

***Acacia beadleana* (Fabaceae: Mimosoideae), a New, Rare, Localised Species from Gibraltar Range National Park, New South Wales**

RODNEY H. JONES^{1,2} AND JEREMY J. BRUHL¹

¹Botany, Centre for Ecology, Evolution and Systematics, The University of New England, Armidale, NSW 2351 (jbruhl@une.edu.au), ² current address: Department of Primary Industries, Primary Industries Research Victoria, Knoxfield, Private Bag 15, Ferntree Gully Delivery Centre, Victoria 3156.

Jones, R.H. and Bruhl, J. J. (2006). *Acacia beadleana* (Fabaceae: Mimosoideae), a new, rare, localised species from Gibraltar Range National Park, New South Wales. *Proceedings of the Linnean Society of New South Wales* **127**, 5-10.

A new, rare species of phyllodinous *Acacia* from granitic areas of the Gibraltar Range in northern New South Wales is described on the basis of phenetic analysis. Comparison of *A. beadleana* with other morphologically similar species, and notes on its biology and ecology are presented. Conservation status for *A. beadleana* is proposed.

Manuscript received 1 May 2005, accepted for publication 7 December 2005.

KEYWORDS: *Acacia*, rarity, resprouting shrub, taxonomy.

INTRODUCTION

During a separate study (Quinn et al. 1995), two specimens of an *Acacia* housed in the N.C.W. Beadle Herbarium (NE) that had been determined variously as *Acacia ruppii* Maiden & Betche, *A. torringtonensis* Tindale and *A. brunioides* A.Cunn. ex G.Don were recognised as not belonging to any of these species. Although clearly belonging to *A.* subgen. *Phyllodineae* sect. *Phyllodineae*, clarification of the identity of these specimens could not be achieved using currently published descriptions at the time (Pedley 1983; Morrison and Davies 1991), and it was therefore tentatively assigned the phrase name *Acacia* sp. nov. (Gibraltar Range). Information from morphology and published descriptions, supported by advice from *Acacia* specialists (B. Maslin pers. comm.; L. Pedley pers. comm.), suggested that these specimens and others collected from the original population within Gibraltar Range National Park had affinities with *A. brunioides*, *A. conferta* A.Cunn. ex Benth., *A. gordonii* (Tindale) Pedley, *A. ruppii*, *A. tindaleae* Pedley, and *A. torringtonensis*.

Subsequent investigation of the taxonomy of these species revealed conflicting classifications. A multivariate analysis (Jones 1997; Jones and Bruhl

in prep.) was undertaken to test and set species limits of *Acacia* sp. nov. (Gibraltar Range) and the others of the study group above. Our plan was to publish the description of this new species together with the supporting analysis (Jones and Bruhl in prep.), but given that this new species is endemic to Gibraltar Range National Park we accepted the invitation to formally describe it in this special issue that celebrates the biodiversity of the region.

MATERIALS AND METHODS

Herbarium specimens from BRI, CANB, NE and NSW were examined, but only NE was found to have specimens of *Acacia* sp. nov. (Gibraltar Range). Field trips were undertaken in Gibraltar Range National Park to expand the sample of morphological features, permit observation of the habit and habitat of the species, determine the extent of the known populations and search for new populations. Terminology for indumentum features follows Hewson (1988), and for other features Radford et al. (1974). Herbarium codes follow the current online version of Holmgren et al. (1990) [<http://207.156.243.8/emu/ih/index.php>].

The number of flowers per head is a useful character for distinguishing *Acacia* sp. nov. (Gibraltar

ACACIA BEADLEANA, A NEW AND RARE SPECIES

Range) from morphologically similar species. Precise counts are necessary as estimates can easily lead to spurious counts. Flower number per head was, therefore, checked either by marking individual flowers with a pen to avoid counting flowers more than once, or by removal of all flowers from a head and counting the number in a Petri dish viewed under a dissecting microscope.

TAXONOMY

Acacia beadleana R.H. Jones & J.J. Bruhl, sp. nov.

