

## *Grevillea buxifolia* (Proteaceae: Grevilleoideae) revisited

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### Abstract

Olde, Peter M.<sup>1</sup> & Marriott, Neil R.<sup>2</sup> (<sup>1</sup>138 Fowler Rd., Illawong, NSW Australia 2234; <sup>2</sup>PO Box 107, Stawell VIC Australia 3377) 1994. *Grevillea buxifolia* (Proteaceae: Grevilleoideae) revisited. *Telopea* 5(4): 707–710. *Grevillea buxifolia* (Sm.) R. Br. sensu McGillivray is re-examined. One new subspecies, *G. buxifolia* subsp. *ecorniculata* P. Olde & N. Marriott is recognised and described. *G. sphacelata* R. Br. is reinstated at specific rank.

### Introduction

J.E. Smith (Smith 1794: 29) first described *Grevillea buxifolia* but placed it in the genus *Embothrium*. Knight (Knight 1809: 115) transferred it to the genus *Stylurus*, a synonym of the conserved name *Grevillea*. Robert Brown (Brown 1810: 174) transferred it to *Grevillea* and at the same time described *G. phyllicoides* and *G. sphacelata* as distinct species. This taxonomy was accepted until 1986, albeit with general recognition of some intergrades and problem populations, when McGillivray recognised *G. phyllicoides* R. Br. and *G. sphacelata* R.Br. as subspecies of *G. buxifolia* (McGillivray 1986: 3). Makinson (1991: 48) asserts that the subspecies recognised, previously regarded as separate species, give an inadequate classification of the species complex. McGillivray (1993: 312–314) notes, after division of *G. buxifolia* into three subspecies, that a further subdivision into five races is useful. He further draws attention to three populations unassignable at present to any of the three subspecies recognised. Re-examination of herbarium specimens at NSW and field assessment indicate that concepts employed by McGillivray (1986 & 1993) in regard to *G. buxifolia* (Sm) R. Br. are inappropriate in a biological sense. Formal recognition of his *G. buxifolia* Race 'a' is warranted and this taxon is here described as *G. buxifolia* subsp. *ecorniculata* P. Olde & N. Marriott. *G. buxifolia* subsp. *buxifolia* and *G. buxifolia* subsp. *sphacelata* (R.Br.) McGillivray occur sympatrically over a wide geographic area where the taxa are clearly reproductively isolated and morphologically distinct. Accordingly, we consider it appropriate to reinstate his Race 'e', *G. buxifolia* subsp. *sphacelata*, at specific rank. The three unassigned populations all involve morphological overlap between Race 'c' (*G. buxifolia* subsp. *buxifolia*) and Races 'b' and 'd' (both currently identified as *G. buxifolia* subsp. *phyllicoides*). Until further research has been conducted, we consider it appropriate to continue recognition of the two subspecies in *G. buxifolia*, subsp. *buxifolia* and subsp. *phyllicoides*. Species descriptions follow McGillivray (1993) and Olde & Marriott (1993a & 1993b).

### Discussion

There is considerable morphological overlap between *Grevillea buxifolia* subsp. *buxifolia* (Race c sensu McGillivray) and subsp. *phyllicoides* (Races b & d) and in the absence of sympatric occurrence, no argument is mounted here for their recognition as separate species. The morphological approach of Race a (here described as *G. buxifolia* subsp. *ecorniculata*) to Race c (subsp. *buxifolia*) is also undeniable, since they share a round, dorsiventrally-

thickened style-end with pollen-presenter up to 2 mm wide. However, there is sufficient discontinuity in pistil and stylar-appendage length to warrant formal separation and recognition, especially given the recognition accorded to subsp. *phylicoides*. Subsp. *ecorniculata* occupies a discrete geographic area and occurs in morphologically consistent populations. It shares with subsp. *buxifolia* and subsp. *phylicoides* a spreading branchlet and leaf indumentum, the two characters that distinguish *G. buxifolia* sens. lat. from *G. sphacelata*. This, and the absence of sympatric populations, has led us to recognise this taxon at subspecific rank.

