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Book Reviews

Morphology and Evolution of Vascular Plants, third edition

E.M. Gifford and A.S. Foster
Freeman & Co., New York. 1988. viii + 626 pp.
Illustrated, hard cover, UK £39.95. ISBN 0-7167-1946-0

This new version again is worth reading and contains many interesting data about anatomy, morphology and evolution of vascular plants. After a general introduction followed by chapters on the origin of land plants and their vegetative and generative parts, the different divisions of the vascular plants are surveyed. The same well-ordered plan is used as in previous editions. Also some relevant physiological and ontogenetic data are included and integrated with morphological or anatomical characteristics. On a few general points, such as raising classes to divisional ranks the book deviates from the second edition. In particular the text is updated with information from recent literature (sometimes up to 1988) and new photographs and line drawings are added. In this way the relevance of this edition is again increased.

The book maintains its emphasis on comparative anatomy and morphology, and the structural analysis of the transport tissue also occupies an important part. For wood anatomists it offers information on transport tissues ranging from primitive types to more specialized ones. Furthermore, insight is given into phylogenetic trends in transport tissues from early land plants to seed plants. The role of lignins is stressed for the evolution of land plants. Less attention is paid to changes that have taken place in land plants, and derived from features developed by their predecessors living in water, such as macro-algae. Possibilities already present in the alternation of generations, the way of dispersal and the model of growth and construction, similarly pre-determine the way in which the land was conquered. Plant strategies to survive in co-operation with abiotic and biotic factors are also well covered. Some recent theories are added in this edition about the origin of land plants and flowers, the last ones not all in accordance with classical morphology. Mostly, the different opinions are given without comment or only followed by an indication of the relevant literature.

The book represents valuable knowledge about vascular plants and because of modern molecular trends in biology it is necessary to collect and recollect these basal and complementary elements of botanical science to understand the origin and life of land plants.

M.T.M. Willemse

Sexual Reproduction in Higher Plants

M. Cresti, P. Gori and E. Pacini (eds).
Springer-Verlag, Berlin. 1988. xiii + 502 pp.
Illustrated, hard cover. DM168. ISBN 3-540-18673-5.

In the summer of 1988 the tenth, biennial Symposium on Sexual Reproduction in Higher Plants was held in Siena, Italy. This book contains the proceedings of the meeting and covers fundamental and applied aspects of micro- and megasporogenesis, activation and recognition of mature pollen, pollen germination and pollen tube emission *in vivo* and *in vitro*, stigma and style morphology, pollen-stigma interactions, incompatibility mechanisms, gene expression and cytoskeletons in microspores and pollen, fertilization, and to a lesser extent embryogeny, and endosperm and seed development.

Not only is a great diversity of items dealt with in this book but also a large variety of new techniques applied in the fields of cytology, physiology, biochemistry and genetics are covered. Data are obtained by such methods as genetic transformation experiments, hybridization studies, (ultra)structural and three-dimensional analysis, micromanipulation, enzymatic gamete isolation, *in-vitro* culture, HPLC, NMR, GC/MS and the (immuno)cytochemical detection of various cell constituents such as elements and proteins.

The editors have prepared a well illustrated and informative book composed of 71 detailed six-page papers and 31 one-page abstracts of posters providing an overview of the present state of research and registering the progress in reproduction research in plants. An author index and the extensive subject index ensure accessibility. Applied aspects of sexual reproduction important for, e.g. crop improvement, are discussed, as are the present status and future prospects of sexual reproduction research in higher plants.

A.A.M. van Lammeren

Ontogeny, Cell Differentiation and Structure of Vascular Plants

R. Buvat
Springer-Verlag, Berlin. 1989. xvii + 581 pp.
Illustrated, hard cover. DM298. ISBN 3-540-19213-1.

Roger Buvat's monograph provides an extensive and detailed description of the structure of vascular plants. The author distinguishes two fields. The first part of the book is focused on embryogeny and post-embryonic ontogeny. The second part is a treatise of the histological differentiation in vascular plants.

In part I the embryogeny of Pteridophytes, Prephanerogams, Gymnosperms, Pre-angiosperms and Angiosperms is described, discussed and compared in detail. The meristems and the indefinite ontogeny of plants are described separately, i.e. the various types of primary meristems of roots and shoots, as well as the secondary meristems are dealt with. In the last chapter of part I the cytology of the processes of differentiation and de-differentiation during the ontogeny of vascular plants completes the ontogenetic study at the sub-cellular level.

