

BOOK REVIEWS

H. KINZEL: *Pflanzenökologie und Mineralstoffwechsel*. Ulmer Verlag, Stuttgart 1982. 534 pp., 178 figs., 96 tables. DM 148.—.

This book is an extensive compilation of ecophysiological literature concerning halophytes (P. Albert, p. 33–215), calcicole and calcifuge, basiphilous and acidophilous plants (H. Kinzel, p. 216–380), serpentine plants (H. Kinzel & M. Weber, p. 381–410), peat-moor plants (E. Kusel – Fetzmann, p. 411–471), heavy metal plants (W. H. O. Ernst, p. 472–506), fluorine and selenium plants (W. H. O. Ernst, p. 507–519). In addition to the mineral metabolism of mainly higher plants, treated in an ecophysiological context, a description is given of the soil types concerned, including their origin and distribution on earth.

The book is indeed of great value to colleagues involved in ecological and physiological research and/or in university education. It gives a fairly complete and up to date review of the impressive knowledge from both German and English written literature. In addition, the authors refer to reviews of less recent papers to give some insight into the history of some ecological views. In accordance with the objectives of the editor (p. 7), the authors do not smooth down differences in results or interpretations, thus making explicit current research problems which still have to be solved.

Leaving the latter value intact, the first two chapters could have gained in clearness when a higher degree of order of the habitat types would have been chosen. A simultaneous exhibition of halophytes in arid and in humid (coastal as well as inland) areas is not necessary to demonstrate real complex interrelations. Too much general significance has been attributed to sodium chloride, both in halophyte research and in the present book. And similarly so, calcicoles and calcifuges each occur in a great variety of habitat types which have been discussed simultaneously. In this respect, it is curious that the response to nitrogen is treated under this heading, and not in a separate chapter, because – according to the editor (p. 6) – nitrogen rich habitats are exceptionally heterogeneous. Chapters 5 to 8 are much shorter due to a more synthetic approach, without losing their research stimulating function.

Extensive tables of contents, referred plant species and subjects make the present work a useful and worthwhile book of reference. But the highest profit may result from close reading and thoroughly studying the text and the many tables and figures, many of which compiled originally. The book is highly recommended.

J. VAN ANDEL

L. KUTSCHERA und E. LICHTENEGGER: *Wurzelatlas mitteleuropäischer Grünlandpflanzen, I. Monocotyledoneae*. Gustav Fischer Verlag, Stuttgart, New York 1982. 516 p., 644 figs. Cloth, DM 220.—.

This book is a continuation of the work that was published in the “Wurzelatlas mitteleuropäischer Ackerunkräuter und Kulturpflanzen” in 1960 by Kutschera. In the first chapter the general morphology of the root is discussed, the second chapter treats a classification of plants according to the basal parts of their shoot system (tussock formers, plants with stolons or rhizomes, etc.) and a classification of root systems. The major part of the book is dedicated to illustrations and descriptions of excavated root systems of individual plants of 146 monocotyledonous species from divergent herbaceous vegetations. The final 127 pages of the book contain excellent photographs of transverse sections of roots together with a key for the identification of species according to the anatomical characteristics of their roots.

Attempts to classify root systems always run up against the problem that root extension, branching and orientation are also strongly affected by the environment and that in interpreting differences in root form, species characteristics and the effects of environmental factors often cannot be separated. Despite this far-reaching conclusions are drawn from the excavated root systems of individual

plants. Moreover, in a general discussion of the environmental effects much is said about the significance of the soil structure and the climate but nothing about the possible effects that for instance the defoliation regime can have on the size and form of the root system in grasslands.

The reason for emphasizing the significance of climate has much to do with Kutschera's ideas on the gravitropic behaviour of roots. This behaviour primarily depends on the replacement of the mucigel on the root tip under the influence of gravitation to the down side of the root. As a consequence the cells at the upper side of the elongation zone of the root can more easily take up water and thus elongate (downward curvature) or lose water through evaporation and thus shrink (upward curvature of the root). Rapid changes in soil moisture content as in continental climates enforce the downward growth response of the roots. This, for instance, brings the authors to the assumption that the shallow root-system of a perennial ryegrass plant, excavated in a pasture near Groningen in the Netherlands would have been due to the more even marine climate. In an earlier publication Kutschera already expanded her views on root gravitropism and stated that plant hormones are not needed for its explanation.

