cm longer and a shorter pistil 10–11 mm long, and *G. oxyantha*, which has a pyramidal perianth-limb of the flower bud (subglobose and obtuse in *G. victoriae*). Other related taxa have the overall rachis indumentum colour reddish, pale tan-coloured, or off-white, rarely pale but with the buds usually red, not ferruginous.

The colour of vegetative growth in *G. victoriae* is ferruginous or green, never pink or purplish-pink as in *G. callichlaena*, *G. epicroca*, some populations of *G. oxyantha* and *G. parvula*.

The summary of the differences between *G. victoriae*, *G. brevifolia*, *G. miqueliana*, and *G. polychroma* are given in Table 2; see also the Notes section for *G. brevifolia* and *G. miqueliana*.

### ***Grevillea victoriae* F.Muell. subsp. *victoriae***

*G. victoriae* F.Muell. 'race c', of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 (1993).

*G. victoriae* F.Muell. var. *victoriae*, of P.M. Olde & N.R. Marriott, *Grevillea Book 3*: 224 (1995), p.p.

*G. victoriae* F.Muell. 'race c', of R.O. Makinson, *Flora of Victoria 3*: 852 (1996).

*Illustrations*: G.R. Cochrane, B.A. Fuhrer, E.R. Rotherham & J.H. Willis, *Flowers and Plants of Victoria*: 161 (1968), as *G. victoriae*; P.M. Olde & N.R. Marriott, *Grevillea Book 3*: 224 (1995); L. Costermans, *Native Trees and Shrubs of South-Eastern Australia*: 160 (1985 reprint), as *G. victoriae*; M.G. Corrick & B. Fuhrer, *Wildflowers of Victoria*: 188 (2000), as *G. victoriae*.

*Branchlets* densely subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs mutually aligned, predominantly appressed with scattered irregularly aligned appressed and some ascending hairs, predominantly straight with occasional  $\pm$  slightly wavy hairs, silvery-white. *Leaves* usually narrowly elliptical to lanceolate (rarely oblanceolate), (30-) 40–120 (–200) mm long, (8-) 10–25 mm (–50) mm wide, apex usually acute with a short blunt mucro or occasionally obtuse, margins shortly recurved; *leaf length to width ratio* (2.85:1–) 4:1–5:1 (–6:1); *leaf upper surface* glabrous and minutely foveolate, or with scattered mutually aligned, appressed, silvery-white biramous non-glandular hairs, dull, dark-green, *lateral veins* conspicuous, *reticulum* obscure; *leaf lower surface* densely sericeous or subsericeous of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, appressed, straight or

with occasional  $\pm$  slightly wavy hairs, silvery-white with or without occasional irregularly aligned, appressed or ascending silvery-white, tan-coloured and/or ferruginous hairs, lateral veins evident or occasionally obscure, reticulum absent; leathery textured; Conflorescences simple to thrice-branched, simple 69%, once-branched 20%, twice-branched 9%, thrice-branched 2%; floral rachises (17–) 40–90 mm long. (Fig. 1 f.)

