

Additional species in the *Indigofera haplophylla* group (Fabaceae: Faboideae)

Peter G. Wilson

*National Herbarium of New South Wales, Royal Botanic Gardens and Domain Trust,
Mrs Macquaries Road, Sydney, NSW 2000, Australia.
Email: peter.wilson@rbgsyd.nsw.gov.au*

Abstract

Two additional species in the *Indigofera haplophylla* group are described. *Indigofera brennanii* Peter G. Wilson, is a recently discovered taxon that occurs on Groote Eylandt and in Limmen National Park on the adjacent mainland. *Indigofera fimbriolata* Peter G. Wilson is a geographically isolated species that occurs in Bulleringa National Park, Queensland; it was formerly included in *I. rupicola*. Although both taxa are found in national parks, their conservation status has not been assessed. A revised key to the group is provided.

Introduction

Indigofera L. is the third largest genus of legumes with over 700 accepted species. Its native range includes Africa, Asia to the south-west Pacific and Australia, and extends from southern parts of the United States, through Mexico to tropical and subtropical America. In Australia there are over 50 endemic species, a number of native species that have wide extra-Australian distributions, and twelve introduced taxa.

In Wilson and Rowe (2004), one of the groups of species included were those with apparently simple leaves and elongated pods. Since then, Schrire *et al.* (2009) have shown that *I. ixocarpa*, despite its simple leaves, is more closely related to the pinnate-leaved *I. verruculosa*, with which it shares the presence of small wart-like protuberances, than it is to *I. haplophylla*, and, presumably, to the other similar species with simple leaves. The new species described here are additions to the *I. haplophylla* group, which seems to have diversified across northern Australia to produce a range of different morphotypes.

Key to species in the *I. haplophylla* group

1. Plants erect 2
1. Plants with lax to decumbent growth 5
2. Inflorescences almost always 3-flowered *I. triflora*
2. Inflorescences at least 5-flowered 3

3. Leaves linear, ≤ 1 mm wide *I. ammobia*
 3. Leaves narrow-elliptical, usually ≥ 3 mm wide 4
 4. Stipules to 1 mm long; biramous hairs \pm appressed on branches *I. haplophylla*
 4. Stipules 2.5–3.5 mm long; biramous hairs on branchlets with distinctly spreading arms *I. fimbriolata*
 5. Leaves elliptical, mostly 10–16 mm wide *I. brennanii*
 5. Leaves obovate or elliptical (rarely oblong), usually 5–10 mm wide *I. rupicola*

Descriptions of new taxa

Indigofera brennanii Peter G. Wilson, **sp. nov.**

Diagnosis. Similar to *I. rupicola* in its decumbent habit but differs by its larger leaves (usual range: 25–41 x 10–16 mm vs 10–25 x 5–10 mm) that are always glabrous on the upper surface.

Holotype. Northern Territory: Darwin & Gulf: Groote Islandt [sic], East side of Little Lagoon, near Umbakumba, Cowie 10548 & Dixon, 2 Mar 2005 (NSW, barcode NSW 818825) Isotypes: CANB, barcode CANB 687348 n.v.; DNA, barcode D0179473 n.v.

Indigofera sp. Groote Eylandt (D.J.Dixon 1365 & I.D.Cowie), Cowie *et al.* (2017)

