

Book Reviews

Plant Taxonomy and Biosystematics (second edition)

C.A. Stace.

Edward Arnold, London, Melbourne, Auckland.
1989. viii + 264 pp. Illustrated, hard cover, UK
£30.00, paperback UK £14.95.
ISBN 0-7131-2955-7.

The first edition of Stace's *Plant Taxonomy and Biosystematics* was published in 1980 and has been widely used as a successful and refreshing textbook over the last decade. In this second edition, all chapters have been updated but, above all, the important developments and recent applications of molecular techniques and cladistic methods for plant systematics have been incorporated. The resulting text is again a well-written and coherent manual which puts general principles before examples, but is still so rich in the latter that one does not lose sight of the plants and of botanical diversity which, after all, is what plant taxonomy is all about.

Stace's attitude towards cladism is one of qualified support, but in between the lines there are indications of a sound dislike of the dogmatic and missionary zeal of its more radical proponents. Although one can wholeheartedly sympathize with this—in my personal opinion—balanced attitude, the chapter explaining cladistic analysis could have been more clearly written. Stace misses the point, I think, when he compares phenetic and phylogenetic classifications and opts for the most predictive approach. Phylogenetic systematics is not about creating a predictive classification but about attempting to unravel the one and only historical genealogy of plant species. Phenetic classifications, if based on a multitude of characters, are predictive by virtue of the very way in which they are constructed. As the author clearly demonstrates in his chapters on biosystematics, plant evolution can move in the most complex and devious ways, and it is no wonder that a true historical genealogy does not necessarily have maximal predictive value. On the other hand, it is these devious ways, especially of speciation through hybridization, which cladists often conveniently ignore in their phylogenetic reconstructions.

I find the book strongest in its treatment of biosystematic aspects and the pragmatic discussion of the relative value of the various kinds of taxonomic evidence (although I would have welcomed a few more lines on the significant contributions by systematic wood anatomists). Enlightened phylogeneticists may find the book ambiguous; I recommend it as an excellent synthesis and basis of learning and discussion in the botany curriculum.

P. BAAS

Modern Concepts in *Penicillium* and *Aspergillus* Classification

R.A. Sampson and J.I. Pitt (eds).

Plenum Press, New York and London, NATO
Scientific Affairs Div. 1990. ix + 478 pp. Illustrated,
hardback. US\$115.00. ISBN 0-306-43156-0.

This volume represents the published proceedings of the Second International *Penicillium* and *Aspergillus* Workshop held at Baarn (The Netherlands) on 8–12 May 1989. These proceedings comprise 40 papers divided into nine chapters. The discussions relating to each paper have been included.

The organizers of this Workshop have attempted to move taxonomy further into new methods by bringing together molecular biologists, medical and food mycologists, as well as more traditional taxonomists. As many species of *Penicillium* and *Aspergillus* are economically important in foods, medicine and biotechnology, a practical and stable taxonomy is of great importance.

In the last decennium, the systematics of *Penicillium* and *Aspergillus*, which until then had been mainly based on the widely-accepted taxonomies of Ch. Thom and K.B. Raper, has found a new approach. By changes in the rules of nomenclature, the use of the teleomorph name became mandatory. Type specimens were studied. Physiological characters were introduced. Pyrolysis gas chromatography showed differences in long-chain fatty acids, but proved of restricted value only in a large genus like *Penicillium*. The production of secondary metabolites, especially mycotoxins, however, has now become an effective taxonomic tool. Comparison of amylase and ribonuclease coenzymes with electrophoresis at low temperatures showed an absolute correlation with specific zymogram patterns in many species of *Penicillium*. This has resulted in a close agreement on the taxonomy of *Penicillium*.

Only recently the genetic tools of DNA hybridization and analysis of DNA and RNA sequences have been used in species of *Penicillium* and *Aspergillus*. This has mainly led to proposals for a few refinements of the taxonomy at the subspecific level.

Each contribution is written by world-specialists in their field of research. This moderately expensive book is well-printed and well-edited. Illustrations seem adequately reproduced. The book is highly recommended to investigators of *Penicillium* and *Aspergillus* and to teachers of advanced courses in mycology.

J. VAN BRUMMELEN

**Methods in Plant Biochemistry Vol. 4.
Lipids, Membranes and Aspects of
Photobiology**

J.L. Harwood and J.R. Bower.
Academic Press, London. 1990. xi+353 pp.
Illustrated, hardback. £49.95, US\$107.00.
ISBN 0-12-461014-5.

Volume 4 of the series *Methods in Plant Biochemistry* contains 10 chapters. Six chapters deal with lipid methodology, three with pigments (phytochrome, the blue light factor, chlorophyll) and a single chapter deals with membrane structure and dynamics.

