

## Book review

### The Biology of Seeds: Recent Research Advances

Editors G. NICOLÁS, K. J. BRADFORD, D. CÔME and H. W. PRITCHARD. Published in 2003 by CABI Publishing, Wallingford, UK. 472 pp. Price £95.00.

This book contains the texts of 49 papers presented at the seventh International Workshop on Seed Biology, held in Spain in 2002. Most of the papers report recent, on-going work in the authors' own laboratories. Contributors were from more than 17 countries. I can only assume that they represent most of the world-wide field of current academic seed research. Many are clearly authorities on their subject matter. The book has been well produced and meticulously edited. It is a valuable and excellent contribution to seed science.

However, it is a book intended to be read *only* by seed scientists. Within the limits set by the readership of *Tropical Grasslands*, this means mostly pasture ecologists and physiologists, seed production agronomists, and seed analysts. If you have no pretensions to being any of these, read no further. If, on the other hand, you are involved in seed science and wish to remain aware of progress over the broad front, whether out of interest or to maintain your competence, you might take steps at least to arrange access to the book. The price makes it unlikely that you will buy it for yourself, and in any case its appropriate place is in a library rather than a personal bookshelf. So talk your librarian into buying a copy.

The chapters are written for specialist-to-specialist communication. There are few concessions to outsiders, so if you are averse to stretching your neurons, don't start. And don't expect to sit down and read a book like this straight through from start to finish unless you are another Lord Macaulay (who is reputed to have committed all 12 books of *Paradise Lost* to memory after two readings). If you merely have a brain like mine, you will have to browse through the chapters, pick out those that you think have something to offer you, and one at a time give them your full attention. It will be a slow process.

If you do this, you will find much of value — not in every chapter by any means, because there is plenty that is hard to follow, or too remote to be yet interpretable in terms of useful insights to the applied scientist. Yet even in the most difficult chapters, it is often worth skipping the incomprehensible and reading the last few paragraphs, because sometimes the authors summarise the implications or the state of progress in just the way that I, and perhaps you, want to know.

The subject matter includes virtually every fashionable topic of modern high-powered biology as it relates to seed — molecular biology, genetics and gene action, biochemistry, growth substance physiology. It is at the applied end of the range where the butter is thinly spread. Even so, there are plenty of crumbs for most of us, and probably the best way to give tropical pasture seed-oriented readers an idea of what might be

useful to them is for me to single out some of the ones that attracted my own interest.

The chapter that I homed in on first was about models of the dynamics of loss of seed viability in storage, a subject of much interest to those of us who have been occupied with storage strategies for tropical pasture seeds. It seems (to my relief, since I continue to make frequent use of them) that the principles proposed by Roberts over 40 years ago, and developed into a broad predictive method over 20 years ago by Roberts and Ellis at Reading, remain as valid and useful as ever. They receive attention in this chapter, but only to address a long-known weakness in mathematical detail and propose an improvement that will raise the predictive accuracy of the old model. The improvement adopts a modification introduced into the probit analysis of insecticide dose rate on insect mortalities by the legendary statistician D. J. Finney over 30 years ago to take account of those deaths that occur irrespective of treatment. It has been waiting around ever since to be re-discovered and adapted by those who treat seed storage durations as analogous to dose rates. All credit to its re-discoverers.

Another chapter deals with smoke stimulation of germination — a subject of great interest to all Australian grassland and woodland ecologists. It reports a number of simple experiments designed to screen a wide range of species for their response to smoke-water, including a number of familiar grasses and weeds. Of all groups screened (which did not include legumes incidentally, some of which have been dealt with in detail previously), it was the seeds of warm-climate grasses that were most consistently stimulated. The authors expressed some preliminary views on why this was so, mainly in terms of relative ease of penetration of smoke-water through the various structural barriers to water penetration to the embryo. The account introduces several interesting possible routes worthy of further investigation.

Orthodox seeds (such as those of grasses and most legumes) are killed if they are dried out during early development on the parent plant, but they quickly become desiccation-resistant as they mature. They must later, of course, be re-hydrated to germinate, but this can happen in both harmful and beneficial ways, and they can even benefit from being briefly re-hydrated and dried back before germination can begin. Different authors have tackled different issues that arise in this sequence of events. Collectively, their chapters help to fill in a few more of the gaps in the vast jigsaw puzzle that is the life history of a seed. They include an outstanding one with the refreshingly direct title "What do we really know about desiccation tolerance mechanisms?". To me it is the highlight of the book, explaining an extraordinarily complex collection of sub-cellular processes in a very readable way.

The first and last chapters are the texts of the opening and closing addresses, respectively. They are excellent, and I recommend that anyone who opens the book should read them, if nothing else. They make a stimulating change from the customary platitudes

delivered on such occasions by tired old eminences. The former summarises history of seed research, the fields of current progress, and the broader social or political issues of the future. The latter covers research directions for the future, accompanied by words of encouragement and advice for those who will be following them.

Finally, despite my high opinion of the book, I must confess to something about its content that left me a little uneasy. It was the scarcity of even token acknowledgement that the fate of seed mostly lies in soil in the ground. There are other equally

important levels of investigation devoted to this, agronomy and ecology among them. They are just as much seed biology as the cleaner levels, yet they have gone virtually unmentioned. Does this suggest a serious and potentially damaging communication gap between levels? Or have recent research advances at the other levels been so few that they can be ignored? I must leave the answers to others more abreast than I of current research.

*John Hopkinson*