

## BOOK REVIEWS AND ANNOUNCEMENTS

E. MEDINA, H. A. MOONEY and C. VÁZQUEZ-YÁNES (Ed.): *Physiological ecology of plants of the wet tropics*. Dr. W. Junk, publishers, The Hague, Boston, Lancaster 1984. Tasks for Vegetation Science 12. 254 pp., 88 figs., 27 tables. Df 160, —; US \$ 60. —; £ 40. —. ISBN 90-6193-952-6.

Ecophysiological studies on plants of the lowland wet tropics have been started relatively late, leaving a large gap between the early work of Schimper, Stocker and Walter.

However, more recently research in this area made strong progress by the development of joint projects by scientists from the U.S.A. with local institutions. The availability of portable instruments of energy fluxes, water potential components, and gas exchange has created the basis for matching up with modern approaches in research elsewhere.

The contents of the present volume (a collection of papers read at a symposium on the physiological ecology of plant of the lowland wet tropics held in Mexico, 1983) prove this convincingly.

All customary items such as a description of the physical environment, studies on canopy structure, leaf-environment interactions and physiological processes pass the review. The information is up to date and the papers are very readable and cover the relevant literature adequately. Besides a number of papers deal with interactions with the biological environment. The role of epiphytes, mycorrhizae and herbivory has been discussed in detail. A chapter on the dynamics in forests and their species dynamics concludes this volume.

It should be at hand in libraries of institutes working in the field of ecophysiology.

R. BROUWER

W. SHROPSHIRE, JR. and H. MOHR (Ed.): *Encyclopedia of Plant Physiology New Series Vol. 16 A, B. Photomorphogenesis*. Springer Verlag, Berlin, Heidelberg, New York, Tokyo 1983. xxx + 832 pp. (in two vols., not separately available), 173 figs., 44 tables, Cloth, DM 338, c. US \$ 139.60. ISBM 3-540-121-43-9.

The vast spread of research into photomorphogenesis, on all levels from subcellular to ecological, with its multitude of contradictory findings and concepts, complicates but also necessitates the enterprise to extract and present the work over the past decade in a single survey. This challenge has been met in the volumes 16 A and B of the *Encyclopedia of Plant Physiology, New Series*, by a team of 42 authors, who combined information from c. 5000 papers in 29 chapters. The editors promoted well-documented presentation of present insights and problems rather than descriptions along historical lines, probably also because of considerations of space.

Much emphasis, therefore, is on the molecular action of phytochrome and its relationship with membrane properties. The late Nestor of photomorphogenesis, Sterling B. Hendricks, to whom the book is dedicated, designed a fascinating introductory chapter in which he analysed the various aspects and prospects of this problem. In the elaboration conflicting statements may be formulated. For instance, in Chapter 29 Smith and Morgan conclude that the function of phytochrome in the green plant is to measure light quality, i.e., the R/FR ratio by the labile fraction  $P_{fr}$  of total phytochrome. On the contrary, Jabben and Holmes state in Chapter 27 that, particularly in the green plant, stable  $P_{fr}$  is the morphogenetically active form. Apparently, the editors did not try to obscure or conciliate such contradictions, leaving it to the reader to make up his own mind and awaiting future research to resolve the dilemma.

The book gave much attention to Cryptogamic plants as well and 'cryptochrome' and even 'my-

cochrome' obtained their place next to phytochrome. The lack of understanding of the mechanism of phototropism is ascribed by Schäfer and Haupt to the lack of knowledge about the spatial distribution of the receptors and about the control of growth by light. In this connection the remark by De Greef and Frédericq that xanthoxin may be more involved in growth inhibition than abscisic acid may be relevant.

The book, however fascinating and complete in many respects, fails to cover the area completely. The role of light and of light/dark changes as a Zeitgeber in endogenous rhythms is only discussed in connection with flower induction. However, attention is very well paid to natural illumination and twilight situations, as well as to properties and applications of artificial illumination, for instance to control photoperiodicity as in horticulture. Therefore, whether the interest is fundamental or also applied, the book is a treasure for every scientist who wants to learn how seed and spore plants respond to their illumination conditions and how light influences the realisation of their ultimate form and function.

J. BRUINSMA

E. ARNOLDS: *Ecology and coenology of macrofungi in grasslands and moist heathlands in Drente, the Netherlands*. Vol. 1. *Introduction and synecology*, Bibliotheca Mycologica Bd. 83, 1981; Vol. 2. *Autecology and taxonomy*, Bibliotheca Mycologica Bd. 90, 1982. J. Cramer, Vaduz. 407 and 501 pp., ill. Cloth. DM 120. — + DM 200. — (subscription: DM. 96. — + 160. —).

In these books Arnolds documents the results of his investigations on the ecology and coenology of macrofungi in grasslands and moist heathlands. A phytocoenological, pedological, and myco-coenological study have been combined. Following chapters on plant communities and soil factors, a very useful introduction to the history and methodology of mycocoenology is given. The main problems are outlined with special attention to the difficulty that sampling of carpophores does not necessarily result in a good estimate of abundance and productivity of the mycelia.

After a comparison of different viewpoints on fungal communities the author concludes that these are best considered as dependent communities, and classified as synusia. These synusia conform more or less to ecological groups, which are separately given.

In Arnold's studies not only the number of carpophores but also productivity (based on dry weight of carpophores) have been determined. Highest species diversity could be found in plots on dry, slightly acid to subneutral soils; the plots are often extensively grazed. The use of artificial fertilizer has a negative effect on species diversity. Carpophore density and productivity are positively correlated with species diversity. This is somewhat surprising in view of the fact that in phytocoenoses a negative correlation between species diversity and productivity has been demonstrated. A possible explanation is given, viz. that only part of the available space is occupied by macrofungi. A comparison of the phytocoenological classification with the results of the mycological relevés shows in general a good agreement. Many fungal taxa can be considered good character and differential taxa of phytocoenoses.

In part II the autecology of the grassland fungi is dealt with. Results based on the author's observations are critically compared with literature concerning other regions and habitats.

One of the major problems of mycocoenological research concerns taxonomy and nomenclature of the macrofungi. Therefore in Part III Arnolds provides an extensive documentation as a critical taxonomic appendix. The importance of thorough ecological research for a better understanding of the taxonomy is repeatedly demonstrated, e.g. in the treatment of *Galerina vittaeformis* and *Mycena filipes*. Unfortunately some nomenclatural errors are made in the treatment of *Entoloma sericeonitidum* and *E. undatiodes*.

This important treatise clearly demonstrates the relevance of mycocoenology for taxonomy, ecology and nature conservation. This kind of scientific work deserves imitation in other countries, and more support in The Netherlands as well. These books will be indispensable to every serious student of mycology, and can be recommended to all mycologists with an interest in ecology.

TH. W. KUYPER

L. C. PALM and H. A. M. SNELDERS (Editors): *Atonie van Leeuwenhoek 1632-1723*.

Studies on the life and work of the Delft scientist commemorating the 350th anniversary of his birthday. Nieuwe Nederlandse Bijdragen tot de Geschiedenis der Geneeskunde en der Natuurwetenschappen No. 8.

Rodopi B.V. Amsterdam 1982. 212 p., 51 figs. Df 50. —.

The year marking the 350th anniversary of the birth of Antoni van Leeuwenhoek seemed a very suitable occasion to invite a number of Dutch science historians to give a picture of the present state of Leeuwenhoek research. Although the *Collected Letters* are still being published, the Leeuwenhoek Commission has not yet come further than the year 1696. Consequently the science historian will have to wait many years before a complete annotated edition of Leeuwenhoek's letters will become available. Nevertheless, he can continue the wearisome search through the remaining original letters of the great Delft naturalist, guided by A. Schierbeek's survey of Leeuwenhoek's life and work (1950, 1951). This commemorative book reflects this situation. Sometimes the reader wonders why certain points do not come up for discussion; in other cases he realizes how difficult it is to surpass Schierbeek as far as his summaries and views are concerned.

