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BOOK REVIEWS AND ANNOUNCEMENTS

K. FÖRSTER: *Das Phytoplankton des Süsswassers – Conjugatophyceae* (Die Binnengewässer, Band XVI, Teil 8, 1. Hälfte). VIII + 543 p., incl. 65 plates. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart 1982. Price (clothbound) DM 174,–. ISBN 3-510-40024-0.

The 8th part of Vol. 16 of the well-known series 'Die Binnengewässer' to be taken care of by Förster deals with the Conjugatophyceae, the Zygnemataceae excluded, *i.e.*, with those families of unicellular conjugate green algae which are usually referred to by the collective name of 'desmids'. The part in question is published in two separate issues, the first of which is reviewed here and the second is planned to appear by the end of 1984. Förster aims at an almost exhaustive survey in two parts of all desmid taxa of the world more or less regularly encountered in freshwater plankton. Most decidedly not only the typically planktonic forms are included – as is known, only a small fraction of the desmid taxa is truly euplanktonic – but also those tychoplanktonic and benthic ones which easily get into open water.

Förster's book starts with a general introduction dealing with the morphology, reproduction and ecology of the group, and purposely kept rather concise with references to similar chapters in such well-known monographs as those of KRIEGER (1933) and RŮŽIČKA (1977), but contains all essential elements for the reader to acquire an elementary understanding of the biology of these algae adequate enough to identify them successfully.

In the subsequent taxonomic part all genera of the families Mesotaeniaceae, Gonatozygaceae, Peniaceae and Closteriaceae are treated, and, in addition 14 genera of the fam. Desmidiaceae, among which, as the largest, *Pleurotaenium, Actinotaenium, Cosmarium, Euastrum* and *Micrasterias*. The filamentous desmids and some well-known genera as *Xanthidium, Staurodesmus* and *Staurastrum* will be dealt with in the second part.

For every genus an identification key to the species or sometimes even the variety is provided. Every (infra)specific taxon included in such a key is separately figured, morphologically described and ecogeographically characterised, and in addition its differentiating characteristics are explicitly compared with a number of related forms among which one finds a fair amount of less common taxa which are not separately discussed. The author states in his foreword that in the two part-volumes about a thousand species in all will be figured and described and in addition an equally large number briefly mentioned in the text. If one considers that in the first two parts of Růžička's recent monograph (restricted to be European representatives!) about 470 (infra) specific taxa have been treated and figured as against, of the corresponding genera, some 250 in Förster's first part, it becomes evident that only a relatively small amount of the desmid taxa described is represented in his keys and plates. This is indeed the greatest failure of the book.

Another objection reviewer wishes to make is that a complete description of all those taxa to which Förster only summarily refers in his book cannot be critically compared since a bibliography is wanting. Although this is not especially mentioned, it is to be expected that such a list of references will be appended to the second part-volume of his book. Until its appearance (at the earliest by the end of 1984, but how much later?) the usefulness of the first part-volume is thus rendered much lower. The identification keys, drawn up according to the hierarchic multiple choice principle customary in the Huber-Pestalozzi series, although ingeniously construed, are for practical purposes but little surveyable and not so convenient to use. Repeatedly one has to make a choice out of a series of alternatives which are not always mutually exclusive and sometimes not very exactly circumscribed.

Opposed to these shortcomings there are fortunately many good points. The extensive treatment of the taxa selected is indicative of a thorough cognisance and direct personal experience of the author. The quality of the mostly original illustrations – of essential importance for the usability

of such a desmid monograph – is without doubt up to standard, as might be expected from Förster. The typography and production of the book are quite satisfactory.

Summarising, reviewer can give as his opinion that the neatly issued book deserves a good deal of admiration on account of the great amount of critically used data, and the qualitatively good figures. Owing to the goal set, *viz.*, the presentation of a distinct selection from the known desmid flora, it is unavoidably incomplete and the choice of the taxa dealt with is rather arbitrary.

Altogether it is not exactly a must for critically minded phycotaxonomists, but a useful reference source for hydrobiologists, water hygienists and workers in related fields.

P. COESEL

O. R. GOTTLIEB: *Micromolecular evolution, Systematics and Ecology.* An essay into a novel botanical discipline. Springer Verlag, Berlin, Heidelberg, New York 1982. xi + 170 p., 80 figs. Soft cover. DM 79,–, c. US $ 33,–. ISBN 3-540-11655-9.

This very stimulating book was written by an excellent phytochemist working with one of the worlds most fascinating floras of higher plants. The author is a natural product chemist with a long-standing interest in plant taxonomy and evolution. Gottlieb has extensive phytochemical experience with a large number of plant taxa mainly belonging to Compositae, Guttiferae, Lauraceae, Leguminosae, Moraceae and Myristicaceae, specialising in metabolites such as alkaloids, essential oils, coumarins, xanthones, lignoids, flavonoids and neoflavonoids.

The author discerns three types of plant metabolites, the primary precursors (micromolecules) which give rise to both biopolymers and secondary metabolites, the secondary compounds (micromolecules) which perform ecological functions (allelochemics), and biopolymers (macromolecules) which govern information (nucleic acids), catalysis (enzymes, i.e. proteins) and structure (i.e. polysaccharides and lignin in plants). One of the main postulates of the book is that secondary metabolites (allelochemics) are as important to plant taxonomy and evolutionary interpretation of plant taxa as are biopolymers which are directly connected with plant genetics and plant form (morphology). To support this postulate the author offers a number of basic principles in chapters 1–3 which are based on the case studies treated in chapters 4–16. In these latter chapters a discussion is found of the chemistry, distribution, evolution and ecological functions of various classes of secondary metabolites at different taxonomic levels (genus to phylum). In the concluding 17th chapter the author tries to achieve an integration of allelochemistry, morphology, ecology and plant geography.

