REVIEW

A.F. TRYON & B. LUGARDON (1991). Spores of the Pteridophyta. Surface, wall structure, and diversity based on electron microscope studies. Springer Verlag, Berlin etc., 1991, XI + 648 pp., 2797 figs. ISBN 3-540-97218-8. Hardcover edition. DM 188.00.

A Gargantuan task has been accomplished: here is a complete survey of the spores of representatives of all genera of ferns and fern allies, studied with SEM and TEM. Some of the pictures have already been published in previous works of the two authors, of which Lugardon's work has mainly been published in French; many of Tryon's SEM pictures have appeared Tryon & Tryon (1982).

In the Introduction a condensation is given of all Lugardon's extensive studies on sporogenesis, with some new additions (e.g., spherules, p. 9). Many of his excellent, detailed micrographs are used in order to describe spore wall development in all main groups of ferns and fern allies. The section on evolutionary levels of sporoderm organization treats fern characters in a very general way and on a family level. The terms primitive, derived, and specialized are used to indicate different levels of organization of the spore wall.

The arrangement of families in this work is based on spore characters. In a work of this scope, this is more informative than a merely alphabetical order, as is used in Kramer & Green (1990, referred to under Kramer, ms, 1986, in Tryon & Lugardon). The arrangement and delimitation of genera largely follow this standard work. Most of the differences between Kramer and Green (1990) and Tryon and Lugardon (1991) relate to generic delimitation or the family in which a genus is placed and are explained in the text on the genus concerned. I found the following omissions from the index: the genera *Diplopterygium* and *Sticherus* (both treated under *Gleichenia*, as subgenus *Diplopterygium* and *Mertensia*, respectively), and *Diplaziopsis* and *Dictyodroma* (treated under *Diplazium*). Two monotypic genera, *Coveniella* (Dryopteridaceae) and *Thysanosoria* (Lomariopsidaceae) have been omitted from this otherwise complete work. The genus *Todea* is indicated as monotypic, while Hennipman (Blumea 16: 105, 1968) described a second species from New Guinea in the genus.

This is the first time that an extensive survey in the English language is given of the important TEM-based terminology developed by Lugardon during his 20 years of research on sporogenesis in ferns and fern allies. The SEM-based terminology, used for the description of surface structures, is very generalized – it will always remain difficult to describe accurately the wealth of detail made visible in SEM pictures. A slight flaw which struck me was the circumscription of the term colliculate, a term Van Uffelen and Hennipman (Pollen et Spores 27: 155–197, 1985) used for the first time to describe spore surfaces, here used for 'scattered elements', but originally used for closely packed elements.

Although Tryon and Lugardon have indicated possible relationships between some fossil sporae dispersae and spores of Recent ferns, they have not been able to cover the very extensive literature available on disperse spores. Also, they have not always been very careful in indicating relationships. For instance, in comparing the fossil *Stenochlaenidites papuanus* to spores of Recent species of *Goniophlebium*, they do not take into account that the spore surface of *Goniophlebium* is determined by a thick perispore, and not by the exospore as is the case in most fossilized material. However, palaeobotanists will also find this work of immense value. As the arrangement of families is based on general resemblance and on notions of primitiveness and specialization of spore characters, it has been made as easy as possible to check up on an unknown spore.

I checked the names of the plants in the family Polypodiaceae, of which the spores have been studied; they are accurately named. This may be an obvious requirement, but it determines the great value of a book like this. Everyone interested in the subject, both actuobotanists and palaeobotanists, may profit from this standard work. Springer Verlag has made it into a handsome book, which is not expensive for such a richly and beautifully illustrated publication. GERDA A. VAN UFFELEN

Kramer, K.U., & P.S. Green, eds. 1990. I. Pteridophytes and gymnosperms. In: K. Kubitzki (ed.), Families and genera of vascular plants. Springer Verlag, Heidelberg etc., 404 pp.

Tryon, R.M., & A.F. Tryon. 1982. Ferns and allied plants, with special reference to tropical America. Springer Verlag, New York etc., 857 pp.