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BOOK REVIEWS

O. L. LANGE, P. S. NOBEL, C. B. OSMOND and H. ZIEGLER (Ed.): *Physiological Plant Ecology III. Encyclopedia of Plant Physiology. New Series 12C.* Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1983. xi + 799 p., 104 figs. DM 298.–, c. US $ 128.50. ISBN 3-540-10907-2.

The central theme of the first three volumes of physiological plant ecology deals with discussions on plant responses to their environment. In the present issue the first 8 chapters are dealing with the chemical environment. the introductory chapters (1 and 2) on the physiology of plant ionic relations and on osmoregulation provide a necessary basis for the next chapters. The topics treated are halophytism (ch. 3 and 4), nitrogen nutrition (ch. 5 and 8), pH (ch. 6) and plant responses to metals (ch. 7). As usual (volumes I and II) the editors have succeeded in getting together outstanding scientists who are presenting their topics in such a way that they are accessible for a broad public and still interesting for insiders.

The second part (ch. 9–18) deals with the biotic environment. A large scala of subjects from mycorrhizal symbioses to zoophilic pollination passes in review. All of them are well-written and are very suited for a fast orientation in the topics whereas the extensive lists of references provide a basis for more penetrating studies.

The usefulness of the present issue is accentuated by the well defined personal views of the authors both on the work done so far and on future research items.

R. BROUWER

O. L. LANGE, P. S. NOBEL, C. B. OSMOND, H. ZIEGLER: *Physiological Plant Ecology IV. Encyclopedia of Plant Physiology NS. 12 D.* Springer Verlag, Berlin, Heidelberg, New York, Tokyo 1983. xi + 644 pp., 61 figs. Cloth, DM 290.–; c. $ 112.60. ISBN 3-540-10908-0.

Reviewing the series of Physiological Plant Ecology I-IV had given me the opportunity to follow the gradual development from presentation of responses of plant processes, through the responses of whole plants to the responses of more complex systems as agricultural monocultures, mixed cropping and ultimately ecosystems.

The first parts (I, II and the first chapters of III) are providing an immense quantity of basic information nicely presented and well documented.

One wonders how and by whom this detailed knowledge can be put together to a synthesis of a much higher level of organisation. This has been attempted in this issue by a number of distinguished scientists and with obvious success. Two ways have been followed.

In most of the chapters the meaning of various well-known responses for a qualitative explanation of the functioning of a number of ecosystems has been discussed at large. As expected in al cases existing knowledge appears to be too scarce and valuable suggestions for future research are presented. At the same time almost all these chapters conclude with indicating the great need for more quantitative models. these demands have been met in a number of chapters (ch. 4, 5, 6, 7 and 8) dealing mainly with growth and productivity. Reading these chapters reveals that notwithstanding existing gaps quantitative models are most helpful in defining the state of knowledge of the subject and in providing a link between scientists in a particular field.

From the above it is quite clear that the whole series should be available at all institutions with scientists working somewhere in the field of ecophysiology mainly since all items treated are intensively interconnected in the intact plant and at any higher organisational level. Besides the series provides well presented material which will interest many scientists and teachers in related disciplines in botany.

R. BROUWER

W. WERNER: *Untersuchungen zum Stickstoffhaushalt einiger Pflanzenbestände. Scripta geobotanica* 16. Verlag Erich Goltze KG, Göttingen 1983. vi + 90 pp., 47 figs., 32 tables. DM 24.–.

The main purpose of Werner's investigation (supported by the DFG) was to quantify the internal distribution and redistribution of nitrogen in different stands of perennial plant species. This work has been thoroughly carried out for stands of *Solidago canadensis, Epilobium angustifolium, Calamagrostis epigejos, Brachypodium pinnatum,* and *Molinia caerulea.* Harvests from field stands and experimental populations in 1977 and 1978 yielded a fairly complete picture of net primary production and nitrogen economy in different stages of the life cycle. Werner presents a set of well-ordered and well-documented flow diagrams quantifying the use and re-use of nitrogen. The calculated "nitrogen utility index" (NPP/absorbed N) and the estimated contribution of accumulated N to growth are very informative. Up to fifty percent of the overall amount of N used for growth originates from internal redistribution.

