

BOOK REVIEWS

Silk Tree, Guanacaste, Monkey's Earring. A Generic System for the Synandrous Mimosaceae of the Americas. Part 1. *Abarema*, *Albizia* and Allies. Rupert C. Barneby & James W. Grimes. *Memoirs of the New York Botanical Garden* 74, Part 1. New York: New York Botanical Garden. 1996. 292pp. ISBN 0 89327 395 3. US \$45 (hardback).

Following close on the heels of revisions of New World *Mimosa* (479 species) (Barneby, 1991) and the American Cassiinae (406 species) (Irwin & Barneby, 1982), as well as earlier accounts of *Astragalus* and the Daleae (Barneby, 1964, 1977) and a continuously swift flow of lesser contributions on diverse Leguminosae, this revision of the Ingeae re-confirms Barneby as one of the most productive legume taxonomists and adds weight to the idea that, blessed with longevity, taxonomists can become progressively more productive with age! Barneby has a prodigious capacity to revise taxonomically difficult, species-rich genera. Here, with Grimes, he grapples with one of the more intractable generic delimitation problems, continuing the long and productive Brittonian tradition of legume systematics at the New York Botanical Garden.

This book is Part 1 of a generic and species-level revision of the tribe Ingeae (Mimosoideae, Leguminosae) of the New World encompassing all genera except *Inga*, which is the focus of current monographic work elsewhere. Part 1 includes treatments of 20 genera, 137 species and 20 infraspecific varieties; seven genera, 17 species and six varieties are described as new. Thus, in terms of scale, new taxa and taxonomic implications alone, this is a formidable piece of work. *Enterolobium* and *Lysiloma* are dealt with in less detail than the rest by brief conspectus of species. While omission of a detailed account of *Enterolobium* may be justified given its recent revision by Mesquita, the same does not apply to *Lysiloma* for which the 'excellent modern monograph' by Thompson (1980) referred to is still not published 16 years after it was completed as a PhD thesis; it is a pity that a full treatment of *Lysiloma* was not included. Three of the four remaining genera (*Pithecellobium*, *Cojoba* and *Zygia*) are covered in Part 2 due to be published shortly and an account of the fourth, *Calliandra*, has also been completed ready for publication.

Generic delimitation within the Ingeae has long been known to present particular difficulties. Although *Inga* and *Calliandra* have remained relatively stable genera, the remaining genera of the Ingeae have had a 'more tumultuous nomenclatural history'. The crux of a new classification is generic delimitation of *Pithecellobium*. A strict definition of *Pithecellobium*, as adopted by Nielsen for Old World species, does not alone solve the problem, but simply transfers it to *Albizia* which becomes 'so internally diverse as to defy description'. Lack of well-defined genera has resulted in nomenclatural instability for many species with successive transfers from genus to genus making this a notoriously

confusing group for foresters, ecologists, conservationists and others. At the extreme, *Samanea saman* has been placed in *Albizia*, *Calliandra*, *Enterolobium*, *Feuilleea*, *Inga*, *Pithecellobium* and *Zygia*. The New World Ingeae are mainly tropical trees. They are ecologically diverse, economically important and widely distributed – from the deserts of Sonora to the flooded forests of Amazonia; a stable classification is long overdue.