In the *Introduction* the editors survey the most important publications on L. They point out that they have not attempted to bring any kind of harmony in the various contributions to this book, which is a pity, for the reader will be surprised by occasional incongruences and omissions. These could have been avoided by adequate explanations in the introduction.

The series of contributions opens with a paper by the late W. H. VAN SETERS which will be discussed at the end of this review. Thereafter DAMSTEEGT, in *Language and Leeuwenhoek*, surveys several studies on L.'s use of language. Discussing 17th century Dutch he concludes that about 1680-1685 L. abandoned his Delftland dialect which he wrote in the old-fashioned spelling of an inexperienced writer, and changed over to a more official style with a simplified spelling, without any loss of the expressiveness for which he is famous.

It is rather surprising to find an unabridged reprint of VAN ZUYLEN's paper *The Microscopes of Antoni van Leeuwenhoek* in the *Journal of Microscopy* (1981) (a revised version in *Janus*, vol. 68 (1981): 159-168).

In *Antoni van Leeuwenhoek's mechanistic view of the world* SNELDERS discusses some of L.'s experiments, explaining from a Cartesian point of view his well-known theories on crystals, globules, gases and taste. The author confines himself to the physical, medical and zoological fields, omitting L.'s theories on botanical subjects, viz. transport of water and air, globules as structure elements of plant tissue, etc.

BAAS, in *Leeuwenhoek's contributions to wood anatomy and his ideas on sap transport in plants*, summarizes L.'s most important observations and views on plant anatomy and in this way gives a most useful guide to L.'s achievements in this field; this part is superior to Schierbeek's chapter on the same theme. By comparing L.'s interpretations of form and function with the interpretations given by Malpighi and Grew the author concludes that L. must be considered as one of the fathers of plant anatomy.

In *Two fellow students of fleas, lice and mites: Antoni van Leeuwenhoek and Jan Swammerdam* MRS VAN BRONSWIJK explains the differences between the personalities, methods and scope of the two scientists. Swammerdam was mainly interested in arguments of his orders of metamorphosis, while L., in studying the form and structure of these tiny despised organisms, came to oppose the doctrine of spontaneous generation, but the author does not elucidate the latter's position with regard to animal reproduction. She does not seem to be aware of the historical fact that Swammerdam's main publication, *Biblia Naturae*, appeared in 1737-1738, after L.'s death, so a detailed comparison of Swammerdam and L. is not really warranted.

LINDEBOOM, in *Leeuwenhoek and the problem of sexual reproduction*, after giving a short, but instructive survey of the reproduction theories of Aristotle, Harvey, and De Graaf, goes on to revise Schierbeek's chapter VIII on the same subject. Since the latter only discussed reproduction in viviparous animals, Lindeboom also restricts himself to the discussion of this kind of reproduction. The

fact that L. also studied reproduction in oviparous animals and in plants seems to have been overlooked.

In *Antoni van Leeuwenhoek's malacological researches as an example of his biological studies* PALM discusses L.'s observations and views on molluscs in far more detail than did Schierbeek. In connection with L.'s opposition to the doctrine of spontaneous generation and with other 18th century studies the author reaches a conclusion that is more balanced than Schierbeek's unconditioned appraisal of L.'s malacology.

SMIT, in *Antoni van Leeuwenhoek and his ideas on spontaneous generation*, deals with one of the main themes in L.'s biological research: micro-organisms, especially spermatozoa. The author clearly explains L.'s way of reasoning, he emphasizes the role of analogy, and he discusses L.'s terminological problems, which were not mentioned by Damsteegt. An important supplement to Lindeboom's paper is Smit's convincing discussion of L.'s views on reproduction in oviparous animals, which shows that L. was only partly and animalculist.

In *Intellectuals against Leeuwenhoek* VAN BERKEL gives a very readable description of the intellectual circles in which L. lived and worked. But in an attempt to reconstruct L.'s intellectual background the author uses a number of insufficiently founded suppositions, thus arguing in a way that was so vigorously opposed by L. himself.

Finally we have W. H. van Seters's posthumous paper *Can Antoni van Leeuwenhoek have attended school at Warmond?* The author enters into the interesting question of L.'s education, and especially his knowledge of Latin. In a lengthy discussion Van Seters proves that the village of Warmond had a Latin school with a Catholic headmaster and a few Reformed boarders. But it is still not certain whether L. attended this Latin school or a normal primary school in that village. When the late Van Seters communicated a draft of this paper to the former editors of the *Collected Letters* he was advised to consult the public records in order to solve the problem, particularly since these records had recently become more easily accessible. Unfortunately, Van Seters had no opportunity to do this, and the draft was left unfinished in the files of the Leeuwenhoek Commission. To me it seems unfair to the memory of that pioneer of Leeuwenhoekian research that the editors of this book have published an unedited draft.

J. HENIGER

S. NILSSON (Ed.): *Atlas of airborne fungal spores in Europe*. Springer Verlag, Berlin, Heidelberg, New York 1983. ix + 139 pp., 10 figs. 87 plates. Cloth DM 128,-, c. US \$ 55.20. ISBN 3-540-11900-0.

In this atlas airborne spores of about 90 central and northern European species of Fungi and Myxomycota are illustrated, usually with both light microscopic and scanning electron microscopic photographs and not rarely with additional transmission electron microscopic photographs elucidating cell-wall structures. The aim of this book is to facilitate identification of airborne fungal spores by workers in all fields of research dealing with such spores in one way or another.

In a chapter preceding the illustrations a survey is given of life-cycles in various groups of fungi and terminology in relation to spores and fruiting structures. This chapter is followed by a four-page glossary of terms. All spores depicted are described on 15 pages following the illustrations.

The book is well-presented (even somewhat luxurious) and the information given is instructive but only up to a certain (not very high) level of usefulness; 90 species represented out of the many thousands occurring in the area concerned is no excess. Moreover the choice of examples is not very well balanced. Seven pages are dedicated to the Russulaceae (because the spores are so beautifully ornamented?), the same number to all of the Ascomycotina.

The separation of the descriptions of the spores from their pictures is unfortunate and was unnecessary in view of the space available on most of the pages with illustrations.

The L.M. photographs are often of a considerably lower quality than the S.E.M. photographs. This is a great pity because the worker who wishes to identify a certain spore will usually see it under the light microscope.

The best thing is to consider this book as an in general well-illustrated introduction into the world of fungal spores, but not more than that.

C. BAS

K. MENGEL: *Ernährung und Stoffwechsel der Pflanzen*. 6th Ed. G. Fischer Verlag Stuttgart and Jena 1984. 431 pp., 158 figs., 16 plates, 97 tables. Cloth. DM 48. —. ISBN 3-437-20307-X.

Plant Nutrition is a discipline on the boundary line between plant physiology and soil science. During the last decades it has become clear that on this boundary between plant and soil, processes occur in which the two media influence each other reversibly. It is evident that the nutrition of plants is affected by the soil's relative ability to make nutrients available to the plant, but likewise it becomes increasingly evident that conversely, through its absorption characteristics, the plant can influence the availability of nutrients in the soil.

Twenty years ago, the author of the textbook under consideration was among the first to draw attention to such interrelationships between plant physiology and soil science. As this subject has rapidly gained attention, several other textbooks on it have since appeared. The advances made in this field have also prompted the author to regularly update his book. The present text is the sixth revised edition. In comparison with the previous edition, it contains more information on the subject of section 1: "The biochemistry of the most important metabolic processes". New material was also included on root growth and rhizosphere, on organic manures, and on toxicity of heavy metals.

