

## Book Reviews

**Cook CDK. 1996.** *Aquatic plant book* (2nd revised edn) 228 pp. \$60–70, 110 Dutch Guilders (hardback).

The first edition of this book had the dimensions of a novel with the traditional single column of text, and the paper quality was inferior and has started to discolour after 23 years. The new edition has completely changed: the size has been altered to 30 × 21.5 × 2 cm; it has an attractive lime green cover showing the sacred lotus; and the paper is of a better quality glazed nature. The format is in a twin column style and there are now several drawings on a page and alternating with the text which is clear and easy to read. The drawings, however, are not wonderful and compared with De Witt's book (1966) on *Aquarium plants* the illustrations are heavy handed and fine definition is often lacking. In addition, there could have been better use made of space in the illustrations with many of the dissections etc being much larger.

The present work includes all aquatic ferns and seed-bearing plants with 407 genera and 87 families covered. Unlike its forerunner, the new volume excludes the Charophytes and mosses but now includes all the marine genera often known as sea-grasses. Rheophytes are also excluded but are covered in works by Van Steenis (1981, 1987). The order follows Dahlgren's arrangement in the main, and good generic and large family descriptions are given—but species descriptions are omitted although they may be mentioned if they have particular points of interest. This results in a book that is too general in content to be of much interest to many biologists as most field-workers work at the species level. Species are mentioned in monotypic genera or where one or two species are present or where illustrated. The text covers distributions, life forms, pollination, disseminules and dispersal, ecological information, importance and nuisance. Selected literature references are mostly for monographs but the selection is very meagre especially when compared with Preston's recent handbook on *Pondweeds* (1995). Furthermore, the lack of recent literature references is disappointing with only a few references since 1990 and these being mainly monographs rather than identification manuals or more varied works. The claimed aim of the book, like its predecessor, was to provide a manual for the identification of freshwater macrophytes of the world, but this book only goes half way to its objective. The task is certainly very large and cannot be done in a single volume. There are dichotamous keys mainly based on vegetative, easily-seen characters but only to families and genera and so it has only marginal use for many biologists. Most researchers would use the keys in a local flora or specialized manual which would take one down to the species level. Even if there had been references to the various works which could have allowed for specific identification such as *British water plants* by Haslam, Sinker and Wolsley (1975) this would have alleviated my

main concern. Certainly the present work does differ from many floristic works in that it does describe vegetative and juvenile features which they usually omit. One would expect a book with such a general title to at least have a chapter on water purification by plants, conservation, eutrophication, acidification, and possibly even collecting and preserving of water plants; but these were lacking. The author missed his chance to make a dry text book into something much more interesting and useful.

Looking at the more technical side of the book most European readers would be amazed to read that '*Ruppia* should be removed from the Potamogetonaceae' as if this was something new, but Dandy made this change in 1952 and this was maintained for *Flora Europaea* in 1980! I wonder what other dated information is lurking where my lack of knowledge prevented me from exposing it. I was further surprised to read that the International Biological Programme convened by UNESCO suggested such a book. I am afraid that this book has rather limited appeal, except possibly to taxonomists, and is certainly little use to ecologists, horticulturalists or those who might wish to control or grow water plants. There is no mention of weed killers or anything about the control of troublesome weeds and practically no references to any weed control books or papers. Instead of this new edition it might have been more worthwhile to embark on a series of volumes to tackle the problem of species identification. One final complaint I have is that my review copy had a 1 cm slice taken from the corners of four pages.

Douglas R. McKean

**Helas G, Slanina J, Steinbrecher R, eds. 1997.** *Biogenic volatile organic compounds in the atmosphere*. 184 pp. The Hague: SPB Academic Publishing BV. US\$50 (softback).

'... consciousness of the existence of BVOC [biogenic volatile organic carbon] is older than knowledge about chemistry. However, the information available on composition of these natural odours is often puzzlingly faint.'—set the target for a workshop held over 3 years ago in Mainz, Germany, but the papers from it have only just been published, a common problem with publications of this type. The wait is partially rewarding because, in general, the improvements that the air chemists have made to their measuring and modelling techniques are now yielding information more useful to biologists. The converse of this reveals what a yawning gap exists between what is known to be emitted from vegetation and how and, more importantly, why these compounds are produced by plants, sometimes in large quantities. One of the chapters by Riba and Torres attempts to show some of the possible internal routes, but much scope now exists for young plant physiologists to elucidate the mechanisms involved.

Many of the BVOC compounds are isoprenoid in origin but, unfortunately, most of these air chemists have assumed that the classical mevalonate pathway underpins all isoprenoid biosynthesis. None of them seem to be aware of the new non-mevalonate IPP pathway identified by Lichtenhaler and his co-workers which he now calls the 'deoxyxylulose phosphate' pathway after the first and essential intermediate used.

