Inclusion of the endemic New Caledonian genus *Pseudosciadium* in *Delarbrea* (Apiales, Myodocarpaceae)

**Porter P. LOWRY II**
Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299 (USA)
pete.lowry@mobot.org
and Département Systématique et Évolution (USM 602), Muséum national d'Histoire naturelle, CP 39, 57 rue Cuvier, F-75231 Paris cedex 05 (France)
lowry@mnhn.fr

**Gregory M. PLUNKETT**
Virginia Commonwealth University, P.O. Box 482012 Richmond, VA 23284-2012 (USA)
gmplunke@vcu.edu

**Virginie RAQUET**
Département Systématique et Évolution (USM 602), Muséum national d'Histoire naturelle, CP 39, 57 rue Cuvier, F-75231 Paris cedex 05 (France)
Raquet.Virginie@caramail.com

**Taylor S. SPRENKLE**
Virginia Commonwealth University, P.O. Box 482012 Richmond, VA 23284-2012 (USA)

**Joël JÉRÉMIE**
Départements Milieux et Peuplements aquatiques (USM 403) et Systématique et Évolution (USM 602), Muséum national d'Histoire naturelle, CP 39, 57 rue Cuvier, F-75231 Paris cedex 05 (France)
jeremie@mnhn.fr

**ABSTRACT**
Recent molecular and morphological phylogenetic analyses of the newly-recognized family Myodocarpaceae (Apiales) have shown that the genus *Pseudosciadium* (represented by a single species endemic to New Caledonia) is nested within a well-supported clade that also comprises members of the genus *Delarbrea*, necessitating its inclusion within a more broadly circumscribed *Delarbrea*. An expanded description is provided for *Delarbrea* along with a detailed description of the newly transferred species, *D. balansae*, accompanied by full citation of specimens, an illustration and a preliminary conservation assessment calculated according to IUCN Red List criteria.

**KEY WORDS**
The relationships and placement of the monotypic, endemic New Caledonian genus *Pseudosciadium* Baill. have confounded botanists for more than 125 years. BAILLON (1878, 1879) originally described the genus on the basis of a beautifully preserved flowering collection made by BALANSA in 1871 at the mouth of the Dothio River just north of the town of Thio along the eastern coast of New Caledonia. At the time, BAILLON indicated that *Pseudosciadium* was closely related to (and perhaps intermediate between) two other genera then placed in Araliaceae, *Delarbrea* Vieill. and *Myodocarpus* Brongn. & Gris, both of which were regarded as endemic to New Caledonia. BAILLON's initial intention had been to describe this new taxon as a species of *Myodocarpus*, but the presence in some flowers of valvate petals with a narrowed base lacking an evident claw (vs imbricate, distinctly clawed petals in *Myodocarpus*) and of an evident stipe at the base of the ovary (lacking in *Myodocarpus*) prompted him to recognize it as a distinct genus. Subsequent authors (e.g., HARMS 1894-1897; CALESTANI 1905; VIGUIER 1906, 1925; HUTCHINSON 1967), placing substantial emphasis on corolla aestivation for the delimitation of major groups within Araliaceae, separated *Pseudosciadium* from *Delarbrea* and *Myodocarpus* (often regarded as comprising tribe Myodocarpeae), and transferred it to tribe Mackinlayeae, defined to include taxa with valvate petals narrowed at the base, where it joined two other genera, *Apiopetalum* Baill. from New Caledonia and *Mackinlaya* F. Muell. from Australia and New Guinea. The affinities of *Pseudosciadium* remained ambiguous, however, until mature fruits became available demonstrating unmistakable homologies with the fruits of *Delarbrea* and *Myodocarpus*, including the presence of distinctive oil vesicles in the endocarp, a feature known nowhere else in the family. This prompted LOWRY (1986a) to suggest that *Delarbrea*, *Myodocarpus* and *Pseudosciadium* form a monophyletic group within Araliaceae, signaling a return to BAILLON's (1878, 1879) original concept.

