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Book reviews

Slack, A.: Karnivoren. Biologie und Kultur von insektenfangenden Pflanzen (translated from the original English by S. Volk), 1st edn. Stuttgart: Ulmer 1985. 272 pp., 176 figs. (16 in color). Hard bound DM 88,–.

This book is not aimed at lion-tamers and bear-hunters but deals with the biology and culture of insectivorous plants. Amateur plant growers will find it to be of tremendous value, for in terms of species listed and discussed it is reasonably complete and up-to-date while it also contains, in the last part, a number of practicable culture-methods. The list of sources of plant material is another attractive feature, and the book is well-illustrated. Creative persons will feel encouraged by the list of known hybrids in *Nepenthes:* its length, which demonstrates that hybridization is relatively easy here, can be seen as an invitation to further experimentation. However, persons interested in the genetics of the situation, including the presence or absence of incompatibility-barriers, will be sadly disappointed. Mention is made of the fact that natural hybrids do occur, but absolutely nothing is said about the particular pollination-situation which makes this possible. In the orchid family, the conspicuous absence of biochemical barriers against hybridization (demonstrated by the ease with which hybrids can be made in the greenhouse) is often discussed in connection with the observation that the plants have very specific insect pollinators so that under normal circumstances the "risk" of hybridization is close to zero; many biologists therefore assume that there has been no selection-pressure to develop biochemical barriers. The inexperienced reader of "Carnivores", left completely in the dark about the pollination-picture, may (on the basis of the above) feel tempted to assume insect-pollination in *Nepenthes. A priori,* it does not seem unlikely, since in the dense tropical jungle which constitutes the normal environment for these plants, wind is not an important factor. But what is the answer?

Unfortunately, the book contains several other sins of omission. In the bibliography, Charles Darwin's classical book (1875) on insectivorous plants is not mentioned, while the work of his grandfather, E. Darwin (The Botanical Garden, 1791) is. Nothing is said about the fascinating microscopic observations one can make when a tentacle of *Drosera* is supplied with e.g. a drop of meat-extract. Schnepf's beautiful work on slime-production in *Drosera* is not mentioned. In general, the bibliography is woefully short on German and Dutch titles. The 1977 quotation for J. T. Barber is incorrect; it suggests a regular journal-article, while in reality the results of his work were given in a supplement to the journal "Plant Physiology", in the form of a very brief report which refers to a paper presented at a meeting. The value of Barber's observations concerning the digestive properties of the slime of certain mucilaginous seeds such as that of shepherd's purse (*Capsella bursa-pastoris*) should not be overestimated, as Slack seems to do. It is very doubtful that the digestion of small organisms by the slime can contribute much to the establishment of the young seedling. Control experiments with seeds in a sterile environment were not mentioned! Very definitely, *Capsella*-seeds are not lacking in reserve materials, as Slack seems to suggest; a few millennia ago, they were highly valued as a human food in N.W. Europe, probably because of their spectacular fat-content! – One can also feel uneasy about Slack's contention that *Nepenthes* was first found by Europeans on the island of Madagascar around the middle of the 17th century. Rumphius, that great blind seer and biological pioneer, reached the island of Amboina in the East Indies as a young man in 1653, and found *Nepenthes* there; it was he who was the first to mention that certain mosquito larvae live in the digestive fluid of the pitchers with obvious impunity. Some 50 years ago, C.G.G.J. van Steenis, in his book "Maleise vegetatieschetsen", reported a neat positive correlation between the geographical distribution of *Nepenthes* and high annual precipitation, suggesting that *Nepenthes* can be used as a climatic indicator. In contrast, the information given by Slack on this aspect (on p. 79) is wishy-washy. Who is correct here?

All in all, one cannot escape the impression that the author has not always done his homework. In summary, then, it can be said that his book is a very useful one, but not the definitive work on carnivorous plants one would like to see.

B. J. D. Meeuse, Seattle

Baserga, R.: The Biology of Cell Reproduction. London, Cambridge (Mass): Harvard University Press 1985. VIII + 251 pp., several figs. and tabs. Hard bound $ 27.50.

Dr. Baserga has written a useful account of an area of fundamental interest in a distinctively personal style. Few books in cell biology begin with a dedication in Classical Greek, and recommend students to follow the admonition (in Latin, but unfortunately with two misprints) of the apostle Paul to the Thessalonians 'to prove all things; hold fast that which is good'. Happily such unaccustomed erudition is maintained throughout the text, and Dr. Baserga presents a wealth of information in a commendably organized and readable fashion.

The treatment proceeds from a consideration of cell replication, and the timing of the events of the mitotic cycle, to more complex matters of current interest, such as the effect of virally-coded proteins on cell proliferation, and the manner in which proto-oncogenes can be activated to acquire a transforming rôle. With regard to the mitotic cycle, Dr. Baserga takes an approach which is refreshingly original. A self-replicating system placed in a medium containing all the essential precursors continues to replicate automatically until the precursors are exhausted. Although such behaviour is characteristic of bacteria in the exponential phase, it is however not characteristic of most cells in multicellular organisms. The problem of development is therefore the identification of the factors which make it possible for a cell to escape from the primitive round of replication, and which allow it to engage in more varied activity. Naturally in higher organisms these fine controls of the cycle, and their inter-relationships are complex. Taking a detached view, it is all the more surprising that research in this field concentrates so extensively on advanced eukaryotes. Just as bacteria have done so much to elucidate the basic principles of molecular genetics, concentration on the simplest eukaryotes might reveal more readily the essentials of the mitotic cycle.

