

Between a rock and a hard place: *Quoya zonalis* (Lamiaceae: Chloantheae), a new threatened Foxglove from Western Australia's Pilbara bioregion

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SHORT COMMUNICATION

The Pilbara Foxglove, described below, is one of only three species from the Pilbara bioregion to be recognised as Threatened (Smith & Jones 2018; Western Australian Herbarium 1998–); however, given the highly prospective nature of the region's geology, and the presence of many other apparent, short-range endemics, it seems likely that this number will grow in the coming years. Although first detected in 2002, material of this new species was not submitted to the Western Australian Herbarium until 2010. At that time it was confirmed as taxonomically distinct and was added to Western Australia's vascular plant census under the phrase name *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) (Western Australian Herbarium 1998–). Recent phylogenetic analyses of nuclear ITS and chloroplast *ndhF* molecular sequence data (M.D. Barrett unpubl. data) confirm that this species, along with the related *P. obliqua* W.Fitzg., actually belong to the reinstated genus *Quoya* Gaudich. (Conn *et al.* 2011). While rare, this species is relatively easy to recognise in the field due to its height, the distinctive colour of its leaves and the fact that it grows in narrow zones along steep rocky slopes of a specific landform.

Quoya zonalis K.A.Sheph. & Hislop, *sp. nov.*

Type: c. 90 km south-south-east of Port Hedland, Western Australia [precise locality withheld for conservation reasons], 30 August 2010, G. Woodman & D. Coultas GWDC Opp 4 (*holo:* PERTH 08253749; *iso:* CANB).

Pityrodia sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 24 January 2018].

Erect *shrub* 1.2–2 m high. *Stems* and branches with a dense indumentum of white, cream or yellow, branched hairs. *Leaves* opposite with petioles 10–30 mm long, weakly antrorse or sometimes ± patent; lamina ovate to broadly ovate, 23–96 mm long, 14–47 mm wide, adaxially concave; adaxial and abaxial surfaces with a 3-layered indumentum consisting of a dense layer of dendritic hairs 0.5–1.3 mm long, obscuring a layer of very short, glandular hairs over scattered sessile glands; base rounded, truncate or cordate; apex obtuse, margin minutely crenulate. *Inflorescence* simple or cymose with 5–7 flowers per

cyme; peduncles 7–31 mm long, tomentose with dendritic hairs 0.2–0.4 mm long; pedicels 2.5–9 mm long, tomentose with dendritic hairs 0.5–1.6 mm long. *Bracts* narrowly elliptic, 3.1–5 mm long, 1.1–1.2 mm wide, abaxial surface tomentose with dendritic hairs 0.25–0.5 mm long; adaxial surface with scattered sessile and shortly stalked glandular hairs towards the base and centre, with scattered dendritic hairs on the margins and apex. *Bracteoles* narrowly ovate, 1.1–2.4 mm long, 0.4–0.8 mm wide, indumentum as for bracts. *Calyx* lobes 5, narrowly ovate to ± linear, 6.5–10 mm long, 0.8–1.6 mm wide, tube (0.35–)1–1.5 mm long, abaxial surface with the same 3-layered indumentum as the leaves, the outer layer tomentose with hairs 0.8–1.7 mm long, variable in colour from white to red-purple; adaxial surface also with the same 3-layered indumentum but much less dense so that the surface is clearly visible. *Corolla* 2-lipped, white to pale pink with darker pink spots and markings on the lower central lobe and in the throat, (13–)15–20 mm long, with a cylindrical tube gradually dilating to 7–10 mm wide; adaxial lobes elliptic to ovate, 3.6–4.1 mm long, 3.2–4.2 mm wide; lateral lobes elliptic to ovate, 3.5–3.6 mm long, 3.3–4.2 mm wide; abaxial lobe broadly ovate, 5.2–5.9 mm long, 6.0–7.5 mm wide; outer surface with moderately dense to dense dendritic hairs 0.25–0.4 mm long over scattered sessile glands; inner abaxial surface with a zone of moderately dense, simple, ± clavate hairs 0.8–1.5 mm long, extending from the lower half of the central lobe into the tube and merging with a dense ring of white, dendritic hairs to 2.5 mm long arising at the base of the filaments, the remainder of the inner surface glabrous. *Stamens* didynamous. *Filaments* glabrous, lower pair 6.5–9 mm long (free portion), 0.45 mm wide; upper pair 4.5–6 mm long (free portion), 0.5 mm wide. *Anthers* ovate with the lower half divergent, 1.6–2.0 mm long, held at or slightly exerted from the throat. *Ovary* depressed-globose to broadly ovoid, 1.5–1.6 mm long, 1.6–2 mm wide, densely tomentose with dendritic, white hairs 0.5–0.75 mm long; 4-locular, with one axile ovule in each locule; *style* up to 10.3 mm long, mostly glabrous but with a few hairs towards the base, stigma bifid. *Fruit* (probably somewhat immature) enclosed within the persistent calyx, broadly ovoid to broadly ellipsoid, densely tomentose throughout. (Figure 1)

Diagnostic characters. *Quoya zonalis* can be distinguished from all other Western Australian members of the genus by the following combination of characters: leaves long-petiolate, ovate or broadly ovate, densely tomentose with dendritic hairs obscuring both surfaces, with the adaxial surface hairs up to 1.3 mm long; corolla (13–)15–20 mm long with narrow calyx lobes 6.5–10 mm long; anthers 1.6–2.0 mm long.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 26 May 2010, *D. Coultas* DCCV Opp03 (PERTH); 28 May 2010, *D. Coultas* DCCV Opp14 (PERTH); 29 May 2013, *D. Coultas* & *T. Jones* DCTJ-01 (PERTH); 29 May 2013, *D. Coultas* & *T. Jones* DCTJ-02 (PERTH); 31 May 2013, *D. Coultas* & *T. Jones* DCTJ-04 (PERTH); 20 Apr. 2012, *K. Critchell* KTC 1416 04 (PERTH); 4 July 2011, *M.J. Macdonald* MJM 1321-06 (PERTH); 4 July 2011, *M.J. Macdonald* MJM 1321-07 (PERTH); 12 Apr. 2012, *M.J. Macdonald* MJM 1416 01 (PERTH); 30 Aug. 2010, *G. Woodman* & *D. Coultas* GWDC-Opp 3 (PERTH); 22 Sep. 2011, *G. Woodman* & *D. Coultas* GWDC-Opp1 (PERTH).