Werner succeeded in quantifying the intended parameters, but there the matter rests. He failed to evaluate his results in an ecological context. Utilization of a substantial amount of available population ecological and ecophysiological literature would have increased the ecological meaning of this study.

J. VAN ANDEL

H. O. MARTENSEN, A. PEDERSEN und H. E. WEBER: *Atlas der Brombeeren von Dänemark, Schleswig-Holstein und dem benachbarten Niedersachsen* (Gattung Rubus L., Sektionen Rubus und Corylifolii). Forschungen und Berichte zur Naturschutz und Landschaftspflege, Beiheft 5. Niedersächsisches Landesverwaltungsamt – Fachbehörde für Naturschutz –, Richard Wagnerstrasse 22, D 3300 Hannover 1. 1983. 150 pp., 8 figs., 123 distribution maps. DM 15.– + forwarding charges.

Brambles are an important part of the flora of north-western Europa which probably is a centre of speciation in the sections Rubus and Corylifolii of this genus. Therefore, this atlas is a valuable contribution to our knowledge of this group. The authors are experienced batologists with a sound knowledge of the region, comprising the whole of Denmark (incl. the isle of Bornholm) and the northern part of the German Federal Republic, south to the line Varel-Zeven-Buchholz-Winsen. The distribution maps are based on a grid of squares of ± 2.75 km; the coverage is in the German part nearly 100%, in the Danish part somewhat lower. The data are based on observations in the field and herbarium material; literature data without herbarium material are left out of consideration.

All mentioned species are polyploid apomicts, partly old taxa dating from before the glacial period. They are restricted to species with an area diameter of at least 50 km. Section Rubus comprises 78 species (incl. 5 escaped from cultivation), section Corylifolii 37. Most species reach in the region their northern and eastern limits. Schlewig-Holstein is by far the richest part of the region.

Many species have disjunct areas, possibly due to dispersal by migratory birds, traffic and as a contamination of plant material from nurseries. Most species have a large ecological amplitude, but 8 are characteristic for poor and 19 for rich soils. The large majority prefers ± sunny habitats, but a few prefer woods, especially in the northern and eastern part of the region. In order to maintain the Rubus flora, destruction of hedges and coppices, replacement of hardwood by softwood forests and use of herbicides should be avoided, especially at type localities of species.

It is to be hoped that this atlas will be followed by others dealing with further parts of north-western Europe.

F. M. MULLER

M. LIEBERMAN (Editor): *Post-harvest physiology and crop preservation.* Plenum Press, New York and London 1983. Nato advanced study institutes series A: Life Sciences vol. 46. xxii + 572 p., 113 figs., 107 tables. Cloth, US $ 81.– (US and Canada $ 67.50).

This book contains the Proceedings of the NATO Advanced Study Institute on Post-Harvest Physiology and Crop Preservation, held at Sounion, Greece, May, 1981. The twenty-five chapters represent a broad-spectrum view of current basic and practical information of importance to post-harvest technology and crop preservation. The text contains a wealth of information, specially about post-harvest physiology and food crop preservation. Also information is supplied on post-harvest physiology of cut flowers. Two chapters refer to post-harvast physiology of seeds (chapter 7) and tulip bulbs (chapter 8) as related to quality and germinability.

The first six chapters of the text are dealing with general information about biochemistry and physiology of senescence. Special attention is paid to ribonucleic acid and enzyme synthesis, respiration and energy metabolism, changes in membrane lipids and hormonal regulation of senescing plant tissue.

In the chapters seven to nine characteristics of senescence in special crops are treated. Some pathological aspects of post-harvest, including aspects of mycotoxins, stress metabolites and control of post-harvest diseases, are reviewed in the chapters ten to fourteen.

