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C. E. Hughes

The Anther: Form, function and phylogeny. Edited by W. G. D'Arcy & R. C. Keating. Cambridge University Press. 1996. 351pp. ISBN 0521 48063 9. £55 (hardback).

Stamens have received little attention, either in studies of morphology or from an evolutionary viewpoint, but in the last few years there has been an increasing interest in them. This book is a major contribution to the study of the morphology and evolution of anthers, and it will be interesting to many researchers.

The book consists of 13 papers which were mostly contributed for a symposium at the 1993 International Botanical Congress in Yokohama, Japan. As the title indicates, it deals with the form, function and phylogeny of the anther. However, other topics such as stamen development and anther anatomy are also covered. To give the potential reader a complete survey, every paper is listed below with title and author(s) followed by a brief discussion of the contents.

(1) Anthers and stamens and what they do. *W. G. D'Arcy*

This paper gives a good, short insight into the many different topics of the structure and function of stamens and anthers. It also points to the various aspects (e.g. evolutionary or taxonomic) that one topic may have, followed by useful references.

(2) The fossil history of stamens. *W. L. Crepet & K. C. Nixon*

The introduction states that this paper tells us about 'the history of stamens in the context of associated floral morphology'. For every time period a detailed listing of the literature records is given, complemented by reports of new findings. It is well illustrated and explained, so that it is understandable even to the non-palaeobotanist. A good point is that in their discussions the authors do not forget that insects played a role in the evolution of stamens.

(3) The origin and early evolution of angiosperm stamens. *L. Hufford*

A section on aspects of stamen morphology introduces this chapter, which deliberates over the controversial terminology of stamens and anthers. The possible pathways of early stamen evolution are discussed exhaustively following the results of recent cladistic analyses by different authors. Another section is a survey of the diversification of the stamens in Magnoliidae, Eudicots and Monocotyledons.

(4) Diversity and evolutionary trends in angiosperm anthers. *P. K. Endress*

The first part of this paper gives a short but informative survey of any possible changes in the groundplan of the anthers and the family in which they occur, with useful references to more detailed work. The main part is on pollination biology and anther shape with emphasis

on buzz-pollination and its implications. There is also a brief discussion of major evolutionary trends of anthers.

(5) Are stamens and carpels homologous? *W. Burger*

The question of the paper's title is answered in the discussion of five general criteria: general similarity, teratology, fossil evidence, sister group similarities and ontogeny. There is a good, compact discussion on carpel-leaf origin with the current major points of view, but a discussion of the same extent for stamen origin is lacking.

(6) Heterochrony in the anther. *J. P. Hill*

This paper gives an extensive review of how far today's techniques can assess the growth rate in early stamen and anther development, and it explains these methods and their applicability. This is followed by a discussion of whether heterochrony provides a satisfactory explanation for differences observed in anther ontogeny at the morphological level.

(7) Diversity of endothelial patterns in the angiosperms. *J. C. Manning*

Once one understands the terminology of the endothelial thickenings it is easy to follow the author's arguments. The thickening types can be a good character for corroborating phylogenetic hypotheses. It is easy to collect these data (requiring few sections and little prior knowledge), and they can provide phylogenetic information from ordinal to species level. However, one important point emphasized is that the thickenings may be highly convergent.

(8) The calcium oxalate package or so-called resorption tissue in some angiosperm anthers. *W. G. D'Arcy, R. C. Keating & S. L. Buchmann*

The authors first present their own histological survey of calcium oxalate packages in Solanaceae and to a lesser extent in Ericaceae. The second part is a literature review of the oxalate packages in other families. Finally, possible functional roles of the oxalate package structure and its contents are discussed. The whole paper is easy to read and highly informative.

(9) Anther adaptations in animal pollination. *P. Bernhardt*

This paper surveys all the functions the anthers may have in animal pollination and their morphological modifications and adaptations. Principal topics are primary attractants and rewards, and passive and active pollen collection.

(10) Anther differentiation in the Asclepiadaceae – Asclepiadeae: form and function. *S. Liede*

After discussing the form and function of these highly differentiated anthers, the author states that the androecial structures are valuable characters for delimitation at subfamily and tribal level. In addition, the corona structures are useful for delimitation at genus and species level.

(11) Stamen structure and development in legumes with emphasis on poricidal stamens of caesalpinoid tribe Cassieae. *S. C. Tucker*

This is a paper well illustrated with SEM pictures and surveys the variability of shape, surface and dehiscence of the stamens in legumes.

(12) Anther investigations: a review of methods. *R. C. Keating*

Each method is presented with a clear introduction about its application, time for fixation and preparation, and other technical details, with references for more detailed instructions and some useful tips from the author. He emphasizes that for good results one does not need only good material, but also one has to be adequately trained in the use of the necessary equipment.

(13) A bibliography of stamen morphology and anatomy. *A. H. Lynch & M. Gregory*

This immensely valuable bibliography consists of over 1400 references in alphabetical order,

which are also listed by subject (such as development and dehiscence) and by angiosperm family.

In summary, this is a most valuable book covering the triangular relationship of pollination biology, anther structure and systematics. It gathers and illustrates (using SEM pictures, photographs and drawings) the most important information on the morphology and evolution of stamens and anthers, which previously was scattered widely in the literature. In summary, I strongly recommend this book for both students and professional botanists.

D. Sutter