

Book Reviews

Differentiation of Protoplasts and of Transformed Plant Cells. Results and Problems in Cell Differentiation.

Volume 12

J. Reinert and H. Binding (eds) Springer-Verlag, Berlin, 1986. viii + 157 pp. 24 figures, hard cover, DM98.00. ISBN 3-540-16539-8.

The series *Results and Problems in Cell Differentiation*, edited by Hennig and Reinert, consists of several volumes that treat specialist topics in developmental biology. The present volume focuses attention in the first three chapters on the development of protoplasts after isolation and after fusion. Here an extended number of cellular and environmental factors are indicated that play an important role in the isolation of protoplasts, fusion, development of fusion products and regeneration processes. It is clearly explained how these factors are responsible for the occurrence of protoclonal variation and for the production of hybrid or cybrid varieties. The possible fates of nuclei, chromosomes, plastids and mitochondria in the fusants are described adequately.

The fourth and last chapter of the book reviews advances in the molecular biology of plant cell transformation by plant gene vectors such as Ti- and Ri-plasmids and the cauliflower mosaic virus (CaMV). It seems that the book's title forms the main link between this chapter and the preceding ones, however, the content of this chapter is worth reading.

The book presents detailed tables, illustrative figures and photographs furnished with clear legends, an extended table of contents, useful indices of subjects and scientific names, short appendices with abbreviations and a glossary, an introductory chapter and an epilogue. The chapter subdivision is logical. Each chapter gives a comprehensive reference list. However, in spite of all these positive features, the book appears to be out of date especially in the provision of new information. For example, the extended lists of references that accompany the chapters are completed up to and including 1983. Only in the short addenda are reference data given up to 1985. During the period of the preparation of this book several new techniques combining fusion and transformation emerged, e.g. electrofusion, electroporation, microinjection, etc., and these are not even mentioned in an addendum. The use of feeder layer and other techniques for the regeneration of cells at low density, or of single cells, has been given too little attention. The application of flow cytometry, e.g. to sort heterokaryons, has been omitted. In addition, the book lacks any discussion on the future prospects, for example, of developments in animal cell transformation.

Although the book is inexpensive, the target readership (postgraduate students and scientists interested in plant cell and molecular biology) can be selective and choose between a number of good (and better) books that cover the same subjects.

L.J.W. GILISSEN

Anatomy of the Dicotyledons. Second Edition, Vol. 1. Systematic Anatomy of the Leaf and Stem

C.R. Metcalfe and L. Chalk. Clarendon Press, Oxford, 1988. viii + 276 pp. 18 half-tone plates, paperback, £25.00. ISBN 0-19-854253-4.

The hardback version of this book was published in 1979 and reviewed in *Acta Bot. Neerl.* 1981; 30: 159–160. It is the first of the two introductory volumes in the second edition series of *Anatomy of the Dicotyledons*, which together can serve as textbooks of comparative plant anatomy. A paperback edition of the second volume is also envisaged by the publishers. It is most gratifying that these volumes will now become accessible to a readership of, for example, graduate students and individual anatomists; thanks to their reasonable price.

P. BAAS

Biomechanisms Regulating Growth and Development

G.L. Steffens and T.S. Rumsey (eds) Kluwer Academic Publishers Group, Dordrecht, 1988. ix + 479 pp. Illustrated, hardback, \$138.50. ISBN 90-247-3668-4.

This is the twelfth volume in a series of symposium books covering meetings organized at Beltsville by the USDA. It contains 29 papers by invited scientists organized into six sections. Its main attraction stems from the fact that chapters on plant research (10), yeast (1) and animal research are intermingled, thereby giving an insight into the state-of-affairs in these areas of research. Topics of a more fundamental nature (e.g. auxin-induced plant gene expression and homeotic genes in animal development) are briefly covered in section I, but lack some areas of research where rapid progress has been made recently (e.g. cell determination by animal CAM genes and tissue- and cell-specific expression of plant genes). Section II contains contributions dealing with mechanisms for regulating hormone concentration, described primarily by physiological experiments. Sections III and IV are devoted to hormonal and non-hormonal regulation of

growth and development, and show clearly that our fundamental knowledge about the developmental biology of plants is scarce indeed. Section V is of a more applied nature as it contains several studies on the effects of nutrition on biomass production in the pig and chicken. These subjects are probably of limited interest to plant researchers. An exception here may be the paper by Dazzo *et al.*, which describes several metabolites involved with the *Rhizobium*-legume interaction. The last chapter deals with several cases of both pathogenic and symbiotic interactions in plants and animals. Of particular interest here is a paper by Owens and Smigocki that describes properties of different *A. tumefaciens*- and *A. rhizogenes*-based transformation vectors and their effects on the regeneration properties of the transformed progeny plants, in this case soybean. Apart from the classical model plant species, little well carried out research is described on this important part of the field of genetic engineering of plants for agriculture.