The chapters fifteen to twenty two are dealing with manipulation of pre- and post-harvest environment to influence quality. Pre- and post-harvest treatments with growth- and bioregulators are discussed, as well as manipulations of the post-harvest atmosphere. There is also a chapter about heat transfer and water loss under hypobaric conditions. The chapters twenty three and twenty four concern the economic aspects of post-harvest losses in the developing world. The last chapter provides some broad considerations about utilization of agricultural wastes.

This book is rather heterogeneous with regard to the choice of subjects. It deals with papers varying from post-harvest physiology to economic problems of the developing countries. Although the papers show great difference in style and approach of the matters, the book as a whole is a useful reference source for research workers engaged in this field.

K. J. HARTMANS

R. M. TRYON and A. F. TRYON: *Ferns and allied plants, with special reference to tropical America.* Springer Verlag, New York, Heidelberg, Berlin 1982. xxi + 857 p., 2028 figs. Cloth DM 428.–, c. US $ 171.20. ISBN 0-387-90672-X.

This voluminous and beautifully illustrated book is the best compilation of old and recently collected data on neotropical ferns, presenting an enormous amount of interesting information for both fern-growers and pteridologists. Although the title refers to all ferns and allies, the subtitle is a mere understatement. The book comprises a short general introduction and detailed treatments of families and American genera, including keys, full synonymy, comments on the systematics, and references to recent literature. Moreover, comments on the phylogenetic relationships of the families, and generic information on the spores, ecology, biogeography, and, as much as possible, fossil records are given. The key to the families has the disadvantage that the families can only be keyed out once, rendering the usage of often microscopic characters and making the key items complex. Geographical distributions are presented by dots in the countries or their major subdivisions. Solid liners circumscribing the distribution areas, however, would be less confusing. According to the authors this book provides a modern classification of the Pteridophyta. This is true considering the incorporated data, e.g. the extensive treatments of spore morphology together with the numerous beautiful SEM micrographs. It does not, however, describe the methodology used. The statement (p. 1): "...genera are neither... derived from, or... ancestral to another genus." is consistent with modern evolutionary theory, whereas the next statement "...the direct evidence for the course of evolution has been lost through extinction" is a tautology if interpreted on the level of individuals,

and is theoretically incorrect if based on the idea that the fossil record is incomplete. The section on Biogeography in the Introduction suggests only classic and unfalsifiable solutions to problems of historical phytogeography. Suggestions for alternative explanations are lacking. The advanced conditions regarding the spore structures (the criteria for their recognition remain unknown) are not consistently used for the classification and the possible phylogenetic relations proposed. Moreover, the authors find that differences are just as informative in rejecting possible relationships as similarities are informative in corroborating relationships. For example (p. 663), it is mentioned that the Blechnaceae show a number of similarities shared with the Aspleniaceae indicating a close relationship (if compared to other families?). But, "in other characters the families are perhaps not closely allied". If these characters describe different states in these two families, this comment is senseless unless the conditions found in one of them are similar to the conditions found in other families and then postulated to represent shared derived character states. The authors often state that an extant taxon is primitive or advanced. It is only possible, however, to say that a taxon has a certain number of its characters in the (relatively) primitive or advanced condition when compared to other taxa. The pretence of providing a modern classification seems too far-fetched, since this book presents the results of a classical and vague interpretation of a selection of available data. Within present-day systematics there is a change of attitude from stressing results towards stressing the methodology used, since the former depends upon the latter. In other words, taxonomists should give the complete data set used and then give all possibilities resulting from the strict application of the chosen methodology. Then an ultimate choice can be made based on personal intuition using biological inferences and other available data. This has not been done here. The authors have presented the results without explaining how they were obtained. Whether one agrees or not with the results, it is impossible to follow their reasoning and to reconstruct their classifying criteria. All in all, this book is a good but expensive flora-like survey of the Neotropical ferns, useful for everyone interested in and/or working on ferns, but it is not a modern systematic treatment.

