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Book Reviews

Ethnobotany: Principles and Applications

C. M. Cotton.
John Wiley & Sons, Chichester, 1996; ix+424 pp., £50.00 (hardback), £24.95 (paperback).
ISBN: 0471–96831–5 (hardback), 0471–95537–X (paperback).

This book enables students of ethnobotany to learn the main principles and potential applications of this discipline. The book is also useful to established anthropologists (as an introduction to plant biology), botanists (as an introduction to anthropology) and pharmacists (as an introduction to phytochemistry and ethnopharmacognosy).

The book is very clearly organized. A general reading of the text gives an overview of the subject under discussion, while reference to the large number of tables, figures and boxes will allow the reader to gain much more detailed information on a particular area of interest. Each of the tables and boxes has therefore been presented as units on their own, which may be consulted directly. To avoid problems in understanding the text, any specialist terms have been italicized and these can be found in standard botanical or anthropological dictionaries.

The bibliography of the book is extensive and easy to consult. The first authors have been ranked in alphabetical order, while the references include the titles which enable the reader to judge the usefulness of further study. The index has a very detailed set-up and is easy to handle. A large number of key words have been listed and where necessary subjects belonging to a key word have been given. For readers interested in plant species it is convenient that the index includes the Latin names of the plants occurring in the book. Chapter 1 is an introduction to ethnobotany including its definition: 'ethnobotany is considered to encompass all studies which concern the mutual relationships between plants and traditional peoples'. The history and development of ethnobotanical study is described (from Columbus and the Pilgrim Fathers to the present). This chapter ends with a table in which the main areas of modern ethnobotanical investigation are listed. The categories defined are ethnoecology, traditional agriculture, cognitive ethnobotany, material culture, traditional phytochemistry and paleoethnobotany. The material available has been organized into chapters according to these categories, with additional sections covering background information and applied ethnobotany.

Chapters 2 and 3 introduce the plants and peoples forming the basis of enthnobotanical study. Chapter 4 discusses the range of relevant methodologies. Then Chapters 5–10 each discuss one of the main fields of study; often case-studies have been used to illustrate a particular point. Finally, in Chapters 11 and 12, the potential benefits and practical problems of applied ethnobotany are discussed. In these last-mentioned chapters the two major potential applications of ethnobotanical data, economic development and resource conservation, are critically discussed since there is often a conflict of interest in this respect.

Briefly, it can be concluded that this book contains very broad information of high quality while the price is relatively low. I strongly recommend the book to students of ethnobotany and people who are interested in this discipline, including scientists.

NIESKO PRAS

Principles of Genetics

D. Peter Snustad, Michael J. Simmons and John B. Jenkins.
John Wiley & Sons, Chichester, 1997, 829 pp., £24.95 (hardback).
ISBN 0–471–31196–0.

The authors state in the preface that '*Principles of Genetics* is the culmination of our collective attempt to stay abreast of the exciting new developments in genetics without sacrificing rigour in the coverage of basic Mendelian genetics'. To a great extent the authors have succeeded in producing this book, containing 28 well-organized chapters, full of excellent illustrations (about 700 figures and 200 photographs) together with clearly written text. It is always difficult to decide whether a genetics course should begin with DNA first followed by transmission genetics, or vice versa. This book, however, has a convenient organization which can be adopted both ways depending on the requirement of the teacher. Molecular genetics can be taught by going directly to Chapters 9–14 followed by formal genetics in Chapters 3–8 when necessary. In order to grip the attention of the students, a large number of examples have been chosen from human genetics for the illustration of basic principles. Nevertheless, several interesting examples from plants have also been included. It is heartening to see that chromosome rings of *Oenothera* has reappeared deservingly in this modern textbook.

There is, however, one conspicuous absence: the techniques of *in situ* hybridization have hardly been mentioned in any of the chapters. For example, in Chapter 6, while mentioning different chromosome banding methods for the study of structure of chromosomes, it would be most appropriate to highlight the importance of genomic *in situ* hybridization

(GISH) and fluorescent *in situ* hybridization (FISH) for unravelling the structure of chromosomes.

A singular feature of this textbook is that conversations with some of the VIPs are given in appropriate places in the book. This should undoubtedly provoke the curiosity of the students. The epilogue by Prof. James F. Crow is a very interesting and a useful addition in this book.