In conclusion, I would say that this book contains a large amount of information useful to scientists involved in biotechnology projects in both animals and plants, but contains little information for the more fundamentally oriented.

S.C. DE VRIES

Genetic Resources of Phaseolus Beans

P. Gepts (ed.) Kluwer Academic Publishers Group, Dordrecht, 1988. xiii + 613 pp. Illustrated, hardback, \$138.50. ISBN 90-247-3668-4.

The editor indicates that the aim of this book is 'to assemble up-to-date information available on a wide range of topics pertaining to the genetic resources of *Phaseolus* beans'. However, it includes not only a description of research on genetic resources of *Phaseolus* beans but also on genetic and breeding research. Such a compilation of information on this crop is not found in the title of the book, so that some potentially interested scientists might fail to be attracted. The book contains five sections.

(i) '*Phaseolus* germplasm exploration and maintenance' (six chapters). This section gives information on matters such as germ plasm expeditions, sampling methods, centres of diversity, centralized database, seed storage methodologies, the *Phaseolus* world collection, and the international network.

(ii) 'Domestication and evolution of *Phaseolus* species with special reference to *Phaseolus vulgaris*' (four chapters). It contains a resumé of the prehistoric distribution of *Phaseolus* and information on the wild relatives of *Phaseolus vulgaris* in Central and South America. It describes the use of phaseolin, the major seed storage protein, as an evolutionary marker.

(iii) 'Genetics of *Phaseolus vulgaris*' (four chapters). It contains rules for gene symbol nomenclature, a gene symbol list, and the genetics on flower- and seed pigments on podform and seed shape. Linkage maps with reference to modern RFLP work are described.

(iv) 'Genetic resources, domestication, and evolution of other cultivated *Phaseolus* species' (three chapters). The domestication, evolution and diversity of *Phaseolus lunatus*, *P. acutifolius* and *P. coccineus* is described, and their potential use as source material for disease resistance, pest resistance, photoperiodicity, N₂-fixation and nutritional quality in breeding as well.

(v) 'Utilization of *Phaseolus* genetic resources' (five chapters). This last section shows that *Phaseolus vulgaris* is one of the most basic foods and sources of vegetable protein for the Brazilian population. The most common breeding and selection schemes are given.

This is an extremely interesting book, despite the absence of chapters on N₂-fixation and on seed protein biochemistry, including molecular genetics.

E. JACOBSEN

Flowering Plants in West Africa

M. Steentoft. Cambridge University Press, Cambridge, 1988. vii + 344 pp. Illustrated, hardback, £45.00 (\$79.50). ISBN 0-521-26192-9.

This book contains an interesting selection of 38 families important in West Africa: all commonly encountered and/or eaten or frequently used species. The first introductory chapter examines interactions between plants and animals. A list of West African plant species with mycorrhiza draws attention to the importance of this phenomenon. Pollination and dispersal by animals is briefly reviewed. Structures of plants that attract insects include: inedible seeds with edible food bodies, such as elaiosomes consisting of caruncles, strophioles, receptacles, etc.; flowers, plant juices, domatia, and extrafloral nectaries are also touched on.

The second introductory chapter discusses the major vegetation types (following White) but in a traditional and more generalized manner that is useful for the general reader but not detailed enough for vegetation experts. Definitions and major or interesting plant species are discussed in relation to their occurrence in the main vegetation types.

Mrs Steentoft provided the selected plant families with English-West-African vernaculars that I had not seen earlier, and some of these will no doubt appeal to West-African readers. It is peculiar, however, to see names such as the 'Gourd' family (because cucumbers are uncommon), 'Cassava' family (where we are used to 'spurge' family), or 'Hausa' potato family for *Labiatae* or 'Mint' family. Why not 'Breadfruit'

family for *Moraceae*, few people are familiar with mulberries in the area. Thus the examples are good and interesting, but some choices are peculiar. The *Liliaceae* are treated in an unbalanced, incomplete way, without advice as to whether to follow Dahlgren's revised classification of Monocotyledons or not. The illustration shows a *Zephyranthes*, an *Amaryllidaceae*. The economic onion is hidden in a footnote that mentions *Alliaceae*. The only reference to *Draceana* is Mouton, a key to distinguish species vegetatively, a key that unfortunately does not work and is based on very little material.

