Volume 15: 51–55
Publication date: 30 May 2013
dx.doi.org/10.7751/telopea2013007

TELOPEA
Journal of Plant Systematics

The Royal Botanic Gardens & Domain Trust

plantnet.rbgsyd.nsw.gov.au/Telopea • escholarship.usyd.edu.au/journals/index.php/TEL • ISSN 0312-9764 (Print) • ISSN 2200-4025 (Online)

Phebalium speciosum (Rutaceae: Boronieae), an endangered, narrowly endemic new species of north-eastern New South Wales, Australia

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Abstract

Phebalium speciosum I.Telford, endemic to north-eastern New South Wales and previously included in *P. nottii* (F.Muell.) Maiden & Betche, is described as new. Information is presented on its distribution, habitat and conservation status. An image of an isotype specimen, a table comparing distinguishing attributes of the new species, *P. nottii* and *P. woombye*, and a modification to the key to the species of *Phebalium* occurring in New South Wales are included.

Introduction

Phebalium nottii (F.Muell.) Maiden & Betche is currently applied to a variable taxon widespread through coastal and inland eastern Australia (http://avh.chah.org.au/occurrences/search?taxa=phebalium+nottii#mapView; accessed 23 April 2012).

Wilson (1970) regarded *P. nottii* and *P. woombye* (F.M.Bailey) Domin as constituting an intergrading pair in south-eastern Queensland. People often confuse the species, as in the *New South Wales Flora Online* (Weston & Harden 2012). In the latter treatment specimens from diverse habitats on the North Western Slopes and Central Western Slopes between Coonabarabran and Peak Hill, the North Coast region from the sandstone country between Copmanhurst and Glenreagh, and acid volcanic outcrops near Urbenville have all been assigned to *P. nottii*. Gross morphological differences, as well as differences in habitat preference and the considerable disjunctions in distributions, suggest more than one taxon may be involved.

Materials and methods

The study is largely based on morphological observations of herbarium specimens held in BRI, CANB, CFSHB, NE and NSW, as well as field studies by the author in Queensland and New South Wales.

Results and Discussion

Specimens attributed to *P. nottii* from the Grafton–Coffs Harbour area (north-eastern New South Wales) exhibit a glabrous adaxial leaf surface, 6–10-flowered inflorescences, and cream–white petals, sometimes turning pink with age. These are attributes of *P. woombye*; the specimens are misidentified. Collections/plants from the Urbenville area (north-eastern New South Wales) have the adaxial leaf surface stellate-hairy, 4–8-flowered inflorescences and pink petals. These Urbenville collections are sufficiently distinct from *P. nottii* (Table 1) to be recognised as a new species described below. The species is regarded as under threat.

The residual populations of *P. nottii,* after segregation of the new species, still appear to represent a species complex. Morphological variation in *P. nottii* pointed out by Wilson (1970) and its putative intergrading with the variable *P. woombye* are currently under investigation in an attempt to resolve taxonomic limits.

Note that the description of *P. nottii* in Weston and Harden (2002: 304) contains elements of *P. woombye*. The upper leaf surface of *P. woombye* is glabrous, while the upper leaf surface in *P. nottii* is initially stellate tomentose, becoming minutely papillose with age as hair branches are lost, not glabrous as stated (Table 1).

Table 1. Comparison of some distinguishing attributes between *Phebalium speciosum, P. nottii* and *P. woombye.*

Character	***P. speciosum***	***P. nottii***	***P. woombye***
Leaf shape	lanceolate or elliptical	elliptical	elliptical or narrowly elliptical
Leaf length (mm)	25–84	6–45	10–66
Leaf width (mm)	7.5–22	1.8–4.5	3–10
Upper leaf surface	stellate hairy, becoming papillose	sparsely stellate hairy, becoming papillose	glabrous
Flowers per inflorescence	4–8	1–5	4–9
Calyx lobe length (mm)	2.3–3	1.2–2.4	1.6–2.6
Petal length including claw (mm)	10–12.2	5.5–8.6	4–5.3
Filament length (mm)	6.5–11	2.6–6.5	3.6–6.4
Cocci length (mm)	4–4.2	3.5–3.8	3.2–3.6
Seed length (mm)	2.6–3	1.6–2.2	1.8–2.3

Taxonomy

Phebalium speciosum I.Telford, ***sp. nov.***

Diagnosis: similar to *P. nottii*, differing in wider (7.5–22 vs 1.8–4.5 mm), mostly lanceolate leaves, more flowers per inflorescence (4–8 vs 1–5), larger calyx lobes (2.2–3 vs 1.2–2.4 mm long) and petals (10–12.2 vs 5.5–8.6 mm long), longer filaments (6.5–11 vs 2.6–6.5 mm), larger cocci (4–4.2 vs 3.5–3.8 mm long) and seeds (2.6–3 vs 1.6–2.2 mm long).