The contents of the 2nd and 3rd section of the book, named "Nutrition- and yield physiology" and "Specific action and importance of individual nutrients" show a great deal of similarity with comparable sections of the book "Principles of Plant Nutrition" written by the same author in co-operation with E. A. Kirkby. Those familiar with the latter textbook will find in the presently discussed book valuable new information primarily in the chapters 2, 3 and 4 named: "Enzymatic reaction", "Energy- and carbohydrate metabolism" and "Lipid metabolism". For the remaining subjects, prospective readers should base their choice among the two books mainly on the language preferred. From a monetary viewpoint, there is not much difference between the two books: both are available at surprisingly low prices.

The book under review contains 24 photographs, half of which are showing plant organelles and -organs, and the other half nutritional disorders. The choice of the latter photos ranges from excellent to rather poor. The book further contains a very extensive bibliography of about 1000 titles, and a subject index with about 1400 keywords. With the above-mentioned conditions taken into account, the book can be warmly recommended.

A. VAN DIEST

HEUKELS- VAN DER MEIJDEN: *Flora van Nederland*, 20th Ed., edited by R. VAN DER MEIJDEN, E. J. WEEDA, F. A. C. B. ADEMA, G. J. DE JONCHEERE. Wolters-Noordhoff, Groningen, 1983. 583 p., flexible cover, Df 59. —. ISBN 90-01-38002-6.

Mainly through the efforts of the late Dr. S. J. van Ooststroom, the "Flora van Nederland" acquired a high scientific standard in the years following the Second World War. Compared with the 19th edition – the last one published by Van Ooststroom – the newly published 20th edition has undergone a drastic revision. The most essential difference with the previous edition is the general adoption (exceptions are indicated) of the nomenclature and systematics of the Flora Europaea. An important practical difference with the previous edition is the introduction of new or drastically renewed keys. Recent use has shown that the renewed main key as well as the family keys work quite well. Especially

the keys to certain notoriously difficult groups such as the Umbelliferae, Gramineae and Carex appear to have been greatly improved.

Data on distribution and habitat have in general been brought up to date. For species coded references to their occurrence in plant communities are given. A large number of new drawings of excellent quality has been included. In general, these changes are beneficial to the general usefulness of this Flora and enhance its use by specialists such as ecologists and others. The consistent following of the Flora Europaea in this edition seems fully justified. For the next edition, however, the authors might consider leaving this rigid policy and following a course of their own with regard to the families for which the Flora Europaea treatment is less satisfactory. At the same time, results of recent biosystematic work carried out in The Netherlands and surrounding countries should be taken into account.

The usefulness of the Flora might be further improved by, e.g., providing page references in the index rather than references to family- and genus numbers. For the use by students and amateurs the re-inclusion of a glossary, available in the previous editions but now left out, is a must. The policy to include only those ornamentals which have been found in the wild, leads to absurdities. This principle which certainly has negative consequences for not unimportant categories of potential users of the Flora, viz. amateurs and secondary school students, should be reconsidered and a next edition should again include the commonly cultivated ornamentals.

By using modern typographic technics a totally new lay-out has been obtained which has resulted in a book of very handsome format. The obvious haste to deliver this new edition has unfortunately induced a too large number of small but sometimes annoying errors. There is no doubt that the "Flora van Nederland" will continue to be the leading Flora for the area of The Netherlands and that it will be used profitably by many.

A. C. DE ROON

M. K. HECHT, B. WALLACE and G. T. PRANCE (Ed.): *Evolutionary ecology*, Vol. 16. Plenum Press, New York and London, 1984. xlv + 499 pp., 85 figs., 40 tables. US \$ 59.40; in US and Canada \$ 49.50.

This 16th volume has been issued in practically the same format as the preceding fifteen – only the composition of the editorial twosome has changed in the course of time. The lay-out and quality has remained of the same standard and the price is reasonable. The contents are heterogeneous especially in the sense that some of the contributors dealt with a more general, and other ones treat a specialized subject (e.g., DENSMORE on the molecular systematics of the Crocodilia). A reviewer, therefore, can not be expected to judge all papers on their merits and only the general and "botanical" ones will be discussed here in any detail. That of Densmore, and the one by WALLACE et al. on mate-recognition systems in introgressive hybrid populations of *Drosophila* are only mentioned here in passing.

The lengthy contribution by DAHLGREN & RASMUSSEN on monocot evolution (141 pages!) is in the reviewer's opinion too much of a rehash of previous (joint) publications by the first author, especially of DAHLGREN & CLIFFORD: *The Monocotyledons* (1982) and brings hardly any novel viewpoints. The application of certain selected character states (and their alleged plesio- or apomorphy) in a cladistic approach to a subdivision of the principal groups is altogether dependent on the subjective selection and evolutionary status assessment of these characters by the authors. It does not necessarily follow that the circumscription, composition and subdivision of the major taxa (here called: Alismatiflorae, Ariflorae, Commeliniflorae, etc.) are the "best", let alone the final ones.

The first paper, by BRIEBICHER, on Darwinian selection of self-replication of RNA molecules is interesting in that, after rather frequently occurring mutations, in vitro selection takes place and small changes may have a profound impact upon the phenotypic expression of the mutated element(s). However, various restrictions summed up in the Conclusions seem to render the evolutionary mechanism both complicated and rather unsurveyable: even the number of replicate molecules is said to have an appreciable bearing upon the outcome of the total of possible selective forces.

How far the *in vitro* changes recorded are a measure of the happenings in living organisms is not clear. In rev.'s opinion the implications of the self-replicative RNA with regard to ideas concerning self-organisation of matter and pre-cellular evolution, purposely only mentioned, are much more intriguing and seem to be much more worth-while.

The paper by HALL & KOEHN on the evolution of enzyme efficiency is decidedly meat for biochemical specialists but may also be useful to workers who use evidence from allozymes and other enzymes in systematic studies even if only to teach them caution.

The contribution by ENNOS on maintenance of genetic variation in plant populations is a useful compilation. The principal conclusions are that (1) a thorough understanding of the genetics and biology of the species under study, including (semi) quantitative demographic data, is a prerequisite, (2) adequate data on all these parameters are only rarely available, so that the issue is all too often only a matter of speculation because, (3) adequate experiments to discriminate between particular pertaining theories have but seldom been designed. Suggestions are made to remedy the deficiencies in the current approach to the problem.

The paper on genetic control of morphogenesis in Flowering Plants is largely based on the studies by its author (BACHMANN), who states that the genetic control of development may be less complex than has often been suggested, and also that certain models for morphogenetic patterns may be more useful and instructive. The importance of epigenetic processes at the level of developing tissues is emphasised. Computer simulation of developmental changes is also advocated, but the simple approach by looking for Mendelian ratios (using the phenotypic expression of "marker genes" among other things) may sometimes yield remarkable results. Rev. is not quite convinced of the validity of the generalisation that the genetic control may be of a lesser complexity than is generally assumed (this because of possible, new interactions between alleles following mutations, insertions, deletions, translocations, etc.). Another question that arises is whether the subject dealt with in great detail (*Microseris*) is a representative case or merely a lucky find of a taxon with a less intricate morphogenesis of certain phenotypical features and patterns.

The sixth entry, on phenotypic evolution in microfossils (REYMENT) is also food for specialists, but it is rather intriguing that apparently genetic drift was at the base of evolutionary progression at least in a few well-documented cases, and selection without drift in other ones. The author also claims that this difference in evolutionary advancement may be correlated with a benthic versus a planktonic way of life.

May workers in the fields of genetic aspects of phylogeny and taxonomy may find at least some papers useful and interesting.

A. D. J. MEEUSE

*Strasburger's Lehrbuch der Botanik*, neubearbeitet von D. VON DENFFER, H. ZIEGLER, F. EHRENDORFER, A. BRESINSKY. 32. Aufl. Gustav Fischer Verlag, Stuttgart, New York, 1983. xxii, 1164 pp., 1088 figs., 50 tables, 1 coloured map. Cloth. DM 80, —. ISBN 3-437-20295-2.