In part II of the book, the author reviews and comments on the present knowledge of the ontogeny, structure and function of simple and complex tissues, i.e. parenchyma, protective tissues, phloem, xylem, supporting tissues and secretory cells and tissues. Buvat successfully presents light microscopical data obtained during the last 150 years together with recent findings obtained with electron microscopical, cytochemical and microspectrophotometrical techniques, amongst others. The physiological importance of results in cytochemistry or biochemistry is frequently mentioned and discussed.

Because of the taxonomic diversity, the clear ordering of the various items, the detailed treatise of development, structure and function and last but not least the clear English text, this book is a valuable and very attractive handbook of plant ontogeny and structure for scientists specialized in plant biology, for teachers and for students.

A.A.M. VAN LAMMEREN

Principles of Field Crop Production

J.E. Pratley (ed.).
Sidney University Press, Sidney. 1989. x + 463 pp.
Illustrated, paperback. £22.50. ISBN 0-424-00131-4.

Principles of Field Crop Production has been written as a comprehensive textbook on all facets of crop cultivation under Australian conditions. Accordingly, information on cultural practices like irrigation and fertilization, on crop improvement, climate, and on soil and crop distribution within Australia has been included as well as socio-political and farm management aspects. The book has been written by not less than 13 experts but is well integrated. It was first published in 1980 and will, due to the well chosen items and their clear presentation continue to serve its purpose.

The chapters not really specific for the Australian situation, such as those on crop protection and crop nutrition, may be of little interest for non-Australian readers. These subjects had to be treated in a rather sketchy way and original references other than Australian have been largely neglected. In addition, environmental aspects of those chapters are highly under-represented compared to Western European standards, even in the revised edition. Readers interested in Australian agriculture, however, may certainly benefit from the wealth of useful information about this continent, such as numerous maps on plant-relevant climatic parameters or on the techniques, problems and constraints in the cultivation of the main field crops in the different areas. Ecophysiological information about the water and nutrient requirements is presented for many crop species, but botanists may miss the respective information for weed and grassland species.

In summary, libraries covering the field of regional agriculture should purchase the title but should not forget to index it first of all under the key word 'Australia'.

G.R. FINDENEGG

An Interpretation of Van Rheede's Hortus Malabaricus Regnum Vegetabile, vol. 119

D.H. Nicolson, C.R. Suresh and K.S. Manilal.
Koeltz Scientific Books, Königstein. 1988. 378 pp.
Hard cover. DM130.00. ISSN 0080–0694.

Reede's *Hortus Malabaricus* is one of the monumental products of Dutch pre-Linnaean tropical botany. The text and illustrations were prepared in India by Indian and European scholars under Reede's supervision. The editing of the 12 folio volumes (1678–1693) was mainly carried out at the Hortus Medicus of Amsterdam, with a commentary by Jan Commelin. The background of this work has been admirably discussed by J. Heniger (1986): *Hendrik Adriaan van Rheede tot Drakenstein (1636–1691) and Hortus Malabaricus*. The historical introduction in the work under review summarizes Heniger's study.

Hortus Malabaricus was one of the main sources for Linnaeus' knowledge of tropical Asian plants. Taxonomists working in this area therefore have to refer to it frequently. Owing to Linnaeus' frequent erroneous citations this is often cumbersome. Heniger alleviated this by elucidating the interpretations of Linnaeus and his contemporaries. However, an interpretation in terms of present taxonomy and nomenclature was still wanting. In 1975 Suresh made a start with this Augean task and in 1981 the three authors began the collaboration that resulted in the *Interpretation* in 1988.

This *Interpretation* is based on an intensive collecting programme in Kerala, resulting in a reconstruction of a 'Reedean Malabar Herbarium', 660 out of Reede's 690 species have been found again. The discussions in the *Interpretation* therefore provide detailed notes on the present occurrence of the pertinent species in Kerala. Also, linguistic notes on Reede's vernacular names compared with modern ones make interesting reading.

The entries are arranged according to their current interpretation, with synonyms, followed by the reference to Reede. There are 13 new combinations. Next comes a critical discussion on typification of the names concerned, with an analysis of confused citations and synonyms of Linnaeus whenever this is relevant. A justification of the applied taxonomic views is consistently given.

