

Book Reviews

The Mycota. Vol. I. Growth, Differentiation and Sexuality

K. Esser and P.A. Lemke (eds); J.G.H. Wessels and F. Meinhardt (Volume eds).

Springer Verlag, Berlin, 1994, xv+433 pp.

Hardback, DM 298,00; öS 2.324,40; sFr 293,00,

ISBN 3-540-57781-5.

ALMOST EVERYTHING YOU WANT TO KNOW ABOUT FUNGI

This is the first of a series of seven volumes that together are meant to present a fairly complete picture of our present knowledge of the fungi as experimental systems. In some ways the series is successor to a somewhat similar enterprise of some 25 years ago (*The Fungi*, four volumes edited by Ainsworth, Sparrow and Sussman). The present volume covers growth, differentiation and sexuality in 25 chapters. There is a good balance between the attention paid to yeasts and mycelial fungi, both ascomycetes and basidiomycetes. The level is quite good, so in fact the book offers 25 good review papers on related subjects. The volume editors have inserted cross-references to other chapters where appropriate, which enhances the coherence somewhat.

The breadth of the coverage is satisfactory. In particular, the book is useful in bringing together recent results on various topics from different fungal systems. A good example is formed by the four chapters on mating type genes, so that we have here a nice overview of the results in yeast (*Saccharomyces* and *Schizosaccharomyces*), ascomycetes (*Neurospora*, *Podospora* and *Cochliobolus*) and basidiomycetes (*Coprinus*, *Schizophyllum*, *Ustilago*). The emphasis throughout the book is clearly on laboratory results, which is understandable since fungal research has been mainly a laboratory enterprise from the start. Nevertheless, I would have appreciated a chapter on what we know of growth and reproduction under natural conditions. We know a lot about a few model species that have a long tradition as laboratory fungi, and have little idea of variability within and between species. For example, we have very little information on (variation in) life cycles under natural conditions. Similarly, the relevance of phenomena like senescence and vegetative incompatibility under natural conditions is not clear. Perhaps in a later edition some space could be devoted to these aspects of fungal biology.

The series seems to be aimed at readers that are actively involved in fungal research. For this group it is certainly attractive to have a collection of reviews available on a great variety of fungal topics. On the other hand, each volume will probably need an

update every 5–10 years to remain functional. This is perhaps a drawback of such a broad enterprise, since organizing such updating is not an easy job. But for the first 10 years to come the fungal research community is well served with this series.

R.F. HOEKSTRA

Stress and Stress Coping in Cultivated Plants

Bryan D. McKersie and Ya'acov Y. Leshem.

Kluwer Academic Publishers Group, Dordrecht,

1994, x+256 pp. Hardback Dfl. 220,00;

US\$132,00; UK£88,00. ISBN 0-7923-2827-2.

This book concentrates on stress experienced by plants and the solutions developed by these organisms to cope with it. The first chapter describes definitions, concepts and a response framework termed 'the general adaptation syndrome'. An argument in favour of this general response model to a wide range of stresses is the observation that the production of oxygen free radicals and consequently oxidative stress is involved in several if not all environmentally imposed cellular stress damage. The current understanding of the general principles of oxygen free radicals or activated oxygen is discussed in chapter 2. Both the activation of oxygen and defence mechanisms against oxidative stress are described. Chapters 3–10 give a survey on the state of the art in fields of salt stress, chilling stress, freezing stress, desiccation, drought stress, heat stress, anaerobic stress and pollution stress, respectively. All these chapters can be divided into two parts. The first part describes the phenomenon and differences in tolerance between various cultivated plants and varieties. The second part describes the mechanisms of tolerance towards these stresses.

The existence of common physiological responses in many stresses implies that there might be genes active during stress independently of the origin of the stress. In the epilogue the authors explain how manipulation of these genes might stimulate the development of multiple stress resistance in new crop cultivars. Monitoring these genes might be a relatively easy tool for ecologists to increase insight in the level of adaptation of wild plants to multiple stress occurring under natural conditions and thus into the field distribution of these plants. As a whole, the book is a well written, personal view of the authors on plant stress and the mechanisms developed to cope with it. It can well serve as an introduction into the field of stress resistance. Therefore, the book can be recommended to advanced students in biology and agronomy.