*Representative specimens examined:* **VICTORIA.** Snowfields: Sources of the Dargo, i. 1891, C. Walter s.n. (MEL 2148384); Buffalo Mountains, x. 1891, C. Walter s.n. (MEL 560245); Mt. St Bernard, i. 1900, J.H. Maiden s.n. (NSW 93284); Mt Hotham, 18. i. 1913, R.H. Cambage 3713 (NSW 93287); Buffalo Mountains, i. 1923, M. Nettie s.n. (NSW 93282); Mt Bogong, i. 1924, ? A.J. Tadgell s.n. (MEL 2145439); Mt Hotham, 30. i. 1938, J.H. Willis s.n. (MEL 75152); Track from Horn Hut to Horn, 22. xii. 1952, B.G. Briggs s.n. (NSW 93280); Macalister Springs, 1 mile east of summit of Mt Howitt 25. xii. 1960, T.B. Muir 2023 (MEL 1510179); Bogong High Plains, near Wilkinson Lodge, 5. xi. 1961, T.B. Muir 2498 (MEL 2148385); About 1 mile below Falls Creek on road to Mt Beauty, 29. xii. 1966, A. Rodd 384 (NSW 96936); Bogong High Plains, North Nelse Creek, south side of Spion Kopje, 23. i. 1967, A.C. Beauglehole 22337 (MEL 2148410); Mt Buller, 8. i. 1969, M. Allender s.n. (MEL 75132); The Razorback, between Mts Feathertop and Hotham, 1. ii. 1969, L.A. Craven 1525 (CANB, MEL 75147); Mt McKay-Howmans Gap Road, 3 km W of Falls Creek, 6. i. 1972, L.G. Adams 2647 (CANB, K, L, MEL 571769, NSW); Macalister Springs area near Mt Howitt, 28. xii. 1972, A.C. Beauglehole 40788 (MEL 559195, NSW); Mt St. Bernard near summit, 27. iii. 1973, A.C. Beauglehole 41190 (MEL 559196, NSW); Mt Buffalo, Reservoir Road, 13. xi. 1973, M.A. Todd 162 (MEL 558749); Mt Hotham development grid, 24. xi. 1979, S.J. Forbes 436 (MEL 594902); Mt Buffalo National Park, ca. 200 m down from summit of Mt. McLeod, 27. i. 1982, P.S. Short 1382 (MEL 601854); Red Robin Mine, 23. ii. 1983, C. Beardsell s.n. (MEL 1563267); Mt Torbreck summit walking track (near summit), 6. i. 1984, D.E. Albrecht 112 (MEL 663503); Mt Buffalo National Park, Mt Buffalo, 0.5 km N of Stanley Rocks wlk track and road junction, 18. xii. 1987, J.L. Porter 009 & B.J. Conn (AD, MEL 1578973, NSW 197042); Mt Buffalo National Park, 2.6 km by road N of Cresta Valley, 12. xi. 1988, B.J. Conn 3052 (CHR, MEL 119291, MO, NSW 218455); Rubicon State Forest, Mount Torbreck, ca. 800 m ESE from carpark/campsite 2. vi. 1996, V. Stajsic 2139, 2140 & W.M. Molyneux (AD, CANB, HO, MEL 2114515, 2114517, NSW); Mount Buffalo National Park, at the Leviathan on Mount Buffalo Road, 21. vi. 1996, V. Stajsic 2149 & P. Wlodarczyk (AD, CANB, HO, MEL 2114546, NSW); Mount Buffalo National Park, on slope above Bunyip Creek, on Mt Buffalo Road, 21. vi. 1996, V. Stajsic 2152 & P. Wlodarczyk (CANB, MEL 2114552, NSW); Bogong Highplains Road at Falls Creek Village on slope overlooking town, 22. vi. 1996, V. Stajsic 2157 & P. Wlodarczyk (AD, CANB, MEL 2115711); C. 39 km from Licola towards Jamieson, high slopes above road, 6. xi. 2002, P.M. Olde 02/303 & Grevillea Study Group (BRI, CANB, MEL 2233943, NSW).

*Phenology:* Flowering has been recorded primarily between October and February, but in the absence of snow can sporadically occur throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation Status:* *Grevillea victoriae* subsp. *victoriae* is endemic to Victoria, primarily on the Mt Buller, Mt Buffalo and the Mt Bogong massifs, but also at Mt Torbreck, Mt St Bernard, Mt Hotham and Mt Howitt. *Grevillea v.* subsp. *victoriae* is adequately represented in the Alpine National Park, being common at a number of localities such as in the Buffalo National Park and in the Alpine National Park near Falls Creek village. However, some populations such as the disjunct population at Mt Torbreck aren't protected in a conservation reserve. *Grevillea v.* subsp. *victoriae* is not considered to be under any current threat.

*Habitat and Ecology:* *Grevillea victoriae* subsp. *victoriae* grows in subalpine and alpine regions, between 1400 and 1900 m above sea level, usually on granites in *Eucalyptus pauciflora* woodland, with frequent associated species including *Acacia alpina*, *Bossiaea foliosa*, *Ozothamnus secundiflorus*, *Pimelea alpina* and *Podolobium alpestre*. On the road between Bogong and Falls Creek Village it also grows on slopes above the road in a *Eucalyptus dalrympleana* and *E. pauciflora* association. At Mt

Buffalo it also grows on boulder strewn creek banks with *Acacia alpina*, *Babingtonia crenulata*, *Derwentia derwentiana*, *Empodisma minus*, and *Westringia senifolia*.

