

BOOK REVIEWS

Induced Mutations – A Tool In Plant Research, Proc. Symp. IAEA/FAO, International Atomic Energy Agency, Vienna, 1981. 538 pp, 77 figures, tables. Price: Austrian Shillings 840,-.

In the course of the last two or three centuries artificial induction of mutations has become a useful tool, though in most cases a rather modest one, available to plant breeders for producing better plant varieties for mankind. Crop plants with characters genetically improved by mutation induction can be used either immediately as new varieties or, in an increasing number of cases, further used in crosses, e.g. with varieties that show good adaptation to local conditions.

Over the years the joint division of IAEA and FAO in Vienna has organized a number of symposia on different aspects of such applications of induced mutations. The worldwide distribution of proceedings of those meetings has undoubtedly contributed considerably to the present situation where a regular and realistic use is made of mutation breeding. In this way several hundreds of plant varieties, some of them of considerable economic importance, have been obtained.

Despite those results for practical breeding work, it is generally accepted that the contribution of mutated genes as research tools in plant science has become far more important. A symposium to assess the value of such approaches was organized in 1981 in Vienna. It was the first meeting to concentrate on such topics. The symposium brought together about a hundred scientists from different plant disciplines. Eight different sessions were held, treating subjects concerning the role of induced mutations in relation to the advancement of genetic studies, plant evolution, plant physiology, parasites, symbioses, in vitro culture, gene ecology and plant breeding. Most sessions started with an invited paper by specialists in the field, followed by other presentations and posters.

From the 34 papers, 30 were presented in English, the others in French or Spanish (with English abstracts). The text of a number of posters was also included in the proceedings. The wide coverage of subjects in the different sessions makes this publication very interesting and useful reading for both researcher and teacher in whose work mutations do or might play a role. Most presentations are of a good standard.

A. M. VAN HARTEN

P. MACURA: *Elsevier's Dictionary of Botany. II. General terms in English, French, German and Russian*. Elsevier Scientific Publishing Co., Amsterdam, and Elsevier/North-Holland Inc., New York 1982. 743 pp. ISBN 0-444-41977-2. Price Df 260.-, US\$ 110.75.

This book is not a dictionary in the sense that definitions of terms are given, but it is rather a glossary of selected botanical terms. These are basically arranged in 9967 numbered English entries with some synonyms or equivalents also cross-referenced. In the first, basic table the French and German translations have immediately been listed, but the Russian ones are in a separate index, probably due to the technical difficulties in intercalating Cyrillic script with Roman. This necessitates constant leafing; one would have thought that with the modern printing techniques such a problem could have been overcome. In the indices for French, German and a second one for Russian the terms in these languages are alphabetically ordered with references to the corresponding numbers of the basic table. The terms are said to have been taken from general botany, phytocoenology, phytomorphology, phytochemistry, forestry, grassland research, biochemistry, agriculture and agricultural chemistry, horticulture, taxonomy and the medical properties of plants.

The book might have been much thinner (and cheaper) with a less wasteful lay-out (although it is pleasing to the eye) and the non-selection of words which are virtually identical in the various languages, differing mainly in orthography, accents, capitals and suffixes. Who needs the information that, for instance, "aberration" (English) is "aberration" (French), "Aberration" (German, why not also "Abweichung"?) and "aberraciia" (Russian); fibroblast (E) = fibroblaste (F), Fibroblast (G), fibroblast (R); polynucleotide (E) = polynucleotide (F), Polynukleotid (G), polynukleotid (R); and so on? In a complete glossary one needs of course to take up even the most inane words, but when a selection is promised by the introduction the likes of these could well have been done without.

The value of works like the present one is questionable. Who is supposed to use it? A translator might be helped at first sight, on the other hand scientific papers should be translated by a specialist on the subject and not by another, how well-versed in languages he or she may be. The first will then hardly need this reference as he may be expected to be familiar with the technical terms of his field, the second even with this, is bound to fall into ludicrous pitfalls. Perhaps then students and laymen may have some use for this when wrestling with a foreign language, but it is to be doubted that they will be able or willing to pay the rather exorbitant price. Having recently translated a German work into English I could have used an actual dictionary giving definitions; may be a third volume in this series is planned to compete with Jackson's Glossary?