Phenology. Flowering from July to September. Fruiting likely from mid- to late spring as a collection with rather immature fruit was made in late September.

Distribution and habitat. Currently only known from the Pilbara bioregion where it occupies an area approximately 20 × 33 km. It is usually found on steep, rocky, sandstone conglomerate and granite slopes in skeletal, brown, sandy loam soils (Figure 1A) of the Capricorn Land System (Environmental Protection Authority 2014). Subpopulations are frequently distributed in a linear arrangement on slopes



Figure 1. *Quoya zonalis*. A – habitat with plant in foreground; B – growing *in situ* on a rocky granite slope in skeletal soils showing the large, opposite leaves; C – inflorescences of 5–7-flowered cymes, with the stem, pedicels and calyces covered in bright pink hairs; D – resprouting individual post-fire; E – flower, showing the characteristic red markings on the abaxial (lower) corolla lobe and simple white hairs in the throat and at the base of the abaxial lobe. Vouchers: *G. Woodman & D. Coultas* GWDC Opp 3 (PERTH) (B–D); unvouchered (A, E). Photographs by: Samuel Coultas (A), David Coultas (C, E) and Terri Jones (B, D).

with a southerly or easterly aspect and tall shrublands of *Terminalia canescens* and *Acacia tumida* var. *pilbarensis* over hummock grassland of *Triodia*, *Eriachne* and *Sarcostemma*.

Conservation status. This range-restricted species is listed as Endangered under State and Commonwealth legislation under the name *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) (Smith & Jones 2018; Threatened Species Scientific Committee 2019). *Quoya zonalis* occupies a specific habitat, with populations occurring within the footprint of three different mining tenements. At the time of its nomination for Threatened status there were 2,03 known individuals distributed across subpopulations of 10–200 individuals (Butcher 2015); however, an overall decline in numbers and increased fragmentation between known populations was expected due to ongoing mining activities.

Etymology. The specific epithet is from the Greek *zonalis* (of a belt) and refers to the fact that this species occurs in narrow lines along steep rocky slopes.

Vernacular name. Pilbara Foxglove.

Affinities. Based on molecular data and general morphology *Quoya zonalis* is closest to *Pityrodia obliqua*, an apparently uncommon species (Priority Three; Smith & Jones 2018) from the central and eastern Kimberley. It can be distinguished from *P. obliqua* by the following characters: densely tomentose leaves, with the dendritic hairs usually completely obscuring both surfaces (vs less densely hairy, with at least the adaxial and often both surfaces visible through the hairs); longer dendritic hairs on the adaxial leaf surface (0.5–1.3 mm long vs to 0.6 mm); longer calyx lobes (6.5–10 mm long vs 5–7.0 mm) that are wider in the upper half (0.6–1.0 mm wide vs 0.4–0.6 mm wide); usually larger flowers (corolla (13–)15–20 mm long vs 12–15 mm long); and longer anthers (1.6–2.0 mm long vs 1.0–1.3 mm).

Notes. The colour of the indumentum of this species varies considerably. The hairs on vegetative parts of the plant may be white, cream, or yellow, while hairs on the inflorescence are often a range of shades between pink and red-purple. At least some of this variation seems likely to be developmental as specimens in late bud have the darkest red-purple coloration about the inflorescence, while those that are in full flower or early fruit have pale pink or white coloration. The frequent presence of pink or red-purple hairs on the inflorescence axes and sepals may represent another difference between *Q. zonalis* and *P. obliqua* as the indumentum of the latter appears to lack hairs of that coloration.

Quoya zonalis was apparently first collected from Panorama Station north-west of Marble Bar during vegetation surveys in 2002 and 2007 by Malcolm E. Trudgen for the Panorama Project (CBH Sulphur Springs Pty Ltd). Trudgen recognised that it was a potentially new taxon, which he referred to as ‘*Pityrodia* sp. Panorama’, but specimens were never forwarded to the Western Australian Herbarium. Trudgen later confirmed that this entity was the same taxon as *P.* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) (*in sched.*).

Observations by Woodman Environmental Consulting (2013) in the aftermath of recent fire indicate that *Q. zonalis* has the capacity to resprout from a woody rootstock after the aerial parts are burnt (Figure 1E). Seedlings were also observed in the vicinity of resprouting individuals at a number of locations.

Acknowledgements

We thank the following people for their assistance: David Coultas, Samuel Coultas and Terri Jones (Woodman Environmental Consulting) for the use of their images; Greg Woodman (Woodman

Environmental Consulting) for supplying their 2013 report; Matthew Barrett (Kings Park Science, DBCA) for clarifying the generic placement of the new species; Niall Sheehy (DBCA) for providing information on the Threatened Flora nomination. We also acknowledge the contributions of the reviewer Trevor Wilson and editor Juliet Wege, which improved the accuracy and readability of this communication.

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