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *Grevillea victoriae* subsp. *victoriae* is a relatively uniform species exhibiting only minor variation in leaf size and shape across its range, and even the most disjunct population at Mt Torbreck (the most southwesterly) exhibits no apparent morphological differences with other populations of *G. victoriae* subsp. *victoriae*.

For differences between *G. victoriae* subsp. *victoriae* and *G. victoriae* subsp. *nivalis* refer to notes under the latter subspecies, the key and Table 2.

***Grevillea victoriae* F.Muell. subsp. *nivalis* Stajsic & Molyneux, in Makinson (2000), *Flora of Australia* 17A: 502.**

*Type:* New South Wales, near Tooma Reservoir, 29. ix. 1973, *R.J. Chinnock* 298 (holo: CANB 492764; iso: AD *n.v.*).

*G. victoriae* F.Muell. of R.O. Makinson, *Flora of New South Wales* 2: 49 (1991).

*G. victoriae* F.Muell. 'race d' of D.J. McGillivray & R.O. Makinson, *Grevillea*: 321 (1993).

*G. victoriae* F.Muell. var. *victoriae* of P.M. Olde & N.R. Marriott, *Grevillea Book* 3: 224 (1995), *p.p.*

*Illustrations:* A.B. Costin, M. Gray, C.J. Totterdell & D.J. Wimbush, *Kosciusko Alpine Flora* (plates 151 & 152) (1982), as *G. victoriae*; P.M. Olde & N.R. Marriott, *Grevillea Book* 3: 224 (plate 184A) (1995), a cultivated form, as *G. victoriae* 'Murray Queen'.

Spreading to erect *shrub* (1.0–) 1.5–2.5 m high, 2–4.5 (–6) m across. *Branchlets* moderately densely subsericeous or densely subtomentose, of biramous non-glandular hairs, epidermis not visible, the hairs mutually aligned, predominantly appressed with scattered irregularly aligned, appressed and scattered ascending hairs, predominantly straight with occasional ± slightly wavy hairs, silvery-white with scattered ferruginous hairs; *Leaves* usually elliptic to narrowly-elliptical, occasionally ovate, rarely lanceolate or oblanceolate (20–) 35–100 (–135) mm long, (7–) 15–37 mm wide, apex acute with a short blunt mucro or obtuse, *margins* flat or almost so, rarely rolled or revolute, but can be variable in the same plant; *leaf length to width ratio* 2.25–4.0:1 (–5.0:1); *leaf upper surface* minutely foveolate, glabrous or occasionally microscopically asperulous (40x magnification), with microscopic T-shaped or triangular asperities, smooth to touch, and/or with scattered mutually aligned, appressed, biramous non-glandular silvery-white hairs or occasionally with irregularly aligned, ascending to suberect biramous non-glandular silvery-white hairs, predominantly along the midvein and lower part of lamina or just above the petiole, occasionally mixed with appressed to irregularly aligned, ascending to erect biramous non-glandular ferruginous hairs, usually semi-glossy particularly the younger leaves which are usually bright green, maturing to mid-green to dark-green, *lateral veins* usually conspicuous to prominent but occasionally variable in the same plant, varying from evident to prominent, *reticulum* usually evident but varying from obscure to conspicuous sometimes in the same plant, rarely absent; *leaf lower surface* densely subsericeous or subtomentose of biramous non-glandular hairs, epidermis not visible, the hairs predominantly mutually aligned, predominantly appressed with scattered mutually and irregularly aligned appressed and ascending hairs, predominantly straight

with occasional  $\pm$  slightly wavy hairs, silvery-white with occasional tan-coloured and ferruginous hairs, *lateral veins* evident to conspicuous, occasionally prominent, *reticulum* conspicuous or occasionally prominent, rarely obscure or absent; leathery-textured. *Conflorescences* simple to thrice-branched, simple 43.16%, once-branched 47%, twice-branched 7.84%, thrice-branched 2%; *overall colour* (as in rachises) often dead-white, or off-white; *floral rachises* (8–) 10–50 (–60) mm long. (Fig. 1 f.)

