REVIEW

K.J. WILLIS & J.C. MCALWAIN: **The evolution of plants.** Oxford University Press, Oxford, UK, 2002. x + 378 pp., illus. ISBN 0 19-850065-3. Price: USD 45.00

In 10 chapters a very interesting and well-illustrated overview of the evolution of plants is presented. The illustrations are very informative and to-the-point. On the accompanying website the most important illustrations are available as chapter-wise presentation files, and interesting links are given. Chapter 1 is an introduction to the technical aspects of palaeobotany. In Chapter 2 a good summary of early biotic evolution is presented. Chapters 3–7 all have a similar structure in treating subsequent geological periods. In each the evidence from geology (e.g. changing polar positions), climatology (e.g. atmospheric CO_2), palaeobotany (e.g. evolutionary trends in morphological features, fossil evidence of the rise and decline and distribution of taxa), phylogeny (e.g. hypotheses of relationships based on morphological and molecular data), physiology (e.g. C_4-photosynthesis) and the more are integrated in scenarios of environmental and evolutionary change. These scenarios are summarised in biogeographical distribution maps of global vegetation, incl. the presumed floristic composition. The third chapter, on the colonisation of the land is very concise and up-to-date. Interesting is the suggestion of a coincidence of the origin of land plants and the glacial period around 440 My ago. The next chapter deals with the first forests in the early Devonian and late carboniferous eras. I like the discussion on stele types and stems. In Chapter 5 the rise of the seed plants is treated and in Chapter 6 and 7 the radiation of the flowering plants. Unfortunately, the authors misinterpret the cladogram on the relationships of the angiosperms (Fig. 6.17b). The last three chapters are devoted to general considerations. In Chapter 8 the lack of mass extinctions in the plant fossil record is clearly and informatively discussed. Chapter 9 elaborates on the use of biomolecular data. Although this does not affect the overall value of this book, again the authors apparently are not trained systematists. They rather awkwardly discuss the relationships of the termites. There is no contradiction between their monophyly and uncertainties whether they originated from mantid- or from cockroach-like ancestors. The final chapter seeks an overall picture and explanation of the evolution of plants. It seems that major evolutionary change and innovation was concentrated into relatively short intervals in geological time. The macro-evolutionary time-scale of plants differs from that of animals in that there is no evidence for the 5 postulated mass extinction events, but there is a rather chronological correlation between major changes in the plant fossil record and proposed pulses of global plate spreading and increased tectonic activity. The authors suggest that pulses of increased CO_2 might well have been crucial to plant evolution, by providing a global extrinsic abiotic stress from which plants could not escape. This, the authors regard a sobering thought for the future in our times of global change. Strongly recommended!

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