In the vast area of technical terms it is not difficult to miss some, or to give an equivalent not in use in a particular jargon. As a descriptive taxonomist I missed for instance 'apert' (a type of aestivation; "valvate", "imbricate", "contorted", "quincuncial" are given), "dorsifixed" (attachment of anthers; "basifixed" is present), "coherent" (for organs glued, not fused together), "epimantium" (the ovule-bearing scale in Coniferae). "Abaxial" is apparently not "abaxial" in German, although "adaxial" is "adaxial", while "nicht an der Achse liegend" is imprecise. Axillary ovules will hardly be "blattwinkelständig" (?), but "achselständig". German will call a grass "Gras" and not "Kraut" if they want to be precise, and use "Balgfrucht" for a follicle but not for a caryopsis. A nucamentaceous fruit is either as hard as a nut, or an indehiscent, one-seeded fruit, which has little to do with "ament" under which it is listed, although a "nucament" is a specialized kind of catkin.

The book is well-printed and bound, but much too expensive for what it offers.

J. F. VELDKAMP

F. JACOB, E. J. JÄGER and E. OHMANN, *Kompendium der Botanik*. VEB G. Fischer, Jena 1981. 494 p., 194 figs., 32. tab. Hard cover. M. 35.-.

In the series of compendiums intended for use in university teaching in the DDR the *Kompendium der Botanik* is a welcome addition to the *Kompendium der allgemeine Biologie* (reviewed by LINSKENS in *Acta Bot. Neerl.* 26, p. 365). In a clear and concise style an adequate and up to date survey is given of plant morphology (JACOB), taxonomy and reproduction (Jäger), metabolism (OHMANN) and physiology of development and movements (JACOB). Genetics and ecology are excluded because these topics are reserved for forthcoming volumes of the series of compendiums; plant geography and paleobotany are not treated either.

The book is intended as a text book for university courses, and as reference work and it will serve both purposes very well. According to a publisher's note it is also intended for self-study, but a student who wants to use the book unaided will have to know already a good deal not only of physics and chemistry, but of different branches of botany as well, as many technical terms are used in the text which are explained only in subsequent chapters or not at all. A manual will suit him better than a compendium, a name meaning "abridgement, summary, abstract".

On the whole the different parts, written by different authors, are well integrated. I would suggest a few more cross references, e.g. on p. 52 where the constant chromosome number of every plant species is mentioned, a reference to the genome mutations (p. 160); on p. 157, where the unlimited fertility among individuals is mentioned as a characteristic of a species, a reference to incompatibility within the species (p. 412).

In subsequent editions in chapter 7.10 "long distance transport of organic molecules" mention could be considered of the origin of the water needed for that transport through the phloem, derived in the source of the organic matter from the xylem, and, after removal of the organic matter in the sinks, returning to the xylem, adding to the transpiration stream, thus allowing some transport of solutes through the xylem when no transpiration is possible (not mentioned in section 7.8.4.3. "Guttation and root pressure").

The printing is clear and attractive, the price moderate; as a compendium, a repertorium of a course in botany, it can be strongly recommended.

H. P. BOTTÉLIER

D. N. SEN and K. S. RAJPUROHIT (Eds.): *Contributions to the ecology of halophytes*. Series: Tasks for Vegetation Science Vol. 2. Dr. W. Junk Publishers, The Hague 1982. Cloth, 272 p., 71 figs., 17 plates, 70 tables. Df 165.-, approx. US \$ 69.50.

Contributions to the ecology of halophytes, well edited by Sen and Rajpurohit, is the second book in the series "Tasks for Vegetation Science" and its content justifies the aim: to update ones interest and knowledge in this field by a compilative treatise of well chosen subjects. The 14 chapters by twenty authors, most of them well known in the field, range from a phytogeographical survey of mangrove communities, case studies and vegetation classifications of selected areas, notably in India, Egypt and Australia, down to the physiology and ultrastructure of salt tolerance phenomena. Some (potential) uses are discussed. A list of over 800 plant species enables a quick inspection and comparison.