E. JACOBSEN

Physiological Ecology of North American Desert Plants

S. D. Smith, R. K. Monson and J. E. Anderson.
Springer Verlag, Heidelberg, 1997, 286 pp.,
DM 228.00 (hardback).
ISBN 3-540-53113-0.

In a series of 13 published books on adaptation of desert organisms, the present study on physiological ecology of North American desert plants is of outstanding quality. It is a very well written, up to date publication.

The book starts with a description of the North American desert environment and its vegetation: abiotic features, geomorphology and soils, plant communities and their dynamics, primary production and nutrient cycling. In a subsequent section a clear overview of the response of desert plants to stress is presented, ranging from photosynthesis, water relationships, growth, source-sink relations to reproduction of desert plants.

In following sections case studies of various growth forms of desert plants are shown: (i) evergreen shrubs, (ii) drought-deciduous shrubs, (iii) CAM succulents, (iv) perennial grasses, (v) phreatophytes, (vi) desert annuals, poikilohydric plants and (vii) introduced exotic plants.

Again, up to date and high quality reports of the various case studies are presented. The choice for an analysis of adaptation of desert plants with the aid of case studies of different growth forms is excellent: it allows comparative studies with (i) other species of the same growth form, (ii) species of the same growth form of plants of other deserts than the North American desert, and (iii) species of the same growth form in other ecosystems than the North American desert.

For these reasons the book is very useful for consultation and citation in similar studies on adaptation of desert plants, worldwide, and it is therefore regrettable that the price of this book is so high that it may pose a severe limitation on consultation by professional and laymen ecological botanists.

P. J. C. KUIPER

Pflanzengesellschaften Nordostdeutschlands. I. Hydro- und Therophytosa

Harro Passarge.
J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, Stuttgart, 1996, 298 pp.
DM 48.00 (paperback).
ISBN 3-443-50020-X.

The 1990s witnessed a revival of phytosociology in NW Europe. A large project on vegetation classification started in the United Kingdom, a similar project in The Netherlands is well on its way and in Germany several reviews appeared within a few years. Oberdorfer published his fourth and last volume on southern German communities in 1992, in the same year a review by Pott on the communities of Germany saw the light and in 1995 a review by Schubert *et al.* on the communities of north-eastern Germany (former eastern Germany) was published. The present book by Passarge fits well into this list. In fact, it can be considered as a completely revised version of part of his two volumes on eastern German communities of the 1960s, which are no longer available.

In comparison to many newer works the present review is very classical in its structure. Extensive information about ecology and biogeography is not available but all described communities are documented by phytosociological tables. An obvious consequence of this choice is a lowered readability than in books without such justification but a much improved scientific value.

The same 'classical accuracy' is visible when the subdivision of the class *Lemnetea* is compared with four other reviews (Oberdorfer, Pott, Schaminée *et al.* and Schubert *et al.*) The work by Passarge gives the most detailed subdivision and presents more associations than any of the others without having to describe new ones. This overview shows at the same time that there is hardly agreement in the subdivision of even such a small group as the *Lemnetea* in NW Europe. Only two of 11 associations mentioned by Passarge were present in all works, all others were not present in one or more books, considered as subassociations, etc.

Whether the subdivision of the *Lemnetea* is representative of the quality is not clear, but a quick glance through the rest of the book is encouraging. However, one should realize that much work still needs to be done. A comparison of the amount of classes treated in this volume to the total number present suggests that one may expect at least two, possibly three other volumes in the future.

In conclusion, the book has limited interest for the general botanist, but holds more for those who are engaged in phytosociology. For the latter group, especially when working in north-eastern Germany but also in a somewhat wider region, it would be

unwise to ignore this book. Not only does it give probably the best review for the region under consideration, but it does so for a very moderate price.

RUDY VAN DIGGELEN

Seed Anatomy (Band X, Teil 3) Encyclopedia of Plant Anatomy

Ella Werker.
Gebrüder Borntraeger, Berlin-Stuttgart, 1997, 424 pp., DM 198.00 (hardback).
ISBN 3-443-14024-6

In the *Encyclopedia of Plant Anatomy* series this is an impressive single-author volume surveying the vast area of seed anatomy. Using the more than 1200 literature references, aspects of general morphology, colouring, surface topology and specialized structures such as stomata and trichomes are clearly described. Also, physiological phenomena are covered, such as the passage of nutrients, the nutritional role of the endosperm and factors influencing seed dormancy.