Decumbent to spreading, perennial herb with a woody rootstock or taproot; young stems ridged, green, strigose with appressed, equally biramous hairs. Leaves simple; stipules linear, 1.5–2.5 mm long, bearing biramous hairs and few to many linear to clavate multicellular hairs, not spinescent, semipersistent; petiole 2.5–3.5 mm long; multicellular hairs at nodes scarce; stipellae absent. Lamina elliptical or narrowly elliptical, (13–)25–41 mm long, (7–)10–16(–19) mm wide; upper surface green, glabrous; lower surface green, slightly paler than above, with sparse, appressed hairs; apex obtuse and very shortly apiculate; veins not particularly prominent. Inflorescences (30–)43–58(–67) mm long, longer than the leaf; peduncle 6–17 mm long; axis ridged, angular; bracts triangular, c. 0.6 mm long, rarely persistent; flowers pink to purple, pedicel 0.5–1 mm long. Calyx 2.1–2.5 mm long, with subequal lobes longer than the length of the tube and moderately dense, white, appressed hairs. Standard pink to purplish, suborbicular, c. 4.5 mm high, 4 mm wide. Wings narrowly obovate to spatulate, 4–4.5 mm long, 1–1.2 mm wide. Keel 5–6 mm long, 1.5–2 mm deep; lateral pockets c. 0.9 mm long; apex acute; hairs moderately dense to dense, hyaline to brownish, at the tip and along the bottom; margin ciliate. Staminal tube c. 3 mm long. Ovary glabrous. Pod mostly ascending, \pm terete, 21–35 mm long, c. 2 mm deep, brown, glabrous; apex shortly beaked; endocarp spotted; seed c. 7–9 per fruit. Fig. 1.

Notes. Flower colour taken from collectors' notes. A good range of flowering material has not been seen, except in photographs of herbarium sheets.

Etymology. Named for Kym Brennan who, when working for the Office of the Supervising Scientist and the Northern Territory Department of Natural Resources, Environment and the Arts, made many important collections in the Kakadu/ Alligator Rivers area. He is also the author of publications, both popular (Brennan 1986) and scientific (Brennan 1996, 2007), that relate to the flora of that region.

Distribution and habitat. Northern Territory: eastern parts of Arnhem Land and Groote Eylandt, where it has been recorded from coastal sand dunes, sandplains in *Acacia* low open woodlands, and on damp ground under a woodland of *Melaleuca viridiflora* and *Corymbia* species. The Northern Territory eFlora fact sheet for this taxon (<http://eflora.nt.gov.au/factsheet?id=1049423>) gives its distribution as the Arnhem Coast, the Gulf Coastal, and the Gulf Fall and Uplands Bioregions. The fact sheet records flowering as occurring in March–April and fruiting in April–May.

Conservation status. This species has not yet been formally evaluated (*vide* Cowie *et al.* 2017) but does occur within Limmen National Park, where it has been recorded from a number of sites. According to IUCN criteria (IUCN 2019) it would be listed as “Not Evaluated”.

Other specimens examined. Northern Territory: Darwin & Gulf: Groote Eylandt, Little Lagoon, near Umbakumba, Dixon 1365 & Cowie, 9 Mar 2005 (NSW, BRI, CANB, DNA photo!, K, MEL); Groote Eylandt, Brennan 6443 & Dixon, 13 Mar 2005 (DNA photo!); Limmen National Park, Westaway 2488, 18 Apr 2008 (DNA photo!); Limmen National Park, Short 5596 & Johnson, 19 Apr 2008 (DNA photo!); Limmen National Park, Dixon 1812, 20 Apr 2008 (DNA photo!); Charlies Camp, banks of the little Wyrrian [Wearyan] River, Mitchell 8356, 27 May 2005 (DNA, barcode D0199005 n.v.)