The principles elaborated from the case studies 4–16 are believed to enable the interpretation of patterns of micromolecules (primary precursors and allelochemics) in a given taxon in terms of evolutionary sequences and consequently evolutionary advancement.

This thought-stimulating book offers many possibilities to explain hitherto unexplainable aspects of secondary metabolism and to appreciate ist impact on taxonomy, evolution, ecology and phytogeography. The book should be available in every botanical and biochemical laboratory.

Some parts of the book are highly speculative and future developments will have to show whether the author's belief that he has induced the transformation of chemotaxonomy from an 'art into a scientific discipline' turns out to be true. In any case Gottlieb has written a book abounding in new and provocative thoughts.

The book has also its weak points: Sometimes the style is rather cumbersome, which does not facilitate reading; taxonomy is the most historically oriented of the biological sciences and it is usual to consider contributions made by predecessors to a field of study, but in this respect the author fails totally. He ignores all that was achieved in botanical chemotaxonomy before about 1965; consequently many of his statements are not as new as they are pretended to be. For everyone wishing to get a more balanced picture of the field the study of the works on the subject by A. P. DE CANDOLLE (1816), M. GRESHOFF (1839), S. IVANOW (1926), and J. B. MCNAIR (1935, 1945) is suggested

R. HEGNAUER

J. B. HARBORNE and T. J. MABRY (Editors): *The Flavonoids: Advances in Research.*
Chapman and Hall, London, New York 1982. xii + 744 p., 178 figs., 76 tables. Cloth. £ 49.50.

The present volume is intended to update the 1975 monograph 'The Flavonoids' by the same editors and publisher. Therefore, it can best be regarded in connection with its predecessor. The latter extensively covers the chemistry, biochemistry, natural distribution and biological function of the flavonoid pigments, one of the most numerous and widespread groups of natural plant constituents. The 'Advances' especially provides a review of progress in the flavonoid field during the years 1975–1980. It is the editors intent to pursue this work with a second supplement within the next five years.

The set-up and division of the 'Advances' follows that of the 'Flavonoids' but not all subjects covered in the latter have been reviewed again. The number of chapters was brought down from 20 to 12, a result of a combination of some chapters and the omission of others. The chapter 'metabolism' (plants and microorganisms) was replaced by a chapter on 'mammalian metabolism', which forms a very useful addition. Of the remaining 11 chapters 7 were reviewed by the same (group of) authors of the previous edition. Most contributors are very well known in their field.

Some of the major developments in flavomoid research are found in the application of newer separation and identification techniques and so in the first two chapters much attention is paid to respectively the use of high-performance liquid chromatography and the measurement of carbon-13 NMR spectra. The second chapter also gives the spectra of 125 flavonoids. The main bulk of the book deals with all major classes of flavonoids divided in 8 chapters mainly covering the natural occurrence, methods of purification and identification, taxonomic significance and sometimes the biological function. New compounds are described and extensively tabulated and each chapter is followed by a list of all known compounds. The large increase in known structures and the overwhelming number of publications in the field must have caused quite an effort to cope with, which was met well by all reviewers. In some chapters the accent lies more on the chemistry and in another more on taxonomy and physiology, but in general the material has been treated in a very balanced way. New developments in biosynthesis are covered in a separate chapter.

During the years covered progress in physology and function of the flavonoids has not been overwhelming, nevertheless I regret the editors choice not to treat this subject from a general point of view. For such an important group of natural plant constituents the physiologists view should not be left out.

As a reference book this work certainly fills a gap in spite of the existing large number of books on flavonoids and (more general) of secondary plant compounds. As such I consider it as a must for any group actively engaged in the field.

G. J. NIEMANN

I. J. MISAGHI: *Physiology and biochemistry of plant – pathogen interactions.* Plenum Press, New York and London 1982. xvi + 287 p., 31 figs. US and Canada $ 32.50; other countries $ 39.–.

In recent years an increasing amount of information has become available about the physiological and biochemical background of host-pathogen interactions. This book, based on the lecture notes of the author, has been designed to compile, synthesize and evaluate this information. After an introductory chapter with terms and definitions, the topics covered have been arranged according to the sequence of events during host-pathogen interactions:

- attraction of pathogens by plants and penetration (one chapter).
- the role of pathogen produced enzymes and toxins in pathogenesis (two chapters).
- pathogen alterations in the plant, with respect to membrane permeability, water relations, photosynthesis, respiration, transcription and translation of nucleic acids, phenol metabolism and growth

regulation (six chapters); a separate chapter deals with crown gall tumor formation.
– mechanisms of naturally occurring and induced resistance, and specificity in plant-pathogen interactions, with special attention to the newly emerging concept of surface – surface interaction (recognition).

During the last two decades several review papers and books have appeared, which cover a part of this field, and in addition, in 1977, an exhaustive handbook by many authors, covering the whole field, has been published. However, during the last 15 years no compact, coherent treatment of the whole field of physiological plant pathology has appeared, which is easily readable for students. The book therefore fills a gap. It is well written with many helpful graphs and figures. It provides an up-to-date overview of sound scientific standard. The author has had the benefit of a large number of leading specialists, who cirtisized parts of the manuscript relevant to their fields of research. The book therefore can also be recommended to teachers, and to other plant pathologists or biologists who want to be kept abreast of new developments in this field.

J. DEKKER

J. GRACE: *Plant-Atmosphere Relationships. Outline Studies In Ecology.* Chapman and Hall, London, 1983. 92 pp., 7 tables, 44 figs. £ 2.95. ISBN 0-412-23180-8.