Mangrove and chenopods are among the most widespread halophytes and they equally dominate the chapters in part I on saline ecosystems and part II on ecophysiological studies in the various adaptation phenomena. The reader will be impressed by the great number of unknown or poorly understood mechanisms, meanwhile being informed about those fundamentals as halophyte germination and senescence or the fine mechanisms of salt secretion in *Atriplex*, the physiology of which is covered in some detail: C₄-efficient photosynthesis and a high proline content of the cells, probably the protecting osmoticum.

Though some mention is made of ecotypic differentiation in salt tolerance characters, a genetical or evolutionary approach of the adaptation to saline habitats would have been most welcome. However, there remains an interesting and stimulating bouquet of contributions, which can be recommended to the reader in search and research of the halophyte problem, both in science and application.

W. JOENJE

R. C. ROMANS (editor) *Geobotany II*. Plenum Press, New York and London 1981. 263 pp., 104 figs., 5 tables, \$ 47.40.

Geobotany II is, like its predecessor, *Geobotany I*, the reflexion of 14 papers read during a conference at the Bowling Green State University in Ohio, USA in 1980. Again the book carries a, for European readers, misleading title, as only one paper (on salt marshes, Massachusetts from the hand of Dexter), deals exclusively with present flora and vegetation. All the other papers have been placed in a palaeobotanical context. However, the emphasis has, compared with *Geobotany I*, shifted. In *Geobotany I* 10 out of 16 papers dealt with classical palaeobotany. This time this is so for only 5 out of 14 papers. The emphasis is clearly in the palaeo-ecology and palaeobotany of the more recent period of earth history. The book illustrates clearly the highly interdisciplinary character of present day Palaeobotany and Palynology: Migrational phenonema are discussed by Stuckey and Denny on the basis of the present day distribution of fen and bog taxa; Bailey and Ahearn reconstruct migration routes for *Pinus strobus* and *Fagus grandifolia* from palynological data, whereas Terasmae traces the pathway of *Picea* in relation to glacial geomorphology. Cotter and Crowl

in their paper draw palaeo-ecological conclusions from pollen and pigments, Kremer and Spackman from the lithology (peat petrology!) of profiles in the Everglades and Merry reports on a buried *Picea glauca* forest 10,000 years ago.

Perhaps the most interesting paper is from the hands of the Delcourts, presenting vegetational formation maps of the eastern U.S. 40,000 B.P. – Present, based upon published pollen diagrams and surface samples from the north American continent: an ambitious enterprise for which the available space is greatly insufficient. Isopol maps as the necessary link between surface samples and pollen diagrams are not included, but I hope that the authors will present sometime their results more completely documented. The more classical palaeobotanical papers deal with the ecology of xeromorphic conifers from the Cretaceous (Garland and Doyle), the structure and phytogeography of silicified wood from the Tertiary (Blackwell et al.) and the morphology of cupula of early Angiosperms (Matten and Lacey). The book, produced by off-set, concludes with 3 short abstracts and a subject index.

C. R. JANSSEN

L. BENSON: *The Cacti of the United States and Canada*. Stanford University Press, Stanford, 1982. XII + 1044 pp., 947 figs., 194 col. pl., numerous distr. maps and tables. US \$ 85.–. ISBN 0-8047-0863-0.

A book of 1044 pages on the Cactaceae of the United States and Canada should be a special book and that's what it is indeed! The author has studied Cactaceae for about 50 years and was able to bring together in this monumental work an enormous amount of data well worth to be studied by amateur horticulturists as well as by professional botanists. The information to be found in this book is far more than one would expect from its title. It is only on p. 251 that the descriptions of the genera and species and the identifying keys start. The foregoing part is dedicated to the history of Cactaceae-research; the structure of the plants, flowers, seeds and pollen; physiology and classification. A very detailed chapter deals with the floristic associations of North America ending with a specified list of species of Cactaceae and where these can be found. The use man makes of this plant family is described as well as the problems related to the conservation of these more or less threatened plants. On p. 106–108 data to be noted in collecting herbarium specimens are thoroughly explained. It struck me that information on the size of plants, colour of flowers and/or fruits, characteristics liable to be lost in drying, are not mentioned at all.

