

## Book Review

### Tropical Woody Rubiaceae

By E. Robbrecht

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For those who still want to know, the Rubiaceae (with 659 genera enumerated by Robbrecht and an estimated 10,700 species) are the fourth largest angiosperm family, after Asteraceae, Orchidaceae and Fabaceae. This family with 29 of its 38 currently accepted tribes being predominantly woody, has a mainly tropical distribution, and is represented in temperate areas by a comparatively small number of herbaceous taxa. How else to better understand such a family than through a proper understanding of its woody representatives?

Robbrecht's book aims at a synthesis of available information from the literature (and there are 325 listed references in this book, which does not cover all publications on the family) and his own studies, mainly of tropical African representatives. There is a useful brief description of methods used in studying domatia, crystals, hairs and excrescences, microcharacters of the corolla, pyrenes, seed-coats, endosperm and pollen, before the author launches into a detailed discussion (exceeding a hundred pages) of "characteristic features of tropical woody Rubiaceae", and a short general discussion of subfamilial classification. There are four appendices which are very useful: (1) a survey of the classification proposed in the book; (2) additions and corrections for the Rubiaceae in the Index Nominum Genericorum since 1979 and until October 1988; (3) an index to taxa in the present work and to the treatments by Schumann (1891, 1897, 1900), Krause (1908, 1915), Verdcourt (1958) and Bremekamp (1966); (4) a list of genera accepted by Robbrecht and their synonymy and tribal or subtribal position.

The most interesting chapter (for reading) is that which surveys different characters in the family. This includes habit and architecture; peculiarities in lifeform; the morphology and anatomy of the vegetative axis (roots, stems, nodes and wood); leaf characters; stipules; exudates, crystal types, trichomes and colleters; inflorescences; flowers; fruits; seeds; pollen; chromosomes; biology; distribution. The illustrations (line-drawings and photographs) are used to good effect. Mention of a few more characteristics may be interesting additions to an already amazing treatment by Robbrecht. There are also epiphytes in *Argostemma* (see Robbrecht's Table 3) and *Aidiopsis forbesii* in Malesia apparently has a strangling habit unique in the family. There is a discussion of geofrutices (plants with massive woody subterranean stems which sometimes ramify, notable in drier parts of Africa) and in this connection it is interesting to note that *Euclinia longiflora* (Africa), *Ixora coccinea* and *I. finlaysoniana* (Asia) can produce root suckers and also originate from somewhat monsoonal climates. The Malayan *Ixora scortechinii* var. *scortechinii* is unusual in that its rosette-like leaf arrangement traps organic litter and its internodes put out fine roots that penetrate the organic matter accumulated; it is a free-standing terrestrial plant. Intrapetiolar rather than interpetiolar stipules, in a way quite out of character in a rubiaceous plant, also occur in *Mussaendopsis beccariana* in Malesia. Shoot-tip and bud waxes in *Gardenia* also occur for the Southeast Asian species. Yellow sap (incredible but true) exudes from the bruised bark and fruit of some *Rothmannia* species in Malaya and Borneo. Some Naucleae even produce a reddish sap! Mitriform

stigmas or types structurally close to this, important in *Mitragyna* and many Van-guerieae, are not discussed. Some *Uncaria* species also consistently have anti-inhabited twigs. Robbrecht has omitted mention of the claim (Tan and Rao 1981, Biotropica 13: 232) that vivipary exists in *Ophiorrhiza*; that is indeed not vivipary but rather germination *in situ*, because the many tiny seeds are not always effectively expelled from the purse-shaped capsules, where their germination occurs without any physiological connections between parent and offspring tissues. The family is certainly not only huge, but also rich in peculiarities. Chemotaxonomic characters are surveyed in the chapter dealing with subfamilial classification, where it is perhaps more appropriate.

Subfamilial classification and the problems of grouping genera into tribes is clearly presented. Two subtitles on the title page of this book, "Characteristic features and progressions" and "Contributions to a new subfamilial classification", indicate how the survey of characters and trends are used here to evaluate and modify the classifications proposed by Hooker (in 1873), Verdcourt (1958) and Bremekamp (1966). Robbrecht makes good use of Venn diagrams displaying the various tribes for indicating character distribution and comparing classification systems. Hooker recognised 2 subfamilies, Verdcourt, 3 and Bremekamp, 8; Robbrecht suggests 4 — Cinchonoideae, Ixoroideae, Antirheoideae and Rubioideae.

The assignment of "problematic" genera to tribes, and even tribes to subfamilies, can remain difficult, often due to a lack of information. We may look at some Southeast Asian genera in relation to this. Robbrecht remains uncertain where Jackieae (represented by *Jackiopsis*, which has a 3-merous calyx and peculiar winged fruit) will affiliate in the Rubioideae. He has synonymised the *Coptosapelteae* (with contorted corolla lobes, unique T-shaped trichomes and a lack of raphides) with the Cinchoninae (with imbricate or valvate corolla lobes and raphides present or not) in the Cinchoneae. This demonstrates that tribal distinction is not easy, because variable and constant character-states are used even for different subtribes within a tribe. Bremekamp's Pomazoteae is regarded by Robbrecht as a synonym of Hedyotideae, with the exception of *Klossia* which is placed in the related Ophiorrhizeae; no clear justification is made. Bremekamp credited the Pomazoteae with no raphides although raphides have been subsequently discovered in *Lerchea*, *Xanthophyllum* and *Pomazota*; however there is little comparable information mentioned for *Klossia*. The laterally flattened capsules of the Ophiorrhizeae seem to me quite distinctive. The odd genus *Scyphiphora* is put by Robbrecht in the Antirheoideae rather than in the Gardenieae of the Ixoroideae, based on the opinion that the unique placentation in *Scyphiphora* (with one pendulous and one upwardly directed ovule inserted on a mid-septal placenta) may be derived from the *Retiniphyllum* (with 2 pendulous ovules attached to a mid-septal placenta) type (Retiniphyllae, Antirheoideae). Yet *Scyphiphora* has mesophyll sclereids so far detected only in seven other genera, all belonging to the Gardenieae and associated tribes.

It seems reasonable that Robbrecht has placed the Acranthereae and the "Mussaendeae" (illegitimate name) synonymous with the Isertieae (Cinchonoideae). But *Lecananthus* to me seems to have greater affinities with the Schradereae (including the Malasian *Lucinaea* and South American *Schradera*; Rubioideae) than the Isertieae: *Lecananthus* has adhesive adventitious roots and congested flowers grouped in heads, and lacks the capsules and winged seeds so often characteristic of the Cinchonoideae. Similarly, *Mycetia* is more often associated with the Hedyotideae (Rubioideae) than the Isertieae. The placement of *Lasianthus* in the Morindeae (which seems well characterised by a strong tendency towards syncarpous fruits) rather than the Psychotrieae is also controversial.

Such characters as presence or absence of raphides have been misinterpreted or

even wrongly ascribed to taxa in the past, and definitions of tribes and subfamilies have also shifted back and forth. In his work, Robbrecht has obviously attempted to verify as much as possible the information reported earlier, and comes out with what I consider the most important review and synthesis for the Rubiaceae. There are few typos and inconsistencies, e.g., "*Anthocephalus*" (which Bosser considers a synonym of *Breonia*) is used on page 29, but is this intended to mean *Breonia* or *Neolamarekia*, the latter name given by Bosser for Ridsdale's intended genus? Robbrecht hopes his book has emphasized adequately that a concerted effort by all workers is needed for a clearer understanding of such a complex family. His book is such an excellent new chapter in our understanding of the Rubiaceae.

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