

BOOK REVIEW

MICKOLEIT G.: **Phylogenetische Systematik der Wirbeltiere**. München: Verlag Dr. Friedrich Pfeil, 2004. 671 pp., 675 Figs. Format 170×240 mm. Hardback. ISBN 3-89937-044-9

Undoubtedly, this is a remarkable book and there are several reasons for such a statement. Perhaps the most obvious is an ostentatious absence of any reference to molecular record and molecular phylogenetics at all – indeed, something very striking in the time when DNA sequences are often considered to be the only reliable data source for phylogenetic systematics. The story of the book is equally remarkable: it begun at beginning of eighties with an idea to compile the vertebrate volume following the invertebrate and arthropod volumes of Willi Hennig's *Taschenbuch des systematischer Zoologie*, a brief but apparently one of the most concise reference manual to major clades of invertebrate Animalia, which continuation to vertebrate clades was unfortunately interrupted by Willi Hennig's death in 1976. Gerhard Mickoleit, chief of the zoological collections at the Zoological Institute of University of Tübingen, was appointed to take the task and finally he accomplished it. His book appeared with a 20 years delay, of course, and meanwhile it changed from a pocket reference booklet to a voluminous compendium covering nearly 700 pages of dense print. Nevertheless, the book responded the challenge of the preceding volumes by Willi Hennig (1984, 1986) quite conclusively. Not only in that it formally respected both the conceptual framework of Hennig's volumes and his way to expose the topics of phylogenetics but, in particular, in that it apparently presents, similarly as the Hennig's book, one of the most concise survey of the topics ever compiled. In comparison to other compendia on similar subject (e.g. Benton 1988, Carroll 1988, Goodrich 1958, Hanken & Hall 1993, Kardong 1995, Pough et al. 2004, Starck 1978, 1979, 1982, Westheide & Rieger 2004, Zieswiler 1976) the reviewed book retains the incipient qualities of a reference manual. It is intended to provide an instant source of a reliable and concise information on every higher taxon of Craniata, for which it is written in a telegraphic-like style without any redundant sentences, supplementary explanations etc. Its arrangement and style is indeed that of a brief reference handbook, yet its volume corresponds rather to the largest compendia of the branch. In short, in amount of the referred information the present book exceeds apparently most of the other currently available compendia. The essential framework of the book is build by a complete list of vertebrate monophyla above the familial level and a survey of the structural characters which substantiate their monophyly. For each taxon of superfamily rank or higher it provides a detailed list of apomorphies, structured with a clear typographic emphasize, together with a list of further significant characters. The lists in the introduction chapters to higher taxa are particularly comprehensive and are supplemented with eidonomic characteristics of the respective clades, accounts of alternative phylogenetic setting of them and summaries on major pathways of structural diversification within the clade.

Though the character choice for diagnoses of the highest taxa cover fine details of various developmental, embryological or physiological characters, in most instances it is restricted onto the morphological and structural characters. Nevertheless, the details on which the descriptive apparatus of the book operates and the spectrum of character systems which are taken in account are indeed fascinating (comp. e.g. structural specificities of sensoric fields of vestibular organ in particular clades, fine angiologic or myologic details, besides of comprehensive account of osteological and function morphological specificities). In all these respects the book provides, at the same time, a concise and extraordinary detailed information on state of all the respective characters in every suprafamilia vertebrate clade. For the specialist who needs a reliable and complete information on morphological and comparative setting of a certain vertebrate taxon and/or on a way of variation of particular character over a spectrum of clades, e.g. in search of the phenotypic correlates to phylogenies suggested by molecular records, this book provides exactly that what is he looking for. The excellent and perfectly selected line drawings not only supplement the information of the text but enlarge it with a possibility of direct comparisons of various taxa as to states of particular cranial and other character.

Correspondingly to Hennig's volumes, only a limited space is devoted to discussions on relationship among particular monophyla. The phylogenetic hypotheses are in most instances exposed rather as illustration to the content of respective higher taxon than as an analytical output and are restricted to informative cladograms supplemented with lists of references to the multiple literary sources. The basic design of cladograms is quite characteristic of the approach: illustrate rather the state of knowledge and account the unresolved situations than hypothesize on possible relations: where monophyly does not seem to be proved for sure, the polytomies are obviously preferred to expected dichotomies. Typically, the presented phylogenetic hypotheses are explained with phylogenetic meaning of the particular morphological characters and orientation of their phylogenetic morphoclines. In that kind information the book is apparently quite a reliable. No wonder, that in more instances the proposed phylogenies do not contradict to up-to-date molecular record or other modern studies which then provide rather resolving of polytomies than a radical controversy to the basic phylogenetic schemes proposed in the reviewed book (comp. e.g. current results on phylogeny of birds: Livezey & Zusi 2007). Where Mickoleit prefers

the traditional concepts on classification of particular taxa he stressed the alternative possibilities in text and his list of controversies may provide thus robust background for alternative views of phylogeny forced by unexpected results of molecular phylogenetic studies (comp. e.g. position of Dibamidae and Amphisbaenidae in Vidal & Hedges 2005 vs. Micholeit's comments on these taxa). In certain groups, of course, the controversy to the recent classifications basing on molecular data, is apparent. First of all it concerns of mammals where the Mickoleit's strict consequentiality in character selection and absence of any reference to molecular studies or to inferences based on recently discovered fossil taxa restrain a possibility of immediate use of the book as a university textbook. The same objection could be addressed to the nomenclature of some higher taxa: there is a large number of non-traditional names or alternatives to standard usage and though the meaning and content of them is explicit in most instances a brief nomenclatoric explanation (e.g. authors of the respective names) would be undoubtedly appreciated.

Of course, it was apparently not the intention of the book to discuss problems of nomenclature of higher taxa but to provide a concise account of vertebrate monophyla and their specificities in terms of the phenotypic traits. In that point, the author undoubtedly succeeded to fulfill his intention completely. Perhaps nowhere in the recent literature a reader could get so large amount of concise information on each particular vertebrate taxon and rarely one meets a book which – due to reliability of primary information it reports – appears to be the works which information content is invariant to temporary changes in taxonomic opinions, methods of phylogenetic inferences etc. A prolonged period of its compilation as well as the author's consequentiality in his own view of topic turned here into a unique quality of the compendium.

For every specialist in vertebrate comparative morphology as well as for every zoologist interested in evolutionary dynamics of vertebrate phenotype and phylogenetic aspects of organismic biology, the "*Phylogenetische Systematik der Wirbeltiere*" may present not only an essential reference manual but a particularly rich source of inspiration.

Ivan Horáček

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