The extensive treatment of genera and species may be to the judgment of many readers somewhat conservative. Many "new" genera, principally based on species of *Opuntia* and *Cereus*, are not recognized here, because the author believes that scientific research on the validity of these "genera" is still far from complete.

The book is very richly illustrated with many fine drawings, distribution maps and hundreds of monochrome and colour pictures. I believe that a number of black and white pictures could have been omitted as their quality (old ones?) is not always up to the standard of this book.

Of course in a work like this bibliography on the subject cannot be omitted. With the exception of some standard works like Backeberg, Berger, Borg and Schumann and a few articles from, for instance, *Cactus and Succulent Journal of Gt. Britain* and *Sukkulantenkunde* all the items are from American origin. Should so little be published on American Cactaceae outside the U.S.? Our Dutch periodical "Succulenta" fails completely. I noted some incorrect citations in this reference list, so *Desert; Des. Pl. Life; Des. Pl. Life and Desert Pl. Life* is of course the same periodical and in close succession *Gentes Herbarium* and *Gentes Herb.* is a slovenliness.

In a special section "Documentation" the nomenclature and distribution of every taxon is treated extensively. It is a pity that in many instances the authors' names used in this section are not in accordance with those in the systematic part of the book! See for instance *Opuntia* nr. 8; *Echinocereus* nr. 4 and there are more to be mentioned.

In spite of these minor deficiencies the author should be complimented with the appearance of this valuable book.

E. A. MENNEGA

JOB KUIJT: *A Flora of Waterton Lakes National Park*. The University of Alberta Press, Edmonton, Canada, 1982, xxiv + 684 p., 156 figs., 8 colour pls. Price \$ 25.00 (hardcover), ISBN 0-88864-065-X, or \$ 15.00 (paperback), ISBN 0-88864-076-5.

While in some European countries there have been available for a long time manuals of local flora, as for instance the British county floras, such works have been scanty in North America despite evident interest in the flora. The need for such manuals is particularly evident in the ecologically much diversified and botanically very rich Rocky Mountains, where a chain of large national parks is found: Rocky Mountain Nat. Park, Grand Tetons and Glacier in the USA and, further north, Waterton Lakes, Banff and Jasper in Canada. Situated at the border with the USA and of a size about ten times the Dutch National Park "Hooge Veluwe", Waterton Lakes is may be less well known as Banff and Jasper, lacks glaciers and has peaks not exceeding 3000 m in altitude, but has a much diversified flora totalling about 1000 species of vascular plants. The area includes different kinds of prairies, woodlands and alpine vegetations and is a meeting place for plants with more western or eastern North American distributions. Genera rich in species are *Carex* (70 spp), *Erigeron* (17 spp) and *Arnica* (14 spp) and there are of course the characteristic North American *Mimulus*, *Penstemon* and *Castilleja*, each with several species, and various handsome meadow-inhabiting Liliaceae such as *Calochortus*, *Camassia*, *Lilium philadelphicum* and *Zygadenus*. The European botanist would, however, be most familiar with the flora of the alpine regions where circumboreal species such as *Antennaria alpina*, *Astragalus alpinus*, *Dryas octopetala*, *Oxyria digyna*, *Poa alpina* and *Silene acaulis* abound. The Flora of Waterton Lakes provides keys to all families, genera and species as well as short descriptions and line drawings (prepared by the author himself) for almost every species. Technicalities in terminology are usually avoided and taxa are treated in an alphabetical rather than phylogenetic sequence, to facilitate easy access for the beginner. The editing is plain and attractive and leaves little to be desired, except may be for a running head for families. A minor flaw is the fact that altitudes are given in meters in the text but in feet on the maps. Furthermore, I find the introductory section concerning the physical setting and vegetation of the park disappointingly superficial and scetchy considering the evident knowledge the author has built up of plant life of the area. The line drawings are a particularly welcome feature as illustrations are lacking in most works thus far available for the region (PORSILD & LID's Rocky Mountain Wild Flowers and WEBER's Rocky Mountain Flora do provide them, but the former is essentially a picture book for the more common plants while Weber's book deals with the southern Rockies, Colorado, only).

