



**Tadpoles of South-eastern Australia - A guide with keys.** Anstis, M., 2002. Reed New Holland, Australia; supported by WWF. 281 pp. AUD 54.50. ISBN 1-876334-63-0.

To date, approximately 225 anuran species have been found in Australia. Some of the local pioneers who initiated particular attention to the (then neglected) larval phase of the frog's life

include Tyler (1962) and Martin (1965). Subsequently, formal descriptions of larval assignments have steadily accumulated, very often only one to two species at a time, published by a variety of authors in an equally diverse array of scientific journals. Of the 89 species/subspecies of frogs known from South-eastern Australia (New South Wales, Victoria and Tasmania), 84 (94%) have positively assigned larval identities, which are systematically described and illustrated in this book. While 47 of these species had been previously described by various authors, no less than 30 additional larval assignments were rendered by the author for the first time here!

The contents of this book have been organised into three progressive components. But even prior to Part 1 are two sections worthy of mention, the Preface and Glossary. In the Preface, Marion shares with us useful details on close-up photography, line drawings, preservation 'recipes' and culturing conditions. This is immediately followed by a Glossary of some 40 terms, commonly used in tadpole biology lingo. Each of these terms is highlighted in bold print, which helps to create a deeper impression for the reader. Furthermore, the placing of this Glossary at the front (rather than at the back) better prepares the reader when he encounters such terms again in the text.

Part 1 provides a firm foundation by explaining the basic rules on how frogs are classified. An adaptation of Gosner's (1960) developmental sequence is also provided, together with vivid illustrations, tracing the moment of ovum fertilization till the completion of metamorphosis, inclusive of all the significant turning points along this journey of transformation. Following this, the legal issues and husbandry tips of egg and tadpole collection in the country are discussed, keeping in line with licencing and ethical requirements. And of course, the conservation message needs to be propagated, achieved through a summary of the most recent threats to local frog populations, plus action plans spearheaded by both government and non-government organisations. A list of frog and tadpole interest groups in various states is also conveniently listed. However, there appears to be no listing for such a society in Tasmania.

In Part 2, we are introduced to the range of morphometric measurements obtainable from a tadpole from the lateral, dorsal and ventral perspectives, while the key body parts are pointed out. Based on variations of body form, tail shape, mouth type and behaviour, the tadpoles have been categorised into 17 distinct tadpole types, each type being characteristic of a particular genus/genera. Zooming in on the mouth, externally visible structures (using hand lens/dissection microscope) are explained, together with the Labial Tooth Row Formula (LTRF), originally devised by Altig (1970). In total, 15 oral disc types were assigned, determined by a combination, or lack of certain structures. Other variations that are known to occur include the relative positions of the eyes, nostrils, oral disc, spiracle and vent tube. Differences in tail shape, musculature and overall pigmentation are also addressed. While all this preamble appears to be long drawn or lengthy, it actually equips the reader to use the tadpole identification key effectively and accurately. An unexpected, but pleasantly surprising round up for Part 2 is the detailed treatment of the eggs and embryos, including an identification key to these spherical, gelatinous masses, which is inherently much more challenging to create compared with a tadpole key.

Finally, Part 3 presents us with the guide proper. In addition to the scientific name, common name and nomenclatural authority, each species is accompanied by a diagnostic colour photograph of the adult and a distribution map to show its range of occurrence. Where available, adults in amplexus are depicted, with my personal favourite being that of the Great Barred Frog, *Mixophyes fasciolatus* (pg. 218), which captures the unique oviposition behaviour of the female splashing its eggs onto the stream bank. The respective embryos and larval types of each species are described with unstinting detail and careful precision. Colour photographs of tadpoles include lateral, dorsal and/or ventral aspects. This is augmented with line drawings of the whole tadpole (lateral aspect) and the magnified oral disc. For some species, photographs of the emergents are shown, most of them miniature replicas of the adults, of which I found that of the Holy Cross Toad, *Notaden bennetti* (pg. 232) most adorable. Additional notes on metamorphosis, behaviour and other closely related species were most welcome and lent depth to the overall coverage. Last, and certainly least liked on the list is the notorious, non-native Cane Toad, *Bufo marinus*, whose tadpoles can swarm by the millions 'like a moving black carpet', and unfortunately, has become a force to be reckoned with today.

Considering less than half of the country's frog fauna (84 out of 225) was represented in this book, the kaleidoscope of larval forms, size ranges, colour, patterns, metamorphosis durations, behaviour is truly enlightening. This book is indeed a treasure chest of jewels, each tadpole sparkling with its very own spectrum of personality and identity.