*Representative specimens examined:* **NEW SOUTH WALES.** Southern Tablelands: Tooma, *s.d.*, Miss [F.] Campbell 4 (MEL 75119); Dredbo [Thredbo] River, xi. 1887, *W. Bauerlen s.n.* (MEL 75115); Tumut, ix. 1890, collector unknown (NSW 93296); Mount Kosciusko, above snow line, i. 1896, *J.M. Curran s.n.* (MEL 75139; NSW 93300); Manjar Mountain, E from Toomah Station, i. 1904, *W. Adams s.n.* (NSW 93295); Mt Kosciusko, xii. 1924, *T. Harris s.n.* (NSW 93307); Mt Kosciusko, vi. 1932, *E.C. Andrews s.n.* (NSW 93301); Near top of Hammel's Spur, Snowy Mountains, 26. i. 1948, *A.R. Tinckman* (NSW 93305); Tumut Pond, 1951, *J.C. Newman s.n.* (NSW 93291); Munyang River Valley, Snowy Mountains, 29 ix. 1952, *M. Mueller* 656 (NSW 93304); Beacon Hill, near Tabletop Mountain, above the plateau east of Tumut River and shortly below the junction of Happy Jacks River and Lake Tumut, 9. i. 1953, *M. Mueller* 658 (NSW 93288); Near junction of Tumut River and Happy Jacks River, Snowy Mountains, 30. iv. 1954, *C.W.E. Moore* 2935 (NSW 93289); Dead Horse Gap on Alpine Way, S of Ramshead Range, Kosciusko Plateau, 11. iv. 1958, *J. Vickery s.n.* (NSW 93302); Near Dickie Cooper's Bogong, on Valentine River Track, Snowy Mountains, 4. xi. 1961, *M.E. Phillips s.n.* (NSW 450180); Happy Jacks Range, south of Kiandra, xi. 1964, *K.M. Cooper s.n.* (NSW 96976); Grey Mare Range, 1/2 mile NE of the Grey Mare, 28. xii. 1968, *A. Rodd* 706 (NSW 131987); 1 mile SW of Kiandra, on road to Cabramurra, 22. iii. 1969, *L.A.S. Johnson & B.G. Briggs* (NSW 130082); Junction of Yorkers Creek and Tumut River, x. 1971, *A.E. Logan* 3 (NSW 450206); Kosciusko National Park, The Sentinel, 16. i. 1972, *J. Simons (J. Thompson)* 1324 (NSW 450207); Kosciusko National Park, Snowy River at Island Bend, 16 km NW of Jindabyne, 20. iii. 1974, *R. Coveny* 5386 (NSW 450210); Slopes of Round Mountain near Cabramurra, 27. iv. 1980, *V. Murtagh s.n.* (NSW 450222); Holland's Crossing on Snowy River, 5 km SE Jindabyne township, 22. x. 1981, *S.F. Forbes* 536 (MEL 603600); Kosciusko National Park, Geehi River, at bridge where the Schlink Pass-Geehi Reservoir Road crosses river, 3. iii. 1984, *B.J. & H.M. Conn* 1441 (MEL 658204, NSW); Kosciusko National Park, 13.6 km from Tom Groggin Camp Ground on road to Thredbo, 27. xii. 1996, *V. Stajsic* 2508 & *G.W. Carr* (AD, CANB, HO, MEL 2117643, NSW); Kosciusko National Park, 15.5 km from Tom Groggin Camp Ground on road to Thredbo, 27. xii. 1996, *V. Stajsic* 2509, 2521 & *G.W. Carr* (AD, CANB, HO, MEL 2117645, 2117651, NSW); Kosciusko National Park, on road to Cabramurra, 8.7 km from Link Track, 0.75 km from Tooma Dam, 27. xii. 1996, *V. Stajsic* 2523 & *G.W. Carr* (CANB, MEL 2117655); Kosciusko National Park, on road to Cabramurra, above Tooma Dam, 1.1 km at bridge of Tooma Dam, 28. xii. 1996, *V. Stajsic* 2525 & *G.W. Carr* (AD, CANB, MEL 2117658, NSW); Kosciusko National Park, Tumut Ponds Fire Trail, 2.5 km SSW from 'Kings Cross', 4 km SE from Cabramurra, 9. xii. 1998, *N.G. Walsh* 4890, *K. McDougall, & G. Wright* (MEL 2054143). **VICTORIA.** On forest rivulets on the Upper Hume River, i. 1874, *F. Mueller s.n.* (MEL 75109, 75110, 75111, 75112); Snowfields: Alpine National Park, ca. 1.8–2.0 km SW from the summit of Mt Pinnibar, on Shady Creek Track, 26. i. 2002, *P. Ashton s.n.* (MEL 2125387); Mount Sassafras, 7. i. 2003, *P. Ashton s.n.* (Seedling: MEL 2185832, 2185833, 2185834, 2185835, 2185836, 2185837, 2185838); Mount Gibbo, 30. i. 2003, *P. Ashton s.n.* (MEL 2185830, 2185831).