L.A.C.J. VOESENEK

The Electronic Comparative Plant Ecology

J.G. Hodgson, J.P. Grime, R. Hunt and K. Thompson.

Chapman & Hall, London, 1995, computer files on disk; incorporating the principal data from *Comparative Plant Ecology* and *The Abridged Comparative Plant Ecology* UK£75.00; ISBN 0-412-63350-7.

The Electronic Comparative Plant Ecology is a database of concise autecological information on 502 common vascular plant species of the British flora. In addition to the 281 species presented in the two printed works, 221 other 'key species' are included. Species are grouped into herbs and woody species <1.5 m tall (458 spp.), woody species >1.5 m tall (29 spp.), with separate data on juveniles for some of these) and 15 Pteridophytes. On the disk, five files can be found with identical content, but of different file type. This makes it relatively simple to adapt the database to different types of software (DOS or Macintosh). The accompanying booklet briefly introduces the database, and rather clearly explains the codes used in each of the attributes.

The attributes are ordered into three main groups. Group 1, *ecological attributes*, comprises: Species name, Habitat range (abundance in seven primary habitat types and commonest terminal habitat), Soil pH, Floristic diversity, Distribution in N. Europe, and Present status. Group 2 contains *attributes of the established phase*: Life history, Established strategy (Grime's C-S-R), Life form (Raunkiaer), Canopy structure, Canopy height, Lateral spread, Mycorrhizas, Leaf phenology, Flowering time and duration, and Polyploidy. In Group 3, *attributes of the regenerative phase* are presented: Regenerative strategies, Seed bank, Agency of dispersal, Dispersule and germinule form, Dispersule weight, Dispersule shape, Germination requirements and Family. The division of attributes into these three groups seems slightly strange. 'Species name' is no ecological attribute, and 'Family' is not an attribute of the regenerative phase.

Although the database is well laid out and easy to use, there are some shortcomings limiting its practical application. In my opinion, there is no great advantage of this electronic version over the two books mentioned above. Although there are more species than in the books, the proportion of the British flora that is covered is still quite small. This can be a major problem if the user wants, for example, to calculate ecological site characteristics on the basis of species lists or vegetation relevés, one of the most interesting applications. Also, the coding of the ecological attributes is not very practical for such calculations. Most of the codes are not

numerical, which means that they have to be transformed into a numerical scale for the purpose of calculations. Sometimes this can be a hindrance. The pH-scale, for instance, is a combination of a numeral, indicating which one-pH-unit interval contains the modal of the species, followed by a letter indicating the number of pH classes in which the frequency of occurrence exceeds 50%. Although this scale describes the pH frequency distribution rather accurately, in my opinion it is not very practical.

Because of the points mentioned above, and the fact that some of the attributes are rather specific for Great Britain (habitat range, pH, status) this database is mainly interesting for British ecologists. For the Dutch readers, I would advise the electronic version of the Basic Botanical Register (*Botanisch Basisregister*, see *Acta Bot. Neerl.* 42: 96-97, 1993), published by the Central Bureau for Statistics, which comprises all species of the Dutch flora and contains many more attributes.

GERARD OOSTERMEIJER

Current Issues in Plant Molecular and Cellular Biology

M. Terzi, R. Cella and A. Falavigna (eds).
Kluwer Academic Publishers, Dordrecht, 1995;
xiii+697 pp. Hardback, Dfl. 300.00; US\$198.00;
UK£123.00. ISBN 0-7923-3322-5.

The contents of this book are not immediately evident from its non-descriptive title. The book reports on plenary lectures and oral symposium presentations of the VIIIth International Congress on Plant Tissue and Cell Culture held in Florence, Italy, 12-17 June 1994. The congress was attended by some 1300 scientists. The accounts on the plenary lectures include an up-to-date report of I.K. Vasil on molecular transformation of cereals and an interesting account from the laboratory of N.C. Carpita on connections between plasma membrane and wall, analogous to plasma membrane-extracellular matrix interactions in animals, involving proteins similar to fibronectin and vitronectin. This is followed by two additional plenary lectures, one on molecular processes in lateral root meristem formation by I.M. Sussex *et al.*, and the other on oligosaccharide elicitors (not oligosaccharins in general) by M.G. Hahn. This is followed by more than 600 pages covering some 90 presentations at this congress. To give an idea of the topics covered it is best to enumerate the symposia each containing five papers: *In vitro* Culture and Plant Regeneration; Plant Propagation; Haploids; Somatic Hybridization; Reproductive Systems; Genetic Variability; Gene Transfer; Organelles; Biotechnology of Tropical and Subtropical Species; Agronomic Traits; Somatic Embryogenesis; Meristems; Cell Surface; Growth