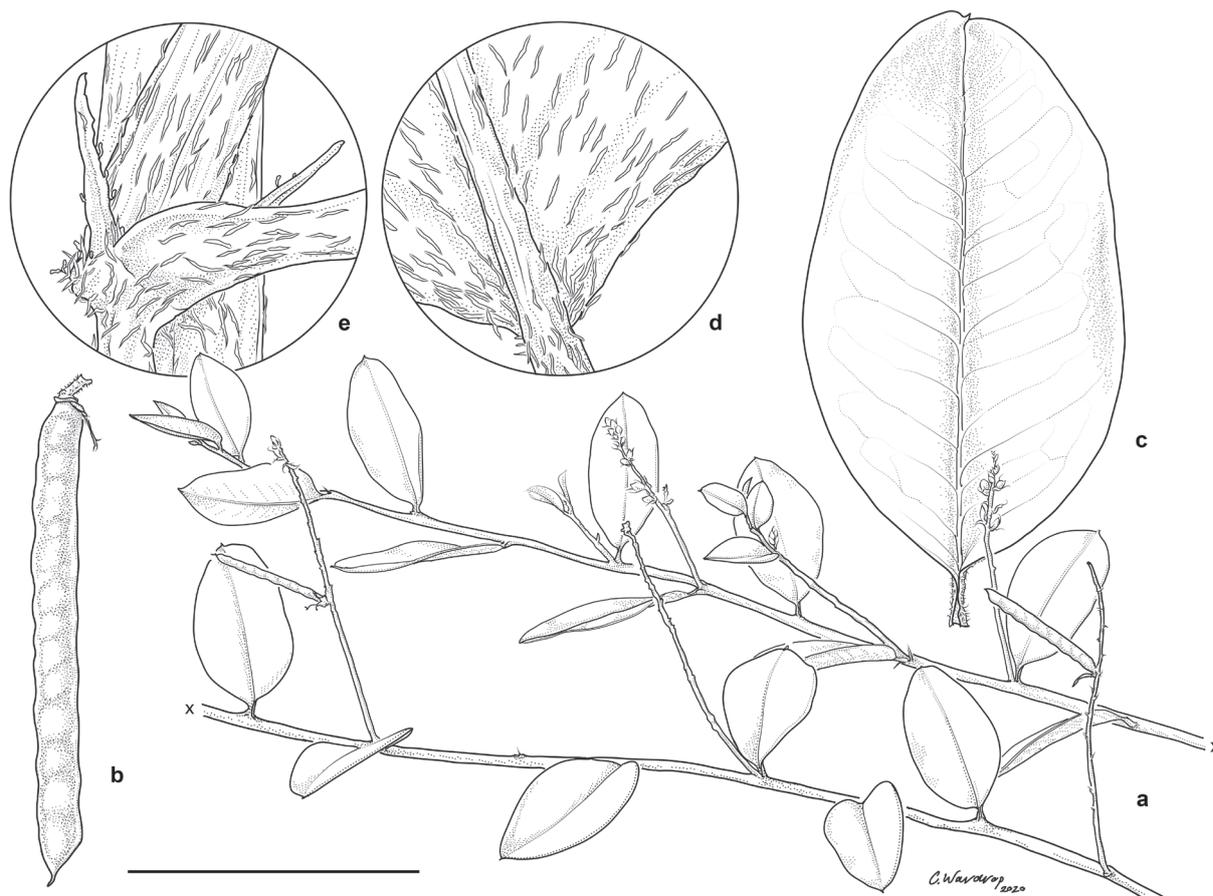


Fig. 1. *Indigofera brennanii*: a. habit; b. fruit; c. adaxial leaf; d. abaxial leaf detail showing biramous hairs; e. stipules. Scale bar: a = 55.5mm; b, c = 16.5mm; d = 3.3mm; e = 3mm. All from, Cowie 10548 & Dixon (NSW818825).

***Indigofera fimbriolata* Peter G. Wilson, sp. nov.**

Diagnosis. Similar to *I. triflora* and *I. haplophylla* in having an erect habit but differing in having much longer inflorescences with many more flowers (8–12 at least), and ridged stems bearing biramous hairs with distinctly spreading arms.

Holotype. Queensland: Cook: Donkey Spring Creek, Bulleringa National Park, 80 km NW of Mt Surprise, Forster 22496 & Booth, 22 Apr 1998 (NSW, barcode NSW 506926). Isotypes: BRI, barcode AQ 605567 n.v.; MEL 0288265 n.v.; DNA, barcode D0160497 n.v.