Ad A. gordonii (Tindale) Pedley *similaris*, a qua phyllodiis in sectione transversali oblongis, trichomis ad marginem abaxialem phyllodii limitatis, petalis piliferis, et floribus per capitulo numerosioris, differt.

Typus: New South Wales: Northern Tablelands: Gibraltar Range National Park, Gwydir Highway [precise locality withheld for conservation purposes], J.J. Bruhl 1584, 28 Jan. 1996 (holo.: NSW; iso.: BRI, CANB, HO, K, MEL, MO, NE, PERTH, PRE). Figs 1–2.

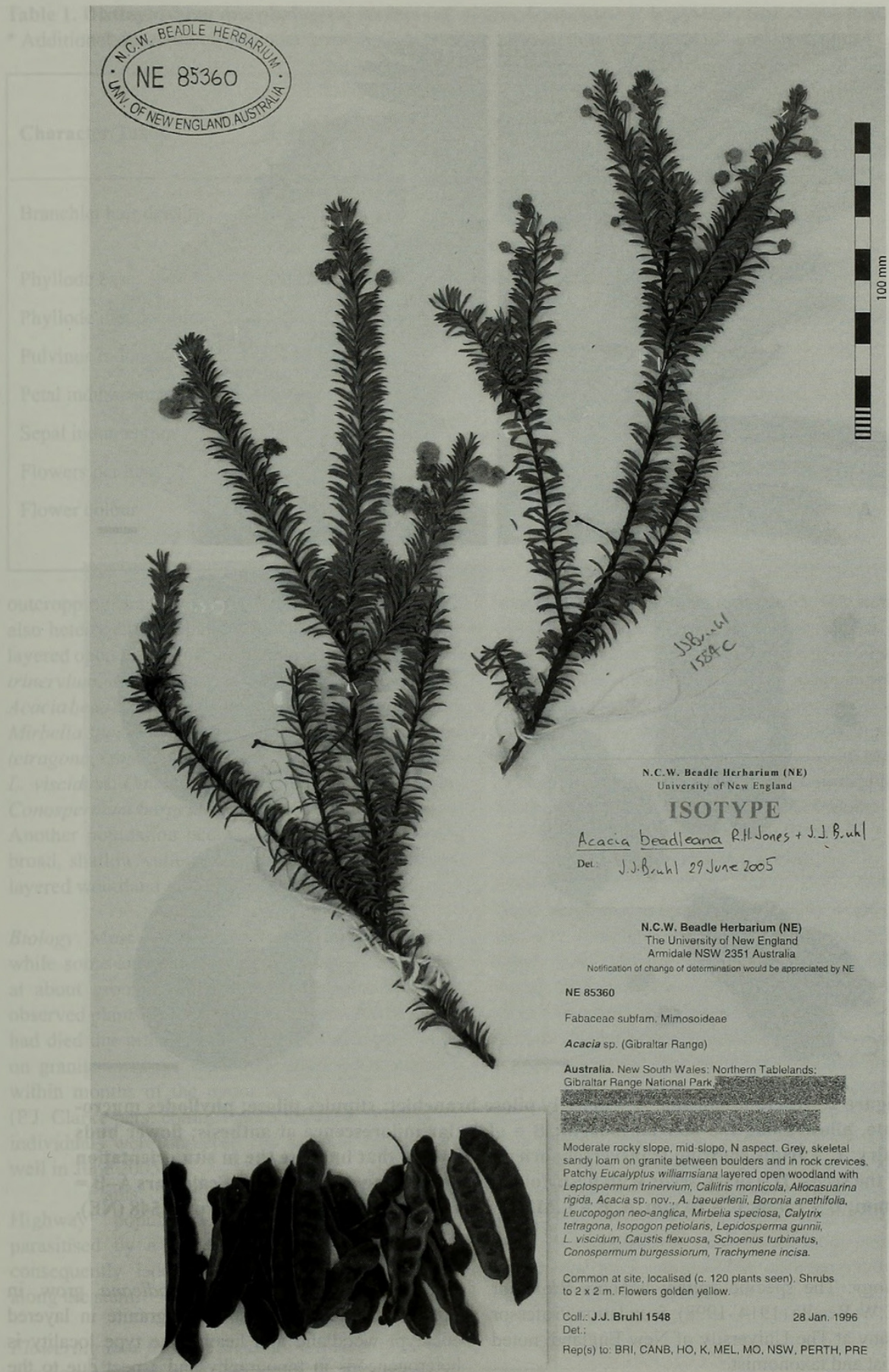
Description: Single to multi-stemmed, lignotuberous, erect to spreading evergreen shrub, 0.4–2.5 m high. *Stems* woody, terete, roughened by phyllode scars. *Branchlets* terete with persistent, densely pilose indumentum; trichomes simple, hyaline appearing silver to white, antrorse to retrorse. *Stipules* subsistent, narrowly triangular to triangular, 0.4–1 mm long, hairy. *Pulvinus* 0.5–1 mm long, sparsely hairy or sometimes glabrous. *Phyllodes* alternate and spiralled, crowded along the branchlets; narrowly elliptic, elliptic, linear to broadly linear, narrowly oblong, or narrowly oblanceolate 5–12.7 mm long, 0.6–1.4 mm wide, straight or recurved, often irregularly furrowed when dried; cross-section narrowly oblong to oblong; sparsely pilose; the hairs mostly restricted to abaxial margin, divergent, sometimes curved, antrorse to subappressed, hyaline and appearing silver to white; base cuneate; apex acute to short-acuminate and mucronate, mucro straight to oblique or hooked; two main veins (separating at proximal end of phyllode; one more or less central and the other closer to the abaxial edge) observed in cleared and stained phyllodes, nerves obscure in dried material; extrafloral nectary usually only one present, occasionally on the pulvinus or more often less than 2 mm distal to the pulvinus; stomata flush with phyllode surface, sometimes slightly raised.

