

BOOK REVIEWS

P. M. ROBINSON: *Practical fungal physiology*. John Wiley & Sons, Chichester, 1978, 123 p. £ 3.50.

Usually fungi are a forgotten group of organisms when devising a course in physiology at the introductory level. This book is meant to propagate fungi as tools in such a course because of the many advantages they have; most fungi are easy to grow under laboratory conditions and the experiments can be performed with simple facilities. This book describes many experiments which can be done with only some petri dishes, a set of simple chemicals and a microscope at hand.

In the first three chapters, covering half of the contents of the book, the pattern of development of mycelial fungi is traced starting with germination of spores and the effect of several factors on this process, then several facets of the growth of mature hyphae are demonstrated and subsequently several aspects of the developing colony are dealt with. This part is the best of the book. Several nice and simple experiments are suggested, intermingled with clearly written theoretical background information. One thing about the experiments is that because they are so simple the results are not very spectacular and it will be difficult to keep the students interested.

The chapter on reproduction of fungi is not of the same quality. It touches very briefly on the taxonomic classification of fungi. However, the information given about the Oomycetes having a diploid mycelium is not correct, the only diploid structures in these organisms are the oospores. The section about the basidiomycetes is too brief and contains wrong information about the only organism dealt with, *Agaricus bispores*; it is impossible to grow this organism under laboratory conditions, which is very well known by mushroom-growers. More information could have been included about sexual interaction in basidiomycetes, several simple experiments could be devised to demonstrate that on organisms other than *Agaricus*.

Several other topics are dealt with very briefly in an almost fragmentary way, including nutrition of fungi, morphogenetic substances produced by fungi, staling, mycostasis and continuous culture. The last technique is demonstrated with *Geotrichum candidum* a fungus which grows almost as a yeast, for this type of organisms this technique works well but for true mycelial fungi continuous culture is still a very difficult procedure.

The list of references contains very specific literature about the topics dealt with in the text: For a book at the introductory level it should contain also some references to introduce the students to the field of mycology as a whole.

The outline of the book could be improved by collecting the flowsheets for the experiments at the end of each chapter, in order to get a better separation between theoretical background information and the outline of the experiments.

J. H. SIETSMA

H. SINGH: *Embryology of Gymnosperms*. Encyclopedia of Plant Anatomy XII. Gebr. Borntraeger, Berlin, Stuttgart 1978. 302 pp., 30 plates, 121 figs., 1 table. Cloth DM 138,-, US \$ 79.-.

This book is a worthy successor of Karl Schnarf's contribution on the same subject in the Encyclopedia of Plant Anatomy instalment published in 1933. Dr. Hardev Singh from the famous school of professor Maheshwari has ably brought together the results of the past 40 years. Thanks to the inclusion of recent results obtained with ultrastructural techniques the problems surrounding the embryology of the gymnosperms have been brought within the scope of modern botany again.

The book is well edited and illustrated. The text follows the developments and events before and after fertilization in a chronological order. Early development of the microsporangium and microsporogenesis are treated first. The structure and development of the young ovule receive attention in

the next chapter. Subsequently the diverse pollination mechanisms for the different members of the gymnosperms are treated. In the section on the male gametophyte a lucid terminology is presented first, but attention is also devoted to fossil forms and *in vitro* culture. The chapters on the ovule after pollination but before fertilization and on the female gametophyte show our poor knowledge on these subjects, especially with respect to development and functional anatomy. Here is an open field for research. The chapters on pollen germination and the male gamete and on the archegonium and the female gamete give a clear account of recent progress, which has been so fruitful, especially on the subject of oogenesis. Fertilization is concisely treated and also its ultrastructural aspects receive detailed attention.

Structure and development of the embryo, endosperm and seed are treated, but especially with respect to functional anatomy of the seeds one becomes aware of the gaps in our knowledge.

The long duration of the reproductive cycle in gymnosperms is considered briefly, and in a concluding chapter the author gives a number of interesting suggestions and also refers to current ideas on ontogeny, phylogeny and function, without, however, placing these in a wider interpretative context. The book thus remains purely descriptive and it seems that an opportunity is lost to discuss these fascinating theoretical aspects which make the diverse gymnosperms such an interesting group from the embryological point of view.