In this small book a wide range of information on plant-atmosphere relationships has been put together. The reader will find something on the history of the atmosphere, on the scales of different boundary layers, on the radiation environment of plants and their response to it, on heat and water exchange through stomatal and boundary layer resistances and finally on what this all might mean for natural vegetation. The result is an attractive and stimulating book for the novice in this field. It provides a broad framework of the subject, laid out in a discussion of the basic processes in the first chapters, gradually passing to the application oriented chapter in the end. The author has confined himself to the absolute necessities, and it is a remarkable achievement that the readability did not suffer from the compactness. A slight unbalance has occurred in the treatment of leaf boundary layer resitances. The details of their calculation has been given too much attention in comparison to the other subjects. Many references are given to guide the interested reader to good textbooks that further elaborate the discussed topic. Also the appendices with tables for frequently required constants, material properties and formulae are extremely useful. The text has been clarified with many graphs and tables. I am sure that this little book will not disappoint the large group of students who find the existing books in this field too voluminous or expensive.

J. GOUDRIAAN

H. HARA: *A revision of Caprifoliaceae of Japan with reference to allied plants in other districts and the Adoxaceae.* Ginkgoana N° 5. Tokyo 1983. 36 pp., 74 figs. (partly maps), 55 + 4 plates (photogr., the latter four in col.). Academia Scientific Book Inc., Daido Bldg., 2-39-6 Hongo. Paperback, US $ 60.–.

Professor Hara's latest work is a very detailed monograph of a family which centres in East Asia, 8 genera with 55 species, out of a total of 14 genera with c. 450 species; in Japan *Lonicera, Weigelia* and *Viburnum* are the largest genera. Hara discusses the delimitation of the family, using the newest data from palynolgy, cytology and phytochemistry; his conclusion approaches that of Cronquist, leaving Adoxaceae as a closely affiliated separate family with 2 genera in China. The genus *Abelia* is split into two. A key to all genera of the family is provided. Great attention is given to variability of the species, cytotypes being arranged as formas. In *Weigelia* hybridsation and introgression is

found. The intricate synonymy of intraspecific taxa is unravelled and all collections examined during three decades of work have been cited. For *Viburnum* an attempt is made towards a genealogical diagram reflecting the interrelationships of the sections and subsections derived from an evergreen subtropical prototype. The correlated information in this monograph is a substantial addition to the understanding of the family. The excellently produced plates, among which many close-ups and SEM-photographs of pollen grains, are most instructive.

C. G. G. J. VAN STEENIS

YASUI ASADA, W. R. BUSHNELL, SEIJI OUCHI, and C. P. VANCE (Ed.): *Plant Infection, the physiological and biochemical basis.* Japan Scientific Societies Press, Tokyo, and Springer Verlag, Berlin, Heidelberg, New York 1982. xviii + 362 p., 54 figs., 37 tables. Cloth, DM 126; c. US $ 50.40. ISBN 3-540-11873-X.

This book contains the proceedings of a seminar, held by plant pathologists from the USA and Japan from 17–22 May 1981 in Brainerd, Minnesota, USA. It was the fourth USA-Japan meeting, devoted to the study of the biochemical and physiological basis of the relation between host plant and parasite; the former ones were held in 1966, 1970 and 1977. Twenty one papers were presented, dealing with the primary interactions between host and parasite during recognition and penetration, the role of host specific toxins produced by the pathogen, pathogen induced metabolic shifts in the plant, the mechanism of hypersensitive cell death, the role of phytoalexins and preformed fungicides in resistance, and susceptiblity as a process induced by pathogens. Some contributions have a review character, other papers concentrate on the author's results, providing also hitherto unpublished information.

A seminar of leading specialists in this field, 23 from Japan, and 13 from the USA, provides and excellent opportunity for an exchange of views and ideas, which might even be considered as the main value of such meetings. In view of this the summaries of the discussions, added after each paper, are very valuable, although they are rather short.

The book reflects the intensive efforts, made by plant pathologists from two countries to elucidate the physiological-biochemical background of the host-parasite relation, which is a prerequisite for development of new ways in plant disease control.

Of the highly interesting developments, which were discussed, only a few can be mentioned in this short book review. Doke and coworkers obtained evidence for induced susceptibility to *Phytophthora infestans* in potato, due to a hypersensitivity inhibiting factor determining race-cultivar specifity. Ouchi and Oku report about pathogen produced suppressors which counteract the formation of phytoalexins; one of these, produced by *Mycosphaerella pinodes* appeared even to be able to induce susceptibility of pea plants to some non-pathogens. Kuć reports that immunisation of plants can be achieved also with abiotic agents. The two last papers are by two recently retired Japanese pioneers in the field of host-parasite relations, to whom the book is dedicated, viz. K. Tomiyama on hypersensitive cell death, and I. Uritani on biochemical approaches to general principles in plants underlying plant diasease phenomena.

The book is not meant to cover systematically the whole field of the physiology of parasitism, but concentrates on topics where most progress is being made. It can be highly recommeded to research workers in plant pathology, plant physiology, and biochemistry, and to students interested in what is going on in this rapidly developing field of science.

J. DEKKER

D. S. INGRAM and P. H. WILLIAMS (Ed): *Advances in Plant Pathology*, volume 1, 220 pp. Academic Press, London, 1982. £ 19.20

Advances in Plant Pathology is a new series, which according to the editors, will carry a wide variety of review articles on topics of current or future interest and importance in plant pathology. These will deal with the relation between host plants and fungal, bacterial, or viral pathogens, with attention to the genetic, physiological, biochemical, ecological and epidemiological aspects of this relation. Also papers on mathematical modelling, control, and breeding for resistance will be presented.

Although most volumes will not have any particular theme, most articles of volume 1 deal with genetical and physiological aspects of the host-pathogen relation. N.T. Keen presents a model for recognition and specificity in gene-for-gene systems: the pathogen elicitor – host receptor scheme. J. M. Daly and H. W. Knoche discuss the chemistry and biology of host selective pathotoxins, with special attention to their mode of action, and their role in pathogenesis and parasitism. D. J. Merlo gives the present state of our knowledge on the biology and molecular biology of crown gall with a speculative and provocative view on the future of crown gall research as a model system for the study of host-pathogen interactions, plant cell growth and regulation, microbial evolution, prokaryotic gen expression in eukaryotic cells, and cancer. J. E. Elliston discusses the phenomenon of hypovirulence, with special attention to its nature and origin in the Castanea – Endothia system and to natural biological control of E. parasitica on chestnut in Europe. Finally T. C. Hall and co-authors review the recent results in the research on enzymes involved in the replication of plant viral RNA's.

