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Book Reviews

Ecology of Tropical Savannas, edited by B. J. Huntley and B. H. Walker, with pp. xi + 669 and 262 figures. Berlin, Heidelberg, New York: Springer-Verlag, 1982. Volume 42 in "Ecological studies: analysis and synthesis". DM 118, approx. US $47,20, R71 + GST. ISBN 3-540-11885-3.

When I was at school some masters used to insist that my essays stress only the best features of the subject under discussion and eschew defects and deleterious comparisons. While the presentation of all points *pro* to the exclusion of those *con* is integral to any argument in which the knowledgeable few participate, such unthinking advocacy produces a false impression on the uninitiated many who may never hear the other side of the argument or fail to detect the significance of what has been deliberately left unsaid. Nowhere is this more apparent than in the current debate on the sacred cow of ecologists in Africa—*Savanna*—the true nature of which this glossy, pretentious and exorbitantly expensive publication reveals little except the jejunity of those who perpetuate such an anachronism in airy disregard of plausibility or sense.

I have nothing against the overall appearance of the book; its size, pagination and durability are acceptable although the balance between illustrations and text is hopelessly lop-sided and the compressed index is in startling contrast to the extensive bibliographies of individual contributors, many of whom are outstanding examples of what Egler has described as that new sociological phenomenon, the Citation Analyst. I find them singularly unimpressive, particularly as only one—and by inference merely—condescends to cite the most substantial botanical and utilitarian classification of African vegetation in existence. Furthermore with the price of the book running at nearly twelve cents a page, both publishers and editors seem determined to turn the discerning student and research botanist into criminals. The facilities of photocopying at five cents a page will enable them to reproduce the *worth-while* content of this book for a modest outlay of thirteen rands!

As for the rest, it could be summed up in Horace's immortal line "Parturient montes, nascetur ridiculus mus", except that with the deplorable state of modern secondary education in South Africa it is doubtful if many readers have even heard of Horace, let alone translated him. The pompous pronouncements in both Introduction, Structure and Conclusion should not be taken too seriously and the editors sermonisings are as inept, tedious and contradictory as their acceptance of vernacular terms is as greatly to be deplored. In their correct usage the latter are too specialised and their proliferation here is indicative of the lack of general agreement as to what is meant by savanna in the African context. The implications for future management of Tropical African vegetation hardly bear thinking about.

What can one deduce for example from the statement, "Reference to its (i.e. Savanna's) supposed etymology, its application by early phytogeographers and its current use in the Americas, Africa and Australia have led most pedantic workers to avoid its use altogether"? As these include Engler, Schimper, Shantz, Marbut, Greenway, Polunin, Whyte, Verdcourt, Keay and a substantial body of members of A.E.T.F.A.T. whose fundamental understanding of the botanical components of African "savannas" obviously transcends that incorporated into the book under re-

view, I find such remarks tendentious and symptomatic of a doleful absence of basic knowledge of the floras.

A more serious indictment from the South African tax-payer's point of view is, of course, the colossal amount of money that has been poured into the Savanna Ecosystem Project at Nylsvley in the Transvaal. Millions of rands, which in the opinion of many of us could have been better utilised for basic ecological survey of our natural resources antecedent to the projection of firm proposals for reservation, have been spent on this "typical southern African Savanna" (page 431). Unmitigated balderdash! Readers (if in the present context any readers can be predicated) have 124 pages from which to draw their own conclusions as to the value and comparability of this research to the southern Africa landscape as a whole.

It is a curious fact that much meaningless botanical work is always done with the best intentions and that ecologists are never so trivial as when they take themselves very seriously. I hope that there will soon be an end to all of this kind for they deprive botany of much of its excitement and exhibit a want of knowledge that must be the result of years of study.

I have no doubt that this is a thoroughly well-intentioned book and presumably there will be people foolish or rich enough to buy it. But they would be advised to first have a look at a comparable volume in the "Ecosystems of the World" series edited by Bouliére. It presents a more balanced coverage and a truly representative selection of data on a subject which urgently requires international integration and synthesis in a form that the rest of the botanical world will respect.

O. Kerfoot

Medicinal Plants of North Africa, by Loutfy Boulos, with pp. 286. Algonac, Michigan: Reference Publications, Inc., 1983. US $39,95. ISBN 0–917256–16–6.

Plants manufacture an incredible range of chemicals, many of which can affect the physiological functioning of human body tissues, producing therapeutic and/or toxic effects.

Comparatively few appear in modern official pharmacopoeias, having unquestionably proven values. Origins of the use of many of these are unknown (e.g. opium poppy, cinchona bark); others were plucked from folk medicine by acute observers (e.g. Withering and the foxglove), while very few were discovered by systematic search (e.g. the *Vinca* alkaloids).