In her first book professor Kutschera was more open to other views on root behaviour, whereas in her new book she hardly mentions other opinions at all. The earlier book also treated a much wider variation of root forms; several of the drawings of root systems in the new book, especially of the grasses, appear to be very similar. However, the transverse sections of the roots of several monocotyledonous species could be interesting to root ecologists, for the simple reason that only few comparable studies of plant species have been published in this field. Therefore, for researchers with specific interests in root anatomy it might be a valuable book, although it is expensive.

J. H. NEUTEBOOM

D. THANNHEISER: *Die Küstenvegetation Ostkanadas*. Münstersche Geographische Arbeiten 10, Schöningh, Paderborn, 1981, 204 pp., 41 Tables and 166 Figures. Price DM 41.50.

In some West-European countries the classification of plant communities is fading out as a research topic or has almost reached saturation. This has different grounds: One is that much vegetation is degenerating or even deteriorating in those countries owing to human activities so that further work becomes problematical. Another reason is that the scientific interest for further refinements of the classification system is decreasing. Classifiers of vegetation should therefore look for other parts of the Globe for applying the need of putting in order the large floristic and structural variety in the Earth's plant cover.

Dr. Thannheiser is one of the pioneers of that new generation of classifiers. He has specialized himself in coastal vegetation of the northern part of the Holarctic Region, especially that of Northern Scandinavia, the North-American continent and subarctic and arctic islands. His book is the result of three geobotanical excursions (1975, 1976 and 1978) along the East Canadian coasts from Nova Scotia to South Labrador and from Newfoundland to the South coast of the Gulf of St. Lawrence.

After a physiogeographic and climatic description of the area of investigation, some remarks are made on the Braun-Blanquet approach of phytosociology. Areal maps with localities of diagnostic and floristically important taxa are presented, mainly of Newfoundland. In three habitats, viz. the salt marsh, primary dunes and beaches, the plant communities are described from the physiographic, physiognomic, dynamic, systematic, ecological, chorological, economical and conservational points of view. Each of the 30 associations and 13 other abstract vegetation units is characterized by many relevés ordered in tables, and a distribution map is added. Vegetational zonation is illustrated in many figures. The author could not resist the temptation of deducing succession from these features of zonation.

Dr. Thannheiser knows the literature on European salt-marsh vegetation well and compares in this book his findings in Canada with the European situation. The value of his work must therefore especially be found in its comparative character. For his European colleagues the author gives a new geographic outlook outside the classic area of investigation carrying new problems to the old hierarchical synsystematics. For his Canadian colleagues Dr. Thannheiser will present perspectives

for further studies in these and other habitats in the field of plant geography, vegetation science and plant population biology. It is a pity that they therefore have to get over the German language.

W. G. BEEFTINK

R. BROUWER, O. GAŠPÁŘIKOVÁ, J. KOLEK and B. C. LOUGHMAN (eds.): *Structure and Function of Plant Roots*. Series: Developments in Plant and Soil Sciences, volume 4. Proceedings of the 2nd International Symposium, held in Bratislava, Czechoslovakia, September 1–5, 1980. Martinus Nijhoff/Dr. W. Junk Publishers, The Hague/Boston/London, 1981. 415 pp., many illustrations and tables. Price Dfl. 150/US \$ 65.00. ISBN 90-247-2510-0.

This book contains 77 oral and poster papers presented at the Bratislava Symposium. The papers are grouped into 6 chapters as follows: 1. Growth processes, structural characteristics, 21 papers (including 3 on gravireaction); 2. Metabolism of roots, 6 papers; 3. Transport phenomena a) Water transport, 6 papers and b) Ion uptake and transport, 18 papers; 4. Functional integrity of the root system, 6 papers; 5. Responses of roots to stress, 10 papers and 6. Interactions between roots and shoots, 10 papers. All papers are of good quality and concisely written, because the oral presentations had to be limited to seven pages and the poster presentations to three.

A disadvantage of this book is that the attention given to the various topics is rather unbalanced. This, however, is the general problem with proceedings of symposia to which contributions are more or less free. In this volume on Structure and Function of Plant Roots, the structural aspects are mainly concerned with early root growth and development, and integration of structure and function is restricted to a few papers on ion uptake and on responses to stress. In addition, important subjects like growth regulation in a root system, the role of plant growth regulators in root functioning, and root/soil interactions received almost no attention.