In the preface the editors state that the articles will be idea-oriented, rather than mere reviews of the literature, and controversial when appropriate. The five articles in the first volume meet these intentions. Moreover, they are clearly written and well presented, with carefully chosen and well designed figures, in a larger number than usual for review articles. This is of importance, since the series aims at a wide audience, including undergraduate and postgraduate students, research scientists and college teachers.

When the editors succeed in maintaining the high standard of the first volume in the future, this opinion oriented review journal will undoubtedly prove to be a very valuable addition to the plant pathological literature.

J. DEKKER

H. KOOP. *Vegetatiestructuur en dynamiek van twee natuurlijke bossen: het Neuenburger en Hasbrucher Urwald/Vegetative structure and dynamics of primaeval forests at Neuenburg and Hasbruch (West Germany)*. Versl. landbouwk. onderz. (Agric. Res. Rep.) 904 Pudoc, Wageningen. (VIII) + 112 p. 62 figs, 21 photographs, 13 tables, Eng summary. Df 35,–. ISBN 90 220 0781 2.

This study gives a detailed description of two formerly grazed forests in Niedersachsen (F.R.G.) that have not been managed for over 100 years. There has always been forest there and the soil is undisturbed. Such areas are rare in Europe and are the best available places to study the structure of natural forest ecosystems. The two forests are composed of four ecosystem types, characterized by floristic composition and soil type, viz. beech-oak forest (*Fago-Quercetum*) on sandy soil with gley humus iron podzol, wood millet-beech forest (*Milio-Fagetum*) on gley brown podzolic sandy soil, oak-hornbeam forest (*Stellario-Carpinetum*) on gley-pseudogley brown podzolic loamy soil and golden saxifrage-ash forest (*Carici remotae-Fraxinetum*) on soils with a high groundwater table. Each of these types has its own structural characteristics, both in vertical composition and in horizontal pattern. These spatial attributes are thoroughly analysed and correlated.

The study of ecosystem dynamics raises considerable difficulties, especially in forests. The author was able to make use of two sources of information. Historical data on management go back to 1428 and a detailed forestrial description exists from 1780. The other source is the dead tree stems on the forest floor, providing a means of reconstructing the tree canopy in a previous phase. It

could be concluded that most of the old oaks are planted and that in the last century a gradual shift took place from dominace of oak to dominance of beech. This long-term change applies for the two forests as a whole; it does not explain the temporal relationship between the six different structural types that could be distinguished for each of the four exosystem types.

At this stage of the study, the author has not avoided the pitfall which so many students of vegetation dynamics have encountered: the translation of structural series into time series without adequate evidence. This confounding of time and space begins with the terminiology, where a "young phase" is "followed" by a "dense phase" and a "tree phase" by a "degenerate phase". As the age of trees can be measured it is in principle possible to arrange structural forest types into a true time series. With the consequent separation of structural types based on spatial attributes from dynamic phases based on temporal characteristics, the data collected on these forests could lead to a clean interpretation of the relation between the structure and dynamics of vegetation. The author's model of cyclical succession, wich includes three consecutive pioneer phases, leading to a phase of long lived species that were already present as juveniles in the first cycle, explains the structural pattern in an attractive way, but it lacks adequate empirical support.

J. T. DE SMIDT

A. SAN PIETRO: *Biosaline research, a look to the future.* Environmental Science Research vol 23. Plenum Press, New York 1982. xiv + 578 pp., 99 figs, 98 tables. US $ 65.–, outside US and Canada + 20%.

When I started to read this book I assumed that "salinity effects" on plants was a subject of study for a rather limited group of research workers. The proceedings of the La Paz symposium published in this book are demonstrating the opposite. Scientists from various disciplines, agriculturists, whole plant physiologists, geneticists, microbiologist and biochemists from all over the world are intensively trying to get better informed how organisms from saline sites manage to exist and to grow in this adverse environment. Their ultimate aim is the exploitation of presently underutilized areas for food production.

It is surprising to learn how much progress has been made in the last decades. This book presents a clear picture of the problems involved, the results already obtained and an outlook in the future. The papers are dealing with responses of higher plants as well as with those of microalgae.

After reading the book one has to conclude that what was thought to be reserved for a group of specialists is very important for all of us.

The present book is pre-eminently suitable to get informed on problems and possibilities of using presently unexploited areas.

R. BROUWER

F. LAMBERTI, J. M. WALLER and N. A. VAN DER GRAAF (Eds.): *Durable resistance in crops.* NATO advanced science institutes series A: Life sciences, vol. 55. Plenum Press, New York and London 1983. x + 454 p. Cloth. US $ 63.–; for USA and Canada: s 52.50. ISBN 0-306-41183-0.

From the beginning of his existence as a cultivator man has been confronted with diseases and pests that attack his crops. The Bible already referred to locusts swarms invading ancient Egypt. And in the Middle Ages many became a victim of ergotism caused by the fungus *Claviceps pupurea* occurring in rye kernels.

However, it is evident that the significance of epidemics in modern agriculture is greater than in the primitive pre-stages. By sowing large areas to one and the same crop, often also of restricted genetic variation, the natural situation of co-adaptation between host and parasite was disturbed. Consequently the crop became an easy target for biotypes of pathogens specialized on particular crop genotypes. The disastrous effects of the successive epidemics of *Phytophthora infestans* in 19th

century Ireland are the most cited example of crop vulnerability to pathogens.