*Phenology:* Flowering has been recorded primarily between October and February, but in the absence of snow can sporadically occur throughout the year. Nectarivorous birds and in particular honeyeaters of various species visit the flowers, and it is assumed that the plants are primarily ornithophilous.

*Distribution and Conservation status:* *Grevillea victoriae* subsp. *nivalis* primarily occurs in the Kosciusko National Park in New South Wales on the western flank of the Kosciusko massif, from The Pilot north to Talbingo and towards Tumut, extending south to Mtns Gibbo, Pinnibar and Sassafras in Victoria. The Pilot site is particularly interesting in that it is a site where *G. victoriae* subsp. *nivalis* is sympatric with *G. brevifolia* (Molyneux pers. observ. ca. 20 years ago). F. Mueller made a number of collections from the 'Upper Hume River' in January 1874 and presumably some of these collections

possibly have come from the Victorian side of the river. In Victoria the species is only known from several recent specimens collected by Peter Ashton between January 2002 and January 2003 from near Mt Pinnibar, Mt Gibbo and Mt Sassafras. The populations at the Mt Gibbo and Mt Sassafras sites were discovered during firefighting efforts during the devastating fires of January 2003, which burnt vast areas of eastern Victoria. Both sites were burnt out in these fires, fortunately however, regeneration has occurred from soil-stored seed with many seedlings observed by one of us (Molyneux) during a recent visit to Mt Sassafras. Previously the most recent report of this taxon in Victoria was sighted by one of us (Molyneux) in the 1970's on the Victorian side of the Murray River, at the Tom Groggin crossing, however no herbarium voucher specimen was collected at the time. In New South Wales *G. victoriae* subsp. *ivalis* appears to be adequately reserved within Kosciuszko National Park where it is reasonably common at a number of localities, and does not appear to be under any threat. In Victoria however, it is known from only three recently discovered populations: near Mt Pinnibar, near Mt Sassafras and Mt Gibbo. The Mt Pinnibar population is reserved within the Alpine National Park, the other two populations are not within a reserve system. A conservation status of Endangered (2EC- *sensu* Briggs & Leigh 1996) or Endangered (EN *sensu* IUCN 2001) is suggested for the Victorian populations.

*Habitat and Ecology:* *Grevillea victoriae* subsp. *ivalis* has a much broader elevational range than subsp. *victoriae*, occurring between 500 and 1900 m above sea level. It was once recorded as growing at Tom Groggin on the Murray River (south of Corryong in Victoria), which is approximately 500 m above sea level. At New Hollands Crossing on the Snowy River in New South Wales it grows at an altitude of approximately 850 m above sea level. This would seem to support the view that *G. v.* subsp. *ivalis* may have been more widely distributed at lower elevations in the Upper Murray region of Victoria, as suggested by a number of F. Mueller collections from the "Upper Hume River." At Tom Groggin it formerly occurred in the riparian zone (Molyneux pers. observ in the 1970's). At New Hollands Crossing it also grows in the riparian zone, associated with *Eucalyptus viminalis*, *Kunzea phyllicoides* and \**Rubus* sp (*fruticosus* complex). At the Tooma Dam it grows in *Eucalyptus stellulata* dominated low forest with the occasional *Eucalyptus pauciflora* subsp. *niphophila*.