M. C. Roos

H. Walter und S.-W. Breckle: Ökologie der Erde, Band 1: Ökologische Grundlagen in globaler Sicht. UTB grosse Reihe. Gustav Fischer Verlag Stuttgart 1983. viii + 238 p., 132 figs., 24 tables. Cloth DM 44.–. ISBN 3-20297-9.

This book is a revision of Walters "Vegetation der Erde" (I, 1962; II, 1968) and "Die Ökologische Systeme der Kontinente (Biogeosphäre) (1976). It is the first of a series of three, named "Ökologie der Erde", in which still will appear volume 2 on the tropical and subtropical zones and volume 3 on the temperate and arctic zones. This work concludes over 60 years ecological research by Walter; for Siegmar-Breckle it is the beginning of a compilation and synthetic work.

The contents of the book reflects its title very well. Indeed it is a global approach to ecological principles and also somewhat one-sided. After a short introduction, the following topics are dealt with: the Geo-Biosphere in the past, its present ecological division, characteristics of terrestrial ecosystems, water and temperature as vital ecological factors, competion, succession-climax-zonal vegetation, assimilation and primairy production in humid and arid zones, the "Gesetz der relativen Standortkonstanz" and finally Venezuela as an example of a vegetation-mozaic in the tropics. A reference list with about 400 titles and a subject index conclude the book.

Many remarks could be made, of course. An esstential chapter on chemical factors is lacking. The discussion of the Braun-Blanquet Approach is not relevant in this book, but moreover it turns out that both authors do not completely understand this method of vegetation research. Also the sequence of the chapters could be improved. Chapter 10 on Venezuela should belong to volume 2.

However, the lay-out of the book is excellent. It is clearly written and it contains a large number of clear figures. Also because of the moderate price the book should be within hand-reach of all teachers in ecology.

F. J. A. Daniels

H. METZNER (Ed.): *Photosynthesis and Plant Productivity.* Joint meeting of O.E.C.D. and Studienzentrum Weikersheim, Ettlingen, October 11–14, 1981. Wissenschaftliche Verlagsgesellschaft mbH. Stuttgart 1983. x + 340 p., 142 figs., 60 tab. Paperback DM 32.–.

At the end of 1978 the OECD set up and financed a "Cooperative Project on Food Production and Preservation" designed to answer future problems of world food shortage and depletion of conventional energy sources. The project was partly devoted to "Improvement of the Efficiency of Photosynthesis for better Use of Solar Energy". In this project were 20 themes to which laboratories in 13 European countries, Canada and the USA contributed. It was recommended to emphasize environment effects on wheat and maize; seeds of special cultivars being at the disposal of the participants. The results of 2 years work were presented and discussed at a Conference in Ettlingen, Germany, 11–14 October 1981 and are gathered together in this paperback.

After a general introduction about "Biological Solar Energy Conversion", "Photosynthesis and Crop Productivity" and "Energy from Biomass – possibilities and constraints" summaries of the poster presentation are given. These include field experiments, studies on whole plants, studies on plant organs and experiments at cellular and subcellular level. Many different problems are dealt with within the complex OECD-program with as a binding factor that 28 of the 52 described experiments used the prescribed cultivars of wheat and maize. The multitude of treated subjects may deter the reader, as it also deterred the potential participants, as one of the summarizing coordinators of the project complains. On the other hand the need to design conditions to better mutual understanding is stressed.

It is difficult to review this paperback, because of the diversity in the treated subjects. Some subjects treated are photosynthesis, dark and light respiration, translocation and matter distribution, growth and development, chemical composition (reserves, proteins/enzymes), regulation, as influenced by irradiance, temperature, irrigation, ionic deficiency (especially for nitrate and phosphorus), hormones, herbicides on several levels of integration. Still for those interested in photosynthesis and plant productivity, especially for wheat and maize, this paperback contains much interesting information from the level of the crop down to the cell organel.