Man did not sit by idly; by culture and control measures he made a stand against the attack on his crops. Crop protection by means of chemicals expanded enormously, mainly after the Second World War. Chemicals, however, are a second-rate solution: the effects are cured, the evil remains. Besides, cumulation of persistent chemicals turned out to influence environment adversely.

Plant breeding therefore directs its efforts with increasing intensity to the development of cultivars carrying genetic forms of resistance against pathogens. A manifold of varieties of our main crops have now been equipped with a range of resistance genes. Hoewever, genetic resistance has appeared to be no panacea. Many resistances are after a shorter or longer time overcome by the parasite which results in the exigency to search for and build in new resistance factors.

Science – geneticists, pathologist and plant breeders – is confronted with the pressing necessity to develop strategies aiming at more effective and durable forms of resistance in our crops before the arsenal of resistance genes has been completely exhausted. From that point of view it has been a useful idea to bring together a group of persons who are both theoretically and practically involved in the matter of durable resistance, to exchange thoughts and procedures to face this challenging problem.

However, after perusing the various contributions the reader is seized by doubt. Has there really been a true effort of arriving at a concerted strategy? One gets the feeling that especially the "theoreticians" took the opportunity to display at large their favourite conceptions and to ride once again their hobbyhorses. There is as yet hardly any sign of a true dialogue. Such would require more than the polite game of questions and answer at the end of a paper. The organistion of the meeting has apparently been wrong. One should have had the supporters of a number of contrasting concepts on durable resistance mechanisms introduce their ideas, after which discussions could have been held before a broad audience. From the clash of opinions some mutual understanding could have arisen, which is a must for concerted action.

With this annotation the book is not judged useless. The collected diversity of opinions and approaches with regard to durable resistance can be a source of information and inspiration for the many workers in the field. After all, they will have to convert the beautiful theories into concrete resistant varieties.

Nevertheless, the main conclusion must be that one has failed to score before an open goal and missed the chance to arrive at a concerted strategy for combatting effectively one of the major threats to agricultural production.

G. A. M VAN MARREWIJK

G. P. GEORGHIOU and T. SAITO: *Pest resistance to pesticides.* Plenum Press, New York and London 1983. xi + 809 p., 154 figs., 151 tables. Hardback US $ 107.40 (US and Canada $ 89.50).

Development of pesticide resistance in insects has caused problems in the control of plant pests already during several decades. Failure of plant disease control due to fungicide resistance is of a more recent date, but its significance increases rapidly. Also some cases of herbicide resistance have been reported.

In view of these problems a seminar was held in December 1979 at Palm Springs, California, under the USA-Japan Cooperative Science Program. The papers presented were grouped under three topics, viz. "Origins and dynamics of resistance" (6 papers), "mechanisms of resistance" (18 papers), and "suppression and management of resistance" (8 papers). By far the major part of these papers deal with insecticide resistance and only four treat fungicide resistance. One contribution discusses herbicide resistance.

The presence of research workers from different disciplines within the science of plant pathology offered the possibility to compare the mutual problems and to discuss to what extent mycologists and herbilogists can learn from the experience of entomologists in coping with pesticide resistance. In most cases resistance appears due to a) detoxification, b) changes at the target site, and c) reduction in uptake of the chemical. With insecticide resistance the accent is on a), with fungicide resistance

on b) and c). Further, resistance has developed to virtually all newly introduced insecticides after the second world war, but only to a limited number of fungicides, predominantly systemic ones.

This does have consequences for the strategies to be followed to counteract resistance, as outlined in the papers by (the late) Gilpatrick concerning plant pathogens and by Georghiou on arthropods.

In the present book leading research workers in this field from USA and Japan share their vast experience and stimulating thoughts with the reader. Although the seminar was a bilateral venture, and thus virtually without participation of researchers from other countries with experience on fungicide resistance, the participants have tried to cover the whole field as good as possible. Attention has also been given to development of resistance in non-target organisms and in natural enemies of insects causing plants pests. Several recommendations are made by authors on promising areas for future investigation, among which the study of fitness of resistant mutants, the search for pairs of chemicals which demonstrate negatively correlated cross resistance and the development of methods to detect resistance early.

Each author was given the opportunity to revise his paper after the seminar, which certainly has contributed to the high standard of the papers. On the other hand it may also have contributed to the delay in publication, more than three years after the seminar was held. Especially for such a rapidly developing field as that of the fungicides this is a disadvantage. The few shortcomings in editing (typing errors, reversal of pages 208 and 209) do not reduce the value of this book, which can be recommended to research workers on pesticides and to all others interested in pesticide resistance.

J. DEKKER

F. A. LOEWUS and W. TANNER (Ed.): *Plant Carbohydrates I. Intracellular Carbohydrates.* Encyclopedia of Plant Physiology N.S. 13 A. Springer-Verlag, Berlin, Heidelberg, New York 1982. xxii + 918 pp., 103 figs. Cloth DM 298,–, approx. US $ 132.40.

D. BOULTER and B. PARTHIER (Ed.): *Nucleic acids and proteins in plants I. Structure, biochemistry and physiology of proteins.* Encyclopedia of Plant Physiology NS 14 A. Springer-Verlag, Berlin, Heidelberg, New York 1982. xx + 768 pp., 135 figs. Cloth DM 268.–; approx. US $ 119,–.

Vol. 13A of the (new) Encyclopedia of Plant Physiology deals with plant carbohydrates. Subject matter has been divided into intracellular (Vol. 13A) and extracellular (Vol. 13B) carbohydrates. The former consists of three sections: (1) monomeric and oligomeric sugars; (2) macromolecular carbohydrates-occurrence, metabolism, function; (3) physiological processes. Its chapters are written by 28 authors, many of them well-known specialists in the field of carbohydrate biochemistry and physiology.