Inflorescence solitary, axillary; peduncles densely pilose, 5.8–15.5 mm long, proximally ebracteate; flower heads globular, bright golden-yellow, 32–46 flowered, 7–10 mm diameter when dried; bracteoles hairy; sepals, more than two thirds united from the base, hairy; petals sparsely hairy. *Pods* oblong; 20–60 mm long, 7–10.4 mm wide, glabrous, pruinose and purplish red when young, maturing to very dark brown outside and mid-tan inside, coriaceous, straight. *Seeds* of transverse orientation in pod; obloid or ovoid, 3.8–5 mm long, 2.5–3.5 mm wide; black to very dark brown; areole usually open, sometimes closed; aril extending to more than half the length of seed.

Selected specimens examined: New South Wales: Northern Tablelands: Gibraltar Range National Park: Anvil Rock Track [precise locality withheld for conservation purposes]: J.J. Bruhl 1759, J.B. Williams & R.H. Jones (BRI, CANB, DNA, L, NE, NSW, P, UPS, WAIK), T. Tame, 4992 (NE, NSW); Dandahra Craggs Track [precise locality withheld for conservation purposes]: J.J. Bruhl 1757, J.B. Williams & R.H. Jones (AD, BRI, CANB, CHR, MEL, NE, NSW, NY), J.J. Bruhl 1758a, J.B. Williams & R.H. Jones (BOL, CANB, EIU, MO, NE, SI, TENN); Gwydir Highway [precise locality withheld for conservation purposes]: J.J. Bruhl 1508, F.C. Quinn & J.B. Williams (BRI, CANB, NE, NSW).

Similar species: *Acacia beadleana* is most similar in habit, phyllode morphology, inflorescence structure and flower colour to *A. gordonii*, a species that grows on sandstone and is restricted to the lower Blue Mountains (Bilpin, Faulconbridge) and the Sydney Hills (Glenorie), more than 450 km south of the Gibraltar Range. Apart from its geographical separation, *A. beadleana* is most readily distinguished from *A. gordonii* by the distribution of phyllode and sepal indumentum and the number of flowers per head (Table 1). The most similar, proximal species to *A. beadleana* is *A. brunioides* A.Cunn. ex G.Don subsp. *brunioides*. The latter is also native to Gibraltar Range National Park, but populations are separated by c. 6 km. These two species are readily morphologically distinguishable (Table 1) as are the broadly similar but more distantly located taxa *A. brunioides* subsp. *granitica* and *A. conferta* (Jones 1997; Maslin 2001).