This 32th edition is published five years after the former. Much updated (up to 1938!) information is included in the text resulting in an increase of the number of pages by 83 and that of the figures by 57, respectively. Most of the chapters are (re-)written by the same authors as in the previous edition. Only the section on the Evolution and Taxonomy of the Cryptogamae has been revised by the newcomer Dr. A. Bresinsky. As emphasized in Bottelier's former review (*Acta Bot. Neerl.* 29, p. 321–322, 1980) the book deserves the predicate excellent for the way it introduces the whole field of Botany. A few remarks may be made. In consequence of the overwhelming bulk of information, it is expected that especially the category of self-studying students often will have difficulties to find their way in this book. For example in the chapter Morphology, the terms centrosome, blepharoplast and centriole are the reader hardly explained. In these particular cases a (better) figure has to elucidate the text or, that also aims at the remaining chapters, a glossary at the end of each chapter would be very helpful. Furthermore, the editors are suggested to unify the explanations

of the organizational level of the growth habit among the lower plants. The distinction of categories, as outlined in the chapter on Morphology (p. 91–93), is quite different from that summarized in the chapter on Evolution and Taxonomy of the lower plant (p. 573). In our opinion, the fairly rigid definition of the term thallus (only restricted to multicellular organisms) makes the former distinction rather illogical.

ZIEGLER's chapters on physiology have been carefully updated; they are again an excellent introduction to plant physiology for the students for whom "Strasburger" is intended. The treatment of the influence of temperature on physiological processes, however, is as unsatisfactory as it was in former editions: SACHS's "cardinal points", minimum, optimum and maximum are mentioned (p. 289 for respiration, p. 399 for growth), without observing that the latter two are dependent on the duration of the temperature treatment or explaining the processes determining the shape of the optimum curve. The confusion between optimum temperature and maximum velocity of the process studied is retained from older editions, notwithstanding the warning SACHS himself issued against this misuse of his optimum concept (in: *Gesammelte Abhandlungen über Pflanzenphysiologie* I, p. 82, footnote added in 1892).

The classification of the plant kingdom is fairly traditional as it was in the former edition. It is therefore quite unsatisfactory that no word is mentioned on the modern classification systems of, e.g. the green algae, which along with the traditional morphological traits are based on consistent features revealed by electron microscopy. In the last decade, details of karyogenesis, cytokinesis and especially of the architecture of the flagellar apparatus in motile reproductive cells have drastically changed the insights into the natural affinities in this group of plants. It seems very attractive to include in this book, as an example of the present-day dynamics of green algal classification, the change of the taxonomic status of the three traditionally ulotrichalean genera *Ulothrix*, *Uronema* and *Klebsormidium* resulting in their assignment to three newly-defined green algal classes, based on elementary differences in their ultrastructure. Notwithstanding these few remarks the book certainly remains one of the best introductory compilations of the whole field of Botany on the university level and therefore it can be highly recommended. The book is carefully and well edited, although there remains some nostalgia for the very high quality of paper used, e.g., for the 30th edition. Its price is moderate.

H. P. BOTTELIER  
G. M. LOKHORST

H. BESL, M. A. FISCHER, F. HAGEMANN, W. HÖLL: *Botanik, Studienhilfe zu Strasburger, Lehrbuch der Botanik*, 32. Aufl. 3. Aufl. Gustav Fischer Verlag, Stuttgart, New York 1984. 250 pp., Ring Book, DM 24.80.

The new edition of Strasburger's textbook necessarily effected in the appearance of an adapted "Studienhilfe". In contrast to the increase of pages in the textbook, the number of questions in this repertorium was reduced by 13 up to 1936. In principle, the style of the book remained the same as of its predecessor. Answers follow the questions directly with a reference to the page(s) in the textbook where more (extensive) information can be found. New are some questions with incorporated figures with which the student can test his understanding of e.g., the anatomy of needle-leaved trees, the diversity of steles. It is to be hoped that the number of this type of questions will be increased in the following edition. In the Netherlands the use of "multiple-choice"-questions is now quite common at both the school and university level. Therefore the editors are recommended to include (a number of) questions in this style in the future edition(s). Of course I am aware that it takes much time to compose three distinct alternative differences versus the correct answer, but it is worth while to try. The book would be still more recommendable than it already is now.

G. M. LOKHORST



A. LÄUCHLI and R. L. BIELESKI (Ed.): *Inorganic Plant Nutrition*. Encyclopedia of Plant Physiology NS. 15 A, B. Springer Verlag, Berlin, Heidelberg, New York, Tokyo 1983. xxxiii + 870 pp. in vols., not available separately, 131 figs. Cloth. DM 338,— c. US \$ 131.20. ISBN 3-540-12103-X.

Anybody searching for the beginning of the period in which plant physiologists and soil scientists became interested in each other's work, will come across the "Lectures on the Inorganic Nutrition of Plants" by D. R. Hoagland (1944), as a likely starting point. In their foreword, Läuchli and Bielecki mention it as a landmark in the history of Plant Nutrition. The rapid growth of this field is reflected by the fact that a subject covered 40 years ago by one person is now dealt with by 37 contributors.

The subject of inorganic plant nutrition is claimed to be arranged functionally rather than by element, which upon reading the two volumes turns out to be only partially true. As usual, the large number of authors appears to be a mixed blessing: the various aspects of the overall subject are competently dealt with by experts, but the presentation suffers from too much diversity in style and approach.

The volume, consisting of two books is divided into five main sections. Section 1, "General Chapters of Inorganic Plant Nutrition" consists of seven chapters and encompasses 240 pages. In section 2, "Inorganic Nitrogen Nutrition" containing five chapters covering 153 pages, much emphasis is given to dinitrogen fixation and the uptake and reduction of nitrate, but the ammonium nutrition and its implications for the uptake of other nutrients is left undiscussed. In section 3, covering 47 pages, comparatively little information is given on the role of sulfur and phosphorus in plant nutrition.

Section 4, "General Functions of Inorganic Nutrients in Growth and Metabolism", contains 4 chapters (146 pages) the topics of which are rather arbitrarily combined in one section. In the last section, named "Special Functions of some Elements", 5 chapters (146 pages) supply information on the functioning of all nutrients except N, P and S. In the last chapter of this section, attention is paid to many elements present in almost every plant, the importance of which for plants, however, is still debatable.

In a concluding "Synthesis and Outlook" the editors of this volume again mention these non-essential elements as likely objects of future research in view of the fact that in animal nutrition research many of these elements have been shown to be essential to animals. They further draw attention to the much needed co-operation between plant physiologists and plant breeders in a search for cultural plants which can produce more biomass with less nutrients, can tolerate high salinity, and/or can cope with at present toxic levels of soluble aluminium or heavy metals.

For future researchers, a thorough knowledge of the achievements of their predecessors is much needed. The present volume will prove to be highly valuable in supplying these future researchers with a not entirely complete, but expertly written account of our present state of knowledge on inorganic plant nutrition.

A. VAN DIEST

N. N. TSVELEV: *Grasses of the Soviet Union*. Published for the Smithsonian Institution Libraries, and the National Science Foundation, Washington, D.C., by Amerind Publishing Co., Pvt. Ltd., New Delhi 1984. 2 vols, 1196 pp., 16 pl., 9 fig. (incl. map). TT 79-52009/01.

