

Book review

FISCHER, E. & FREY, W. (with contributions of THEISEN, I.) 2015. *Syllabus of Plant Families. Adolf Engler's Syllabus der Pflanzenfamilien. 13th edition by WOLFGANG FREY. Part 4: Pinopsida (Gymnosperms), Magnoliopsida (Angiosperms) p.p.: Subclass Magnoliidae [Amborellanae to Magnolianae, Liliae p.p. (Acorales to Asparagales)]. XI + 495 pp. Borntraeger Science Publishers, Stuttgart. ISBN 978-3-443-01087-4 [Price 139 EUR]*

The exceptional significance of Adolf Engler (1844–1930) in the field of plant systematics is twofold. First, he conceived an influential system, the so-called Englerian system, according to which several herbaria all over the world are still arranged. Second, he was the editor of two standard taxonomic monograph series, the *Pflanzenreich* (107 issues between 1900 and 1953) and the shorter *Die natürliche Pflanzenfamilien* (first edition 1887–1915, partial second edition 1926–1959), as well as a still shorter manual, *Syllabus der Pflanzenfamilien*, which had twelve editions between 1892 and 1964, the last one in two volumes edited by H. Melchior (with E. Werdermann for the first volume). After approximately half a century a new *Syllabus* edited by W. Frey began to be published in 2009. Out of a scheduled total of five parts in eight volumes, five volumes have already appeared [titles shortened]: Blue-green algae, Myxomycetes, and Fungi p.p. (1/1, 2012); Ascomycota (1/2, 2016); Photoautotrophic eukaryotic Algae (2/1, 2015); Rhodophyta (2/2, 2017); and Bryophytes and seedless vascular plants (3, 2009). The present Part 4 deals with gymnosperms and part of the angiosperms, the former section authored by E. Fischer and W. Frey and the latter by W. Frey (with contributions from I. Theisen for the *Orchidaceae*).

The book is organised in a manner familiar to users of the former editions of *Syllabus*, with concise characteristics of taxa in descending order down to genus level (but with some taxa given without characteristics; see below). The gymnosperms (pp. 6–110) are recognised as a single class, Pinopsida Burnett, with five subclasses. The system follows Christenhusz et al. (2011) for extant representatives and Anderson et al. (2007) and Taylor et al. (2009) for fossil ones.

The angiosperms (pp. 110–495) are recognised as the class Magnoliopsida Brongn. subdivided into two subclasses, namely Magnoliidae Novák ex Takht. and Rosidae Takht. However, these subclasses are understood very differently from the original circumscriptions. The name Rosidae is used for eudicots, whereas the Magnoliidae are non-eudicots (incl. monocots),

following the APG III. The merits of such a classification are not evident. First of all, the non-eudicot/eudicot dichotomy is used instead of the classical dicot/monocot dichotomy. Of the two resulting groups, one is strictly monophyletic (holophyletic) and the other paraphyletic, just as in the traditional system, so orthodox cladists will not see such a classification as an improvement. On the other hand, whereas the monocot/dicot dichotomy is easily characterised morphologically, both for recent plants (this distinction was still taught to schoolboys when I was one) and for fossils (the omnipresent fossil-genus *Dicotylophyllum*), the non-eudicot/eudicot dichotomy is not. Indeed, the new *Syllabus* does not provide any characterisation of its two subclasses. The orders (which are given with their characteristics) are grouped into subclasses and superorders which are mere titles of subdivisions of the book, lacking any diagnosis, description or discussion. Contrary to the Editor's declaration underlining the importance of classical morphology and referring to the "tradition of Engler" (Preface, p. I), such an approach seems to be the ultimate departure from the principles of traditional systematics, where the definition of a taxon is based on observable characters.

Secondly, using names well established in angiosperm systematics in a way very different from the original circumscription of the taxa is likely to create confusion. For example, the name Rosidae is used throughout the book to denote eudicots, but on page 119 to denote a subdivision of eudicots along with the Asteridae. This is probably the reason why the author felt obliged to add the unequivocal name when writing about the "[t]ricolpate pollen characteristic for Rosids (Eudicots)" (p. 120). Moreover, if one considers that in the Introduction (p. 1) "core eudicots" [= *Pentapetalae* auct.; ATH] is used to mean just eudicots, the apprehension of taxonomic confusion does not seem groundless.

Another problem concerns the high-rank taxa. In a general synopsis (p. 3) the gymnosperms and the angiosperms are included in the subkingdom Embryobionta Cronquist, Takht. & W.Zimm. However, in a previous volume of the new *Syllabus* dealing with algae, an unranked Chlorobionta group within the plant kingdom (Part 2/1, p. 189) is considered to include all land plants. If Plantae are a kingdom, then Chlorobionta is logically a subkingdom and Embryobionta a subdivision thereof. Moreover, the authors of the red algae volume (Part 2/2, 2017) do not use the subkingdom Rhodoplantae G.W.Saunders & Hommersand, but recognise the red algae as a division. The classification systems used in different volumes of the series are thus not congruent.