The Dutch-born author is a professor of botany at the University of Lethbridge, Alberta, and a leading authority on the biology of parasitic flowering plants. His Flora of Waterton Lakes deals, so to speak, with the plants of his backyard. The volume is handsomely produced and shall no doubt become a popular and indispensable tool for those interested in the flora of this beautiful section of the Rocky Mountains.

S. R. GRADSTEIN

M. JACOBS: *Het Tropisch Regenwoud, een eerste kennismaking*. Dick Coutinho BV, Muiderberg, 1981, 318 p., many figs. Price f 48.50. ISBN 90-6283-539-2.

Among the ecosystems of our planet tropical rainforests are generally considered the most diverse and complex but their persistence has become alarmingly endangered by human interference. Land deforestation is currently calculated to take place at a speed of four to six times the surface of the Netherlands per annum, which would lead to extinction of the rainforest within the next fifty years. Concern is growing as to the need of conserving at least portions of the vanishing forest and increased scientific activity focusing on this unique ecosystem is noted. To the classical, recently reprinted scientific standard work on the tropical rainforest by Richards (1952) at least four important texts have now been added, by WHITMORE (1975), HALLÉ, OLDEMAN & TOMLINSON (1978), LONGMAN & JENIK (1974) and the voluminous "state of knowledge report" by UNESCO (1978).

"Het Tropische Regenwoud" by Dr. Jacobs, staff botanist at the Rijksherbarium, Leiden, is spe-

cifically written for Dutch readers and provides an introduction on the subject based on lectures at the University of Leiden. Although the frontispiece shows a Brazilian rainforest as seen by Martius in 1819, the text deals primarily with rainforests of the far East, the area with which the author is most familiar. Generalities concerning the forest, however, are relevant to other tropical regions as well. The tropical rainforest is defined as comprising the primary forests of the tropics below 1000 m; mountain forests are thus largely left out of consideration.

The book contains 16 chapters, each subdivided into short paragraphs of 1–3 pages to facilitate easy reading. The main subjects dealt with are: a. species diversity and life forms, b. ecology, climate and soil, c. forest dynamics and succession, d. plant-animal relationships, e. evolution and speciation of the rain forest inhabitants, f. the significance of the rain forest, and criteria for conservation, g. exploitation, protection and the role of the man.

Besides being an authority on Malesian botany, Dr. Jacobs is a very gifted writer. His writing is never dull, often polemic and sometimes philosophical. His appreciation for the more descriptive, qualitative approaches to the study of nature is apparent. Specialists would no doubt point at certain shortcomings of his review, such as the rather superficial treatment of ecological processes such as waterbalance, nutrient cycles, energy flux etc., the neglect of the cryptogamic and certain portions of the faunal diversity of the forest, and the incomplete citations for Africa and tropical America. The latter may have led the author to refer important Dutch research results concerning the geological history of tropical forests to an Australian reviewer (p. 174). The statement that it is generally agreed that plant life (or does the author mean Angiosperms?) has originated in the Tropics (p. 173) is certainly incorrect. So called "ant gardens", a striking plant-animal feature of the Amazonian rainforest described by Ule and others, are not mentioned.

Notwithstanding such flaws, Dr. Jacob's book is a very welcome addition to the literature on the tropical rainforest and should prove an indispensable source of information for those interested in the subject. The attractive format, numerous illustrations and reasonable price should allow the book to find its way to a broad public, hopefully also including non-biologists.

S. R. GRADSTEIN

Focko WEBERLING: *Morphologie der Blüten und der Blütenstände*. Verlag Eugen Ulmer, Stuttgart, 1981, 392 pages, 193 figs. Price: DM 108.–.