Each of the main chapters concentrates on different types of BVOCs and some of them will be extremely interesting to certain groups of applied plant scientists. The one on methane by Conrad is a very useful summary for those interested in global warming and the one on carbonyl compounds by Kotzias *et al.* reviews the important hydrocarbon reactions of the atmosphere surrounding ozone. Many of the others tend to be of the inventory type listing species, amounts emitted, etc. without getting to grips with any of the associated biology. The one that comes closest is that on isoprene by Steinbrecker, but the greatest disappointment must be the chapter on alkenes by Rudolph. Of all the biogenic hydrocarbons plant physiologists know most about, ethene, as the air chemists correctly call it, receives the poorest treatment. Where we are now talking about receptors for ethene and the associated genes of synthesis, regulation and control, this chapter only outlines developments of the previous 2 decades.

In summary, one for the library of the better-endowed universities and inter-library loan for the rest of us.

**Alan Wellburn**

**Walker B, Steffen W, eds. 1996.** *Global change and terrestrial ecosystems*. 620 pp. \$39.95 (paperback).

This book contains summary chapters on activities which have taken place as part of the Global Change and Terrestrial Ecosystems (GCTE) Project which is part of the International Geosphere-Biosphere programme. GCTE started in 1992 and many scientists across the world are affiliated. The annual expenditure on research has nominally been \$20 million (but the research is in fact paid for by existing funding bodies with their own strategies and priorities). The structure and objectives of GCTE are well set out in the introductory chapter by the Editors, the two overall objectives being: 'To predict the effects of changes in climate, atmospheric composition and land use on terrestrial ecosystems, including (i) agriculture, forestry, soils and (ii) ecological complexity. To determine how these effects lead to feedbacks to the atmosphere and the physical climate system'. The subsequent structure of the book is divided into sections for each of the four foci of GCTE: (1) Ecosystem Physiology; (2) Ecosystem Structure; (3) Agriculture, Forestry and Soils; and (4) Ecological Complexity. Within these chapters leading researchers in the field summarize particular topics. Following these is a section on linking GCTE with Earth system science and a concluding chapter.

The chapters are mostly interesting and well written, presenting a few key figures and tables. The extremely wide

range of fields covered—ecological physiology, patch models, landscape dynamics, crop physiology and modelling, pest-crop interactions, soil erosion, biodiversity, soil biota and remote sensing reflects the multi-disciplinary nature of GCTE and the enormous complexity of their mission. A problem faced by GCTE is that many aspects of global change that are least predictable (e.g. changes in temperature and rainfall, frequency of extreme events) may have the greatest consequences for ecosystems, and may dwarf the effect of the most certain aspect—the rising CO<sub>2</sub> concentration. Some researchers take the view that research should continue to focus on CO<sub>2</sub> as the one area where we have a good understanding of all the processes directly affected, the means to do the research and where we can be certain of its relevance to the future environment. However, many take the view that the effects of other potential changes can already start to be dealt with in models. A recurring subject in different sections of the book is the appropriate degree of complexity of models, and whether it is better to construct them in a top-down or bottom-up manner. This subject will continue to excite debate, but it is agreed that the optimum approach is dictated by the objective of the model. In the area of plant models, it does seem that the emphasis in bottom-up models is often placed on those processes which can be described in a mechanistic, or near-mechanistic manner, such as light interception, photosynthesis and transpiration, rather than those which cannot such as phenology, allocation and acclimation. There are still substantial discrepancies between predictions from wheat models developed in different parts of the world, although there is apparently much closer agreement for rice models.

Something that strikes this reader, is that while some observational data and a great deal of model output are presented, there is almost no comparison of model output with observation. There is quite a lot of comparison of models, but I doubt that anyone would feel this worthwhile if there were high quality datasets available for testing with. The problem of paucity of data is recognized and addressed in a chapter outlining what is needed. It seems to me that a lot of funding is going to be needed for unglamorous work on monitoring and data collation of weather, soil, agricultural statistics, ecosystem data etc. along with remote sensing techniques. This is essential to provide a benchmark of high quality, relevant data for testing models, so that we are eventually able to judge whether we have the tools to fulfil the aims of GCTE. The problems in obtaining funding for such long-term, globally managed projects are well stated in the concluding chapter by Dr Walker.

This book is an interesting collection of chapters summarizing diverse fields of research under the GCTE umbrella. Inevitably, the chapters do not always link obviously together, perhaps partly because so much research has to be conducted under short-term grants within the priorities of funding bodies. It will be of interest to researchers of many disciplines to see how their fields are contributing in the context of global environmental change.

**Rowan Mitchell**