Some of the many tables showing species are inconsistent; references to the family are often lacking (e.g. p. 25). References to the *Flora of West Tropical Africa* could have been restricted to the general bibliography. De Koning's *Forêt du Banco* is sadly missing. In general, the references are good for further reading, but have been selected haphazardly.

The illustrations are clear, but in several cases the quality of reproduction leaves something to be desired. Most are adapted from various sources, which is the usual method for this type of book, however the cover picture is quite ugly. The price is clearly beyond the means of the major target groups, post O-level GCE students or those following basic courses in higher education; unless they can obtain the book at a subsidized price. Teachers or school and university libraries will certainly be compelled to purchase the volume, because it combines readable matters of interest on many West-African plants, with a guidance to further reading.

L.J.G. VAN DER MAESEN

Tropical Woody Rubiaceae— Characteristic Features and Progressions, Contributions to a new Subfamilial Classification

E. Robbrecht *Opera Botanica Belgica* 1, Meise, Nationale Plantentuin van België, Belgium, 1988. 271 pp. 61 illustrations and 5 tables, B.Fr. 1500. ISBN 90-72619-02-1. ISSN 0775-9592.

This new series of botanical publications has made an excellent start with this book which is of great interest for both research and teaching in plant taxonomy. The family of Rubiaceae follows Compositae, Orchidaceae and Leguminosae, the fourth in size with 10,700 species in 637 genera and therefore it is difficult to give an overall view. Starting with a diagrammatic survey of the tribes, all the known characters are discussed to reinforce the natural system. All the attributes are dealt with, beginning with their habit and ending with chorology and distribution of genera. The classification is discussed. The book contains four valuable

appendices: (i) a survey of the proposed classification, (ii) an index nominum genericorum, (iii) indices to taxa with diagnoses of subfamilies and tribes with lists of genera, and (iv) *Genera Rubiacearum*, an index to the genera and their synonymy and tribal/subtribal alliance. The book is copiously illustrated, in particular with photographs of pollen and details seen through the electron microscope.

A.J.M. LEEUWENBERG

De toename van Gevinde kortsteel in Zuidlimburgse kalkgraslanden: oorzaak, gevolg en toekomstig beheer (The Increase of *Brachypodium Pinnatum* in Chalk Grasslands in South Limburg: Cause, Effect and Future Management)

R. Bobbink (Publ. Natuurhist. Gen. Limburg 37/2) Natuurhist. Genootschap in Limburg, Groenstraat 106, 6074 EL Melick, The Netherlands, 1988. 72 pp. Illustrated, paperback, Dfl 15.00. ISSN 0374-955X.

This study deals with the dominance of the grass *Brachypodium pinnatum* in Dutch chalk grasslands. The first two chapters give an introduction to *B. pinnatum* and the chalk grassland ecosystem. Chalk grassland has been suffering for a decade from an increase in *B. pinnatum*, causing its rich flora and fauna to decline considerably.

Chapter 3 deals with the cause of this increase. Fertilization experiments carried out in a few Dutch chalk grassland reserves confirm the hypothesis that the raised nitrogen input from the atmosphere has led to the increase in *B. pinnatum*.

Chapters 4 and 5 discuss mowing and grazing experiments. The aim of the project was to provide management measures that will contribute to the preservation of the whole ecosystem. Two alternatives are suggested: mowing in August and sheep grazing. Mowing twice a year for a period of three years was demonstrated to restore poor vegetation.

Chapter 6 reviews the results of the experiments and integrates all the conclusions.

This study is in Dutch. The results are clearly presented using many tables and figures. Summaries in English and French are provided.

R.W.J.M. VAN DER HAM

Viruses of Fungi and Simple Eukaryotes

Y. Koltin and M.J. Leibowitz (eds) Marcel Dekker Inc., New York, 1988. 456 pp. Illustrated, hardback, US \$150.00. ISBN 0-8247-7890-1.

Mycoviruses are relatively new to science. Around 1950, the first evidence for the existence of such a

virus was found. In 1962 a virus in *Agaricus bisporus* (the cultivated mushroom) was described, in 1967 photographs of virus-like particles from *Penicillium stoloniferum* were published and in 1971 the viral status was confirmed. The known number of viruses in mold species has grown since then, to more than 100.