A more important problem is with "Subdivision Euphyllphytina Kenrick & P.R.Crane", "Superclass

Radiatopses Kenrick & P.R.Crane”, and “Superclass Moniliformopses Kenrick & P.R.Crane” used in the same synoptic table (p. 3). These subdivisions were introduced (partly with different ranks) in the book *The Origin and Early Diversification of Land Plants* (1997, p. 135, 228–229, 235) by P. Kenrick and P.R. Crane. However, they lack Latin diagnoses, which means that they are not validly published according to the ICN, and listing them with authors’ names is misleading. The solution would be either to refer to “Radiatopses auct.” or to validate the taxa by providing a diagnosis.

In the section on apomixis the standard term “microspecies” is introduced, but subsequently wordings like “an inflation of species” and “new «species» are described every year” (p. 115) are likely to be understood as a rejection of describing microspecies as species. The relevant point is that this amounts to opposing the position taken by the standard flora of the area concerned (Germany, *Rothmaler Exkursionsflora von Deutschland, Bd. 4: Gefäßpflanzen: Kritischer Ergänzungsband*, 10th ed., 2005; 11th ed., 2016) without providing an explanation or reference to a paper recommending the contrary taxonomic practice.

The Amborellaceae are described as having “[f]lowers dioecious” (p. 131). From a terminological point of view it would be better to talk about unisexual flowers, whereas dioecy or monoecy are characters of plants and not of flowers. If *Amborella* is dioecious, then it would be useful to say whether the inflorescence represented in fig. 4-2-1 is male or female.

The discussion of the fossil record of angiosperms is very short. It begins with the sentence “The sudden appearance and the subsequent dramatic rise of the angiosperms have caused much debate (see Darwin’s «abominable mystery»)” (p. 120). This laconic allusion might be misleading to non-palaeobotanists; a more detailed explanation would be of use, given that the “mystery” has even been used as an argument by opponents of the theory of evolution. In Darwin’s times the oldest well-known floras containing angiosperms were those in which angiosperms were already numerous and diversified, so their sudden appearance seemed in “abominable” contradiction to the usual evolutionary model. Since then, thanks to careful investigation of Lower Cretaceous strata (first in 1976 from the Potomac Group by J.A. Doyle & L.H. Hickey), assemblages with rare and undiversified angiosperms were discovered. So Darwin’s “abominable mystery” is no more a scientific problem. At present the main unsolved question is that of the closest relatives of angiosperms.

The famous *Archaeofructus* is mentioned as “assigned to a subclass Archaeagnoliidae” (p. 120). The name of this subclass is in bold in the text, but it does not appear on any synoptic table, so it is unclear whether

it is recognised by the new *Syllabus* or not. Concerning the oldest monocotyledons described as representatives of the Triuridaceae (p. 121), one might mention that their assignment to that family is “not fully secure” (Friis et al. 2011, p. 204; this standard manual is absent from the bibliography) because of differences in pollen structure. More generally, the pollen characters are only seldom taken into account when characteristics of taxa are given.

The novelty of the 13th edition is that recent plants are illustrated with photographs. The Part 4 contains 118 colour plates (nearly all full-page) and nine black-and-white diagrams or maps. It is evident that a choice must have been made (even *The Families and Genera of Vascular Plants* does not illustrate every genus), but some unnecessary doubles, like two cones of *Pseudotsuga menziesii* (fig. 3-16), two flowers of *Hypoxis obtusa* (fig. 4-66), or two enlargements of *Parasitaxus usta* (fig. 3-20), might profitably be replaced with images of plants that are not illustrated. Some photographs are impressive, such as the flowers of Hydnoraceae (fig. 4-9), a preparation of the inflorescence of *Arum maculatum* (fig. 4-23-3) or the orchid *Bartholina pectinata* (fig. 4-84-6); however, some are too dark (*Arachnitis uniflora*, fig. 4-44-1), out of focus (*Parasitaxus usta*, fig. 3-20-4; *Hammarbya paludosa*, fig. 4-93-5) or have manifestly artificial colours (*Ginkgo biloba*, fig. 3-9-1).

In comparison with another recent manual of similar scope, the *Flowering Plants* by A. Takhtajan (Springer 2009), the new *Syllabus* (as represented by the Part 4) has several advantages. First, it integrates new palaeontological and molecular data; this is especially important not only because angiosperm evolution is a rapidly developing domain, but also as Takhtajan’s book was outdated even at the moment of its publication [see my review in *Bull. mens. Soc. linn. Lyon*, 79(5): 179–182]. Second, the *Syllabus* is richly illustrated, even if overall the photograph quality of Part 4 is less impressive than, for example, in the Ascomycota volume. Last but not least, each genus is characterised (Takhtajan’s book goes down to families, and genera are only enumerated). The characteristics of the taxa are written in an easily readable style. So despite the several reservations expressed above, this book may be a valuable item in a botanical library, although its relatively high price is likely to be an obstacle to its larger dissemination. Time will show whether it becomes a standard reference.

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