In line with modern revisions, this treatment combines phylogenetic analysis, provided by Grimes, with a descriptive account, provided by Barneby. They are jointly responsible for sections on morphology and for taxonomic decisions. Four separate species-level phylogenetic analyses of subgroups within the tribe are presented, building on an earlier analysis of the tribe by Grimes (1995). Because of the difficulties involved in a global analysis of all species (missing data, large numbers of taxa and high levels of homoplasy), Grimes (1995) adopted an approach that is unconventional and controversial. I would take issue with his iterative approach to defining exemplar taxa and testing monophyly, the generation of consensus trees based on incomplete heuristic searches and his approach to character conceptualization and coding. As acknowledged by Grimes himself, the analysis provides only a preliminary, tentative and partially resolved hypothesis of sister group relationships; much remains to be done and whole classes of data – cytological, molecular and chemical – remain unavailable. These limitations mean that the subsequent species-level analyses using single outgroups selected on the basis of the tribal analysis do not provide an unequivocal and globally parsimonious scheme of relationships and character support across the group as a whole, nor a strong test of monophyly of putative genera. Workers delimiting genera in other legume groups, faced with similar problems, have generally adopted a cautious approach consistent with well-supported monophyletic groups, preferring to defer nomenclatural changes until more robust hypotheses, based on more data, become available. By contrast, Barneby and Grimes have been bolder and have not hesitated to name six new genera and reinstate numerous others. This may be viewed as premature by some and is perhaps the most controversial aspect of this revision. While most of the genera do appear to be well-supported monophyletic clades, I am less happy with the two monotypic genera *Hesperalbizia* and *Blanchetiodendron* which are poorly supported and, at least for *Blanchetiodendron*, with uncertain relationships.

Fortunately the more manageable species-level analyses avoid the methodological pitfalls of exemplar taxa and character coding. I noticed only a few minor errors. No explanation of character optimization routines nor options used to denote homoplasy on cladograms is provided; the shading (black/stippled/white) is hard to distinguish; character states were omitted from the terminal branch on Fig. 4; the number of equally parsimonious trees generated in the analysis of the *Abarema* alliance is variously reported as eight (p. 21 line 43), 24 (caption to Fig. 4) and 20 (p. 21 line 98) and there appears to be an error in the text describing character support (p. 158, para. 2 lines 2–4).

Whatever future analyses of new data sets may reveal, there is no doubt that with this revision users may now indeed expect greater nomenclatural stability, but it will be a while before confusion subsides. Several of the new names provided are, to my mind, not well chosen for those with memories less acute than Barneby's. New names which are anagrams or modifications of existing names – *Albizia* and *Balizia* or *Leucochloron* and *Chloroleucon* – may be aesthetically pleasing to some, or indicative of close relationships to others, but to many will be no more than a source of further muddle. The upgrading of sect. *Falcataria* of *Paraserianthes* to generic rank means that many, who were just getting used to the name *Paraserianthes* for the well-known and widely cultivated tree, long known as *Albizia falcataria*, must now adapt to the exceedingly confusing change to *Falcataria moluccana*! Although the authors see this as a 'matter of regret . . . that cannot be remedied' such changes are unwelcome and add fuel to those who argue for conservation of names.

The descriptive account of species is excellent, limited only by lack of detail in field characters such as bark and flower colour. The extent of field work is perhaps indicated by the small number of cited specimens (18) collected by the authors; this revision is based largely on herbarium study. The keys look very workable and worked well on material at FHO, the descriptions are extremely detailed, the notes on distribution, phenology, vernacular names and etymology are useful and the whole account is crafted in Barneby's rich, scholarly, and flowery style exemplified in the title of the book. Species delimitation and description of infraspecific variation seem sound although further work on some Mexican species groups (e.g. the *Albizia tomentosa*/*A. purpusii*/*A. sinaloensis* alliance) is needed. A list of exsiccatae is provided, but no fuller citation lists indicating herbaria where material is housed.

Distribution maps are provided for 103 of the 137 species. While the majority are detailed and of reasonable quality, there are a number of minor inconsistencies and imperfections. While maps for some species were justifiably omitted due to lack of data, there seems to be no logic in omitting others such as *Leucochloron limae* or *Albizia sinaloensis*. Perhaps these were judged to be too restricted to merit a map, but several narrowly restricted endemics are mapped (e.g. *Ebenopsis caesalpinoides* and *Leucochloron foederale*); provision of maps for all species, especially new ones, would have been desirable. Some distribution maps, particularly for Mesoamerican species, are very incomplete. For example, *Albizia niopoides* is not recorded from Guatemala, Honduras or Nicaragua where it is a common, conspicuous and widely collected tree of dry tropical forest now amply represented in herbaria such as MEXU; several type specimens, although cited and from known localities – such as those of *Albizia plurijuga* and *Havardia sonorae* – appear to have been omitted from maps. The symbols for *Sphinga acatlensis* and *S. prehensilis* should be reversed on the legend to Map 43. Inconsistencies in symbol size and base maps, unrelated to scale (some with one-degree grid, some without), are annoying and the quality

of reproduction, at least in my copy, is poor, with fading grid lines and rivers. There is similar loss of detail on some drawings; it is to be hoped that this is not a limitation of the use of recycled paper and soy-based ink.