The strength of the book is that it combines these processes with classical as well as modern microscopy in an elegant way. Many older, mainly light microscopical observations, are represented by drawings which are of a very high quality and which are well mixed with more recently obtained histological and electron microscopical information. The book is well edited, with an excellent printing quality.

The only point which could possibly have been included is to give a short description of the state of the art of artificial seeds and how, for example, the somatic embryos in these 'seeds' look after controlled dehydration. Several original papers covering this area have already appeared, so some of this work could have been mentioned.

Nevertheless, as a general impression I consider the book as an already now classical reference work, from which the wealth of information will deserve not only teachers in botany, but also those researchers who want to elucidate structure–function relationships in one of the most important biological processes on earth, the process of seed development.

J. H. N. SCHEL

Biological Nitrogen Fixation Associated with Rice Production Developments in Plant and Soil Sciences, Vol. 70

M. Rahman, C. Van Hove, Z.N.T. Begum, T. Heulin and A. Hartmann (eds).
Kluwer Academic Publishers, Dordrecht, 1996, 247 pp., Dfl. 180.00 (hardback).
ISBN 0-7923-4197-X.

This book is based on selected papers presented in the international symposium on Biological Nitrogen Fixation Associated with Rice, which was held in 1994 in Dhaka, Bangladesh. It provides a comprehensive summary of current research in the field of Biological Nitrogen Fixation (BNF) in rice cropping in developing countries. As rice plants do not fix nitrogen and chemical nitrogen fertilizers are expensive, optimum use of BNF in the rice ecosystem is most important.

For decades the scientific world has been split up into believers and non-believers of the significance of BNF in rice cropping. In the introductory papers J. Balandreau & P. Roger gave a realistic overview of the agronomic facts and figures of studies on inoculation with N_2-fixing bacteria. Many overestimates on the role of BNF in rice cropping are based on simply extrapolating results from temperate countries to the tropics and neglecting many yield-limiting factors other than nitrogen. In a similar way C. van Hove & A. Jejeune present a critical overview on the enthusiasms and skepticism about the potential of *Azolla* in rice production. No doubt BFN plays an important role in rice cropping, irrespective whether it comes from rhizobia in legumes, *Anabaena* in *Azolla* or from free-living N_2-fixing bacteria. The book covers many examples of using BNF in sustainable agriculture. It informs us that the goal of developing BNF is not to achieve the maximum input; rather, it is really to achieve the maximum income (money and/or food) for farmers. In several chapters it is demonstrated that BNF is excellent for sustainable agriculture, but never will replace chemical fertilizers that give maximum yield.

In the last section the application of biotechnology in rice culture is described, with emphasis to the description of occurrence and diversity of N_2-fixing bacteria and its use as inoculum. Within this microbiologically/agronomically orientated overview the plant molecular biotechnological work in rice has completely been neglected. A pity, as real progress in improving BNF in rice production might come from this side according to new believers in science.

ANTOON D. L. AKKERMANS

Physiology, Biochemistry and Molecular Biology of Plant Lipids

John Peter Williams, Mobashsher Uddin Khan and Nora Wan Lem (eds).
Kluwer Academic Publishers, Dordrecht, 1997, 418 pp., Dfl. 365.00 (hardback).
ISBN 0-7923-4379-4.

This publication contains the presentations, held in July 1996, at the 12th International Symposium on Plant Lipids in Toronto, Canada. These symposia are organized biannually, starting from 1974, when the first meeting was organized by T. Galliard in Norwich, UK (and the 5th in Gronigen, NL).

Over the years the following sections have been recognized and used as a guideline for presentation and publications of the progress in the field of plant lipids: (i) fatty acid biosynthesis, (ii) glycerolipid biosynthesis, (iii) membranes, (iv) isoprenoids and sterols, (v) environmental effects on lipids, (vi) lipid degradation, (vii) oil seeds and fruits and (viii) molecular biology and biotechnology. In particular, the last section has extended greatly over the years. It is impossible to review all presentations and progress in plant lipid sciences in this book, covering physiology, biochemistry and molecular biology of plant lipids.

Transformation and genetic engineering of crop plants and oil seed plants and production were particular topics of the present meeting. Oil seeds and fruits attract special attention, since the rise in price of petroleum oils from oil fields makes introduction of economic oil crops for industrial use increasingly possible.