The book gives an easily accessible and comprehensive, up to date picture. Pure and functional anatomy receive full attention, but one could have wished more information on physiology and ecological relationships, although this is hardly within the scope of the Encyclopedia. In summary: a well-produced book on an interesting subject which will be very valuable for current and future research.

M. T. M. WILLEMSE

A. J. RICHARDS (editor): *The pollination of flowers by insects*. Academic Press, London, 1978, 213 pages, 34 figures, 24 tables, 30 plates. Price £ 12.60 / \$ 26.00 ISBN 0 12 587460 x.

Nearly two hundred years ago Sprengel published his immortal work on flower-insect relations and it is a measure of its timelessness that he is still cited three times in the present Symposium Volume devoted essentially to the same topic. However, a perusal of the papers collected here reveals the impressive progress made since. Especially significant is the emphasis on experimental methods and integration with general ecology and population dynamics.

The contributions which were presented at a meeting at Newcastle upon Tyne in 1977, organised jointly by the Botanical Society of the British Isles and the Linnean Society of London can be conveniently separated in reviews and papers of a more restricted scope.

In the first category fall a stimulating paper by Faægri on the newest developments in the field and one by Kevan on flower colour as insects might see them. Both Van der Pijl and Proctor discuss general trends in flower evolution in relation to pollination, while Lewis discusses in detail the contribution of pollination biology to the field of genecology. Vogel reviews his special subject of how plants deceive pollinators and B. J. D. MEEUSE brings his study of Aroid inflorescences up to date.

The more factual papers of the second group are often to a considerable degree quantitative. The attractants of flowers are discussed, as it were from the insects' point of view by Brantjes (smell) and Corbet (nectar). The effectiveness of pollination is dealt with by Woodell (wind pollination), Stel-leman (syrphid pollination of *Plantago*) and A. D. J. Meeuse (*Salix*), while the effectiveness of gene dispersal is evaluated by Beattie for *Viola* and by Richards & Ibrahim for *Primula*. These last two contributions indicate the future course of investigations in this important field of population biology.

Polymorphism in flower colour is analysed by Kay (*Raphanus*) and Mogford (*Cirsium*) and shown to be part of an overall pollination strategy.

Valentine and Eisikowitch deal with the pollination difficulties which *Impatiens* and *Nigella* have to overcome when flowering in unusual situations.

The last paper by Faulkner is about the problems facing the grower of the humble Brussels sprouts. Here pollination has turned out to be a limiting factor in F_1 hybrid seed production. Apparently bees are less effective because they discriminate too much, while the less selective blowflies cause higher seed set.

Special mention should finally be made of the remarkable set of photographs by Proctor, illustrating various aspects of pollination.

The volume is faultlessly produced as no. 6 of the Linnean Society Symposium series and no serious student of Angiosperm biology can afford to ignore it, especially in view of its relatively low price.

J. MULLER

TH. L. ROST, M. G. BARBOUR, R. M. THORNTON, T. E. WEIER & C. R. STOCKING: *Botany, a brief introduction to plant biology*. X + 344 pp. + appendices 62 pp., hard cover, ISBN 0-471-02114-8, John Wiley & Sons, New York-Santa Barbara-Chichester-Brisbane-Toronto, 1979, Price £ 10.-.

(Based on: *Botany, an introduction to plant biology*, 5th ed., by T. E. WEIER, C. R. STOCKING & M. G. BARBOUR)

The attractive appearance and the low price invite closer examination of this book. Most teachers would not be disappointed because the authors clearly display what botanists think their pupils ought to know. That means full account is given to modern developments in botany, such as the molecular basis of metabolism and photosynthesis, including the C_4 pathway. In a more traditional way, but rather extensive, are treated plant anatomy and the botany of non-vascular and lower vascular plants. Although less attention is paid to other topics the book covers the complete field of botany. In fact more processes and phenomena are described than even outstanding botanists will ever meet in reality.

It may sound cynical but, from his experience with students, the reviewer wonders how far this book and other of the kind contribute to a better understanding of the plant world in the immediate surroundings.