The book *Viruses of Fungi and Simple Eukaryotes* is a collection of 19 chapters, the result of a workshop held in 1986. Fifty authors contribute, and of these only two are from Europe. I wonder whether there is little research on mycoviruses in Europe, or whether this is another example of isolated continents? The first chapter describes the discovery of a mycovirus and its nature: a double-stranded RNA virus. It was studied intensively because of its interferon-inducing capacity and therefore potential clinical applications. The other chapters deal with details on structure, similarities with retroviruses, mechanisms of transcription, genetic control of replication and effects on several plant pathogenic fungi. All the chapters are well supplied with tables and illustrations, such as electrophoresis patterns and (electron microscope) photographs.

Although the result of a workshop, the book proposes to be more than a meeting proceedings, and provides general information about current research and the existing knowledge on mycoviruses. There are therefore chapters that present new data and chapters that include literature reviews. In the preface the editors announce that they have done their best to make this work accessible to colleagues working on different systems and to the general scientific community. They have only partly achieved their goal. The chapters that present new results are highly specialized and not easy to understand in detail for a non-virologist. The chapters that give reviews and those on plant pathology are more easily accessible. A chapter to draw conclusions would have contributed to this accessibility. General information can only be found in the preface and in the introductions and conclusions to some chapters, particularly those on Dutch Elm disease and on *Rhizoctonia solani*. It is fascinating to read that mycoviruses were found in the aggressive strains of the fungus that causes Dutch elm disease and not in the non-aggressive strains. The same is reported in *Rhizoctonia solani*, but the reverse in *Endothia parasitica*. This indicates that there are still many unsolved questions in the field of mycoviruses. *Viruses of Fungi and Simple Eukaryotes* stresses these problems. Thus the book is not only useful for virologists and phytopathologists, but also for people interested in the processes of research and discovery.

A.E. JANSEN

Dependent Plant Communities

J.J. Barkman and K.V. Sýkora (eds) SPB Academic Publishing, The Hague, 1988. vii + 177 pp. Illustrated, paperback, Dfl. 85.00, US \$46.00. ISBN 90-5103-015-0.

This book is a collection of papers (and two abstracts) presented at the annual symposium of the International Association for Vegetation Science (IAVS) on 'dependent plant communities'. It was held in Wageningen (NL) in April 1984. The papers are arranged in four sections: (i) seam and mantle communities; (ii) herb and dwarf shrub undergrowth communities; (iii) terrestrial moss and lichen communities; and (iv) fungal communities.

The introduction to the theme by the organizer of the symposium (Professor J. J. Barkman) is short and solid. In only three pages the participants of the symposium are offered a fine piece of reflection on the types of dependency that can exist within and between ecosystems. The central theme of the symposium is the ecological and syntaxonomic dependence of plants in (whole and partial) plant communities, with particular reference to their biological background. The majority of authors, however, have presented papers that are linked with this theme. Although some interesting methods for studying dependent plant communities are presented, most of the authors have not really attempted to reveal the biological background behind observed phenomena. Good exceptions are the papers presented by During and Verschuren, Kuusipalo (both on moss vegetation) and Massari and co-workers (on microfungi).

Authors who have made an effort to challenge the problems put forward by the congress organization are H. D. Knapp (DDR) on forb fringes, Hartmund Dierschke (BRD) on wet microhabitats in deciduous forests, and Eef Arnolds (NL) on fungal communities.

Knapp's work on xerotherm forb fringes in Central Europe is, in my opinion, very relevant for discussions on the characteristics of plant communities that occur in environmental gradients. His approach to syntaxonomical problems with regard to European forb fringes is very refreshing because he clarifies the distinction between natural and man-influenced forb fringes and stresses the importance of phytogeographical differences. He presents a good example of how interesting biological phenomena can be obscured in the description phase, by grouping vegetation types in artificial sociological units without considering the geographical aspects and degree of anthropogenic influence.

The contribution of Dierschke to the subject of wet microhabitats in deciduous forests is also worth reading. He thoroughly discusses the problems of describing and classifying vegetation complexes, but the reader is left with the feeling that there is more

to vegetation science than improving description techniques.