Over the years the position of these three genera within Apiales has likewise presented difficulties. Because *Delarbrea*, *Myodocarpus* and *Pseudosciadium* are all woody, they have traditionally been placed in Araliaceae, despite the presence of several features generally regarded as more typical of Apiaceae, including a bicarpellate gynoecium, petals with inflexed tips and, in the case of *Myodocarpus*, a schizocarpic fruit. To clarify the affinities of these and several other taxa often regarded as “intermediates” between the two families, PLUNKETT & LOWRY (2001) used a combination of nuclear (ITS) and plastid (*matK*) sequence data to evaluate the phylogenetic relationships of these problematic taxa. Their results confirmed that *Delarbrea*, *Myodocarpus* and *Pseudosciadium* comprise a strongly supported monophyletic...
Inclusion of *Pseudosciadium* in *Delarbrea* (Apiales: Myodocarpaceae) group segregated from the core members of Araliaceae and from other basally branching lineages in Apiales, a conclusion that led Doweld (2001) to describe Myodocarpaceae as a distinct family. Within this clade, two well supported subclades were identified, one comprising *Delarbrea* + *Pseudosciadium* (which share terete fleshy fruits and noncalyptrate corollas) and another containing species of *Myodocarpus* (characterized by dorsally flattened, winged schizocarpic fruits and buds with calyptrate corollas) a finding supported by data from wood anatomy (Oskolski et al. 1997). The study of Plunkett & Lowry (2001) was not, however, able to resolve the relationship between *Delarbrea* and *Pseudosciadium*, although some of their cladograms suggested that *Pseudosciadium* may be nested within the *Delarbrea* subclade. In a subsequent study, Sprenkle (2002; see also Plunkett et al. 2004) carried out a more detailed phylogenetic analysis focusing specifically on relationships within Myodocarpaceae using an expanded set of molecular data from three nuclear markers (ITS, ETS and the 5S non-transcribed spacer) and one chloroplast marker (*trnL-trnF*). The results of that study confirmed the earlier finding of two well differentiated clades within the family, and clearly showed that *Pseudosciadium* falls within the *Delarbrea* subclade. In a complementary phylogenetic study using 35 morphological characters, Raquet (2004) also confirmed the presence of two distinct lineages within Myodocarpaceae corresponding to *Myodocarpus* and *Delarbrea* + *Pseudosciadium*, as well as the placement of *Pseudosciadium* nested among the members of *Delarbrea*. The morphological analysis also revealed the presence of a stipe at the base of the fruits of several species of *Delarbrea*, further supporting a close relationship with *Pseudosciadium*. Taken together, these findings indicate that *Pseudosciadium* should be included within a more broadly circumscribed *Delarbrea*, necessitating the transfer of *P. balansae*.

**DELARBREA** Vieill.


Delarbrea balansae (Baill.) Lowry & Plunkett, comb. nov.


Trees 2-4 m tall. Leaves 25-40(-50) cm long; leaflets 9-15, membranous, ovate to ovate-elliptic, often narrowly so, 5-12.5 × 2-5 cm, the lowermost somewhat reduced and often broadly ovate, apex narrowly obtuse to acuminate, minutely mucronate, margin entire, to serrate on the first few leaves of new shoots (finely and more deeply serrate in juvenile foliage), base obtuse to truncate; petiolules 7-15 mm long, flattened laterally, with the scarious margins upturned and forming a groove on the top; petiole terete, with an evident thickening c. 1 cm from the base, usually glaucoscent. Inflorescence light yellow-green throughout, primary axis (55-)65-150 cm long, pendant, glaucoscent at the base, secondary axes 10-15, alternate, regularly scattered and borne at 45-90° angle to the primary axis, the lower ones up to 40 cm long, reduced progressively toward the apex, tertiary axes 8-12 per secondary axis (fewer on the upper ones), alternate, 3-9 cm long (the uppermost somewhat smaller), each with a terminal umbellules of 4-10(-12) hermaphrodite flowers and (0-)1-4 small lateral umbellules of 1-8 staminate flowers, involucrre minute, of 4-6 triangular, acuminate bractlets each 0.5-1 mm long (smaller in staminate umbellules), pedicels 3-7 mm long (those of the staminate flowers 1.5-4 mm long). Petals yellow-green, c. 0.7 mm long (smaller in staminate flowers). Filaments yellow-green, 0.8 mm long, anthers 0.6 mm long (0.4-0.5 mm in staminate flowers). Ovary 0.8-1 mm long at anthesis, styles 0.6-0.8 mm long at anthesis (0.4 mm long and vestigial in stamine flowers), expanding very little in fruit, but becoming somewhat thicker. Fruit ellipsoid-ovoid, olive-green turning deep purple when mature, 10-13 mm long, smooth, shiny, nearly always crushed in pressed specimens. 2n = 24 (Lowry 1986b; Yi et al. 2004). — Fig. 1.

Habitat. — Delarbrea balansae appears to be restricted to ultramafic substrates in southern New Caledonia, and occurs primarily in humid forests, although one collection has been made in maquis vegetation (see Lowry 1986b). The species has only been recorded at five sites, four at low elevation (0-50 m) along or near the east coast (one on the Baie de Ouinné and three in the region of Thio) and one at about 450 m on Mt. Mou, NW of Nouméa.

Conservation status. — Using the IUCN (2001) threat criteria, Delarbrea balansae is assigned a preliminary status of Endangered (EN B1ab2abD) based on the fact that it has an Extent of Occurrence of c. 1000 km², an Area of Occupancy <100 km² (known from just five locations), and an estimated total population of less than 250 mature individuals.

Inclusion of *Pseudociadium* in *Delarbrea* (Apiales: Myodocarpaceae)

**Fig. 1.** — *Delarbrea balansae* (Baill.) Lowry & Plunkett: A, flowering branch; B, juvenile leaf; C, flower at anthesis (side view); D, flower at anthesis (top view); E, fruit; F, portion of an infructescence. A, C-D, Lowry 3663; B, Lowry 3549; E, F, Lowry 3548.

Acknowledgements

The authors are grateful to the Direction des Ressources naturelles, Province Sud, for logistical support and permission to conduct field work in New Caledonia, IRD-Nouméa for assistance and access to the NOU herbarium, and John Myers for the fine illustration. Support for field work was provided by grants from the U.S. National Science Foundation (BSR83-14691 to PPL), the National Geographic Society (5793-96 to GMP), and the John D. and Catherine T. MacArthur Foundation (to PPL); lab- oratory work was supported by grants from the NOU herbarium, and John MYERS for the fine

REFERENCES


Submitted on 28 June 2004; accepted on 7 September 2004.