The grasses are one of the major angiosperm families both in size and in economic importance. In the Soviet Union alone there are 177 genera with 1011 species. Up to now those who were unable to read Russian had to use the translation of ROZHEVITS et al.'s outdated treatment in the Flora of the U.S.S.R., vol. 2 (1934). It is therefore a pleasure to announce this Indian translation into English of Tsvelev's treatment of 1976. An extensive introduction is given in which the history of

the study of the Gramineae (or Poaceae) in the Soviet Union is outlined. Tsvelev explains his concepts of the taxa he recognizes. As this work is an example of recent and future Soviet treatments of the grasses and perhaps other families his definitions are well worth contemplating. The morphology and anatomy are extensively discussed with an attempt to place the features into a phylogenetic context. A list of 35 polarities is given from which the main directions of the evolution of the family are deduced and given in a scheme of evolutionary relationships for the tribes occurring in the U.S.S.R. From the citations it becomes evident how much work on grasses has been done in the U.S.S.R. of which little seems to have seeped outside. Western literature at first sight seems known to the author through Russian publications only, but perhaps the latter have been cited to facilitate the research of those who have no access to the originals. Descriptions are only given for the taxa above sections and the varieties (which often seem to be mere forms not requiring names at all). Those for the species and subspecies must be gleaned from the keys, which makes critical comparison impossible if the leads cannot be answered satisfactorily, and additional literature must be searched for.

For bibliographic uses it is certainly fortunate to have the original pagination indicated in the margins, but for the direct usefulness of the book it would have been more handy when the index would have referred to the present pages and not the original ones. Another drawback is the lack of difference in the typography used and the virtual absence of demarcation of the various paragraphs. It takes an effort to find where a taxon is located on a page and browsing is made nearly impossible. Otherwise the books are well-executed and the Smithsonian Institution and the NSF must be thanked for producing this undoubtedly very useful work.

J. F. VELDKAMP

M. SCHAEFFER and W. TISCHLER: *Ökologie, Wörterbuch der Biologie*. 2. Aufl. Gustav Fischer Verlag, Stuttgart 1983. 354 pp., 38 figs., 6 tables. DM. 26.80. ISBN 3-437-20308-8.

This low priced book contains definitions and explanations of more than 4000 terms and concepts used in the field of ecology. They cover general aspects of ecology, plant ecology, animal ecology, limnology, marine ecology, soil ecology and to a limited extent applied ecology and parasitology. Ecology is a relatively young branch of natural sciences which, coupled with the increasingly limited natural resources and endangered human health, is becoming increasingly important. Few textbooks in ecology contain glossaries, and the comprehensive approach in Schaeffer and Tischer's book is a praiseworthy piece of work.

The book is more than a dictionary; it gives lengthy explanations with additional illustrations and tables for general as well as specific concepts. Also each explanation is accompanied by a number of cross reference keywords treated elsewhere in the book. Each word or concept treated is followed by its English synonym which usually is just a transliteration (Kondensation – condensation) but occasionally the equivalent is less predictable (Abwässer – sewage).

An English-German register at the end of the book makes it useful to a broad public. The help of English or American colleagues would probably have perfected the register and the book as a whole. For example, in the explanation of Kompass Pflanzen, Meridianpflanzen (compass plants, meridian plants), p. 138, the explanation "sun tracking plants" is missing.

This book deserves to be fruitfully used by students and advanced scientists, not as a complete repertory, but as a clear and concise starting point and route-indicator for further reading. A selected list of recommended textbooks is given on p. 311.

The book is well-printed and bound as a durable "flexibles Taschenbuch". Since the field of ecological research covers the complete range of integration levels (molecular biology – landscape planning) the book can be highly recommended to every student, teacher and scientist in Biology.

J. ROZEMA

R. M. T. DAHLGREN and H. T. CLIFFORD: *The Monocotyledons, a comparative study*. Botanical systematics: an occasional series of monographs, V. E. HEYWOOD, ed. Vol. 2. Academic Press, London, New York &c., 1982. xiv + 378 pp., 105 diagrams, 113 figs. Cloth. £ 48,—; \$ 98.50.

This monumental volume of Monocotyledons is the result of an intercontinental cooperation between the danish botanist Dahlgren and the australian botanist Clifford. It includes several contributions by other authors as well. It is in fact the first book that treats the Monocotyledons to such an extent.

In the first chapter a survey is given of previous classifications, starting with Lindley (1853), Bentham & Hooker (1883), and Engler (1892), and ending with the most recent classifications, those by Hamann (1961), Huber (1969, 1977), Dahlgren (1975), and Ehrendorfer (1978).

In the next chapter the authors propose a classification used in the course of the present study. Their classification is based on a very narrow family concept. The authors are well aware of this, but defend their approach arguing that it facilitates the procedures used in this project.

The classification is as follows:

1. superorder Alismatiflorae (5 orders and 13 families). In their revised classification at the end of the book the authors go even further in splitting off the Triuridales as the Superorder Triuridiflorae.
2. Superorder Ariflorae (1 order and 2 families).
3. Superorder Liliiflorae (11 orders and 47 families (!!); the order of Asparagales includes no less than 24 families).
4. Superorder Zingiberiflorae (1 order and 8 families).
5. Superorder Commeliniflorae (8 orders and 20 families).
6. Superorder Areciflorae (3 orders and 3 families).

In a separate chapter the superorders and orders, as distinguished here, are briefly and clearly described, while for each superorder all orders, families, and genera are mentioned. Unfortunately no indication of numbers of species is given.

The most important part of the work, in my opinion, consists of the chapters treating the selected characters and their states, including roots, bulbs, corms, leaves, hair types, anatomy, flowers, nectaries, pollen, fruit, aril, seedlings, geographical distribution, chemistry, and host specificity of parasitizing fungi.

The ensuing chapters give an evaluation in which all superorders are treated in detail, with an indication of affinities with other groups, and a circumscription of the entities included.

There are also chapters on alternative classifications, relations between Monocotyledons and Dicotyledons, while the last chapter attempts a reconstruction of the monocotyledonous ancestors.

The book is not complete, and the authors do not pretend it to be. The reviewer misses chapters on inflorescence and cytology. In his opinion both aspects, even if treated briefly, might have provided additional support for the classification. Furthermore the book is not without serious omissions and errors. The reviewer carefully checked various groups with which he is quite familiar. The authors state the Triuridaceae to have an achene, whereas in reality by far the most representatives possess a follicle. *Burmanna*, according to them, has osmophores; as a matter of fact, osmophores in Burmanniaceae in the broad sense, are found in *Thismia* only. *Phenakospermum* is mentioned as having a nutlet, whereas this genus clearly has loculicidal capsule. There are several more examples of this which we shall not mention in detail here.

Despite these shortcomings I can strongly recommend this book, not to those specializing in Monocotyledons only, but to all botanists, at least those who can afford it! The book excels by its very systematic approach, and it is lavishly illustrated with very good drawings and diagrams. The reviewer has found it to be a very practical reference work while revising families of Monocotyledons.

N. T. BURBIDGE: *Australian Grasses*, revised by S. W. L. JACOBS. Angus & Robertson Publishers, London, Sydney, Melbourne. Oct. 8, 1984. x + 283 pp, 14 figs., 119 pl. £ 15.00. ISBN 0-207-14839-2.

Some years ago the well-known Australian botanist, Nancy T. Burbidge, published a delightful series of three books on the most commonly encountered genera of grasses of some regions of Australia. Especially because of the pictorial keys based on the structure of the inflorescence (reminiscent of the former treatment of the grasses in the Heukels' Flora of The Netherlands) and the usually rather clean line drawings, these were a very good introduction to the family both for the layman and the specialist. Perhaps 50% or more of the genera are not found outside Australia (a few of these have crossed over to neighbouring areas in New Guinea, the Moluccas and the Lesser Sunda Isles) and this illustrative reference to the Australian grasses is therefore most useful.

These books have now been brought together in a single volume; some species have been deleted, but 13 genera have been added whereby about half the number of Australian genera have been treated.