Type: New South Wales: North Coast: Battery Hill, 6 km SSW of Urbenville, 4 Aug 2007, *I.R.Telford 13171, T.Vollbon & D.H.Moffatt*; holo: NSW; iso: BRI, CANB, HO, K, MEL, MO, NE, PERTH (Fig. 1).

Shrub to 3 m tall. Branchlets ferruginous lepidote. *Leaves* with petioles 3–4.7 mm long, channelled above, silver and ferruginous lepidote; lamina lanceolate or narrowly elliptical, 25–84 mm long, 7.5–22 mm wide, obtuse; margin undulate, slightly recurved; adaxial surface dark green, silvery stellate, becoming minutely papillose by erosion of hair branches, the midvein deeply impressed; abaxial surface silvery and ferruginous lepidote. *Inflorescences* terminal, sessile umbels of 4–8 flowers; pedicels 7.5–10 mm long, slightly thickening distally, ferruginous lepidote. *Calyx* cup-shaped with 6–8 lobes, silvery and ferruginous lepidote outside, silvery lepidote inside; cup c. 2 mm long, 4.2–4.8 mm diam.; lobes erect, triangular, 2.2–3 mm long, acute. *Corolla* of 6–8 petals, of which 4 adjacent spreading, the other 2–4 more or less erect, clawed; claw 1.5–2 mm long, glabrous, white to pale pink lamina obovate or elliptical, 8.4–10.2 mm long, 3.2–5 mm wide, shortly acuminate, margin minutely crenulate; adaxial surface glabrous, deep pink paling with age; abaxial surface silvery and ferruginous lepidote with a glabrous marginal band. *Stamens* 12–14, inclined over the 4 spreading petals; filaments filiform, 6.5–11 mm long, glabrous, pink; anthers oblong, 1.7–2.5 mm long, yellow. *Ovary* subglobose, 2–3 mm diam., of 6 or 7 free carpels; carpels 2–2.3 mm long, ferruginous lepidote; style 5–5.5 mm long, glabrous, recurved above stamens; stigma capitate, minutely papillose. *Cocci* ellipsoidal, 4–4.2 mm long, 2.4–3.2 mm wide, ferruginous lepidote. *Seeds* ellipsoidal, 2.6–3 mm long, 1.2–1.6 mm wide, longitudinally striate, black.

Fig. 1. Isotype of *Phebalium speciosum* I.Telford (NE).

Additional specimens examined (selection): **New South Wales**: North Coast: rock just N of Battery Hill near Tooloom Falls at end of Wood Duck Rd, Yabbra State Forest, c. 6 km SW of Urbenville, 22 May 2004, *Phillips 1172 & Phillips* (BRI); Battery Hill, c. 6 km S of Urbenville, 19 Feb 1997, *Gilmour* (CANB, CFSHB, NSW); Battery Hill, c. 5.5 km SSW of Urbenville, 21 Nov 1987, *Coveny 12802, Donabauer & Dunn* (BRI, NSW); Mt Cullawajune, near Urbenville, 29 Jun 1987, *Neville s.n.* (CFSHB); ibid., 26 May 2012, *Sadgrove 232* (BRI, CANB, NE, NSW).

Distribution: apparently restricted to Battery Hill and Callawajune Mountain (South Obelisk), 6–8 km SSW of Urbenville, North Coast Bioregion, New South Wales (Fig. 2).

Habitat: grows on steep slopes below cliff lines on acid volcanic plugs at 350–400 m altitude in open forest or heath on skeletal clay-loam soils. Associated species include *Eucalyptus microcorys, Corymbia intermedia, Allocasuarina littoralis, Bossiaea rupicola* and *Leptospermum polygalifolium*.

The acid volcanic outcrops of the McPherson Range and adjacent areas between Boonah, Queensland and Woodenbong and Urbenville, New South Wales, constitute a well-known area of endemism. Many of the taxa restricted to these rocky sites occur widely in the area, e.g. *Acacia brunioides* subsp. *brunioides, A. acrionastes, Pultenaea whiteana and Coronidium lindsayanum*, but several are recorded only from a single mountain, e.g. *Bertya ernestiana* on Mount Ernest, *Arundinella grevillensis* on Mount Greville, *Jacksonia chappilliae* on Bald Knob.

Phenology: flowers recorded June–August and February. Fruit recorded in August.