G. A. PIETERS

J. HEIMANS, TH. C. TH. VETHAAK and V. WESTHOFF: *Naamlijst van de Nederlandse Plantesoorten.* Koninklijke Nederlandse Natuurhistorische Vereniging, Hoogwoud, 1983. Wetenschappelijke mededeling nr. 161. 91 pp., 10 ill., D*f* 12.50. (Address: Hoogenboomlaan 24, 1718 BJ Hoogwoud.) (Te bestellen door overmaken van het bedrag op girorekening 13028 t.n.v. Bureau K.N.N.V., Hoogwoud. Prijs voor leden K.N.N.V.: *f* 10.–).

In 1967 the authors of the three Dutch floras decided to change c. 250 Dutch names of plants which were native or established in The Netherlands. Contrary to the preceding meeting leading to a list of Dutch names (1906), the 1967 meeting was not initiated by one of the Dutch botanical or biological societies. The introduction of the new names in edition 15 of Heukels-Van Ooststroom's Flora van Nederland (1970) had been felt as a shock by many florists in this country since it also forced the authors of the widely sold book series "Wilde Planten" to use these new names. With the present publication the reasons behind the changing of the names become public for the first time. Unaware of the coming publication the new group of authors of edition 20 of the "Heukels"-flora (1983) again changed some 50 Dutch names – unaware of the decisions of the 1967 meeting; the editors have accepted the new changes as appropriate. In view of the rather complicated history concerning the revision of Dutch plant names the editors are congratulated with the clear presentation of Latin and Dutch names in the present list. In 1983 a new flora appeared in the Dutch language, viz. the Dutch translation of the originally French "Nouvelle Flore" of Belgium and adjacent parts (including half of The Netherlands). The plant species themselves being mainly the same, one is

confronted with a surprisingly large number of differences both in Latin names (as well as species concepts) and in Dutch names of the plants. Therefore it has to be envisaged that different Dutch speaking botanists will use different Dutch names for the same plant species in the future. Perhaps this situation – so strongly reminiscent of the unfortunate instability of Latin names in botany – can be corrected by the preparation of a new (authoritative and abided-by-all) list of Dutch (including Flemish) plant names in the near future. The list will not bring the stability it intended to bring and undoubtedly will soon be succeeded by a new list. The great efforts of the editors deserve a better fate.

R. VAN DER MEIJDEN

P. F. M. COESEL: *De desmidiaceeën van Nederland – sieralgen – Deel 2. Fam. Closteriaceae.* Wetenschappelijke mededelingen K.N.N.V. nr. 157. Koninklijke Nederlandse Natuurhistorische Vereniging, Hoogwoud 1983. 49 p., 19 plates. f 7,50 (Address: Hoogenboomlaan 24, 1718 BJ Hoogwoud). (Te bestellen door overmaken van het bedrag op girorekening 13028 t.n.v. Bureau K.N.N.V., Hoogwoud. Prijs voor leden K.N.N.V.: f 6.–.)

The genus *Closterium* does not constitute the most spectacular part of the Desmids, a group so popular among taxonomists and ecologists. It does not possess the multitude of beautiful forms as we find in other extensive genera, and it is much less restricted to the specific position within the gradient of trophy, which makes Demids so favourite as an object for nature conservationists.

These very features, however, make the genus interesting for the connoisseur. The taxonomy is diffficult but challenging; and the figuring of its representatives also outside the narrow rank of an ecological gradient, with specific taxa in each section, makes them useful indicators for this gradient.

It is a good thing that Coesel gives attention to this interesting genus in the second part of his flora. In sanitary plans, drafted on behalf of the enforcement of the Law on the sanitation of waters the typology of aquatic habitats plays an important role and the genus *Closterium* may serve as a good help in characterizing these habitats.