This scepticism is also based on a foolish representation in "Botany". In the meagre treatment of Angiosperm families a drawing is given of cotton. The flowering shoot reminds of a raceme with a terminal flower but has certainly not any resemblance to the dimorphic structure of cotton with its monopodial vegetative and sympodial fruiting branches. How this representation could pass the criticism of the authors, botanists of the USA, worlds leading cotton producing country, may worry the reader.

However, these remarks do not imply that the reviewer has not intensely enjoyed the beautiful illustrations in the book, the clearly written text and the extensive glossary.

The book may serve as an introductory for undergraduate students not specialized in botany, but not for students in botany because the simplifications in the book may interfere with their ultimate knowledge.

G. STARITSKY

K. FAEGRI & L. VAN DER PIJL: *The principles of pollination ecology*, 3rd revised ed., IX + 225 pp. Pergamon Press (Oxford etc.), 1979. Price (hardcover, ISBN 0-08-021338-3) £ 12.50 or US \$ 25.00; (flexicover, ISBN 0-08-023160-8) £ 7.00 or US \$ 15.00.

A book of this kind tends to become a "neoclassic" owing to the general and exhaustive treatment of the many aspects of anthecology proper. Reviewers of a previous edition sometimes commented on the total disregard or at best concise treatment of marginal subjects such as the physiology of flowering, the sense physiology of pollinators, the phytochemistry and biochemistry of floral pig-

ments, nectar secretion, *Pollenkitt*, and pollen germination and pollen tube growth in conjunction with incompatibility barriers and receptiveness of the stigmatic parts of the pistil. Presumably the authors deliberately left them out, but the present reviewer did not find enough references in the text to guide the reader to relevant publications. Whether this is a more or less serious omission remains a matter of personal opinion, but uninitiated readers may not always be aware of all implications of such aspects.

In the new edition the authors apparently attempted to bring the text up-to-date as much as possible, but a number of anthecological papers published before 1978 (when according to a communication by Dr. Faegri the finishing touches were applied) are not cited. Reviewer wonders why the evolutionary origin of the pollination in (early) Angiosperms is not discussed, in particular the question – if not moot point – why the predominant dicliny of gymnosperm forms changed into monoclony in some groups and the associated question of the primacy of entomophily (and primarily of cantharophily). The users of this book are not being told in so many words that its authors accept phaneranthly and dicliny (and naturally also entomophily) as primary conditions even to the extent of arriving at absurdities. Although (on p. 11) some useful information on the Gnetatae is given, the (almost inevitable but erroneous) conclusion is drawn that these gymnospermous forms “must descend from plants with hermaphroditic inflorescences or flowers, which later become (sic!) unisexual” – one may well wonder what these (of necessity gymnospermous) postulated progenitors looked like and where they in turn originated from. There are several other examples of such a reasoning emanating from the euanthous concept (such as the sub-chapter 12.1 on p. 134–135). Such flaws do not detract much from the value of the book as a guide to many anthecological terms and concepts. The many “case histories” are useful on account of the additional comments. Some errors crept in, however; on p. 171/172 it is said that night-blooming species of *Nymphaea* do not trap visiting beetles (they do!). It is a pity that, as in the first two editions, the figures are of such a low standard that they do not do justice to the text. Many of them are indistinct and blurred, which is especially regrettable when the structure meant to be shown is of importance for a proper understanding of the pollination mechanism.

The wealth of detailed information is accessible by separate indices of subjects, plant names, and animal names, but why is there no author index?

Another point of criticism concerns the style and use of words. It is not a great disadvantage if the reader discovers that the authors are not primarily English-speaking so that their work has a continental flavour, but one ought to avoid such apparently self-coined terms as “coleopters”, “dipters”, and “lepidopters”. Other words cannot be found even in larger dictionaries; “revertence” (p. 134) for “reversal” (or “reversion”) is an example. On the other hand misprints are few in number.

This book is a “must” for many biological libraries and it is a good thing that a reasonably priced “flexicover” edition for students and other interested parties is available apart from the more expensive hardcover issue. It is indeed to be hoped, as the authors say, that by stimulating more research, this book will become rapidly outdated. In view of recently published and very cogent palaeobotanic evidence of the primacy of at least some “amentiferous” (and diclinous) groups and therefore, of primary anemophily, it may be expected that certain parts of a forthcoming 4th edition will have to be drastically revised in several respects.

A. D. J. MEEUSE