The first section contains chapters on e.g. aminosugars in algae, fungi and higher plants (Beevers), sugar alcohols (Bieleski), cyclitols (Loewus and Dickinson), sucrose and other disaccharides (Avigad), oligosaccharides based on sucrose (Kandler and Hopf). In the second section we can find chapters on e.g. biosynthesis of starch (Preiss), reserve polysaccharides other than starch (Meier and Reid), steryl glycosides (Axelos and Pèaud-Lenoël). The third section consists of chapters on transport of sugars (Komor), secretion of nectar (Findlay), storage of sugars (Willenbrink), storage of starch (Jenner), and control over the utilization of reserve carbohydrates (Halmer and Bewley).

The plant physiologist interested in a particular physiological process should be aware that chapters with useful information may also occur outside those volumes of this Encyclopedia that are particularly devoted to his field of interest. Although, for example, the first volumes of this Encyclopedia exclusively deal with translocation we also meet in volume 13A several chapters largely dealing with translocation, but published seven years later. Such overlap of information is distinctly of advantage to the reader and in no sense an objection against the set up of the Encyclopedia. But some subjects may get more attention than strictly necessary. For example Vol. 13A includes

a chapter on plant glycoproteins (Selvendran and O'Neill), with emphasis on their glyco-components. In Vol. 14A, however, we find a chapter on plant proteins of which several groups are glycoproteins. Lectins, toxins like ricin D and storage proteins are treated in two volumes published in the same year. Such overlap could have been avoided, just like that within Vol. 13A, wherein fig. 11 on p. 771 is almost identical with fig. 16 on p. 377.

Volume 14A presents a well-balanced collection of subjects treated by 23 authors. It is divided into two sections: (1) biosynthesis and metabolism of protein amino acids and proteins (13 chapters); (2) nucleic acids and proteins in relation to specific plant physiological processes. The latter contains chapters on seed development (Müntz), seed germination and early seedling growth (Bewley), leaf senescence (Stoddart and Thomas), and macromolecular aspects of cell wall differentiation (Northcote). It is the section I appreciate most because it integrates chemical data and combines them into the whole of more complex structures and processes many plant physiologists are interested in. This does not mean that in the first section the chapters are purely biochemical and only of interest to those working on a subcellular or molecular level. In that first section even botanists not engaged in plant physiology will find much useful data and views in the chapters on biochemistry and physiology of leaf proteins (Huffaker), physiological aspects of protein turnover (Davies), and on protein degradation (Matile). An excellent chapter is written by Miège on protein types and distribution, that relates many chemical data with plant taxonomy, anatomy and physiology. Plant taxonomists can also find a superb survey of protein structures in the chapter written by Ramshaw on structures of plant proteins. A chapter on cereal storage proteins (Payne and Rhoades) aimes at agriculturists and food technologists.

The chapter on ammonia assimilation and amino acid metabolism is the least satisfactory one of the volume. The authors, Miflin and Lea, undoubtedly have given a large amount of data on relevant enzymes and chemical processes, but have been reluctant to connect these with the more complex intra and intercellular processes these enzymes and processes are part of. For example, the physiologist interested in photorespiration reads in this chapter (p. 42) that probably ammonia produced in the mitochondria moves as such to the cytoplasm. But he might wonder whether ammonia movement through mitochondrial membranes would not affect processes such as oxydative phosphorylation, and why mitochondrial glutamate dehydrogenase would not come into action, expecially if its K_m for ammonia may be much lower than the authors originally thought (p. 13). In the same chapter three nitrogen transport compounds are discussed. Glutamine, however, has not been mentioned in this respect, although it very probably is the most widely distributed intercellular nitrogen compound in higher plants.

Much research on plants is carried out in the fields of nitrogen and carbohydrate metabolism. The workers actively engaged in such research will find in these two volumes a wealth of information and views otherwise difficulty to gather. For laboratories active in the field of plant biochemistry, fytochemistry and plant physiology the price of these books will not be a serious objection against their purchase. I am afraid, however, that for many individual research workers it will be too high. On the other hand, the books are perfectly produced and the series as a whole will probably retain its value for a relatively long period; its purchase could consequently turn out to be a good investment for individual botanists too, especially for those engaged in teaching at an advanced level.

J. VAN DIE

P. F. M. COESEL: *De Desmidiaceeën van Nederland – sieralgen – Deel 1. Fam. Mesotaeniaceae, Gonatozygaceae, Peniaceae.* Wetenschappelijke mededelingen K.N.N.V. nr. 153. Koninklijke Nederlandse Natuurhistorische Vereniging, Hoogwoud 1982. 32 p., 12 ill. D*f* 7.– (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* 5.40.)

The distinguishment of microphytes knows its own reglementations. The multiplicity of forms, bad contiguity of marks, rarity of sexual reproduction – they make every built up system remaining arbitrary to a very large extent. Authorative researchers may design fine systems, but for regional

studies critical surveys have to be based upon the features of the material itself, classified according to insights obtained from this material. This course of matters differs completely from those in higher plants, in which the use of a French flora in The Netherlands at most leads to the sigh, that a species is not mentioned in the book.

Although Coesel seems to entertain a pretension towards such a critical work – a contribution to an all embracing taxonomy of Desmidiales, based upon Dutch material – the scope of this booklet is of a much more modest nature. It is meant as the completion of a work, started already in 1916 by J. Heimans; a survey of the Dutch finds, classified according to their own intrinsic features, for which drawings are required. The systematic classification and the name-giving are based upon foreign literature, especially Krieger and Ruzicka. The lack of original drawings in Heimans' concept is regarded as its most important shortcoming. I do not agree with this thesis, but I endorse the plea for these drawings. They make the little book valuable for the expert as well.

After an introduction, mainly based upon Krieger we find a review of eight genera – under which also those of the Mesotaeniaceae, by Ruzička excluded from Desmidiales. Coesel is Holland's best expert of Desmids. His judgements may serve as a good starting point for species distinguishment. They are exposed clearly. But I have the feeling that much existing material is not taken into consideration. Several "rare" species may have a much wider distribution.