In the foreword Dr. Ayensu states "The systematic isolation and identification of these compounds is essential if we are to help the search for new useful drugs. Unfortunately the impressive variety of plants being used in different parts of the world has not been subjected to careful study. One of the main objectives of this volume and those in the series is to assemble, in one place, basic information on the plant species used frequently in folk medicine, for the guidance of plant chemists and pharmacologists desiring to investigate the chemical constituents and to determine the efficacy of these plant resources." Well that's it; that is what this book is about. It is in effect a list of plants growing in North Africa that are known to be used medicinally, together with the ailments for which they are employed. Arrangement is in families, and vernacular names, with references, are given in abundance.

The uses of each listed plant are mentioned without qualification. Thus of the common onion we have "Bulbs are diuretic, hypoglycemic, antiscorbutic, antidia-

betic, bacteriostatic, antibiotic, intestinal disinfectant in homeopathy." While of the opium poppy we have ". . . analgesic, narcotic. Capsules used for intestinal disorders, chest ailments, cough, diarrhoea . . ." etc, etc. We are given no indication that onions are in truth innocuous and of no proven medicinal value, whereas opium is a valuable, powerful and dangerous drug. As another example we find "Intestinal parasites are expelled by coriander seeds." Does this unconditional statement indicate truth? or folk-lore?

369 species of vascular plants are featured, with monochrome drawings of 107 of these. The bibliography appears to be adequate, though omitting "Watt and Breyerbrandwijk"; there are indices for common names, species and ailments, and there is a glossary of medical terms. The latter includes several terms quite new to me, such as "vulnerary", "emmenagogue", "depurative", "bechic", "bourdonnement", "calefacient", "sternutatory", "cataplasm", "lenitive", "revulsive" and "albugo". "Felon" (how delightful) is given as equivalent to "whitlow". Etymologists might enjoy decipherment.

In summary then this book is the product of a great deal of hard work and investigation but its value and interest seem to me to be restricted to those people referred to in para 3.

W. P. U. Jackson

Heterosis: Reappraisal of Theory and Practice, edited by R. Frankel, with pp. ix + 290 and 32 figures. Berlin, Heidelberg, New York: Springer-Verlag, 1983. Volume 6 in "Monographs on Theoretical and Applied Genetics". DM 118, approx. US $50,90. ISBN 3–540–12125–0.

This is the sixth volume in a valuable series of monographs devoted to specific topics in genetics; all are of uniform format with hard cover and quality paper and printing, as one has come to expect from Springer.

The volume under review comprises 10 chapters, each chapter being a contribution by one or two specialists. Coverage is given to aspects of heterosis relating to: biometrical genetics; maize; barley; wheat; fodder grass; vegetable crops; tomato; onions; ornamentals; and finally, intergenomic complementation (mitochondria, chloroplasts and nucleus). The book is clearly aimed at those with theoretical or practical interests in plant breeding at the postgraduate level. The book is highly relevant to breeders in South Africa as all the crops mentioned are grown here. Each chapter on a crop also goes into breeding plans associated with the exploitation of heterosis.

The phenomenon of heterosis ("hybrid vigour" in common parlance) was recognised early in the development of genetics, the word having been coined by Shull in 1907 in connection with the superiority of heterozygotes with respect to some measurable attributes in comparison with the corresponding homozygotes. Heterosis thus results from heterozygosity but how heterozygosity leads to heterosis has yet to be explained in molecular-operational terms. In fact, it is embarrassing to note that the causal factors for heterosis at the physiological/biochemical level are today almost as obscure as they were 50 or more years ago. Nevertheless, because of its vast economic significance much progress has been made in our ability to manipulate populations to enhance heterotic expression—hybrid maize was one of the early triumphs of practical genetics. Applications of heterosis show no signs of abating, indeed they are increasing as the book shows.

Speculations as to the cause of heterosis are as old as the observations describing it. The two main theories were, briefly, the "dominance" and "overdominance" hypotheses. Jink's Chapter One (Biometrical Genetics of Heterosis) comes out in favour of dispersion and absence of genuine overdominance as the major cause, i.e. heterozygosity is not an essential prerequisite, but rather the correct gene content which can be assembled in the homozygous state, or if the alleles are completely dominant, as a heterozygote. In maize, most breeders accept the quantitative genetic approach where additive and dominance effects provide a satisfactory model for heterosis, the former being precisely those which respond to selection. However, the best inbreds are still far short of the best hybrids which suggests the persistence of some residual overdominance.