McGillivray (1993: 313–4) acknowledges that his subsp. *buxifolia* and subsp. *sphacelata* (Race e) occur sympatrically and without signs of interbreeding in at least one locality. He further states that these races are at the 'morphological ends' of a series of more or less coherent populations and that the separation of these ends is no basis for disputing the coherence of the populations there treated as one species, *G. buxifolia*. There is thus an implication that evolution in *G. buxifolia* is linear and somewhat circular and that the two ends have somehow come together. However, we have observed sympatry of these two races in numerous localities between Heathcote, including several points in the northern part of Royal National Park, and Illawong, a distance of approximately 10 km. Furthermore, there is gross morphological discontinuity in these locations. *G. sphacelata* is distinguished by its appressed branchlet and leaf indumentum, narrower, oblong-lanceolate leaves, shorter pistils (10–12 mm long), an elliptic pollen-presenter, a style-end < 1.5 mm wide with a very short to absent stylar appendage (< 1 mm long), while *G. buxifolia* subsp. *buxifolia* has a spreading branchlet and leaf indumentum, ovate to elliptic leaves, pistils longer than 18 mm with a round pollen-presenter, a style-end > 2 mm wide with a conspicuous stylar appendage (2–4 mm long). While the two taxa are clearly related most closely to each other in a phenetic and evolutionary sense, they are equally clearly separate in a biological sense.

The morphological close approach of some specimens of *G. buxifolia* subsp. *phylicoides* Race d and *G. sphacelata* through a shared, elliptic pollen-presenter and (rarely in the case of *G. buxifolia* subsp. *phylicoides*) an obscure stylar appendage, is to be expected in species of common ancestry, but does not, in our view, justify unification of *G. buxifolia* and *G. sphacelata*. We assert that these taxa, being morphologically discontinuous in their branchlet and leaf indumentum and reproductively isolated in sympatry, should be recognised as separate species.

### Key to species morphologically similar to *G. buxifolia*

- 1 Style end with an incurled appendage
  - 2 Apex of appendage papillose; leaf upper surface scabrous; pollen-presenter not concurrent with the style ..... **G. scabra**
  - 2\* Apex of appendage smooth; leaf upper surface usually smooth; pollen-presenter concurrent with the style ..... **G. candolleana**
- 1\* Style end lacking an incurled appendage (appendage absent, erect or reflexed)
  - 3 Stigma conspicuous, extending  $\pm$  0.5 mm from the face of the pollen-presenter
    - 4 Style end glabrous and smooth ..... **G. pilulifera**
    - 4\* Style end bearing an inconspicuous indumentum of short hairs or papillae ..... **G. uncinulata**

3\* Stigma not conspicuous

- 5 Leaf upper surface smooth ..... **G. umbellulata**
- 5\* Leaf upper surface granular to scabrous
  - 6 Flowers abaxially orientated
    - 7 Floral bracts < 2 mm long; ovarian stipe 0.5–0.9 mm long; outer perianth indumentum with few to no rusty hairs; style end lacking an appendage ..... **G. occidentalis**
    - 7\* Floral bracts > 2 mm long; ovarian stipe 0.9–2.3 mm long; outer perianth indumentum mostly rusty; style end with or without an appendage
      - 8 Branchlets silky; leaf undersurface obscured by a dense, silky indumentum; stylar appendage absent to 1 mm long ..... **G. sphacelata**
      - 8\* Branchlets villous; leaf undersurface villous to subsericeous, the lamina not obscured by the indumentum; stylar appendage absent to 4 mm long ..... **G. buxifolia**
        - i Pollen-presenter round, c. 2 mm wide
          - ii Stylar appendage 2–4 mm long; pistil > 15 mm long ..... subsp. **buxifolia**
          - ii\* Stylar appendage 0–1 mm long; pistil 11–13 mm long ..... subsp. **ecorniculata**
        - i\* Pollen-presenter elliptic to narrow-elliptic, c. 1.5 mm wide ..... subsp. **phylcoides**
  - 6\* Flowers adaxially orientated ..... **G. acerata**

***Grevillea buxifolia* subsp. *ecorniculata* P. Olde & N. Marriott, subsp. nov.**

Ab subspecie typica pistillo brevior (11–13 mm longo) apice styli vel ecorniculato vel brevissime corniculato (< 1 mm longo) differt.