That it continually provokes thought about fundamental problems is a measure of the success of Dr. Baserga's book. It is a matter of personal regret that, apart from an accurate and concise treatment of cell cycle mutants in yeast, the subject matter is concerned entirely with animal cells. Also, as usual in discussions of the cell cycle, there is no mention of that highly peculiar deviation, meiosis. Omniscience, however, is regretfully beyond most of us, and there is plenty in "The Biology of Cell Reproduction" to stimulate and enchant.

The production of the book is excellent, and the references, though numerous, have evidently been chosen with care.

P. R. Bell, London

A. Razin; Cedar, H.; Riggs, A. D. (eds.): DNA Methylation Biochemistry and Biological Significance. Series in Molecular Biology. Berlin, Heidelberg, New York, Tokyo: Springer 1984. XIII + 392 pp., 73 figs. Hard bound DM 188,–.

The book "DNA Methylation" covers the biochemistry and biological significance of postreplication modification of DNA comprehensively and well. It sets out to cover both prokaryotic and eukaryotic DNA modification. However, as is usual with many of these reviews, the eukaryotic coverage only take into account perhaps mammalian and *Drosophila* cells, leaving out plant cells either completely or giving them scant regard only. While it is widely accepted that plant cells pose greater problems experimentally for biochemical studies, never-the-less some data is available and if it is intended not to include plants under the all embracing term "eukaryotes", then that should be stated.

That aside, the book does cover the field well. The introductory chapter (General overview) by the editors sets the tone for the whole book, being incisive in its main facts and trends, briefly describing the occurrence of minor bases, the DNA methylating enzymes and the present thinking on the biological significance of DNA methylation. The next three chapters deal with the various types of restriction-modification enzymes, thee are followed by several chapters on methylation of prokaryotic DNA, replication and repair, patterns of methylation and the effect of DNA methylation on gene expression.

An interesting chapter on DNA methylation and early mammalian development is only one of seven chapters dealing with methylation and its biological function which are to be found in the last hundred pages of the book. These include gene inactivation, gene expression through development, differentiation, chromatin structure and a consideration of conformational changes consequent on methylation of sequences known to influence gene expression. The book comes with an index.

A book to be read by those, new to the area and those already familiar with it but wanting a comprehensive documentation of research findings, it should find a place in your library.

J. F. Jackson, Glen Osmond

Friedberg, E. C.: DNA Repair. New York: Freeman 1985. X + 614 pp., several figs. and tabs. Hard bound $ 28.95.

Following an introductory chapter on damage to DNA by spontaneous and environmental means, including by base analogue and physical agents, changes in chromatin structure and the commonly used methods of detection and measurements of base damage in DNA, it was refreshing to find in the second chapter of "DNA repair" by Errol C. Friedberg, a table (2.3 on page 85) listing the occurrence of DNA photoreactivating activity which included several plant cells among microbial and mammalian tissues. This revelation was short-lived however, as reference to higher plant cells ceased at that point, and right up to the last page (page number 614) no further mention of plant cells can be found in the book. The book does have an index, but a quick look showed that no mention of the word "plant" appeared in this index.

While appearing to dwell on this discrepancy, it should be said at this point that this book is no worse than others which have appeared recently. They too have dwelt on DNA repair in *E. coli* and in mammalian cells and referred little if at all to plant cells. It could be said that some of this reticence to refer to plant cells could be due to the first reports in the 1960s which suggested that plant cells did not exhibit DNA repair. However this has now been refuted, and work with carrot cells and with pollen shows that DNA repair in response to a range of mutagens does in fact take place in plant cells.

To get back to this book, the remaining seven chapters do indeed do justice to the non-plant DNA repair, dealing as it does with the DNA glycosidases, with excision repair including the situation where there is "bulky" base damage and mismatch repair in prokaryotic cells and mammalian tissues. The final three chapters deal with DNA damage tolerance in prokaryotes and mammalian cells, and finally an excellent chapter on DNA damage and human diseases. The latter deals with the diseases Xeroderma pigmentosum, Ataxia telangiectasia, Blooms syndrome, Cockayne syndrome and Fanconis anemia in human cells, and is well illustrated and explained so as to be well worth purchasing for this chapter alone.

At the risk of being pedantic, it is a pity that plant cells do not receive adequate treatment in a book with such an all-embracing title. Perhaps at some time in the near future a book will appear which will give some attention to DNA repair in plants.

J. F. Jackson, Glen Osmond

Key, J. L.; Kosuge, T. (eds.): Cellular and Molecular Biology of Plant Stress. UCLA Symposia on Molecular and Cellular Biology. New Series, Vol. 22. New York: Alan R. Liss 1985. xvii + 494 pp., several figs. and tabs. Hard bound $ 66.–/ £ 50.00.