The structure of grasses is briefly discussed, perhaps too much so, and someone interested will have to find a more thorough introduction to the family elsewhere, for instance in Wheeler, Jacobs and Norton's excellent Grasses of New South Wales (1982). Fortunately this is the only work I know where the awful term "seedhead" is employed for what everyone calls "inflorescence". This seems an unnecessary bow to ignorance and the introduction of a technical term (not found in English dictionaries) through a backdoor. Similarly the terms "glumes", "lemmas", and "paleas" should have been used instead of "husks".

Each genus is represented by a drawing and description of one of its representatives. When more species occur the others are sometimes mentioned. It would then be nice to know how they differ from the example given. A remark as "a species used in lawns in cooler areas" to distinguish *Agropyron repens* from *A. scabrum* is not very helpful to distinguish this troublesome, common weed.

Still, this is a fine book to be recommended for those interested in grasses in general and the Australian ones in particular.

J. F. VELDKAMP.

K. KUBITZKI (Ed.): *Dispersal and distribution*, an international symposium. Sonderbände des Naturwissenschaftlichen Vereins in Hamburg Nr. 7. Verlag Paul Parey, Hamburg und Berlin 1983. 406 pp., 102 figs., 27 tables. Stiff paper cover. DM 108, —. ISBN 3-490-13996-8.

Anyone organizing a symposium on Dispersal and Distribution runs the risk of being reminded of Webb's famous words in Hawkes, Reproductive Biology (1966): "Everything, apparently has been said before; facts are rare and speculation plentiful, the literature is boundless; and a firm stand on anything means heated discussions for the rest of your life". These words are cited by Berg in his excellent introductory chapter.

Still, I think, the organizers have managed to bring together an interesting set of speakers and topics. Apart from the introduction by Berg and the Summary paper by Ehrendorfer there are 20 contributions covering a wide range of subjects and divided over four main themes: 1. Approaches from Different Disciplines, 2. Systematic and Evolutionary Aspects, 3. Impact of Special Vectors of Diaspores and 4. Community Relationships. Mentioning only a few does injustice to the other contributors and is simply a reflection of the reviewer's personal interest.

Speculation is in general kept to a minimum and is of course inevitable. There is nothing wrong with speculation if it is on good grounds as seems the case with Carlquist's paper on amphitropical disjunctions between California and Chile, where the latter appears to be on the receiving end of a bird dispersal stream. Van Zanten shows that long distance dispersal can be successful within a climatic belt. To explain amphitropical disjunctions and similarities at genus level between S. America and Australasia he prefers the "land theory" c.q. plate tectonic events. Prance discusses dispersal in two successful tropical families, Chrysobalanaceae and Lecythidaceae, both with limited

morphological fruit variation, yet with adaptations to various dispersal agents. Although some distributions can tentatively be ascribed to long-range dispersal, most distribution patterns can best be explained as resulting from historical changes. The Bignoniaceae, discussed by Gentry are basically wind-dispersed but various taxa have developed means of dispersal suitable for other vectors; mammal dispersed taxa are mostly local members of the subcanopy, bird dispersed ones are mostly epiphytic and water dispersal seems to have arisen independently in various genera. A relatively little known phenomenon is Ichthyochory, dispersal by fishes. This is the topic discussed by Goulding who shows that especially catfishes and characins have played an important role in the upstream dissemination in the flood forests of Amazonia.

Editor Kubitzki is to be congratulated upon the production of a well executed, interesting book. If there are printing errors I failed to notice them. There is a welcome index on plant and animal names.

M. M. J. VAN BALGOOY

E. MÖHN: *System und Phylogenie der Lebewesen: Bd. 1. Physikalische, chemische und biologische Evolution; Prokaryonta, Eukaryonta (bis Ctenophora)*. E. Schweizerbart'sche Verlagsbuchhandlung (Nägele u. Obermiller), Stuttgart 1984. xxxv + 884 pp., 318 figs. Cloth. DM. 330, —.

This first volume of what, by the look of it, is going to be a handbook of considerable size and scope. The author must have a very broad knowledge of both botanical and zoological taxonomy and phylogeny, a nowadays very rare combination. This 'synthesis' is most useful when general issues are dealt with (e.g., the origin of cellular organisation). However, as a botanist one must get used to the treatment (Table 32 on p. 117) of the subgroup of the Ctenophora including, as a side-branch, the Animalia where one finds dinoflagellates, euglenoids and diatoms interspersed with coccidia, ciliates, amoebae and radiolarians! This is, at any rate, a "modern" viewpoint like several other ones in this volume.

Although the present volume is compact in its lay-out, the author managed to put in a wealth of information ranging from the origin of the universe and our planet to taxonomic methods, apart from the sequential enumeration of the groups, from the simplest lifeforms to the green algae and the Radiata (= Cnidaria and Ctenophora). Theoretical aspects are lucidly discussed, alternative views and moot points mentioned and often neatly illustrated by clear figures and diagrams (all figures are adapted but well-chosen and adequate). To mention one example: on p. 44 Möhn shows diagrams of four alternative hypotheses concerning the origin of cellular organisation. The treatment of the dawn of organic evolution is up-to-date and within the scope of the volume exhaustive. As regards the methodology, his explanation of cladistics is up to the point, critical and (a bit unusual among German writers!) concise, in fact excellent; Möhn summarised his judgement as follows: the method has its merits but the ensuing cladograms cannot be considered as replacements of systems of classification. M. is clearly an adherent of evolutionary systematics in the sense of Mayr and Simpson in which fossil evidence is accounted for as much as possible. The nomenclature used is modern and quite consequent, and the surveyable treatment of the groups always preceded by diagrams or cladograms (or both) to show the connections. The references are arranged per chapter or per subject, but the author explains why he did not give references in the text (*viz.*, to save space). A glance through some bibliographies which Rev. feels he can judge competently reveals that (1) references from the last decade (some even after 1980!) abound, (2) general, reviewing and classificatory treatments of taxonomic groups and other items are well-chosen, (3) the numbers of publications in other languages (mainly in English) exceed that of the German ones, which clearly indicates a broad coverage and (4) strangely enough the references (and indices) are obviously reproduced by off-set printing from a typewritten original, which is incongruous and contrasts strongly with the very fine typography and lay-out of the text and figures – surely this did not save much in the costs of publication? In brief, an excellent but rather expensive book – expensive also in view

of the necessity to order forthcoming ones to get a complete set. It is rather a pity that it was issued in German, which reduces the number of potential buyers appreciably; publication of an English translation is certainly recommendable.

A. D. J. MEEUSE

N. MARGARIS, A. KOEDAM and D. VOKOU: *Aromatic Plants: Basic and Applied Aspects*. World Crops: Production, Utilization, Description Vol. 7. Martinus Nijhoff Publishers, The Hague, Boston, London 1982. xii + 284 p., 166 figs., 40 tables. Df95,—, approx. US \$ 41.50.

After a long lasting decline of the use of aromatic plants and their products, the last years have brought a remarkable transition towards their utilization. As a consequence increasing numbers of phytochemists, plant physiologists and ecologists have directed their attention on them.

In five chapters this book presents a selection of lectures held at an International Symposium on Aromatic Plants, organized by the Laboratory of Ecology of the University of Thessaloniki, Greece, held September 1981. A number of lectures deals with ultrastructure of essential oil secreting glands of several aromatic plants and with the process of oil secretion. A group of other lectures concerns chemotaxonomy of *Mentha*, *Origano* and *Artemisia* species.

Essential oil analysis and composition (e.g. of *Satureja* and *Sideritis* spp.) are treated in seven papers, and a chapter on ecology and distribution deals with subjects such as volatile oils as allelopathic agents, and with the effects of monoterpenoids on ruminant digestion and forage selection.