HOLOTYPE: NEW SOUTH WALES: Staircase Hill, Putty Road, 82.8 km N of Windsor, R.O. Makinson 384, 24 Sep 1989 (NSW). Isotypes: CBG, COLO, HO, LE, MEL, PE.

An erect, symmetrical to spreading shrub 1–1.5 m tall, 1.5 m wide; branchlets round, villous. Leaves 1–2 cm long, 3–6 mm wide, ascending, ± sessile, simple, elliptic or narrowly so; upper surface glabrous, granulose, midvein and lateral veins faintly evident; margin entire, shortly recurved; lower surface villous, midvein prominent. Conflorescence 1–2 cm long, 3 cm wide, erect, sessile to shortly pedunculate, terminal, unbranched, umbel-like, with development basipetal; peduncles and floral rachises villous; floral bracts 3 mm long, 1 mm wide, linear to narrow-elliptic, villous, falling before anthesis. Flowers abaxially orientated; pedicels 6–9 mm long, brown-tomentose to villous; torus 1–1.2 mm across, square, ± straight; nectary conspicuous, semi-circular, smooth; perianth 5–6 mm long, 1.5–2 mm wide, oblong to cylindrical, strongly curved from halfway, villous outside, lanate inside; tepals splitting to the base on the dorsal side at anthesis, ventral tepals remaining joined, and then rolling down in one piece to about half-way forming a platform extending out from the ovary; limb ± pyramidal, densely villous, revolute, not relaxing after anthesis; pistil 11–13 mm long; stipe c. 1 mm long, glabrous on the ventral side; ovary densely villous; style villous, loosely so on the ventral side, strongly incurved in the upper half; style-end 2 mm wide, either

entirely lacking an appendage or sometimes bearing a short apical appendage c. 1 mm long; pollen-presenter round, lateral, surrounded by a conspicuous, wrinkled rim, flat. Fruits & seeds not seen.

ETYMOLOGY: The subspecific epithet is derived from the Latin *e-*, without, and *corniculatus*, horned, in reference to the styler appendage being more or less absent by contrast with subsp. *buxifolia*.

FLOWER COLOUR: Perianth brown and grey, sometimes with pinkish overtones outside, whitish-grey inside; style grey with a chocolate-brown tip; pedicels brown.

FLOWERING PERIOD: Usually all year but principally in winter–spring.

DISTRIBUTION: New South Wales, where confined to a small area extending between Putty, Gaspers Mountain and Wollombi.

CONSERVATION STATUS: Not presently endangered.

ECOLOGY & HABITAT: Usually found in heath or in dry sclerophyll forest in skeletal, sandy soils with outcropping sandstone. No pollinator has been observed attending the flowers.

SELECTED SPECIMENS (15 examined): NEW SOUTH WALES: Central Coast: East of Putty, *Johnson s.n.*, 20 Sep 1951 (NSW); 10 miles [16 km] S of Howes Valley (35 miles [56 km] SW of Singleton), *Constable 7157*, 22 Sep 1966 (NSW); 6 miles [9.6 km] NE of Howes Valley, Howes Mountain, *Constable*, 26 Aug 1959 (NSW); Yango Track near Wollombi, *Story 6658*, 6 Sep 1959 (NSW); 50 miles [80 km] N of Windsor on Putty Road, *McKee 400 & 401*, Oct 1952 (NSW); Between Three Ways & Kekelbon Mountains, 15 miles [24 km] directly NW of Putty, *McGillivray 1567 & 1588*, 12 Feb 1966 (NSW); Putty Road, S of Newcastle, near the turn-off to Putty township, *Olde s.n.*, 3 July 1988 (NSW); 10 miles [16 km] N of Gaspers Mountain Army Airstrip, 9 miles [14.4 km] NE Glen Davis, *Rodd & McGillivray 1170*, 26 Apr 1965 (NSW).

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