On the road between Tom Groggin and the Dead Horse Gap it grows in tall *Eucalyptus delegatensis* forest with an occasional *Eucalyptus pauciflora* subsp. *niphophila*. On the road to Cabramurra between Khancoban and the Tooma Reservoir it was found growing beside the road in tall *Eucalyptus delegatensis* and *E. dalrympleana* forest with the understorey dominated by *Bossiaea foliosa* and *Tasmanian xerophila*.

More typically it is found in subalpine and alpine woodlands in *Eucalyptus pauciflora* woodland, often on granites and slates. Near Mt Pinnibar in Victoria it occurs on the boundary of Boebuck Adamillite and sedimentary pinnack sandstone in *Eucalyptus pauciflora* woodland. No other member of the *G. victoriae* species complex occurs at higher elevations as does *G. victoriae* subsp. *ivalis*, and appears to be even marginal above the tree line, being found for example on Sentinel Peak (1917 m altitude at the summit) (Costin et al 1982).

There are no records of vegetative reproduction. Plants are killed outright by severe fire and regeneration is from seed only, as illustrated by the fires of January 2003. Long-term fire regimes may be significant for local populations. Some forms of forest management such as regular cool-burns could threaten the existence or long term survival of some populations if the period between the burns is not sufficiently long enough to allow seed regenerated plants to reach a flowering and seeding stage. Given that some populations occur along vehicle-tracks, care must be taken not to eliminate these populations through road works.

*Notes:* *Grevillea victoriae* subsp. *ivalis* corresponds with the informal race 'd' in McGillivray & Makinson (1993). Olde and Marriott (1995) treat this taxon under *G.*

*victoriae* var. *victoriae* together with race 'c' (which is the type taxon of *G. victoriae*). *Grevillea v.* subsp. *nivalis* is a well known taxon and has largely been popularised through the nursery trade where it has been sold as *G. victoriae* 'Murray Queen' which is thought to have been introduced into horticulture from a collection near Dead Horse Gap south from Thredbo, in the Kosciusko National Park, in New South Wales.

*Grevillea victoriae* subsp. *nivalis* is very closely related to *G. victoriae* subsp. *victoriae*. *Grevillea v.* subsp. *nivalis* differs in having elliptic to narrowly-elliptical or rarely ovate leaves, with a length to width ratio 2.25:1–4:1 (–5:1), leaf margins that are flat or very shortly recurved, and a leaf upper surface that is either glabrous/smooth or microscopically asperulous (40x magnification) (smooth to touch), and semi-glossy. In comparison, *Grevillea v.* subsp. *victoriae* usually has narrowly elliptical to lanceolate (rarely oblanceolate) leaves, with a length to width (3:1–) 4:1–5:1 (–6:1), leaf margins that are shortly recurved, a leaf upper surface that is never microscopically asperulous, and usually dull. The leaf lower surface in *G. v.* subsp. *victoriae* is usually densely sericeous or occasionally subsericeous, usually 'tidy' with appressed mutually aligned hairs (only with the occasional ascending or suberect ferruginous hairs) whereas in *G. v.* subsp. *nivalis* the leaf lower surface is densely subsericeous, or subtomentose and slightly 'messy'. In *G. v.* subsp. *nivalis* the leaf lower surface reticulum is usually conspicuous or prominent, and the floral rachises are (8–) 10–50 (–60) mm long. Conflorescences are simple to thrice-branched: simple = 43.16%, once-branched = 47%, twice-branched = 7.84%, thrice-branched = 2%. As compared to *G. v.* subsp. *victoriae* in which the leaf lower surface reticulum is absent or obscure, and the floral rachises (17–) 40–90 mm long. Conflorescences are simple to thrice-branched: simple 69%, once-branched 20%, twice-branched 9%, thrice-branched 2%.

*G. diminuta* has much smaller leaves <20 mm long, and characteristically zygomorphic perianths with much shorter pistils 10–11 mm long.

The most characteristic difference between *G. oxyantha* subsp. *ecarinata* and *G. victoriae* subsp. *nivalis* is the subpyramidal and acute perianth-limb of the flower bud. The perianth-limb in *G. v.* subsp. *nivalis* is subglobose and obtuse. The very early flower buds in *G. o.* subsp. *ecarinata* also tend to either spread at right angles to the stem or face upwards towards the apex of shoots as they do in *G. o.* subsp. *oxyantha*, in contrast to the downward facing flower buds in *G. v.* subsp. *nivalis*. The leaf upper surface venation in *G. o.* subsp. *ecarinata* is obscure to evident and the leaves are dull.