Another aspect concerns the comparative study of mutants among which is *Arabidopsis*, which deviate in some aspect of plant lipid metabolism. These mutants are obtained in the classical way by mutagenic treatments, but cloning of genes of prokaryotic or mammalian origin into higher plants and the study of their expression in the newly formed transgenic plants becomes increasingly frequent and several presentations on this topic—as far as plant lipids are concerned—are found in this book.

P. J. C. KUIPER

Photosynthesis and the Environment

Neil R. Baker (ed.)
Kluwer Academic Publishers, Dordrecht, 1996, 491 pp., Dfl. 405.00 (hardback).
ISBN 0-7923-4316-6.

This book is Volume 5 in a series of prestigious books on the state of the art in photosynthesis research: advances in photosynthesis. In the present volume the numerous aspects on the interaction between photosynthesis and the environment are discussed in 20 chapters, mainly prepared by two or more authors. The first five chapters deal with various aspects of the light reaction, such as processing of excitation energy, *in vivo* electron transport and its regulation, photoinhibition and oxygen radical production and scavenging.

Two more chapters are devoted to carbon metabolism and photo respiration and its regulation. In five subsequent chapters the role of photosynthesis is analysed at a more integrated level: gas exchange, the role of stomata, source–sink relations, developmental constraints and molecular biological aspects of the photosynthesis–environment interaction. Specific interactions between environment and photosynthesis are dealt with in another six chapters: sunflecks, drought, raised temperature, elevated CO_2, ozone as an air pollutant and UV-B radiation.

Final chapters discuss integration of environmental effects on photosynthesis, including studies on stable isotopes and environmental constraints. In general, the chapters are well written and up to date as far as new scientific information is concerned. The book is very well suited for graduate students, beginning researchers and scientists involved in the concern about the impact of global climate change in the form of the effect of raised atmospheric CO_2 and increased average temperature on agricultural crop production and sustainability of the green plant cover on our planet. This book presents an excellent background for basic information of the above-mentioned topic and can be fully recommended, notwithstanding its high price.

P. J. C. KUIPER

In Vitro Haploid Production in Higher Plants; Volume 2—Applications

S. Mohan Jain, S. K. Sopory and R. E. Veilleux (eds).
Kluwer Academic Publishers Group, Dordrecht, 1996, 438 pp. Dfl. 330.00, US$ 231.00, UK £148.50 (hardback).
ISBN 0-7923-3578-3.

This book is no. 24 in the series *Current Plant Science and Biotechnology in Agriculture*, and Volume 2 in a row of (for the moment) five review books entitled 'In Vitro *Haploid Production in Higher Plants*'. Volume 1 in this series of five deals with fundamental aspects and methods of *in vitro* haploid production. The present Volume 2 is divided into two sections. Section 1 deals with a broad range of aspects: genetic stability, transformation, gametoclonal variation, breadmaking quality, DNA amplification, RFLP-mapping, mutation, genetics of regeneration, segregation distortion, chromosome engineering, self incompatibility, pollen protoplasts, gametosomatic hybridization and also some more widely related applications such as cryopreservation, statistical models and artificial seeds. Section 2 consists of three chapters, more specifically discussing genetic transformation of *Petunia*, wheat and rice via pollen or protoplasts. The quality of the chapters differs, ranging from excellent review work (Chapters II.1, II.11 and II.15) to an overview of the experiments

carried out in the laboratory of the author (Chapter II.4), but the overall quality is good. The subjects 'possible causes of somaclonal variation' and 'protoplast isolation' are described in at least two chapters and some communication between the authors and the editors might have prevented the overlap. The editors have succeeded in assembling some of the main players in the haploid research field. Chapter 18 summarizes future prospects which have already been given in all the previous chapters. The quality of the photographs and figures is average to good and in some cases excellent, although in some cases colour photographs would have been more illustrative, e.g. in the case of the transgenic *Petunia* flowers. As most references in the chapters are at least from 2 years before this publication, the information is not up to date. New reviews on the presented topics will be published in a few years by the same or new research groups, and it can be questioned whether a paperback edition would have been a more appropriate choice, with this evoking a more attractive price. Nevertheless, the book can be considered a valuable asset to anyone working or starting in the haploid research field: good to have to hand for the next few years.

MARCEL BRUINS