Reede described 742 plants and all but one are identified. The *Interpretation* provides a sound and authoratative answer to Reede's puzzles. Jointly with Heniger's book it should be within reach of everyone who deals with Reede's plants. But, next to a Reede *vademecum*, it also makes fascinating reading. I like best the story on *Bem-schetti* (Reede, *Hort. Malab.* 2: 19,t,14.1679), the lectotype of Linnaeus' *Ixora alba*. This was a mystery name, not identifiable with any modern species. However, the single unique specimen of *I. leucantha* G. Don was collected during the project in a sacred grove near Cochin. 'The place is called Cheraneellore today, about 8 km northwest from Cochin. This is where Rheede resided'.

The book is well produced. The only mistake which might cause confusion is on p. 57 'Tsjovanna-ampelodi Rheede, Hort. Malab. 9:15,t,10.1689', it should read 6:81–82,t.47.1686.

D.O. WIJNANDS

Flora Malesiana Series 1, vol. 10, part 4, Dedication, Chrysobalanaceae, Sabiaceae

W.J.J.O. de Wilde (ed.).
Kluwer Academic Publishers, Dordrecht. 1989.
158 pp. Illustrated, paperback. Dfl.155.00,
UK £49.50, US$77.00.

This concluding part 4 of volume 10 is, besides the thorough family treatments by G.T. Prance (Chrysobalanaceae) and C.F. van Beusekom & Th. P.M. van der Water (Sabiaceae), most interesting for its dedication to Carl Ludwig Blume, the first director of the Rijksherbarium (1829–1862) by his successor a century later, C.G.G.J. van Steenis, director from 1962 to 1972. This dedication, finished by Van Steenis shortly before his death in 1986, is a complete biography of Blume with appendices on Blume's publications (A), Biographical sources (B), References (C), Notes (D), Eponymy (E), and Honorary distinctions and memberships (F). In this biography Van Steenis shows much sympathy for Blume and tries to alleviate at least part of his bad reputation, notably by sketching the difficult circumstances under which he had to fulfil his duty. Some of these difficulties have not ceased to exist nowadays or are again felt in many herbaria as shortage of funds and staff, technical as well as scientific, or moderate to bad housing facilities. The Rijksherbarium notably had to move twice in the last 30 years and is still not properly housed, at least not according to its international scientific reputation and certainly not in accordance with the wealth displayed in The Netherlands in general.

One who has known Van Steenis personally feels that the botanist Blume emerging from this biography is in many ways like Van Steenis himself. Both men were great taxonomists entirely devoted to Malaysian botany, and who worked hard and wanted to achieve something in their professional life. Blume in fact may be considered the founder of the Rijksherbarium, Van Steenis the intellectual father of the Flora Malesiana. Both men were not easy-going, rather high-tempered, but of great importance to Malaysian botany. Van Steenis ends his dedication with the wish that it will restore Blume's image. I think it will.

F.J. BRETELER

Morphology of Flowers and Inflorescences

F. Weberling.
Cambridge University Press, Cambridge. 1989. xx + 405 pp. Illustrated, hard cover. £55.00, US$110.00.
ISBN 0-521-251-346.

This book is the English edition of F. Weberling, *Morphologie der Blüten und der Blütenstände*, Ulmer, 1981, translated by R.J. Pankhurst (British Museum, London). The excellent translation follows the German text exactly, with a few minor additions added where this was unavoidable (see p. 113). Strikingly, many long German sentences are more readable in English. Special mention is deserved for the addition of a profitable glossary, which was a co-production with D. Müller-Doblies (Berlin). Moreover, the bibliography is extended with many recent publications which have been marked with an asterisk. These new results are mostly not considered in the text.

The translation of the German plant names into the English ones attracts special attention. For instance, Schwarzkümmel (*Nigella damascena*) becomes Love-in-a-mist. However, would that not be the equivalent of Jungfer im Grünen?

With this edition, 150 years of mainly continental European research is opened to the English-reading botanical world. The book can be viewed as a successor to and counterpart of A.J. Eames, *Morphology of the Angiosperms*, McGraw Hill, 1961. However, the second part of the book takes a separate position, as the outcome of the investigations on inflorescence morphology by W. Troll and his pupils (including the author).