A variety of environmental and biological stresses can interfer with normal plant development having negative impacts on the production and the quality of the crop and plants. Besides economic losses, these stresses reduce the efficiency of crop production to a level where it is uneconomical to raise crops in many regions. The new approaches in molecular and cellular biology offer the opportunity of applying new knowledge to plant biology as well as the development of new plant varieties with enhanced stress tolerance.

The literature describes weekly new approaches and developments in molecular and cellular biology. Due to changing terms and new developments this literature is for non-molecular biologists mostly hard to read and difficult to interpret.

The aim of this book by Key and Kosuge is to assemble an overview of cellular and molecular responses of plants to stresses in a readable text for every interested biologist. In their discussions several authors also refer to "local" journals and unpublished data which provides helpful background information and demonstrates the overwhelming amount of work that has been done in this field during the last years (most refer to papers published in 1984).

The presented research on cellular molecular biology deals with the responses of plants to stress imposed by biological

agents (microorganisms, viruses) and environmental factors (temperature, salinity and water stress). Other topics include the immunochemical identification of antigens involved in plant/pathogen interactions, the involvement of two genes in the maize anaerobic response, potato cold hardiness and freezing stress, molecular mechanisms of compensation to light stress in chloroplast membranes, plant adaptations to toxic natural products and the impact of plant stresses on crop yields.

This book will be of interest to researchers and teachers in botany, agriculture, biochemistry and genetics.

J. A. M. Schrauwen, Nijmegen

Larcher, W.; Häckel, H.; Sakai, A.: Meteorologische Pflanzenpathologie, Witterung und Klima als Umweltfaktoren. Kälte und Frost. Rademacher, B.; Richter, H. (eds.): Handbuch der Pflanzenkrankheiten, Vol. 1. Die Nichtparasitären Krankheiten, Teil 5. Berlin, Hamburg: Parey 1985. 326 pp., 184 figs. (13 in color on 2 plates), 57 tabs. Hard bound DM 248,–.

Ecologists will consider it a pity that this excellent monograph on cold and freezing as ecological factors is hidden in the famous classical Encyclopedia of Plant Diseases. For breeders, the background information on weather and climate, with emphasis on below zero temperatures, and the diagnosis of chill symptoms of frostbitten plants is useful information.

The part on chill resistance is most important and although the treatment of the genetics of cold resistance as a species and cultivar specific characteristic is only marginal all the other important aspects, such as interspecific and intraspecific resistance and differences between base and scion, are discussed. It is important to know that frost resistance is not a general criteria of a plant individual, but different for different organs and tissues, as well as in the various developmental stages. Even hardening could be gene dependent. Breeders will definitely learn a great deal by reading this monograph.

H. F. Linskens, Nijmegen

Böhme, H.; Mettin, D.; Müller-Stoll, W. R.; Müntz, K.; Rieger, R.; Rieth, A.; Scholz, F.; Stubbe, H. (eds.): Die Kulturpflanze, Mitteilungen aus dem Zentralinstitut für Genetik und Kulturpflanzenforschung Gatersleben der Akadmie der Wissenschaften der DDR, Bd. 32. Berlin: Akademie-Verlag 1984. 268 + 310 pp., 74 + 87 figs., 16 + 34 tabs. DM 120,–.

This recent volume of the yearbook of the Institute of Genetics and Crop Science of the DDR consists of two parts: the full text of the lectures of the 3rd Seed Protein Symposium, held in 1983 (K. Müntz and C. Horstmann, editors), and the usual cocktail of reviews and original papers from the institute, dressed up with information on the institute in 1983, and finishing with a subject index.

Sixty scientists from 13 different countries gathered for the topic "Genetics of Plant Seed Proteins". The 21 plenary lectures covered not only wheat, barley and maize storage proteins, but also non-cereal proteins of *Vicia faba, Glycine max* and *Pisum sativum.* Improving seed proteins by breeding is also a major topic of the institutes own research program. In addition, the text of 19 poster sessions is given in full detail, demonstrating the penetration of N-terminal amino acid sequence analysis into the area. The analysis of secaline, glutenin, albumin, legumin and vicilin is making further progress.

The annual publication of the institute contains 2 important review articles on the domestication syndrome (K. Hammer) and on models of carbon isotope discrimination during photosynthesis of C3 and C4 plants (M. Peisker). The original papers cover a broad field: pollination ecology of wild barley, variation of seed characters of *Vicia* species, the genetic resources of *Malus.* The institute's travel activities are also reported: information on the farro in southern Italy and the collection of indigenous taxa of cultivated plants in the CSSR, Lybia, Georgia and South Italy. Literature reviews on the archaeological remains, taxonomy and evolution of cultivated plants are continued.

The extensive volume again demonstrate the institutes broad interests and the staffs wide activities.

H. F. Linskens, Nijmegen

Erratum

Theor Appl Genet (1985) 71:22–25
B. Glaz et al.: Evaluation of cultivar-testing locations in sugarcane

On page 23, second column, second line, the degrees of freedom for F should read:

"...(t – 1) and st(r – 1)..."