What troubles me always in considering Coesel's work is his systematic attempt to catch complex ecological phenomena in a monocausal reasoning. In his thesis he tried to find a direct relationship between calcium contents and patterns of distribution of Desmids. Here – due to recent literature – it must be the speed of reproduction which clarifies it all. Both will be true for a little part, but a satisfying explanation requires other approaches. Why not think of more indirect, "conditional" relationships?

The remaining genera will be treated in a second part. As this concerns the most of them, including the biggest ones we may wonder about the sizes of this part. One of these genera will be the most difficult one: *Staurastrum*. There are several reasons to look forward for the continuation. The first part gives reasons for it.

P. SCHROEVERS

J. MOORBY: *Transport systems in plants*. Longman, London, New York 1981. iv + 169 pp. £ 6.95. ISBN 0 592 44379 2.

This book contains nica chapters on the morphology of the transport systems and their evolution in plants, on the movement of water and ions, and on transport and plant growth. Serious objections, however, can be raised against several opinions expressed by the author on the kinetics and mechanisms of movement through the phloem. Especially the calculation given on p. 65 may lead to unjustified doubt on the adequacy of the pressure flow mechanism in explaining long distance translocation through sieve tubes. It is based on the erroneous figure of the average pore length in a sieve plate of 5 μm, on a too low sucrose content, and a probably too high flow velocity through sieve tube pores, which together lead to an almost ten times overestimated resistance to flow (see TAMMES, VAN DIE and IE, this journal 20(2), 245–252, 1971). MOORBY's calculation leads to extensive attention for CANNY's transcellular strands, whose very existence CANNY himself (in Encyclopedia of Plant Physiology **1**, 287–300, 1975) admitted to be doubtful. Reviewer regrets that in this way the mechanism of sieve tube translocation is made more mysterious than the experimental facts force us to believe.

Reviewer also has little appreciation for some of MOORBY's remarks, for example on p. 163, where he states: "The situation" (in transport research) "is almost analogous to that in economics, if two economists agree they are probably both wrong". On the other hand he states (p. 13): "there is still no general agreement on the existance of membrane-bound strands". Does this mean that, if this agreement were present, the strands do exist or that they do not exist? According to reviewer very few people believe in the existence of such strands and therefore there is little reason to devote much attention to them.

Reviewer's conclusion is clear: this book is not suitable as a guide to undergraduate students

or biology teachers because it confuses; nevertheless it contains interesting information for more advanced students interested in translocation.

J. VAN DIE

J. CALKINS (Ed.): *The role of solar ultraviolet radiation in marine ecosystems.* Nato conference series IV: Marine Sciences. Plenum Press, New York and London 1982. xvi + 724 p., 204 figs., 52 tables. US $ 95.40; U.S.A. and Canada $ 79.50.

The book contains a survey of the papers read at the NATO conference on influence of ultraviolet radiation on marine ecosystems, held from 28–31 July 1980 in Copenhagen. It is dedicated to two eminent Danish investigators: N. G. Jerlov, who studied the physical aspects of the oceans, and E. Steemann Nielsen, the investigator of photosynthesis and other biological aspects of the oceans.

The subject matter is divided into three sections: 1. Ultraviolet (280–380 nm) transmission from the troposphere to the surface of the earth and its biological dosimetry; 2. penetration of this ultraviolet in the hydrosphere; 3. its influence on the biosphere.

In later years our knowledge of the intensity and composition of extra-terrestrial U.V. and the influence of ozone on both has increased considerably through measurements from satellites. Formulas have been developed on the influence of aerosols on scattering and transmission, before the U.V. reaches the surface of the earth. Further the influence has been studied of changes in the average density of the ozone layer. In the papers about dosimetric methods among other things the pros and cons of biological action spectra of the U.V. effects are discussed. The absorption of long-wave U.V. in clear water is low, but the presence of foreign substances, largely of biological origin, has a strong influence on the penetration. Study of the effect from chrorophyll containing organisms is complicated by the fact that part of the absorbed energy is used in photosynthesis.

Several of the many varied effects ascribed to absorption of U.V. B and A are treated in this volume; the inclusion of measurements on higher land plants and contemplation of U.V. selection during atmospheric evolution are not covered by the title of the book and damage its unity.

For those interested in the possible consequences for life on our planet of changes in the ozone layer the book is worth studying.

J. C. GOEDHEER

O. L. LANGE, P. S. NOBEL, C. B. OSMOND and H. ZIEGLER (Eds.): Encyclopedia of Plant Physiology. New Series Vol. 12B. *Physiological Plant Ecology II: Water Relations and Carbon Assimilation.* Springer Verlag, Berlin, Heidelberg, New York 1982. xi + 747 pp. 153 figs. Cloth, DM 288, c. US $ 120.10. ISBM 3-540-10906-4.

The present volume presents up to date information, theory and discussion on the central theme of water relations and carbohydrate economy in higher plants (mainly). In the chapters on water relations (13 out of 18) plant responses in all life stages are discussed by outstanding specialists. In addition to separate treatments of water status, water absorption, water transport and water loss in a number of chapter various aspects are integrated into a functional whole with special emphasis on their meaning for extension growth, carbon exchange, ionic relationships and hormone balances. (Useful information on the effects of water relations on hormone physiology and the reverse remains scarce.)

Much attention has been paid to the short-term and long-term interrelationships between transpiration and CO_2-assimilation and their significance for the ecological situation in the field as well as their possible role during evolutionary development. It is emphasized that optimization of water use efficiency has played a leading role.

Contemplations on the functional significance of different pathways in CO_2-assimilation and on the meaning of differences in carbon, water, and nutrient relations in various plant life forms are completing the high amount of information that is presented.

It is very adequate that two chapters are devoted to possibilities and difficulties which are met in making mathematical models on water relations or photosynthetic responses in various environments. All this makes this book a very useful source of information on the progress made in the last few years. The material is conveniently arranged and the subject index provides an easy entry.