The last chapter concerns Production and Application and contains lectures on e.g. "Labiateae as medicinal plants in Israel" (YANIV et al.), and "Potential important indigenous aromatic plants of Southern Africa" (PIPREK et al.). The chemo-botanical significance of essential oils becomes clear if one reads the paper of KUBECZKA (Essential oils of Umbellifers): up till 1980 759 compounds were isolated from essential oils of this family, of which roughly 40% consist of terpenes.

Although most of the papers presented in this volume concern terpenoids, some of them also deal with other more or less regularly occurring constituents of essential oils, such as polyacetylenes.

Undoubtedly the book will be of much importance to those involved in essential oil research, because it brings together ultrastructural, physiological, chemical, ecological and taxonomic aspects of this field of research.

Owing to its specialistic nature the need of its purchase by librarians of botanical departments of universities is less obvious, although its price is moderate and the information supplied cannot easily be found elsewhere.

J. VAN DIE

R. B. MILLER and P. BAAS: *Standard list of characters suitable for computerized hardwood identification*, recommended by a Committee of the International Association of Wood Anatomists. Published by the International Association of Wood Anatomists, Rijksherbarium, P.O. Box 9514, 2300 RA Leiden, The Netherlands, 1981. 48 pp., 60 photomicrographs. Df25.—; US \$ 12.—; UK£ 5.—.

Identification of wood samples from all over the world, in particular from tropical regions with their great variety in hardwoods, is one of the most time-consuming activities of a wood anatomist. Comparatively few dichotomous keys for identification exist, and they are usually restricted to limited areas, or they apply to commercial timbers only. Keys based on punched-card systems have been developed in several wood-research institutes. Such systems are useful and easy to consult, except when hundreds of cards are involved. The next logical step was to develop computer programs using computer data to assist in the identification of wood samples.

Dr. R. B. Miller of the Forest Products Bureau in Madison (Wisc.) took the initiative to prepare a list of all possible character states occurring in hardwoods to be used in a computer program. The present list is based on a program developed in 1974 by Morse for taxonomic data. Miller's initial list has been scrutinized and amended by a committee of the International Association of Wood Anatomists. The present booklet is the outcome of these joined efforts. It contains an Introduction, a Standard list of hardwood characters with code numbers and cross references to three well-known and much-used codes from other institutes (Table I), a Recommended data sheet of hardwood characters (Table II), an Explanation of coding procedure, and an extensive Explanation of characters used. These characters are illustrated by 60 microphotographs. It is regrettable that some of them are rather poorly reproduced like e.g. figs. 26 and 40.

The facilities offered by a computer to handle very extensive lists of characters is a great advantage over the usual punched card systems. The character states have been carefully chosen, and are recorded not only for presence or absence, but also for form, size distribution and other diagnostically important features, as for instance the 25 categories for crystals. In some cases like division of the thickness of the fibre wall in four classes, one might even wonder if the division is not pushed too far. On the other hand one could suggest some more odd characters to be included, but that is not of fundamental importance as compared to the great promise this method holds not only to wood anatomists, but to all having anything to do with systematics. Our thanks are due to Dr. Miller, who had the greatest share in the achievement of this work, to Dr. Baas as the coordinator, and to the members of the Committee for their contributions.

A. M. W. MENNEGA

R. C. CRAW and G. W. GIBBS (Ed.): *Croizat's Panbiogeography & Principia Botanica*. Search for a novel biological synthesis. Depts. of Botany and Zoology and Victoria University Press, Wellington 1984 (= *Tuatara* 27). 75 pp., 1 portrait. Soft cover. US \$ 5,—.

A sympathetic but, in my opinion, obsolete rehabilitation of a sort. Several authors discuss Croizat's life and his *Panbiogeography* (Craw), his orthogeny (Grehan), and *Principia botanica* (Heads), and a bibliography is added (Heads & Craw). An English version of a paper on Darwin by Croizat (Heads) and a polemic, posthumous paper against E. Mayr (by Croizat himself) complete the issue.

After the original impact of *Panbiogeography* in the 'fifties and early 'sixties, not so many students of biogeography seem to be so thoroughly convinced of the significance of Croizat's viewpoints. The trouble with Croizat's ideas, cladistic vicariance studies, and other approaches exclusively based on recent faunal and floral elements, is the almost complete disregard of fossil and stratigraphical evidence. The merit of Craw's pertaining contribution may be the discussion of the relation of these ideas with vicariance cladistic biogeography with which it is often confused (see also Croizat's paper).

The paper on the *Principia* is too nice – the ancienry of most insectivorous plants, for instance (herbaceous and often morphologically specialized forms found in more or less extreme, mineral-deficient and acid environments), is open to much doubt, and so are the various "linking" taxonomic relationships suggested by Croizat. Croizat's idea of enveloping "scales" in his floral theory is unacceptable to the large majority of phytomorphologists, both "classical" and "neological" ones, primarily on the ground of the lack of any morphological and/or phylogenetical definition of such "scales". The citation by Heads of a number of papers (appended to his discussion) in which the classical carpel theory is reflected is not to the point: in hardly any of these publications the criticism was based on Croizat's ideas. Croizat's leaf concepts are likewise unacceptable to most phytomorphologists.

Croizat's own paper, a polemic and cantankerous attack on Mayr (and other biogeographers), was apparently principally borne from vexation – I at least did not glean any convincing, novel arguments.

The idea one may get from this issue of *Tuatara* about Croizat as a person and a scientist is that of a brilliant and colourful personality that should have found more recognition. Quite apart

from the handicap of Croizat's florid style of writing and his complicated and argumentative way of reasoning, I believe that he may have received more understanding, lenience and possibly recognition if he had had a different, less pugnacious nature. I know of at least one biologist who got a most insulting letter from C. (so did I, incidentally), and who simply returned the document after having torn it to pieces. Still, the booklet may be of historical interest, but I do not believe it could lead to a proper rehabilitation.

A. D. J. MEEUSE

P. D. HEBBLETHWAITE, T. C. K. DAWKINS, M. C. HEATH and G. LOCKWOOD (Ed.): *Vicia faba: Agronomy, Physiology and Breeding*. World crops: production, utilization, description Vol. 10. Martinus Nijhoff/Dr. W. Junk, Publishers, The Hague, Boston, Lancaster 1984. ix + 333 pp., ill. Cloth Df 140,-, US \$ 53.-, £ 33.75. ISBN 90-247-2964-5.

This volume contains 35 papers, being the proceedings of a Seminar in the EEC Programme of Coordination of Research on Plant Protein Improvement, held at the University of Nottingham, United Kingdom, 14-16 September 1983.

Nearly all the work, presented in this volume, is carried out with faba beans, cultivars of *Vicia faba* L. Moreover, research on pea cultivars (*Pisum sativum* L.), is presented.

The first three sections of this volume deal with: physiology and agronomy, breeding and cytogenetics and nutrition and quality. In the final section, conclusions, general discussion and recommendations are presented.

In the first section, after two introductory papers describing the yield components of faba beans and a key for growth stages, nine papers deal with a number of factors influencing total dry matter production and dry matter partitioning, such as the phenological factors vascular development and growth habit, the physiological factors water stress and nitrate reduction and the agronomical factors poor soil physical conditions, growth regulators, seed metering devices and seed source. Two papers present the results of the EEG Joint Faba Bean and Pea Trials 1980-1982, giving a comparison of yield and yield stability for eight faba bean and three pea cultivars, grown at nine locations in Western Europe. Six remaining papers contribute to the research on the potentials of faba beans for silage, the forecasting and control of pests and the possibilities for winter beans, while the last paper deals with some personal observations about faba beans in China.

In the second section, three papers present selection methods for self-fertility and combining ability, a design for a genotype  $\times$  environment test and microdensitometric analysis of chromosome images. The remaining seven papers deal with advanced plant breeding techniques and related problems such as barriers to interspecific hybridisation and the unstability of cytoplasmic male sterility.