Regulators; Reception and Transduction of Signals; Gene Expression under Extreme Conditions; Primary Metabolism; Secondary Metabolism; Transport; and Large-Scale Production. Nearly all presentations describe work involving tissue or cell cultures although there are exceptions, such as an interesting but somewhat out-of-place review by M. Chrispeels *et al.* on aquaporins in plant cells.

It is clear that during the past few years major progress has been made with respect to the transformation of cereals, both by using highly regenerative cells from somatic embryos and by using new methods of DNA introduction such as 'biolistics'. Other topics such as somatic cell hybridization, which earlier dominated this field, are no longer pursued. This congress also had little to offer with respect to the use of plant cells as industrial production systems. However, in general it is clear that the use of cultured plant cells and tissues continues to play an important role in the elucidation of molecular and cellular processes of plants. The book suffers from the fact that authors had to present camera-ready manuscripts and that no editing was done. Not only do papers appear in different print but there is also no consensus on, for example, presentation of references in the text and reference list. It is not surprising that the quality of the papers is also variable, to put it mildly. The book is expensive. Nevertheless, laboratories involved in plant cell and tissue culture will want it on the shelf.

J.G.H. WESSELS

Historical Ecology of the British Flora

Martin Ingrouille.

Chapman & Hall, London, 1995; xi + 347 pp.
Paperback, UK£22.50. ISBN 0-412-56150-6.

The British Isles have a rich described fossil flora, from the earliest land plants to the plants of the Quaternary period. Based on the fossil evidence, the author tells the history of the changing British and Irish vegetation from its earliest beginnings to the present. The book is divided into three chapters. In the first, the fossil flora of the British Isles is described. This is the story of adaptation and evolution of plants as shown by fossils. The second chapter deals with the establishment of the natural vegetation after the last glacial period, and in the final chapter, the establishment of the present British vegetation is told. The use of the flora by prehistoric

man and the conversion of the natural vegetation into a countryside managed by human activity are discussed. The book is very well presented and up-to-date. It is a useful book and a necessary purchase for all those who have interest in 'historical ecology'. It fills a niche in the market, and it is valuable for students with some botanical or geological background and for specialist readers. I also want to recommend the book as a very useful resource for the non-British botanists and geologists (although they often will not know the sites mentioned, and the present vegetation types described).

In general the information is presented clearly, but there are a limited number of errors; for example illustration 1.58 mentions Upper (=Upton) Warren interstadial en Ipswichian (=Ipswichian) interglacial. Some names of taxa are misspelled but their number is less than a promille of the taxa mentioned. On p. 97 it is erroneously stated that the Bølling interstadial started at 14 000 ¹⁴C years ago (instead of 13 000) and the Allerød interstadial at 12 600 ¹⁴C years ago (instead of C. 12 000). The famous Dane Iversen is called a Swedish botanist (p. 211), and elsewhere in the book he is called Iverson. Such mistakes are rare in the book and this criticism does not alter my generally positive opinion. Some of the black and white illustrations are in some ways a disappointment. The book deserved more coloured illustrations, especially of the plants. The author combines information from a variety of disciplines, including palaeobotany, climatology, ecology, palaeoecology, geology and archaeology. Aspects of the present vegetation types are combined with historical aspects. The British vegetation has developed from the interplay between natural forces and human influence. The story of mankind's increasing influence on the vegetation is told in detail. Aspects of the present managed landscape are combined with historical information. In some parts of the book the reader may even become confused because of the alternation of going forward and backward in time. By giving this book its rather grand title, the author lays himself open to some criticism in that a fully comprehensive account of the historical ecology of the British flora is an ambitious thing to attempt. In my opinion, Martin Ingrouille has been very successful in producing an explanation of the diversity of today's vegetation and landscape in Britain.

BAS VAN GEEL