

## Book review

**Plant Toxicology** – 4th Edition. Edited by Bertold Hock and Erich F. Elstner. 2005. 648 pp. Marcel Dekker, New York. ISBN 0824753232.

The nature of plants makes them vulnerable to a wide range of natural environmental insults, both biotic and abiotic, plus an increasing number of anthropogenic factors, including pesticides and pollutants. Fundamental research into the effects on and responses to stresses such as drought and salinity has increasingly found applications in agriculture. Most of our current strategies for enabling crops to overcome stress problems are based not on tolerance but on stress avoidance, such as the daylength-insensitive early flowering wheat varieties which predominate in the drought risk areas of Europe. True tolerance could permit higher yields by permitting a longer growing season. A better understanding of the underlying mechanisms by which plants can withstand stresses will open up new avenues for the genetic and chemical manipulation of crops better adapted to the various stresses.

‘Plant Toxicology’ is a multi-authored monograph, translated from German. It is part of the always-interesting *Soils, Plants and the Environment* series published by Marcel Dekker. The editors are from the Technische Universität München at Freising, and almost half of the chapter authors are from the same institute. This emphasis on European researchers results in welcome novel slants on previously well-reviewed areas, including induced disease resistance. The publishers highlight the fact that the book “contains new information never before offered in English!”, although less than 20 references out of 1500 appear to fall into that category.

The book starts with an unusual opening chapter. In ‘Characteristics of Plant Life’, Hock and Wolf describe plant structure, organisation and development. With increasing emphasis in the plant sciences on molecular biology (especially among funding bodies!) and with fewer researchers having a sound knowledge of the fundamentals of plant structure and function, this inclusion could

be considered timely, although 80-plus pages is a little over-indulgent. Subsequent chapters deal with plant stress (principally, the causes of oxidative stress; Schempp et al.), the molecular basis of toxic effects (Kramer and Hock), and the uptake, transport (Riederer), metabolism and elimination of toxic chemicals (Hatzios). The chapters then become more stress-specific, dealing with air pollutants (Schempp et al.), salinity (Hu and Schmidhalter), mineral toxicities (specifically aluminium and manganese; Horst et al.), herbicides (Fedtke and Duke), allelochemicals (Lux-Endrich and Hock), fungi, bacteria (Heiser et al.), viruses and phytoplasmas (Barna and Király).

I found the book to be rather turgid in places but overall it was a worthwhile effort. With respect to the depth of coverage in individual chapters and its price range (approximately €200), the book has clearly been aimed at libraries and research groups. The book is reasonably up-to-date, though a book published in 2005 should be expected to have cited literature more recent than 2002. The various chapters cover stress physiology (both effects on the plants and their responses) at different levels from the molecular level through cellular and whole-organism levels to the ecosystem (allelopathy), which is important but not too common an occurrence. Another very useful feature was the comparison in several chapters of the systems operating in plants and animals.

On the other hand, I have my doubts about the book title, particularly as to whether it will attract the people to whom this book could be useful. Although the term ‘plant toxicology’ is probably more widely used in the context of poisonous plants, the editors here have used it to cover material “dealing with poisons causing harmful effects in plants”. Chapter contents and titles then appear to have been modified to fit that description. The introductory chapter (Characteristics of Plant Life) has a sub-heading of ‘Hazards from Pollutants’, yet only one sentence appeared to deal directly with this topic. Fungal and bacterial plant pathogens have been included as a chapter on the basis of pathogen-derived elicitors and toxins, but

inclusion of viruses and phytoplasmas as part of plant toxicology is even more strained. A title for the book invoking plant stress effects and responses may have been more appropriate.

In my opinion, the book would benefit from a firmer editorial control, which should result in a more coherent production. The general and stress-specific texts, for example, could be presented in separate sections rather than being mixed together. With any multi-authored production, consistency is important but difficult to achieve. The enormous difference in the length of individual chapters is a case in point; they range from 137 (molecular basis of toxicity) to 19 pages (the uptake and transport of xenobiotics), and this disparity unbalances the book. Other inconsistencies include the use of reactive (ROS) and active oxygen species (AOS) in different chapters. One consistent but infuriating stylistic point involved the different authors indicating vaguely that, for further information, the reader should check the later discussion; this would be facilitated if the relevant section code

were appended. Indeed, a final discussion chapter (for which the editors would be ideal authors) would be useful in pulling together threads from the previous chapters, such as cross-talk between signalling pathways; it could also discuss fruitful avenues (potential and realised) for applied research into the development of crops with increased tolerance to chemical-induced stresses.

Overall, the translation is very good, although some work is still necessary (e.g. "detoxifying"); there are also a number of typographical errors, and the index is less than exhaustive. Researchers in the field of plant stress (in its broadest sense) should find much of interest here; I just hope that they realise that *Plant Toxicology* is aimed at them.

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