Nine species are illustrated with excellent drawings, although longitudinal sections of flowers would have been useful. However, for a revision of this scale and taxonomic significance it is sparsely illustrated. This is aggravated by uneven coverage; there are two drawings each for *Abarema* and *Macrosamanea* while only one of the seven new genera is illustrated. This is a major criticism. New genera deserve illustration. I should like to have seen one drawing per genus as a minimum.

Ten of the 17 species described and named as new are based on incomplete material. This means that their status and affinities, and in the case of *Albizia leonardii* even the genus, are provisional; two are designated *nom provis*. Some may deplore description of new species 'from imperfect or litigious material' but I would support this on two counts. Firstly, publishing partial descriptions may encourage new field work or location of additional material. Secondly, given that some are clearly restricted endemics growing in endangered floras and are candidates for protection, it would be hoped that publication might prompt conservation action.

The few reservations expressed about this revision are those that encapsulate the difficulties associated with revision of any large pantropical group – the need for more field work and better integration of New and Old World taxonomies and, more fundamentally, the dilemmas of how to undertake simultaneous species and higher-level analyses in the absence of either complete species revisions or a well-corroborated hypothesis of sister group relationships. For most, such work must proceed by accretion by searching for sister groups to well-established monophyletic groups. Many might have hesitated before finalizing such a large segment of the generic system for the Ingeae. The boldness of this revision perhaps reflects the 'oft repeated injunction – get it into print' of N.L. Britton, advice that Barneby admired as 'pragmatic genius' (Barneby, 1984: 94). This seems prudent advice for those whose knowledge of a large and complex group such as this is as comprehensive as that of the authors.

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C. E. Hughes

The Anther: Form, function and phylogeny. Edited by W. G. D'Arcy & R. C. Keating. Cambridge University Press. 1996. 351pp. ISBN 0521 48063 9. £55 (hardback).

Stamens have received little attention, either in studies of morphology or from an evolutionary viewpoint, but in the last few years there has been an increasing interest in them. This book is a major contribution to the study of the morphology and evolution of anthers, and it will be interesting to many researchers.

The book consists of 13 papers which were mostly contributed for a symposium at the 1993 International Botanical Congress in Yokohama, Japan. As the title indicates, it deals with the form, function and phylogeny of the anther. However, other topics such as stamen development and anther anatomy are also covered. To give the potential reader a complete survey, every paper is listed below with title and author(s) followed by a brief discussion of the contents.

(1) Anthers and stamens and what they do. *W. G. D'Arcy*

This paper gives a good, short insight into the many different topics of the structure and function of stamens and anthers. It also points to the various aspects (e.g. evolutionary or taxonomic) that one topic may have, followed by useful references.

(2) The fossil history of stamens. *W. L. Crepet & K. C. Nixon*

The introduction states that this paper tells us about 'the history of stamens in the context of associated floral morphology'. For every time period a detailed listing of the literature records is given, complemented by reports of new findings. It is well illustrated and explained, so that it is understandable even to the non-palaeobotanist. A good point is that in their discussions the authors do not forget that insects played a role in the evolution of stamens.

(3) The origin and early evolution of angiosperm stamens. *L. Hufford*

A section on aspects of stamen morphology introduces this chapter, which deliberates over the controversial terminology of stamens and anthers. The possible pathways of early stamen evolution are discussed exhaustively following the results of recent cladistic analyses by different authors. Another section is a survey of the diversification of the stamens in Magnoliidae, Eudicots and Monocotyledons.

(4) Diversity and evolutionary trends in angiosperm anthers. *P. K. Endress*

The first part of this paper gives a short but informative survey of any possible changes in the groundplan of the anthers and the family in which they occur, with useful references to more detailed work. The main part is on pollination biology and anther shape with emphasis