Figure 1 (right). Isotype of *Acacia beadleana* R.H. Jones & J.J. Bruhl, J.J. Bruhl 1548 (NE). Precise locality withheld for conservation purposes.



ACACIA BEADLEANA, A NEW AND RARE SPECIES

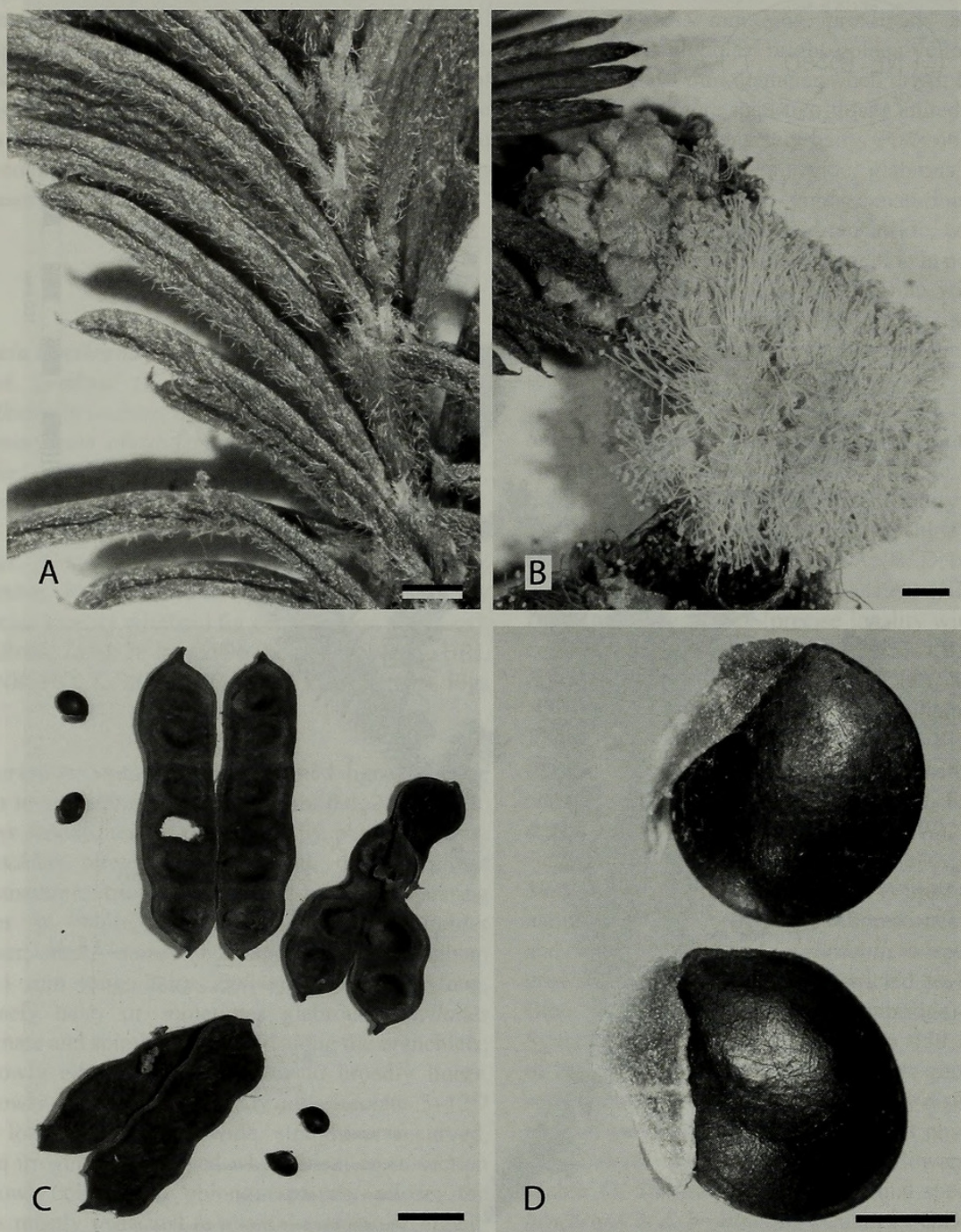


Figure 2. *Acacia beadleana*. A = densely pilose branchlet; stipules pilose; phyllodes mucronate, pilose along the abaxial margin; B = globular inflorescence at anthesis; flower buds hairy; C = fruits showing transversely oriented cavities that indicate the in situ orientation of the seeds; D = black seeds with fleshy/oily funicle forming an elaiosome. Scale bars A–B = 1 mm; D = 1 mm; C = 10 mm. A, B = L.M. Copeland 3892 (NE); C, D = J.J. Bruhl 1548 (NE).

Etymology: The specific epithet honours Professor Noel C.W. Beadle (1914–1998), foundation Professor of Botany at The University of New England, noted ecologist and taxonomist.

Ecology: Plants of *Acacia beadleana* grow in skeletal to deep sandy soils on granite in layered eucalypt woodland and heath. The type locality is heterogeneous in topography and aspect due to the

Table 1. Distinguishing morphological features of *Acacia beadleana*, *A. brunioides* and *A. gordonii*

* Additional observations provided by P. Kodela (NSW)

Character/Taxon	<i>A. beadleana</i>	<i>A. brunioides</i> subsp. <i>brunioides</i>	<i>A. gordonii</i>
Branchlet hair density	Dense	Absent, isolated or sparse	Dense
Phyllode base	Cuneate	Obtuse	Cuneate to obtuse
Phyllode indumentum	Abaxial margin only	Absent	Over whole phyllode
Pulvinus indumentum	Usually present	Absent	Present
Petal indumentum	Present	Absent	Absent
Sepal indumentum	Present	Sparse or absent	Sparse or absent
Flowers per head	32–46	21–26	(12–)21–25(–34)*
Flower colour	Bright golden yellow	Pale creamy yellow	Bright golden yellow