Another genetical complication could be that of epistasis between genes from parental lines interacting favourably in the hybrids; this, like dominance, should be fixable in inbreds unless impeded by linkage. A popular current view would be that dominance is the essential basis but with complications that could include some true overdominance, epistasis and so on. The matter is of practical importance because it bears on whether or not "hybrid varieties" should be bred.

Space limitations preclude detailed comment on each chapter. The final chapter opens new paths to a further understanding of heterosis by a consideration of the mitochondrial and chloroplast genes. Superior organelle functions (due to both genomic and intergenomic complementation) are thought to be essential components of heterosis, and are manifested as increased rates of DNA processing, enhanced enzyme activities and an overall faster rate of cell division.

Summing up, the text is accurate, the illustrative matter relevant and well-chosen, while the references and index are adequate. The book is well-nigh indispensable to anyone with a serious interest in theoretical and practical aspects, i.e. all plant breeders.

J. D. Agnew

Physiological Plant Ecology: III. Responses to the Chemical and Biological Environment, edited by O. L. Lange, P. S. Nobel, C. B. Osmond and H. Ziegler, with pp. xi + 799 and 104 figures. Berlin, Heidelberg, New York: Springer-Verlag, 1983. Volume 12 Part C in the New Series "Encyclopedia of Plant Physiology." DM 298, approx. US $128,50. ISBN 3–540–10907–2.

The first two parts of the four part Volume 12 of the "Encyclopedia of Plant Physiology" entitled *Physiological Plant Ecology* have received mixed receptions by various reviewers. Many of the chapters were not treated in an integrated manner and a number remained as straight plant physiology. It is a relief that Part C has achieved some degree of integration and the chapters have an ecophysiological framework, although a number of authorities are not clear what either ecophysiology or physiological plant ecology embraces. This is particularly true when one considers the theme of Volume 12 C as being responses to the chemical and biological environment. Most of the chapters have concentrated on the soil as the environment although others deal with carnivorous plants, higher plant host/parasite relationships and virus ecology.

There is very little on the aerial environment, even though a small section on lichens and air pollution is presented in the chapter on ecophysiology of lichen symbioses. Volume 12 D, however, contains a chapter on the ecophysiological effects of atmospheric pollutants. In Volume 12 C, there are a few lines in Chapter 6 on "acid rain" and chapters 6 and 7 cover aluminium toxicity and tolerances by plants. It would have been extremely interesting to have had a chapter in Volume 12 C dealing with the responses of input of nutrients from precipitation and in particular "acid rain". In those ecosystems containing oligotrophic soils, nutrients from precipitation may be a significant contribution to the pool of available soil nutrients. The pH of rain in Europe has been shown to be approximately 3 and this has resulted in marked changes to the soil environment with a drop in pH and the concomitant release of aluminium. Thus, aluminium toxicity has been a major impact of soil acidification in European forests and has caused considerable damage to trees. This has not been clearly spelt out in either Volumes 12 C or 12 D.

The aquatic environment has been considered in relation to plant ionic relations, osmoregulation and halophytes. Although the halotolerance of bacteria, micro-algae and vascular plants has been covered in depth at the physiological level, there is very little on the physiological ecology of marine algae in estuarine and marine environments. Again, this aspect is covered in Volume 12 D with chapters on nutrient cycling in freshwater and marine ecosystems, phytoplankton productivity in aquatic ecosystems and eutrophication.

Of the 24 contributors to Volume 12 C, the majority reside in the northern hemisphere with six coming from Australia. The content of each chapter therefore tends to depend upon the whims of the authors and consequently there is very little data coming from Africa. Copper-tolerant and arsenic-tolerant plant species are referred to from central and southern Africa respectively. The South African studies on *Drosera aliciae*. *Alectra vogelii* and nitrophilous plants are all referred to in Volume 12 C. However, it would have been useful to have had something on the seasonality of flowering and pollination strategies of the South African Flora in particular the Proteaceae.

In conclusion, Volume 12 C of the "Encyclopedia of Plant Physiology" is an extensive one and includes a wealth of information which would be useful to South African conditions. The final chapter is an important one dealing with interactions between plants which includes some interesting information on allelopathy. Compared with Volumes 12 A and 12 B there is a greater integration in Volume 12 C. However, after a brief glance at Volume 12 D, both Volumes 12 C and 12 D should not be consulted in isolation to one another. Finally, the 4 part series of Volume 12 dealing with Physiological Plant Ecology will appeal to undergraduates, postgraduates and research workers in botany, agriculture, ecology and plant physiology.

Derek T. Mitchell