[misapplied name: *Indigofera rupicola* pro parte (Wilson & Rowe 2004: 670)]

Erect, multi-stemmed subshrub, to c. 0.5 m high; young stems ridged (ridges running decurrently, in pairs, from the base of each leaf), strigose with sparse, distinctly spreading, equally biramous hairs, mixed with dark, scattered multicellular hairs. Leaves simple; stipules linear, (1.7–)2.5–3.5 mm long, bearing a few biramous hairs, not spinescent, semipersistent; petiole 1–1.8 mm long; multicellular hairs somewhat denser at the nodes, red, club-shaped; stipellae absent. Lamina oblong, occasionally narrowly ovate or obovate, (18–)20–34(–37) mm long, 6–9.5 mm wide; upper surface dark green, glabrous (except for a few spreading hairs on the margin); lower surface paler than above, with sparse, appressed hairs; apex obtuse with short apiculus 0.5–1 mm long; veins not prominent. Inflorescences 35–45 mm long, slightly longer than leaves; peduncle (8–)11–16 mm long; bracts narrowly triangular, 0.7–1.1 mm long; flowers pink to purple; pedicel c. 1.5 mm long. Staminal tube c. 3 mm long. Ovary probably glabrous. Pod spreading to ascending, terete, 22–24 mm long, c. 2.5 mm deep, brown, glabrous; apex shortly beaked; endocarp faintly spotted; seed 6–8(–9) per fruit. Fig. 2.

Etymology. from the diminutive form of the Latin ‘*fimbriata*’ (fringed), a reference to the stems minutely fringed with spreading hairs.