The editors already indicate in their preface to this volume that not every aspect of the research area indicated in the title is covered in the present book. Coverage of plant lipid methodology is reasonable; the chapters on fatty acids, phospho- and glycolipids, triacylglycerol biosynthesis, polyacetylenes, waxes, cutin and suberin are in general well-written, clear and informative. I missed chapters on methodology of terpenes, sterols, carotenes, ubiquinone and other polyprenoid compounds.

Pratt and co-workers present an excellent chapter on phytochrome, including the use of molecular biological techniques. Chapters on spectroscopy, including chlorophyll fluorescence in the study of photosynthesis also are informative and well-written. The final chapter on membrane structure and dynamics is valuable in this rapidly advancing field of research. I missed a chapter on the electrophysiology of plant-cell membranes, where the patch-clamp technique is introduced in many laboratories.

P.J.C. KUIPER

**Wetlands and Shallow Continental Water
Bodies. Vol. 1. Natural and Human
Relationships**

B.C. Patten (ed.).
S.P.B. Publishing, The Hague. 1990. xiii+759 pp.
Illustrated, hard cover. Dfl.275.00, US\$160.00.
ISBN 90-5103-046-0.

This book is designed to give an overview on freshwater wetlands and shallow water bodies, conforming to a SCOPE definition by excluding coastal saline or brackish marshes. The 31 chapters are arranged in six parts: Objects, Elements, Processes, Impacts, Management and Modelling of Wetlands. By treating the four ecosystem elements of wetlands, i.e. climate, mineral soils, hydrology and biology, the authors obviously got into trouble with the concept of the editor, to present general principles and to leave details for the second volume on case studies. The result is sketchily treated chapters as those on climate by Davis & Botch and on hydrology by Duever, or chapters with a high degree of differentiation. In part II on wetland processes, this discrepancy is still more elaborate resulting

in a flux description of two very local case studies or in a rough generalization of global biogeochemical cycles. In part IV on wetland impacts, Löffler & Malkhazova overaccentuate the negative impacts of wetlands on man by water-borne diseases without mentioning positive effects presented in the chapters on impact and value assessment and natural values of wetlands. Similar imbalances were found in the parts on wetland management and modelling.

The lack of cross-referencing among chapters, even by authors contributing to more than one chapter, demonstrates the recent misconception of a lot of multi-authored books. A book should be more than a restricted random collection of non-interrelated chapters. I was left with the feeling of a missed opportunity, although the idea of bringing together the various aspects of wetlands is a good one.

W.H.O. ERNST

**The Rhizosphere and Plant Growth.
Beltsville Symposia in Agricultural
Research 14**

D.L. Keister and P.B. Cregan (eds)
Kluwer Academic Publishers, Dordrecht. 1991.
xii+386 pp. Illustrated, hard cover. Dfl.300.00, UK
£103.00, US\$196.00. ISBN 0-7923-1032-2.

This book consists of a compilation of papers written as a result of the 14th (1989) Beltsville symposium which focused on the rhizosphere and plant growth and gathered an international forum of specialists in this field. It provides information, in the form of research and review articles, on current developments in rhizosphere (plant/soil/microbe) studies. The type of (mechanistic) information on the intricacies of plant-microbe and microbe-microbe interactions in the rhizosphere presented in this book is much needed in order to establish and sustain healthy agricultural practices. In addition, it becomes apparent from the book that modern biotechnological developments already are influencing both the experimental approaches to biological interactions in the rhizosphere and the strategies to establish desirable plant-microbe associations. The considerable amount of relevant information on rhizosphere biology in its widest sense which can be found in this book, makes it certainly worthwhile both for workers in the field and for beginners. However, publication of the book 2 years after the symposium may have affected the actuality value of some of the data presented in this rapidly developing field. A second point of criticism is the consistent appearance of sometimes disturbing typing errors, which may completely change the meaning of sentences (e.g. 'plant rest' where 'plant pest' is meant).

The book is subdivided into four sections: 'Progress in Rhizosphere Research', 'The *Rhizobium*-legume

symbiosis', 'Rhizosphere Interactions and Plant Pest Control' and 'Rhizosphere Interactions and Plant Growth Promotion'. Each section is composed of 6–11 keynote papers (mainly review-type) and 12–17 very short (1-page) research contributions probably based on posters. Whereas the keynote papers of each section tend to provide a very relevant update on available information in the respective field, the value of the small contributions is limited where in-depth information is sought. These, however, might have served to gain a rapid entry into literature; it is therefore to be regretted that often no space was allowed for relevant references.