outcropping granite. Consequently the vegetation is also heterogeneous: patchy *Eucalyptus williamsiana* layered open woodland and heath with *Leptospermum trinervium*, *Allocasuarina rigida*, *Callitris monticola*, *Acacia beadleana*, *A. baeuerlenii*, *Boronia anethifolia*, *Mirbelia speciosa*, *Leucopogon neo-anglica*, *Calytrix tetragona*, *Isopogon petiolaris*, *Lepidosperma gunnii*, *L. viscidum*, *Caustis flexuosa*, *Schoenus turbinatus*, *Conospermum burgessiorum* and *Trachymene incisa*. Another population occurs on the lower slope of a broad, shallow valley on deeper soils in a eucalypt-layered woodland close to a swamp.

Biology: Most plants appear to be single-stemmed, while some are clearly multistemmed. A lignotuber at about ground level is often apparent. We have observed plants resprouting after most main branches had died due either to senescence or drought. Plants on granite outcrops were also observed to resprout within months of the major fire of 2002 in GRNP (P.J. Clarke pers. comm.) and such fired, resprouting individuals were observed (by JJB) to be growing well in June 2005.

Plants, especially those in the ‘Gwydir Highway’ population, appear generally to be parasitised by a scale or related hemipteran and consequently laden with sooty mould, especially along the stem.

Flowering and fruiting phenology: Plants of *Acacia beadleana* have been observed to flower in all

seasons of the year. Examination of herbarium material indicates that the main flush of buds occurs around November, and these buds are well developed by December–January. Flowering peaks in January–February. Abundant, young, immature fruit is evident by July–August. While some mature fruit is probably held on the plants for months after seed drop, the collection with the most mature fruit containing seed *in situ* was the type collection of late January.

