

## Book reviews

**The Biology of Xenopus (Symposium of the Zoological Society of London, 68).** R.C. Tinsley and H.R. Kobel (eds). Oxford University Press, Oxford. 1996. Pp. 464. Price £45.00, hardback. ISBN 1 19 854974 1.

Since its initial radiation from South Africa to laboratories around the world for pregnancy testing some fifty years ago, *Xenopus* has become even more widely distributed as a laboratory source of oocytes and embryos for many studies in cell, molecular and developmental biology. As one of those scientists brought up on a diet of developmental biology after this unnatural radiation, it came as a bit of a shock to learn that *Xenopus* really lives in the wild all over sub-Saharan Africa. The editors' aim in *The Biology of Xenopus* was to bring together aspects of the life of *Xenopus* to generate both a comprehensive reference source and an appraisal of a 'type example' in vertebrate zoology. This sounds a bit dry. Not only does the book achieve these aims, but I learnt much and enjoyed it. As Gurdon points out in the introduction, the life-style of these permanently aquatic animals is fascinating and, for those of us who worry about egg quality, and consequently the appropriateness of food and water supplies to laboratory colonies, knowledge of the ecology, behaviour, defence mechanisms, species differences and speciation is extremely valuable.

The articles are grouped in four sections covering: *Xenopus* species and ecology; behaviour, sensory perception and development; infections and defence; and phylogeny and speciation. Seventeen extant species are described, many of which have been identified only in the last twenty years. In addition five (possibly six) geographical sub-species of *X. laevis* are known, amongst which experimental hybrids are fully fertile. DNA content and karyotype analyses indicate that the species form a polyploid series. Remarkably, only one species (*X. tropicalis*,  $2n = 20$ ) seems to be truly diploid, based on comparisons with other members of the pipid family. *X. laevis* can be considered tetraploid because most of its 18 chromosome pairs can be grouped as quartets of chromosomes by specific replication patterns. On this basis five species are octoploid and two dodecaploid. The distribution of the *Xenopus* species in Africa is complex, in habitats from tropical rain forest to semi-desert, with extensive sympatry in some regions. The wide tolerance of environmental conditions by (particularly) *X. laevis* makes the occurrence of feral populations in Britain, Europe and the Americas hardly surprising. In addition, *X. laevis* seems adept at moving into waterbodies perturbed by human activity. In the unique, acidic, 'blackwater' ponds of Cape Province, incursion by *X. laevis* into the preserve of *X. gilli* has

produced natural hybrids without an increase in ploidy. However, experimental hybrid females of these species produce endoreduplicated 'big' eggs giving triploid backcross progeny which, with a further round of endoreduplication generate fertile tetraploids in the  $F_3$  backcross generation. This provides, with temporary loss of genetic control for environmental sex determination, a route for allopolyploid speciation — clearly the theme for *Xenopus*.

In picking my way through this book, I found the ecology and behaviour sections interesting and enjoyable. *Xenopus* is the only frog so far in which long-term memory has been shown. The information on parasites provides independent insight into *Xenopus* phylogeny through host-parasite co-speciation and is, at a mundane level, valuable for those keeping colonies. In the final section on phylogeny and speciation, I was left cold by the palaeontological evidence, primarily because of my lack of background. The chapters on molecular evolution, allopolyploid evolution and host-parasite co-speciation were much more digestible.

The book is successful in providing a broad biology of *Xenopus* with extensive source information. It draws attention to many questions that, through the relative paucity of field studies, still remain. The theme of allopolyploid speciation provides an intellectually satisfying case. And not least, the diversity of bio-active peptides produced by frog skin is only now being uncovered, although witches have known about it for centuries. Never again will I suggest anyone kisses a frog in the hope of finding the partner of their dreams!

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**Gene Structure and Expression (3rd edn).** John D. Hawkins. Cambridge University Press, Cambridge. 1996. Pp. 212. Price £32.50 (hardback), £11.95 (paperback). ISBN 0 521 56043 8.

Faced with the prospect of having to prepare lectures for first, second and third year undergraduates on gene expression, the opportunity of reviewing this book seemed timely. This slim and economically priced book covers an