Makinson (2000) commented that the population in the Baldy Range area in the Brindabella National Park, north of the border between the Australian Capital Territory and New South Wales is closely related to (if not part of) *G. victoriae* subsp. *nivalis*. Vegetatively this taxon shares a superficial resemblance with *G. victoriae* subsp. *nivalis*, but the Baldy Range entity is unique in the species complex in that there are scattered hairs at some stage on the ovary either pre-anthesis, anthesis or post-anthesis, and usually on the follicles. Although inconstant, simple glandular hairs are also found on very young flower buds. It is a distinct species, which will be described by the authors in a subsequent paper. The taxon also occurs at Waterfall Creek and at Genges Trig within the Brindabella National Park (N.S.W.), it does not occur in the Australian Capital Territory.

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**Table 4.** A summary of McGillivray & Makinson's (1993) 'races' and 'unassigned specimens' and their current names/taxonomic placement.

<b>Race or unassigned specimen sensu McGillivray &amp; Makinson (1993)</b>	<b>Current name/taxonomic placement, authority &amp; year of publication</b>
Race 'a'	<i>G. oxyantha</i> Makinson (1997) subsp. <i>oxyantha</i>
Race 'b'	<i>G. oxyantha</i> subsp. <i>ecarinata</i> Makinson
Race 'c'	<i>G. victoriae</i> F.Muell. (1855) subsp. <i>victoriae</i>
Race 'd'	<i>G. victoriae</i> F.Muell. subsp. <i>nivalis</i> (2000) Stajsic & Molyneux
Race 'e'	<i>G. brevifolia</i> F.Muell. ex Benth. (1870)
Race 'f'	<i>G. parvula</i> Molyneux & Stajsic in Makinson (2000) (in part only) <i>G. brevifolia</i> subsp. <i>polychroma</i> (Molyneux & Stajsic in Makinson (2000)) (in part only) <i>G. polychroma</i> Molyneux & Stajsic comb. et stat. nov. (2005) (in part only)
Race 'g'	<i>G. rhyolitica</i> Makinson subsp. <i>semivestita</i> Makinson (1997)
Race 'h'	<i>G. monslacana</i> Molyneux & Stajsic in Makinson (2000)
Race 'j'	<i>G. miqueliana</i> F.Muell. (1855) subsp. <i>miqueliana</i>
Race 'k'	<i>G. miqueliana</i> F.Muell. subsp. <i>moroka</i> Molyneux & Stajsic in Makinson (2000)
Race 'l'	<i>G. irrasa</i> Makinson (1997) subsp. <i>irrasa</i>
Unassigned specimen 1	<i>G. oxyantha</i> Makinson (1997) subsp. <i>oxyantha sens. lat.</i>
Unassigned specimen 2	<i>G. oxyantha</i> Makinson subsp. <i>ecarinata</i> Makinson
Unassigned specimen 3	<i>G. brevifolia</i> F.Muell. ex Benth. (1870)
Unassigned specimen 4	Currently unassigned
Unassigned specimen 5	<i>G. epicroca</i> Stajsic & Molyneux (2000)
Unassigned specimen 6	<i>G. brevifolia</i> F.Muell. ex Benth. (1870)
Unassigned specimen 7	<i>G. rhyolitica</i> Makinson (1997) subsp. <i>rhyolitica</i>
Unassigned specimen 8	<i>G. hockingsii</i> Molyneux & Olde (1994)

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DSE = Department of Sustainability and Environment (Victoria).

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Greybox & Grasslands = Greybox and Grasslands Indigenous Nursery, Balliang East, Victoria.

Hume City Council = Dallas, Victoria.