Anti-nutrition and favism inducing factors, quantification of quality determining factors in general and potentials for improving the nutritive value of faba beans are discussed in three papers of the third section.

In the final section, it is concluded that faba beans have a good long term future as a protein resource and are a rival to peas. The key is finding the right plant model in relation to agro-climatic area. Future research has to give priority to the setting up of co-operative breeding programmes and continued fundamental work on pod set, pod retention and assimilate transfer, water stress and irrigation, pest control and nutritive quality.

This volume can be recommended as an up-to-date source of information on faba bean research and a good example of co-operative work of agronomists, physiologists and plant breeders, which will be of growing importance in the future.

E. GRASHOFF



I. ROTH: *Stratification of tropical forests as seen in leaf structure*. T:VS Vol. 6. Dr. W. Junk publishers, The Hague, Boston, Lancaster 1984. viii + 522 pp., Cloth. Df 300.—, US \$ 115.—, £ 54.—. ISBN 90-6193-946-1.

In this book Dr. Roth tackles a most interesting problem: leaf structural diversity in tropical forests viewed from an ecological perspective. Rather than to review the extensive literature on this subject, the author has chosen to present her views on the basis of a study of leaves from about 200 adult trees and 100 juvenile ones, collected during a forest inventory in a seasonal rainforest in Venezuelan Guiana. Following 4 general introductory chapters, the bulk of the book is taken up by chapter 5 consisting of 321 pages of tables listing 23 different character states for each leaf or tree studied. Chapter 6 summarises in words the information for each individual family. The remaining 5 chapters dealing with developmental, ecological, taxonomic and phylogenetic aspects, and one discussing the most important results cover a comparatively modest 49 pages. The main conclusion of Dr. Roth is that the xeromorphic leathery leaf of the humid tropical forest is nothing more than an adaptation of the *evergreen* leaf to drought occurring periodically in the higher levels of the forest. She bases this conclusion on the fact that the leaves of low, young trees are less xeromorphic than those of adult trees. To my surprise she does not use information on the different size classes of the adult trees contained in the tables to back this conclusion.

Despite the appreciation one must have for the industrious achievement of studying the leaf anatomy of so many species, the main reaction to this book is a negative one. There is hardly any major aspect of it which one cannot criticize severely. First of all the data base: apparently no information was available to the author about the position in the crown at which the leaves were sampled; yet she freely draws far-reaching conclusions with respect to sun- and shade-leaf syndromes. Moreover, for many species the anatomical data are not complete. In the interpretative parts the author puts too much emphasis on direct environmental control and often ignores the possibility of genotypic variation. Adaptive interpretations are all purely intuitive, going back to the Haberlandt era (there is nothing wrong with this, as long as the reader is warned that hypotheses are of a speculative nature and are not presented as gospel truths). Modern ecophysiological research is largely ignored, as well as the vast body of comparative anatomical information of the older literature. Dr. Roth's obsession with adaptive interpretations even goes so far that she has marked the individual leaves as showing a "very good", "good", "medium" or "poor" adaptation to their actual environment. One is very relieved to find that most species appear to be well adapted in Venezuela and pities those unfortunate ones which will loose the struggle for survival. For *Diploptropis*, which has a variable length/width ratio of palisade cells Dr. Roth even proclaims the formation of new structures, mysteriously adding that this taxon belongs to a gene pool family.

In many chapters there is a high degree of repetition of the same statements. However, at times the text is contradictory, e.g., on stomatal size which is shown to be unaffected by the position in the forest (p. 430) but heralded to show an ecological trend on p. 439.

The very high price of this book must be largely due to the 320 pages of tables which contain so little information that a collective table of at most 10 pages would have sufficed. Add to this the 40 pages of ill-assorted illustrations (fig. 31 duplicates fig. 77, and why show us so many SEM pictures of papillae?), plus the superfluous repetitive discussions, and one arrives at the conclusion that this study should have appeared in the form of a concise research paper of at most 30 pages and be available free of charge to the botanical community.

P. BAAS

J. J. Bos: *Dracaena in West Africa*. Agricultural University Wageningen, Papers 84-1 (1984). 126 pp., 41 figs., 23 maps. Soft cover. Df 50.—.

This modest volume contains a taxonomic treatment of the West African species of *Dracaena*, the area defined as West of the Cameroons, excluding Fernando Poó and Macaronesia.

In total the genus has c. 150 species, mainly tropical and in the Old World, c. 60 species in Africa.

The genus is considered to belong to the Liliaceae (by Airy Shaw in Willis's Dictionary and Hepper in the Flora of West tropical Africa: Agavaceae). The author accepts 23 species in the area, as compared to 20 in Hepper's revision in R.W.T.A. (1968); 8 species are endemic; there are some name changes, and 3 species are new to science.

The taxonomy of *Dracaena*, a genus of old horticultural interest and nowadays enjoying intensified popularity as ornamentals, is hampered by the fact that no less than some 2200 names are extant. Noteworthy is the supposition that the well-known *Sansevierias* might be congeneric. Almost all available herbarium material from the area seems to have been examined, and data have been extensively supplemented from specimens grown in the greenhouses and living plants in the field.

The work is executed in the Wageningen tradition of taxonomic papers, containing short introductory chapters, a lengthy new genus diagnosis, full species treatments, all well-illustrated. It is hoped that (a) similar revision(s) of the species of the rest of Africa may follow.

W. J. J. O. DE WILDE

E. RODRIGUEZ, P. L. HEALEY and I. MEHTA (Eds.): *Biology and chemistry of plant trichomes*. Plenum Press, New York and London 1984. vii + 257 pp., 156 figs., 19 tables. Cloth. US\$ 47.40; USA and Canada: \$ 39.50.

This book contains the papers presented at a symposium on Biology and Chemistry of Plant Trichomes, which was held July 1980 at the joint meeting of the Botanical Societies of America and Canada, in Vancouver. It was focused on the areas of development (Peterson & Vermeer), ultrastructure (Mahlberg, Behnke), physiology (Thomson & Healey), chemistry (Croteau, Kelsey, Rodriguez), systematics (Wallenweber), and ecological significance (Ehleringer). Especially for those involved in work on secondary plant metabolism, it offers a modern morphological basis, which is often absent in the numerous phytochemical papers on e.g. terpenes, polyketides and flavonoids.

The book contains eight chapters, of which two are devoted to trichome structure, ultrastructure and development. Two chapters deal with histochemistry and the cellular basis of trichome secretion, and two others with the biosynthesis of terpenoids and the chemistry of other biologically active constituents secreted and stored in glandular trichomes.

Although at present especially the role of glandular trichomes in plant defence is a popular topic and gets ample and justified attention in this work, there also is a chapter on the abiotic ecophysiology of leaf pubescence in North American desert plants.

The book can be highly recommended to phytochemists and physiologists working on essential oils; they can find in it a wealth of relevant morphological knowledge. But it will also be of great value to morphologists and ecologists interested in leaf pubescence because it offers many chemical and functional data they are probably not familiar with. It deserves a place in libraries of botanical departments in general, where it certainly will be much consulted for teaching purposes.

J. VAN DIE

E. FEOLI, M. LAGONEGRO and L. ORLÓCI: *Information analysis of vegetation data*. Tasks for vegetation science vol. 10. Dr. W. Junk, publishers, The Hague, Boston, Lancaster, 1984. 143 pp., ill. Cloth. Df 100.— US \$ 38.—; £ 25.50 ISBN 90-6193-950-X.

In this tenth volume of the series "Tasks for Vegetation Science" an overview is given of the mathematical background of the application of information analysis to vegetation data. Algorithms for that analysis are included, with examples from relevés of ecological investigations by one of the authors. The major part of the book is occupied by detailed computer programs.

The vegetation scientist wishing to apply this type of analysis to his problems must have a good deal of specialized mathematical background to take full advantage of the contents of this book.