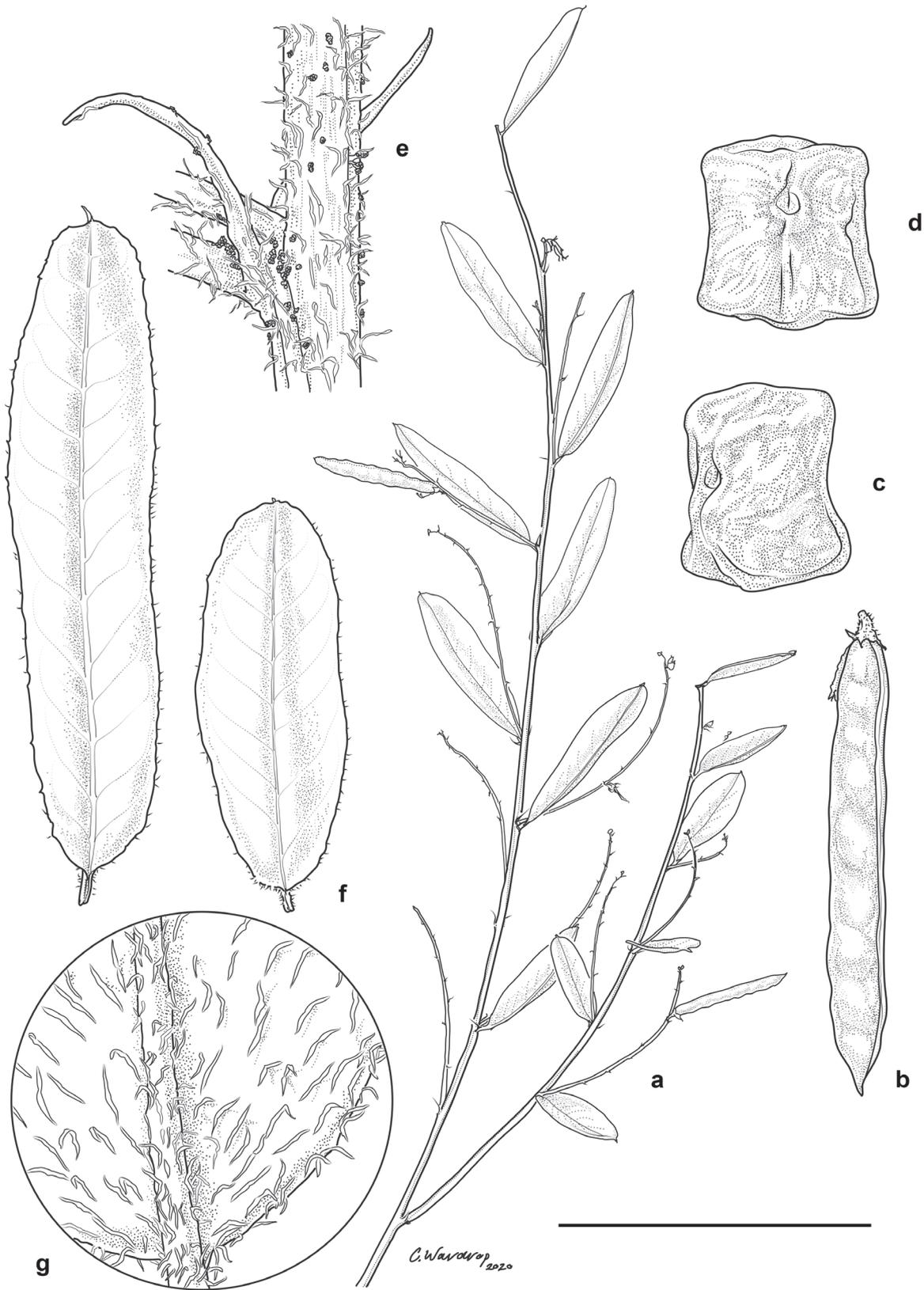


Fig. 2. *Indigofera fimbriolata*: a. habit; b. fruit; c, d. seeds; e. stipules; f. adaxial leaves showing shape variation; g. abaxial leaf detail showing biramous hairs. Scale bar: a = 55.5mm; b, f = 16.5mm; c, d = 2.5mm; e = 3mm; g = 3.3mm. All from Forster 22496 & Booth (NSW506926).

Notes. Known only from the type collection. Wilson and Rowe (2004) mistakenly included this in *I. rupicola* but it is geographically very isolated from populations of that species and differs in its erect habit, the narrower leaves and the spreading stem hairs. It also resembles *I. triflora* and *I. haplophylla* but differs from both in having many more flowers (8–12 at least) in an inflorescence with much shorter internodes. Flower colour was taken from collectors' notes; flowering material not seen, so all inflorescence and flower-related features have been estimated from the fruiting specimen.

Conservation status. This species is newly recognised so has not been formally evaluated. According to IUCN criteria (IUCN 2019) it would be listed as “Not Evaluated”. The only known collection is from within Bulleringa National Park where it was noted to be locally very common.

Acknowledgments

Thanks to Ian Cowie (DNA) for sending photographs of other holdings of *I. brennani*. Particular thanks go to the illustrator, Catherine Wardrop, for her excellent work. Reviewer suggestions significantly improved this paper. This is a continuation of work previously supported by funding from the Australian Biological Resources Study.

References

- Brennan KG (1986) Wildflowers of Kakadu: a guide to the wildflowers of Kakadu National Park and the Top End of the Northern Territory. (Jabiru, N.T.: K.G. Brennan)
- Brennan KG (1996), An annotated checklist of the vascular plants of the Alligator Rivers Region, Northern Territory, Australia. Supervising Scientist report 109. <http://www.environment.gov.au/science/supervising-scientist/publications/ssr/annotated-checklist-vascular-plants-alligator-rivers-region> (Accessed May 2020)
- Brennan KG (2007) A field key to the trees and shrubs in the Jabiru area. Supervising Scientist Report 187. <http://www.environment.gov.au/science/supervising-scientist/publications/ssr/field-key-trees-and-shrubs-jabiru-area> (Accessed May 2020)
- Cowie ID, Cuff NJ, Lewis DL, Jobson P (eds) (2017) *Checklist of the Vascular Plants of the Northern Territory*. (Northern Territory Herbarium, Department of Environment and Natural Resources: Palmerston)
- IUCN Standards and Petitions Committee (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> (Accessed May 2020)
- Schrire BD, Lavin M, Barker NP, Forest F. (2009) Phylogeny of the tribe Indigofereae (Leguminosae–Papilionoideae): Geographically structured more in succulent-rich and temperate settings than in grass-rich environments. *American Journal of Botany* 96: 816–852 <https://doi.org/10.3732/ajb.0800185>
- Wilson PG, Rowe R (2004) A revision of the Indigofereae (Fabaceae) in Australia. 1. *Indigastrum* and the simple or unifoliolate species of *Indigofera*. *Telopea* 10: 651–682