Conservation status: *Phebalium speciosum* is known from two populations, one at the type locality below Battery Hill, the other at the foot of Mount Cullawajune, 1.5 km to the south-west. The Battery Hill population consisted at the time of the type gathering of some 200 mature plants confined to a narrow strip between the perimeter road of a *Pinus* plantation in Yabbra State Forest and the cliff line. The Mount Cullawajune population is larger, of some 250 plants in an undisturbed rocky gully (pers. obs., May, 2012).

Possible threats to survival of the species are of concern, particularly for the Battery Hill population with its

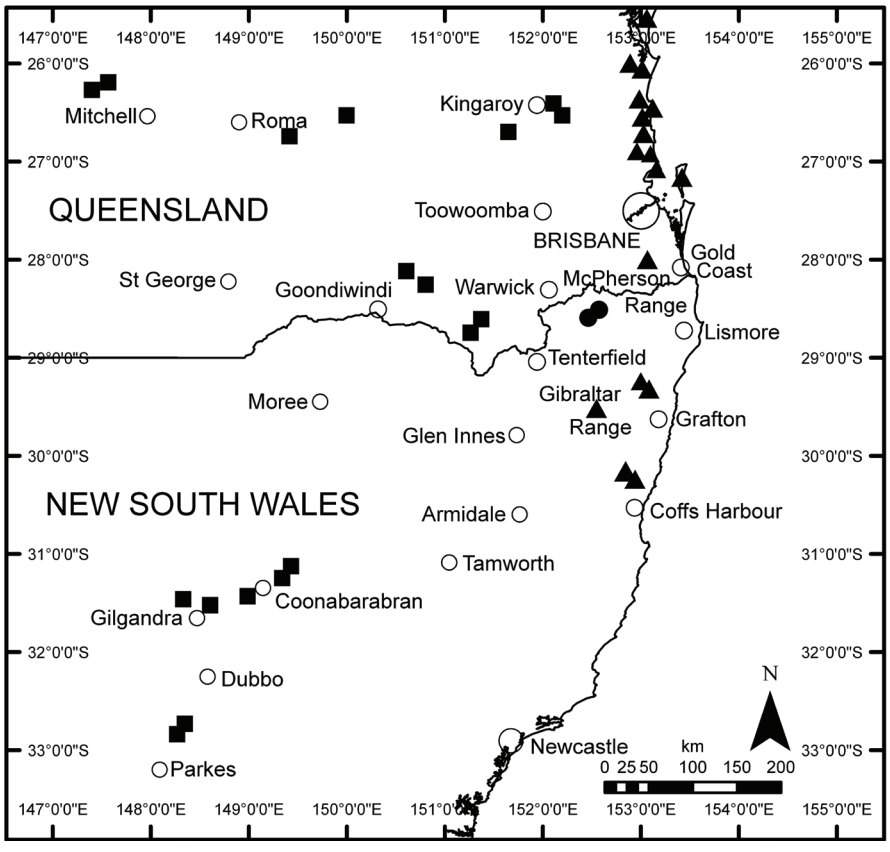

Fig. 2. Distribution of (●) *Phebalium speciosum,* including partial ranges of (■) *P. nottii* and (▲) *P. woombye.*

confined habitat and proximity to the plantation road. Too frequent fires would present a major threat to survival of both populations. Accessibility of the Battery Hill cliffs makes them a favourite with rock climbers and some trampling of plants has been observed. Extension of Toonumbar National Park to include the populations within the reserve system is recommended.

A coding of "Endangered" is suggested following the New South Wales Environmental Planning and Assessment Act 1979, and "Data Deficient" following IUCN guidelines (IUCN 2012).

Etymology: epithet is from the Latin *speciosum* (beautiful), in reference to the showy effect of pink corollas and silvery under-surfaces of the leaves.

Modification to key in Flora of New South Wales

The key to *Phebalium* species in *Flora of New South Wales* (Weston & Harden 2002: 300) and the *New South Wales Flora Online* (Weston & Harden 2012) may be modified to accommodate the new species as follows:

1 Corolla pink; flowers 5–8 merous

1a Leaves >7 mm wide, lanceolate or elliptic..... ***P. speciosum***

1a* Leaves <5 mm wide, narrowly elliptic..... ***P. nottii***

1* Corolla white or bright yellow, sometimes ageing pink; flowers 5-merous

Acknowledgments

I wish to thank Directors of the herbaria BRI, CANB and NSW for access to collections and Alex Floyd at Coffs Harbour Botanic Gardens for use of CFSHB. Thanks to John Nevin for the image of the isotype specimen.

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Manuscript received 07 May 2012, accepted 15 April 2013