Coesel's basic aims are justified in the previous part and my comments may be identical to what I said on that occasion. He does not give a critical taxonomical study, but restricts himself to the enumeration of the variations as he experiences them on drawings from Dutch material; he puts names to this, which he chiefly derives from RŮŽIČKA (1977). This is a legitimate procedure, but it only represents the more or less supported opinions of one person and we have to consider it as such. A certain number of boundaries I personally would draw in other places (e.g. *C. malinvernianum* as a separate species, *C. acutum* var. *variabile* as a variety of *C. limneticum*, no difference between *C. venus* and *C. incurvum*, etc.). But these opinions are as arbitrary as the authors's. At least his pronouncements represent those of a thorough researcher with much experience.

It seems to me, that the review of findings of the different forms neglects many available data, in this part as well as in the previous one. Also the use of the Dutch language is sometimes debatable. Conclusion: a useful little book on an important genus, of personal character, from which it derives its restrictions as well as its charm.

P. J. SCHROEVERS

W. JÜLICH: *Kleine Kryptogamenflora* Vol. II b/1: *Die Nichtblätterpilze, Gallertpilze und Bauchpilze*. Gustav Fischer Verlag, Stuttgart, New York 1984. 626 pp., 175 figs. on 15 plates. DM 88,–.

In 'Kleine Kryptogamenflora' vol. II b/2 (4th ed., 1978), Moser compiled the mushrooms of Europe and classified them in Polyporales, Agaricales, Boletales and Russulales, a 'modern' classification. Jülich, in this first edition of vol. II b/1, compiles the remaining European Basidiomycota, excluding the plant parasitic Uredinales (rusts), Ustilaginales (smuts) and Tilletiales (bunts). For practical reasons he accepts the polyphyletic groups Aphyllophorales, Heterobasidiomycetes and Gasteromycetes, but the usefulness of this classification may be questioned. A redistribution of the Aphyllophorales sensu lato would be more convenient, e.g. Thelephorales, Polyporales and especially Cantharellales. The latter has been clearly delimited by Jülich himself (1981, Higher taxa of Basidiomycetes) and comprises the Cantharellaceae, Clavariaceae, Hydnaceae (s. str.) and some additional families. The Heterobasidiomycetes in the present scheme are extremely polyphyletic. For example *Thanatephorus* with its unseptate basidia, classified by Jülich in this class, is related to *Athelia* or *Botryobasidium* of the 'Corticiaceae', but unrelated, e.g. to *Herpobasidium* or *Auricularia*, both with transversely septate basidia.

Some taxa with the hymenophore on gills, but in all other respects polypore-like are omitted, e.g. *Lentinellus, Schizophyllum* or *Pleurotus*. The latter is closely related to *Polyporus*, and *Lentinellus* to *Auriscalpium* and *Hericium*. *Exobasidium* is limited to species parasitic on Ericaceae; two similar species, growing on *Saxifraga* and *Laurus* are classified in separate genera. The value of such genera has to be questioned, since *Exobasidium vexans*, an economically important species, is a parasite on *Thea sinensis* (Camelliaceae or Theaceae). It should not be renamed in future. Surprising is the classification of *Microstroma* in the Exobasidiaceae. Only *M. juglandis* parasitic on walnut leaves is treated; *M. album* on oak leaves is omitted.

The keys given by Jülich are clear and will be very useful for field and herbarium mycologists, professionals and amateurs. The genera are easily reached, often by several pathways. Additional keys are given e.g. for the Polyporaceae. The keys to the 379 accepted genera covers p. 15–61; the keys to and the descriptions of 1956 species p. 62–550. Most species recorded for Europe are listed, including those which are very rare. Many species, especially of the Corticiaceae, are microfungi and must be studied in the laboratory for identification. A large number of genera is monotypic or contain only 2 or 3 species; they often are delimited by minor characters. Only a few genera contain more than 20 species, among which are *Clavulinopsis, Typhula, Ramaria, Hyphoderma, Peniophora, Tomentella, Phellinus* and *Hymenogaster*. The book ends with line drawings of basidiospores, basidia and other structures of selected species, arranged in 15 plates. Indices to the generic and specific names are given.

Jülich newest book is a welcome and useful, but voluminous part of the 'Kleine Kryptogamenflora'.

J. A. VON ARX