Especially German botanists have contributed so much to our knowledge of plant morphology. GOETHE, EICHLER, GOEBEL and TROLL belong to the best known representatives of this discipline. Nowadays plant morphology is still actively pursued at German universities. However, nowhere else morphology has been so much affected by a typological approach and a dogmatic use of terminology.

This new text book by Focko WEBERLING, a scholar and protagonist of W. TROLL, clearly reflects the German tradition. Of the almost 900 references 70% are in German, and only 25% are Anglo-Saxon ones. About half of the figures are fully or partly borrowed from Troll. The number of figures adapted from non-German workers is negligible. The well-known books of FOSTER & GIFFORD (1959, 1974) and STEBBINS (1974) are not even mentioned. Only two papers of the extensive work of TUCKER are referred to, of those of BAILEY not one. Also the work of French morphologists, such as CHADEFAUD, EMBERGER, LEROY and NOZERAN, is not cited. It is, therefore, amusing that one of TROLL's most important works "Vergleichende Morphologie der höheren Pflanzen" (1937–1939), although mentioned in the text, is not inserted in the references.

Although they are not altogether neglected, very little attention has been paid to opponents of the idealistic morphology. In the explanation of the peltate leaves, ROTH's (1952) histogenetic study, which does not agree with the interpretations presented here, is missing. Even the rather far-fetched "diplophyllous" interpretation of the anther (according to Baum-Leinfellner) is mentioned without criticism. CORNER (1946), whose paper on the centrifugal androecium inspired so much new research, is given but little credit in the chapter on polyandry. No justification is given why the ontogeny of the microsporangium is described in detail, and no attention has been paid to the structure of the ovule.

The use of the SEM has considerably advanced flower morphology in the last decade. It enables

good 3-dimensional views of especially younger developmental stages, whereas in the past we depended mainly on reconstructions based on slides, what in the case of oblique sections can easily lead to misinterpretations. It is a pity that Weberling included only one plate for SEM photographs.

The book is divided into three sections. The first and largest deals with the structure and development of the flower and its subordinate parts. In the second section the different types of inflorescences are discussed. In the relatively short, final section the functions of the flower in pollination and dispersal are touched upon. Many special phenomena and structures, such as anther fusion, hypogyny, pseudomonometry, epiphylls, cauliflory, nectaries, staminodes etc. are discussed.

Although the book seems to be written for a mainly German public, and in spite of the above-mentioned criticism, it represents an advanced text book and has no recent counterpart. It gives a thorough recapitulation of the extensive, especially German, post-war literature and contains a wealth of excellent figures. This book is strongly recommended to all students of plant morphology and systematics.

F. BOUMAN

N. C. W. BEADLE: *The Vegetation of Australia. The Evolution of the Vascular Flora by Description of the Modern Plant Communities*. Vegetationsmonographien der einzelnen Grossräume, Band 4. Gustav Fischer Verlag. Stuttgart – New York. 1981. XXVIII, 690 p. DM 189,-.

Noel Beadle's book fills a very big gap in the literature. It contains a compilation of existing literature on the vegetation of Australia, much of which is not easily accessible or even known to exist in other countries. Since Beadle for a long time has been one of the major authors in this field, and the book could not have been written without extensive original research in many parts of Australia (carried out especially for this purpose), it shows a homogeneous approach throughout. All major areas of this huge, in the eyes of the superficial traveller often monotonous, but really varied country, have been covered for the first time in an equilibrated way. There will not be many interested botanists, ecologists or geographers, for which it is not full of surprises. An important advantage is, that the author is also a taxonomist and author of various floras, and has fitted out all vegetation units with species lists, which are one of the major assets of the book to make it really useful.

The book opens with chapters on "The Australian Environment" (topography, climate, soils etc.), "The Flora" (with a taxonomical, phytogeographical as well as ecological approach), "Origins of the Flora", "Development of the Modern Flora" and "The Flora of the Arid Zone". The major part on the plant communities starts with an introduction on classification, ecological factors and distribution. The headings of these chapters are partly structural (e.g. rainforests, natural grasslands and savannahs), taxonomic-geographic (e.g. Eucalyptus communities of the tropics, Eucalyptus forests and woodlands of the South-West) or ecologic (e.g. Halophytic Shrublands, Communities of the Littoral Zone).