I feel that an updated edition, directly into English, would be welcome in the near future. Herein, more attention should be paid to comparative ontogenetic and systematic research. The present book is provided with a very smart hard cover; is that possibly to seduce botanists to buy a private copy?

W.A. VAN HEEL

Infloreszenzuntersuchungen an monotelen Familien

W. Troll and F. Weberling.
Gustav Fischer, Stuttgart. 1989. vii + 490 pp. 373 figures, hard cover. DM178.00. ISBN 3-437-30599-9.

This book was composed after a manuscript left by W. Troll of his work *Die Infloreszenzen II*, part III, chapter 5, Fischer, Jena, 1969. Part I was published in 1964. Weberling elaborated and updated this manuscript describing examples of monotelic families, in the style of W. Troll. Together, the three books—all wrapped in orange covers—represent a standard work consisting of more than 1700 pages and 1436 figures. The latter are combinations of photographs of living plants, explanatory drawings, and schemes. The drawings especially show good old handwork.

Because, 20–25 years after the first two volumes, this third book will tend to lead its own life, Weberling has included a recapitulation of the principles of polytelic and monotelic inflorescences. There is also a welcome glossary, established in co-operation with D. Müller-Doblies, in which, as a surprise, the English translations of the terms are also given. Remarkably, the definitions are not identical in every case to those in the glossary of Weberling's book *Morphology of the Flowers and Inflorescences*.

It is the credo of the authors that a comparative morphological elaboration enables a better systematic evaluation, especially in monographical work on plant families. Nineteen monotelic families are treated, most of them without arboreal representatives. A publication on the latter is intended.

Troll's methodology is distinguished, except by its broad systematic basis, by the consideration of the entire flowering region of each species, which is also viewed in connection with the growth form. Convincing examples are *Silene*, *Parnassia*, and *Mesembryanthemum*.

For each family the basic types of inflorescences, often thyrsoidal systems, are reported, followed by the derivative tendencies, often leading to 'incomplete' inflorescences. Here an important constancy is evident for each family, e.g. in the Gentianaceae as against the Menyanthaceae, or per group of genera within a family, e.g. as in the Vitaceae.

Unfortunately, the ontogenetic processes which are involved in the derivative developments of the inflorescence types are in many cases not made clear. Sometimes examples are given, see *Medinilla magnifica* (p. 367). I think comparative ontogenetic investigations are indicated, especially if relations between monotelic and polytelic types must be found.

Some families and genera are treated in Weberling's book *Morphology of Flowers and Inflorescences*, for instance the very instructive Caprifoliaceae.

The terminology of the inflorescences according to Troll and collaborators is difficult to handle and has not come into general use. A classical background is needed. It is not readily apparent why monotelic basic types and their derivatives should be named . . .oid, thereby indicating the polytelic constructions which they resemble. Yet, after a struggle through the two books reviewed here, an affiliated botanist may communicate with the specialists with some success.

W.A. VAN HEEL

Developmental Biology of Fern Gametophytes

V. Raghavan.
Cambridge University Press, Cambridge. 1989. xiv + 361 pp. Illustrated, hard cover. £40.00, US$80.00. ISBN 0-521-33022-X.

This book deals with fern gametophytes, with the stated aim to present a brief but comprehensive account of their developmental biology, mainly to an audience that is interested in plants as experimental systems. It has an emphasis on developmental physiology, biochemistry and morphogenesis, etc. As such, the book is the only available treatment of this particular system and deserves to be read (at least partly) by every experimenter who is deeply buried in peas, Petunias or unidentified plastids, but aware of the great diversity in plants outside his or her laboratory.

Yet it is also a useful book to those who approach plants and especially ferns from other directions. Much of it, especially in the sections on spore germination, sex determination, breeding systems and apogamy forms an essential background to an understanding of much of today's fern taxonomy and ecology. Scattered throughout the book we can find other data that are interesting from a comparative point of view, e.g. the excellent diagram (4·12) presenting a summary of patterns of spore germination, or the account of the activity spectra of several antheridiogens.

Throughout, the book is well-illustrated, and there is an extensive bibliography of nearly 50 pages and over 1000 items.

I have only one negative comment. The style is unnecessarily chatty and riddled with phrases like 'remains to be demonstrated', 'lead to the inference', 'it would appear'. Information is therefore sometimes difficult to locate quickly, a slight disadvantage for a book that will be used mainly to find specific information about a particular subject.

P. HOVENHAMP