However, this book gives more than that. The personal views of the authors on what has been achieved but especially on what should be done in the near future makes its use a pleasure. Every eco-physiologist should have this book at hand.

R. BROUWER

D. B. RODYN (Ed): *Subcellular Biochemistry Vol. 8.* Plenum Press, New York, London 1981. xvi + 407 pp. US$ 59.40; U.S. and Canada $ 49.50.

This volume is one in an ongoing series that deals with a wide range of topics in cell biochemistry and cell biology. It is not unusual in such treatises that the plant cell is badly represented and that the various subjects are aimed at animal or human researchers. In so far at least this volume is an exception to this custom as it contains several chapters which may attract the interest of workers on plant or microbial cells. It includes a chapter on "Composition and development of the bacterial photosynthetic apparatus", and another one on "The cascade of membrane events during development of *Dictyostelium discoideum*". Two other chapters are of more general interest, viz. on "Tubulin and the microtubule system in cellular growth and development", and on "Nucleus and cytoplasm: supply and demand; what underlies the flow of genetic information?"

As with other volumes of this series, the book includes an extensive book notice section: "Recent books in cell biochemistry and biology", that gives detailed accounts of new books in these fields (10 pages). The book is well produced but is relatively expensive for the information it offers botanists active in (sub)cellular biochemical research, unless perhaps they feel themselves more cell biologist than botanist.

J. VAN DIE

J. D. PHILLIPSON and M. H. ZENK (editors): *Indole and Biogenetically Related Alkaloids.* Annual Proceedings of the Phytochemical Society of Europe, number 17. Academic Press, London, New York 1980. 379 pp. U.S. $ 78.50.

Indole alkaloids from biological origin have provided many challenges indeed to scientists from different disciplines. Strychnine as a representative of this group of compounds was among the first alkaloids to be discovered more than 150 years ago. Since then an ever increasing interest in indole alkaloids can be recorded. This may be explained by the following facts. Plants containing the major type of indole alkaloids have played and still play an important role in the cultural history of populations of many African, Asian and South-American countries. The molecular structure of the majority of indole alkaloids is in general rather complicated; hence the structural elucidation and chemistry are challenges to many a chemist. The ethnopharmacology and the broad spectrum of biological activities in man and animal connected with the molecular structure of alkaloids have been an ever triggering stimulus for researchers. With respect to the current clinical use of members of the Ergot alkaloids, *Rauwolfia* alkaloids and *Catharanthus* alkaloids, and the potential possibilities of naturally occurring alkaloids the book deals with the several aspects of the subject matter. The chapters cover botany, isolation and separation, biosynthesis, biomimetic and 'classical' synthesis, fermentative production and biological activities. The majority of data presented in the chapters is based on research carried out between 1970 and 1980.

As far as botanical distribution and chemotaxonomical considerations are concerned, chapters one to four deal in particular with the alkaloids in the families Loganiaceae, Apocynaceae and Rubiaceae. Especially the modern chromatographic methods applied for isolation and analysis of different classes of indole alkaloids are described and discussed in chapter five. The results obtained by the study of the biosynthesis of some terpenoid-indolalkaloids are discussed in chapters six, seven and fourteen. Thus the role of strictosidine in the biosynthesis of heteroyohimbine type of alkaloids gets special attention. The unravelling of the biosynthesis of Ergot alkaloids discussed in chapter fourteen surely exemplifies the high sophistication demonstrated by the researchers involved. In the chapters eight through thirteen, dealing with synthesis of Ergot alkaloids, classical as well as well as biomimetic reactions are treated.

As for the production of Ergot alkaloids through fermentation techniques it is concluded that the genus *Claviceps* remains to be the only source of commercial Ergot alkaloids. Two chapters (16 and 17) deal in particular with biological activities of Indole alkaloids. Their contents reflects the existing variety in pharmacodynamic activity connected to structural differences within the Indole alkaloids. On the basis of this diversification it is expected that new structural types of alkaloids are yet to be found with desirable therapeutic properties. The book closes with a chapter in which recent work on Indole alkaloids as mould products and plant products is highlighted.

It may be concluded that this book represents a valuable treatise of recent achievements in the field of Indolealkaloids. Its scope which reaches from botany over chemistry to biochemistry and pharmacology makes it useful as a reference source to biological, chemical and pharmaceutical trained researches.

R. P. LABADIE

W. BRAUNE, A. LEMAN and H. TAUBERT: *Pflanzenanatomisches Praktikum II.* Veb Gustav Fischer Verlag, Jena 1882. 2. Aufl. 426 p., 135 fig. Cloth 45.– M.

Teachers of introductory plant kingdom courses will welcome the second edition of Braune's 'Practicum zur Morphologie und Entwicklungsgeschichte der Pflanzen', now appearing under a new title as to draw attention to the existence of a sister volume on anatomy (Pflanzenanatomisches Praktikum I. See *Acta Bot. Neerl.* **29**: 318, 1980 for review). The present edition differs from the previous one only in minor respects: the text and bibliography have been updated based on comments or criticism of the users and a number of photographs and line drawings have been replaced. For algal groups generic keys have been included to facilitate the identification of mixed samples of natural populations. For the instruction and demonstration of the life histories of the various plant groups to university students this is certainly one of the most comprehensive and inexpensive lab manuals currently available.

S. R. GRADSTEIN

I. MÁTHÉ and S. PRISZTER (Editors): *Review and indices of the series "The Cultivated Plants of Hungary", booklets 1–50.* Akadémiai Kiadó, Budapest 1982.

"The Cultivated Plants of Hungary" is a series of short monographs, in Hungarian language and written by a team of specialists, on the agricultural plants of Hungary. The present jubilee issue contains indices and contents, in english and latin, for the volumes published so far, in order to facilitate access to the series for foreign specialists.

S. R. GRADSTEIN