If ever a book may be judged by its cover, then this 'larger than life' tadpole pictured rising to the water's surface for a gulp of fresh air signifies a refreshing milestone that has

been reached after more than a century of amphibian research in this unique island continent. Beyond its simple, yet eye-catching, cover design is an inspiring tapestry of one woman's passion and determination in her quest to seek out this elusive and often overlooked aspect of a frog's 'childhood days'. I believe that her profession as a music teacher (yes, you heard correctly), rather than an academically competitive institutional scientist, has enabled her to compose this book into a silent symphony that is palatable to both the uninitiated man (and woman) in the street, as well as the stringent herpetologist.

## LITERATURE CITED

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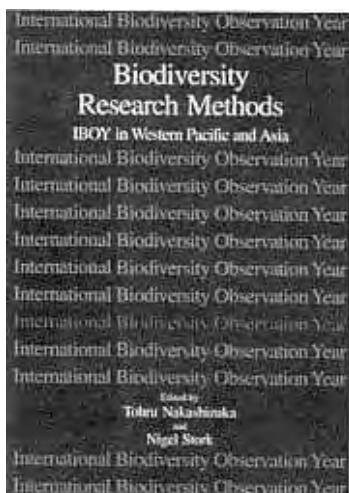
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**Biodiversity Research Methods. IBOY in Western Pacific and Asia.** Nakashizuka, T. & N. Stork (eds.), 2002. Kyoto University Press and Trans Pacific Press. xvi + 216 pp. USD 28.00. ISBN 4-87698-435-2 (Kyoto University Press). ISBN 1-87684-377-2 (Trans Pacific Press).

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D I V E R S I T A S

International Biodiversity Observation Year in the Western Pacific and Asia (IBOY-DIOWPA), which focuses on the assessment of biodiversity at selected/representative study sites throughout the said region. As its title indicates, the book is essentially a manual of recommended standardised research methods aimed at providing bases for proper comparisons and monitoring in biodiversity assessments. It has drawn input from a large number of experts, as can be seen in the long list of contributors for some sections.

The book is divided into five chapters. The first chapter is a general introduction to the mission, rationale and approach of IBOY-DIOWPA. Chapters 2 to 4 focus on forest ecosystems, freshwater ecosystems, and coastal macrophyte communities, respectively, and include, to differing degrees, topics like rationale, site selection, and general and specific methods of sampling and studying selected key groups of organisms. Chapters 2 and 3 can be stand-alone manuals of biodiversity assessment methods. Chapter 5, dealing with island ecosystems, serves more as an introduction to the Pacific-Asia Biodiversity Transect network (PABITRA), the tropical island branch of DIOWPA (DIVERSITAS in the Western Pacific and Asia).

Chapter 2, "Forest Ecosystems", covers the terrestrial taxonomic groups that are prominent in forests, namely plants, with emphasis on tall trees; and the following animal groups: arthropods, emphasising on Drosophilidae, Lepidoptera, spiders, ants and termites; amphibians; reptiles; birds; and mammals. It is comprehensive in its treatment of the selected groups, and accompanied by numerous simple but clear illustrations of various sampling methods, and some sample data sheets.

In Chapter 3, "Freshwater Ecosystems", the coverage of organism groups includes one animal group, the fishes; and the following assemblages: macrobenthos and macrophytes; meiobenthos; epi-microphytes; and plankton, including treatments of bacteria, zooplankton and phytoplankton. The title of the chapter, however, is somewhat misleading, as it actually deals primarily with lacustrine habitats (which it does well), but falls short on coverage of the numerous other freshwater habitats found throughout the region. The chosen emphasis here on lakes is apparently because of their relatively stable nature, allowing for easier standardisation of methods and data comparison. No doubt some of the lake-sampling methods featured can be modified for other freshwater habitats, but the problem is the chapter states that "...due to large fluctuations in their [rivers and streams] environmental conditions, e.g., resulting from seasonal and sporadic rainfalls, the observation of biodiversity in running waters is often complicated by the difficulty of choosing stable or ordinary conditions and selecting typical habitats comparable to elsewhere." I feel that this should not prevent at least attempts to come up with some form of standard protocol for sampling other freshwater habitats such as rivers, peat and freshwater swamps, montane forest streams, etc., as these: i) represent much of the watersheds of the region; ii) harbour a large proportion of the freshwater aquatic biodiversity, much of it stenotopic in nature; and iii) are the study sites for many researchers.

Chapter 4, entitled "Latitudinal Biodiversity in Coastal Macrophyte Communities", seems to lack the detail seen in