Notwithstanding this imbalance of contributions the book is very useful to anyone concerned with the study of root functioning, because it contains a wealth of up to date information. Another important aspect of the book is that two third of the contributions is from scientists from Eastern European countries. It is a clear advantage that in this way so many results of their research are more readily available than usual.

H. KONINGS

R. VAN DEN BOSCH, P. S. MESSENGER and A. P. GUTIERREZ: *An introduction to biological control*. 2nd. ed. Plenum, New York, London 1982. xiv + 247 pp., 91 figs., 13 tables. \$ 18.95, outside USA and Canada \$ 22.75.

The book by Van den Bosch and Messenger, two Californian colleagues who passed away far too early, has been continued by their successor Gutierrez in a very adequate way.

The virtue of the first edition, a paperback published by Intext, was simplicity and overview, and a very reasonable price. The book, therefore, was very suitable as a guide for undergraduate students, in the frame of a lecture-course.

The present, second edition, published by Plenum Press, has been considerably revised and extended, and the result is an entirely new book. The price has gone up fivefold, but one obtains a textbook that represents, in theory and practice, "The State of the Art".

The book deals with biological control of insects and weeds. We knew for long that in insects, regulation of numbers can be brought about by enemies. As regards plants, of which the demographic study is so much more complicated, it has only recently become apparent that abundance and distribution pattern may be determined by the activity of phytophagous insects. Biological control of Klamath Weed (*Hypericum perforatum*) in USA provides an example.

Four introductory chapters deal with terminology, history, ecological basis and Biological Con-

trol agents. Subsequently, two chapters discuss the procedures in the application of pathogens and entomphagous insects. One chapter, on Models and Life Tables, according to my taste could have been combined with that on Ecology.

The following four chapters concern the practice of Biological Control, case studies, and the relation to Integrated Control.

Chapters on Cost-Benefit aspects (it is calculated that every dollar spent on Biological control yields a 25-fold profit) and on future trends conclude the book, which is recommended to everyone concerned with Crop Protection.

Regrettably, the cases mentioned in point are nearly all American, whereas, especially as Pest Management is concerned, the European literature would have provided superior examples.

J. DE WILDE

W. F. PRUD'HOMME VAN REINE: *A taxonomic revision of the European Sphacelariaceae (Sphacelariales, Phaeophyceae)*. Leiden Botanical Series vol. 6. E. J. Brill, publisher, Leiden 1982. x + 294 pp., 6 plates, 660 figs., 4 tables. Df 120.-

For the taxonomy of the Sphacelariaceae we depended up till now largely on the work of Sauvageau (1900–1914). New insights and new methods in taxonomy made a revision needed. The study by Prud'homme van Reine on this group resulted in a very detailed revision of its representatives along the European coasts.

The study has been carried out along the following lines:

1. Study of living material in its natural habitat (at different times of the year, if possible), with comparative observations on morphology of the species growing in one locality.
2. Study of the morphology in unialgal cultures of strains isolated from widely varying material taken from as widely varying habitats and from areas as geographically distant as possible.
3. Study of the reproduction, of the life-histories, and of the morphology of the reproductive bodies.
4. Study of herbarium material.
5. Formulation of taxonomic criteria and delimitation of the taxa using the above four methods.
6. Critical investigations of the type-material of as many taxa as possible in order to establish the correct epithets and the synonymy.

First a description is given of the order Sphacelariales and its nomenclatural history. Other paragraphs deal with distribution, morphology and the used descriptive terminology, ecology, variability and culture studies, reproduction and life history, systematic position and classification. The family Sphacelariaceae is treated in a similar way. Two genera are recognized in this family: the monotypic genus *Sphacella* and the complex genus *Sphacelaria*, subdivided in 4 subgenera, 7 sections and 16 species in Europe. Keys to the taxa are given.

Several approaches for the construction of a classification are mentioned. The phylogenetic-cladistic approach according to Hennig is discussed in detail. The Sphacelariaceae all belong to one group with a monophyletic origin.

The greater part of the book deals with the descriptions of the species. Most details of morphology are depicted. Maps of distribution of each species are given. The book is well printed, like the other volumes of Leiden Botanical Series.

The revision has been carried out very carefully. The author has given a monographic treatment which may serve as a model for all others working on the systematics of algae. Revisions of this high standard are very needed, also for other groups of the smaller brown algae, and may serve as a sound basis for a marine algal flora of Europe.

M. VROMAN