MEL = National Herbarium of Victoria

NSW = National Herbarium of New South Wales

## References:

- Aston, H.I. (1984). Publication of early scientific journals in Victoria. *Muelleria* **5**, 281-288.
- Bentham, G. (1870). *Flora Australiensis*, Vol. 5. (Reeve: London.)
- Briggs, J.D. & Leigh, J.H. (1996). *Rare and Threatened Australian Plants*, Revised Edition. CSIRO and Australian Nature Conservation Agency, Canberra.
- Chesterfield, E.A., Hurley, V.A., Henry, S.R., Schulz, M., and Pyrke, A.F. (1988). Ecological Survey Report No. 19. *Flora and Fauna of the Brodribb Forest Block, East Gippsland, Victoria*. Department of Conservation, Forests and Lands.
- Cochrane, G.R. 1968. *Flowers and Plants in Colour* (Australian Flora in Colour series). A.H. & A.W. Reed. Printed in Tokyo by Kyodo Printing Co. Ltd.
- Corrick, M.G. & Fuhrer, B.A. (2000). *Wildflowers of Victoria*. Blooming Books, Hawthorn, Australia. Samwha Printing Co. Ltd.
- Costermans, L. 1985 (reprint). *Native Trees and Shrubs of South-Eastern Australia*. Rigby Publishers. Printed in Hong Kong by Toppan printing Company (H.K.) Limited.
- Costin, A.B., Gray, M., Totterdell, C.J., and Wimbush, D.J. (1982). *Kosciusko Alpine Flora*. (CSIRO and William Collins Pty Ltd: Adelaide.)
- Hart, J.M., and Henwood, M.J. (1996). The taxonomic web of the Grey Spider-Flower: *Grevillea buxifolia* (Proteaceae). *Telopea* **7**, 65-76.

- IUCN (2001). *IUCN Red List of Categories and Criteria (version 3.1)*, International Union for Conservation of Nature and Natural Resources, Gland, Switzerland.
- Johnson, L.A.S. (1962). *Contributions from the New South Wales National Herbarium* **3** (3): 95-96
- Maiden, J.H., and Betche, E. (1916). *Census of New South Wales Plants*. (Government Printer: Sydney.)
- Makinson, R.O. (1991). *Grevillea*. In G.J. Harden (ed.), *Flora of New South Wales* 2:31-55 New South Wales University Press, Kensington.
- Makinson, R.O. (1996). *Grevillea*. In N.G. Walsh and T.J. Entwisle (eds.), *Flora of Victoria* 3: 845-870, Inkata Press: Melbourne
- Makinson, R.O. (1997). New segregate species and subspecies from the *Grevillea victoriae* (Proteaceae: Grevilleoideae) complex from south-east New South Wales. *Telopea* **7**, 129-138.
- Makinson, R.O. (2000). *Flora of Australia*. Volume 17A, Proteaceae 2: *Grevillea*.
- McGillivray, D.J. (1986). *New Names in Grevillea* (Proteaceae). (privately published: Castle Hill.)
- McGillivray, D.J. & Makinson, R.O. (1993). *Grevillea* (Proteaceae), a taxonomic revision. (Melbourne University Press: Melbourne.)
- Miles, J. (2001). *Vegetation of Rocky Outcrops, South East Forests National Park, Bemboka National Park*. (unpublished, consultant report for the NPWS).
- Molyneux, W.M. & Stajsic, V. (2000). *Grevillea victoriae* subgroup (in part only), in R.O. Makinson, *Flora of Australia* 17A, Proteaceae 2: *Grevillea*.
- Olde, P.M., and Marriott, N.R. (1995). *The Grevillea Book*, Vol 3. (Kangaroo Press: Kenhurst, N.S.W.)
- Olde, P.M., and Molyneux, W.M. (1994). Delimitation of two new species from the *Grevillea victoriae* alliance (Proteaceae: Grevilleoideae). *Telopea* **5**, 781-787.
- Ross, J.H. (1996). *A Census of the Vascular Plants of Victoria*. (National Herbarium of Victoria, Royal Botanic Gardens, Birdwood Avenue, South Yarra, Victoria, 3141, Australia.)
- Ross, J.H. & Walsh, N.G. (2003). *A Census of the Vascular Plants of Victoria*. (National Herbarium of Victoria, Royal Botanic Gardens, Birdwood Avenue, South Yarra, Victoria, 3141, Australia.)
- Willis, J.H. (1973). *A Handbook to Plants in Victoria*. Vol. 2. (Melbourne University Press: Carlton.)