It is impossible in this brief review to give a detailed overview of all the topics treated in the book due to the heterogeneity of the subjects. However, some highlights probably ought to be mentioned and are listed here.

(1) The focus in some contributions on methodological problems and developments in studying micro-organisms in the rhizosphere.

(2) The application of molecular methods to tackle questions in plant–microbe interactions and the advances made at the molecular level (many examples).

(3) The advances in plant-induced *nod* gene expression.

(4) The unravelling of the genetics of siderophore production and uptake, and its ecological significance.

(5) The emphasis in many papers on the importance for plant development of vesicular-arbuscular mycorrhizal fungi and the interaction of these with rhizosphere bacteria.

As a whole, the book seems to serve its purpose, to provide a rapid entry into recent developments in rhizosphere biology, reasonably well; it may serve as a 'starting point' when very specific information is sought.

L. GILLISSEN

Oxford Surveys of Evolutionary Biology. Vol. 7

D. Futuyma and J. Antonovics (eds).
Oxford University Press, Oxford. 1990. xi + 314 pp.
Illustrated, hard cover. UK £45.00.
ISBN 0-19-506289-2.

The new editors of Volume 7 adhere to the pattern set by the preceding volumes. The nine survey articles cover widely divergent topics and were intended more to present a 'personal, even provocative, approach' rather than be comprehensive reviews. Richard R. Hudson discusses gene genealogies and what they may reveal about forces acting on molecular variation in populations. John Avise & R. Martin Ball contrast the 'biological' and the 'phylogenetic' species concepts and emphasize the importance of concordant gene

genealogies in the recognition of species. Richard Harrison reviews investigations of hybrid zones and the insights into factors promoting the maintenance of species identity that can be derived from them. Hampton Carson highlights a few important conclusions about factors involved in speciation in the Hawaiian Picture Winged *Drosophila*. Michael J. Ryan considers sexual selection by female choice from the viewpoint of communication, especially how the physiological properties of the receiver exert selection on male traits. M.W. Shaw and G.M. Hewitt examine the population dynamics of B chromosomes as examples of 'selfish DNA', and D. Couvet and five co-authors apply the selfish DNA concept to cytoplasmic male sterility in plants. Cytoplasmic male sterility can be seen as a strategy of symbionts (mitochondria) to further their own transmission. Albert F. Burney & Raymond B. Huey summarize studies on the evolution of physiological (locomotor) performance in lizards and snakes. May R. Berenbaum evaluates the evidence for genetic variation and fitness effects of secondary plant compounds and relates this research to applied aspects of pest control.

Most of the papers review a substantial body of evolutionary research from a novel point of view. From the special properties of gene genealogies to the experimental investigation of the physiological basis of Darwinian fitness, these are timely points worth considering, even though some, on closer inspection, will turn out to be self-evident rather than provocative. No new paradigm is likely to emerge from this volume. However, a periodical re-interpretation of a well-researched case history from a new angle should finally reveal the most natural concordances between facts and theories. As the emotional shock value of the 'selfish DNA' concept wears off, for instance, it is gradually recognized as a powerful evolutionary paradigm. As each article presents ample documentation, they are well worth reading. Graduate students and advanced undergraduates can read these papers with profit for the factual information alone, and if the aim of the series is to expose evolutionary biologists to attractive presentations outside their direct specialty, this seems to me the way to do it.

KONRAD BACHMANN

Leaf Venation Patterns Volume 5. Combretaceae

E.P. Klucking.
J. Cramer (Borntraeger), Berlin. 1991. 219 pp.
Illustrated, hard cover. DM240.00.
ISBN 3-443-50016-1.

The author describes the leaf venation patterns not only from the Combretaceae, but includes also 11 other smaller families of the Myrtales, i.e. Anisophylleaceae, Barringtoniaceae, Foetidiaceae,

Lecythidaceae, Lythraceae, Napoleonaceae, Oliniaceae, Onagraceae, Punicaceae, Rhizophoraceae and Sonneratiaceae. Emphasis is given to woody species, because the studied species are all obtained from herbarium collections.

The author classifies the leaf venation of the species into three categories of secondary venation: pinnate, acrodromal, and arcuate, which make up 82, 10 and 8% of the investigated species. Some aspects of intercostal venation are included. The description is quite clear. The leaves of most genera are presented by a photograph of chemically treated specimens.

A drawback of the approach is the restriction to herbarium specimens, which has often a strong bias due to selection by the collectors for accessibility (tree height, non-random-sampling) and size. Therefore the data on leaf size will not be fully representative. Despite this restriction the book is valuable for libraries and researchers in areas of taxonomy and (sub)tropical forestry. The 108 photographs may be the reason for the high price.

W.H.O. ERNST