In the Australian classification, the terms "Alliance" and "Association" are used for relatively large units, characterised by dominants or codominants in the highest layer. This principle is very unsatisfactory where there are no such dominant species, e.g. in rainforests, sedgelands and heaths. It is confusing for users of the Braun-Blanquet classification, based on fidelity. Even more confusing is the way in which the units are used. After reading a number of descriptions, it becomes gradually clear that the alliance is not really a plant community, characterised by a certain structure, floristic composition etc., but an area of land, dominated by one or more prominent species of the original vegetation. Because of this, the text reads like a description of mapping units of a reconnaissance survey – alas without an adequate map.

There are many places where the book is weak in ecological interpretation (e.g. underestimation of the role of fires and of the effects of competition between plant species), the recognition of special types of biologically important environments (e.g. tide marks along the coast, rock crevices, brackish zones) and comparisons with other parts of the world (e.g. the occurrence of blanket bogs in Tasmania). The treatment of the ecological and successional background of heath and swamp communities along the eastern coasts is very unsatisfactory indeed.

Minor irritations are to be found in the use of language (e.g. in the confusion of taxonomic singulars and plurals), misspelling or errors in the names (e.g. *Phytophthora infestans* instead of *P. cinnamomi*), and the fact that certain references are missing in the list. Despite the good quality of the paper, most of the photographs are poor (black and white prints of colour slides?) and it would have been nice to know the name of the person who has posed for so many of them. There is a good index, and the price of the book is normal by present standards.

H. DOING

O. L. LANGE, P. S. NOBEL, C. B. OSMOND & H. ZIEGLER (Ed.): *Encyclopedia of Plant Physiology. New Series Vol. 12A. Physiological Plant Ecology I*. Springer Verlag Berlin Heidelberg New York, 1981, 625 pp., 109 figs., 40 tables. Cloth, DM 239,- c. US\$ 101.70,- ISBN 3-540-10763-0.

At the presentation of a volume "Ecological Plant Physiology" one may raise the question what the particular objectives are of ecophysiology in comparison with plant physiology s.s. In an introductory chapter the editors mention as special problem and special challenge the search to link the knowledge of general plant life functions with ecology. This knowledge is available and can be completed by observations on any scale and organisation level but the relevance with regard to the plant maintaining itself in a community for long periods of time is hardly to evaluate.

Two main items have to be dealt with: the limits of tolerance in any most threatened life phase; the performance within the limits of tolerance under fluctuating environmental conditions.

Since individual representatives of a species may respond rather differently to environmental conditions the analysis should concern appropriate physiological-genetic entities.

The present volume (12A) deals with the responses to radiation and temperature in both terrestrial and aquatic environments. Besides there are chapters on wind and fire effects. The last chapter "Soil environment" appears as a link to the next volume.

The first chapter deals with theory and application of methods to predict environmental conditions at the plant level (microclimate) from climatic data that are more generally available. Its contents are prerequisite knowledge for any ecologist. It demonstrates how far this discipline has been developed already. As a matter of fact these studies have proceeded much further than present-day knowledge of physiological responses.

By reading the subsequent chapters this conclusion seems rather remarkable since a wealth of data on the response of plants to light and temperature both in terms of tolerance and performance have been presented. Outstanding experts have surveyed existing knowledge and insights comprehensively and perspicuously. They have done a very good job and their product will appear a great help indispensable for any one working in the field of ecophysiology.

However, in spite of the research that has been done already and thanks to the excellent discussion of achievement up to now great gaps in our knowledge are apparent. In the first place very little is known of the response of plants in frequently changing conditions. It is clear enough that the feed-back between laboratory and field is rather poor and this holds not only with regard to the complexity of the environment in space and time.

The value of this volume gains from an outlook into the future that is given in some chapters, in others, however, the absence of such an outlook may be regretted.

R. BROUWER