The last section of the book is recommended to readers who are in a hurry. Arnolds presents a very stimulating paper on the status and classification of fungal communities. He begins with analysing the differences between phytocoenoses and mycocoenoses as objects of study and discusses the various problems of substrate heterogeneity with regard to mycocoenoses, which he illustrates with very convincing examples. In order to solve the very many classification problems he introduces the term niche-substrate groups: defined as lists of species that grow on a similar substrate, in a similar microhabitat and exploiting the environment in a similar way. This work is not only relevant to people working on fungal communities, but should be read by anyone who is interested in the fundamental problems related to the (supposed) uniformity of the environment of phytocoenoses.

A.P. GOOTJANS

Flora Malesiana Series I Spermatophyta, Flowering Plants Volume 10, Part 3, Revisions

W.J.J.O. de Wilde (ed.) Dr W. Junk/Kluwer Academic Publishers, Dordrecht, 1988. 298 pp. Illustrated, paperback, Dfl.190.00/US \$100.00/£59.50. ISBN 90-247-3736-3.

This volume includes revisions of Coniferales (de Laubenfels, Syracuse, USA), Polygalaceae (van der Meijden, Leiden), Cruciferae (Jonsell, Stockholm), Magnoliaceae (Nootboom, Leiden), Linaceae (van Hooren and Nootboom, Leiden), Ixonanthaceae (Kool, Leiden), and Ctenolophonaceae (van Hooren and Nootboom, Leiden).

On the whole we were impressed by the quality of the various revisions. Like previous instalments, this is a highly valuable contribution to our knowledge of Malesian plant families.

The treatment of the order Coniferales is the largest in this fascicle and has been singled out for more detailed review. The well-known specialist of Southern Hemisphere conifers, De Laubenfels, has provided the user with detailed information on taxonomy, morphology, anatomy, ecology and distribution (past and present) of the Malesian taxa. Extensive references, keys, synonyms, and vernacular names accompany the detailed descriptions of all species. It is therefore a pity that the illustrations do not come up to the same standard. Where illustrations are given, they are often of a very diverse quality: one only needs to compare figures 18 and 19 with figure 26 (Podocarpaceae), or figure 82 with figure 84 (*Agathis*)

to see this point. Where each species in the large genus *Podocarpus* is represented by a distribution map, only two of the 30 Malesian species, recognized by the author, are depicted with a minimal figure showing few morphological features. As figures are also absent in the taxonomic revision of this genus, published by the same author as a precursor to the *Flora Malesiana* treatment (*Blumea* 1985 30:), in which a number of new species were proposed, we feel that this is a serious omission. Generic delimitation is not always clearly argued: the notion of three separate genera in the Cupressaceae for the region is dismissed because they are only 'based on slight differences' (p. 444), yet equally slight differences seem to distinguish some of the genera accepted in the Podocarpaceae. The use of generic as opposed to sectional level for species grouping is not made explicit and also seems rather arbitrary. These criticisms aside, the chapter is a worthwhile source of information on Malesian conifers.

In the keys to the other families some inconsistencies can be found when comparing measurements given in the description with those in the key. For instance, in *Magnolia* (*M. carsonii*, *M. macklotii*, and *M. uvariifolia*) and in *Hugonia* (p. 611). The petals of *Hugonia jenkinsii* are recorded in the key to measure 2.5–3.5 mm by 1.5–2.5 mm, whilst in the description they appear much larger: 6–9 mm by 1.5–3(–4) mm. Lead 1 of the key to the Cruciferae (p. 545) contains an error which should not have passed unnoticed: in both couplets the fruit is called a siliqua, whilst in the first couplet the fruit should be a silicula.

Other comments concern the lay-out and editorial policy of individual *Flora Malesiana* fascicles. A table of contents and an index to taxa for these individual instalments would be useful, despite the fact that for complete volumes into which these fascicles can later be bound such information is provided. The almost complete absence of indication of types also seems a weak point of *Flora Malesiana*, when compared with floras of comparable scope, e.g. *Flora Neotropica*. The Magnoliaceae constitute the only exception. For the Polygalaceae, two new species of *Epirixanthes* are described (p. 491 and 492), alas, without any indication of the type locality. Distribution maps usually compensate for the absence of exact citations of localities in *Flora Malesiana*, however, in this fascicle only Coniferales, Ctenolophonaceae and Linaceae have maps for all species. Why is there only one map for Magnoliaceae, and no maps at all for Cruciferae, Ixonanthaceae and Polygalaceae?

A final comment, which holds true for all revisions of this kind (cf. *Flora Neotropica*), is about the price. US \$100.00 for an instalment of 298 pages puts it out of reach for most local botanists for whom these revisions are so important.

P.J.M. MAAS and A. FARJON