Distribution and conservation status:

Evidence from our study (Jones 1997; Jones and Bruhl in prep.) indicates that *Acacia beadleana* is rare and geographically restricted. It is only known from three discrete populations within Gibraltar Range National Park. Each population is composed of c. 100 plants. One population is bisected by the Gwydir Highway, so roadside maintenance and any plan to widen or alter the road or extend the verge in that vicinity is likely to impact the population and should be actively discouraged. Three populations with a total of fewer than 1000 plants occur within the National Park, therefore a ROTAP code (Briggs and Leigh 1996) of 2VCit is suggested for *A. beadleana*. The population biology of *A. beadleana* merits close study. We predict that most likely range extensions are in the more inaccessible escarpment areas of Gibraltar Range National Park.

ACACIA BEADLEANA, A NEW AND RARE SPECIES

ACKNOWLEDGMENTS

Financial support to RHJ from the Noel C.W. Beadle Scholarship in Botany and the Keith and Dorothy Mackay Scholarship (Honours) is gratefully acknowledged. Thanks go to Carolne Gross, Frances Quinn, Warren and Gloria Sheather, and John Williams (all UNE) for field assistance, and staff and students of Botany, UNE, for support and advice to RHJ as an honours student. Thanks go to Bruce Maslin (CALM, WA) for personal communication and access to unpublished material; Terry Tame for discussions and specimens; Les Pedley (BRI) and Peter Clarke (UNE) and Philip Kodela (NSW) for personal communications; directors of herbaria BRI, CANB (including CBG) and NSW for loan material; and access to the N.C.W. Beadle Herbarium and facilities is acknowledged. We thank National Parks and Wildlife Service of NSW for permits to collect, and access to the park. Thanks also to Alex George (as Australian Botanical Liaison Officer) for Latin diagnosis and comments; Ian R.H. Telford (NE) for advice during the project and comments on the manuscript; and Lachlan Copeland (UNE) and the two referees for comments on the manuscript.

Radford, A.E., Dickison, W.C., Massey, J.R. and Bell, C.R. (1974). *Vascular Plant Systematics*. (New York, Harper & Row).

REFERENCES

- Briggs, J.D. and Leigh, J. (1996). Rare or threatened Australian plants (Melbourne, CSIRO).
- Hewson, H.J. (1988). *Plant Indumentum: A handbook of terminology*, Volume 9 (Canberra, Australian Government Publishing Service).
- Holmgren, P.K., Holmgren, N.H. and Barnett, L.C. (1990). *Index Herbariorum. Part I: The Herbaria of the World*, 8th Edition (Bronx, New York Botanical Garden).
- Jones, R.H. (1997). Systematic studies in *Acacia* subgenus *Phyllodineae* (Fabaceae: Mimosoideae). Honours thesis, The University of New England, Armidale.
- Jones, R.H. and Bruhl, J.J. (in prep.). Species limits within *Acacia* subgenus *Phyllodineae* (Fabaceae: Mimosoideae): A case for analytical assessment.
- Maslin, B. ed. (2001). *WATTLE: Acacias of Australia* (Perth, ABRS and CALM).
- Morrison, D.A. and Davies, S.J. (1991). *Acacia*. In *Flora of New South Wales*, vol. 2, 1st edn (Ed. G.J. Harden) pp. 327-392. (Sydney, UNSW Press).
- Pedley, L. (1983). Mimosaceae. In *Flora of South-eastern Queensland* (Eds T.D. Stanley and E.M. Ross) pp. 332-386. (Brisbane, Queensland Department of Primary Industries).
- Quinn, F.C., Williams, J.B., Gross, C.L. and Bruhl, J.J. (1995). Report on rare and threatened plants of north-eastern New South Wales, p. 292. Report prepared for National Parks and Wildlife Service of New South Wales and Australian Nature Conservation Agency.



Jones, Rodney H and Bruhl, Jeremy J. 2006. "Acacia beadleana (Fabaceae: Mimosoideae), a New, Rare, Localised Species from Gibraltar Range National Park, New South Wales." *Proceedings of the Linnean Society of New South Wales* 127, 5–10.

View This Item Online: <https://www.biodiversitylibrary.org/item/110727>

Permalink: <https://www.biodiversitylibrary.org/partpdf/287744>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.