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BOOK REVIEW

KUSCHEL, G. 2003. **Nemonychidae, Belidae, Brentidae (Insecta: Coleoptera: Curculionioidea). Fauna of New Zealand 45**, 100 pp. ISBN 0-478-09348-9. Price: \$40.00 US (including packing and postage). Available at the Manaaki Whenua Press Website: www.mnwpress.co.nz.

This monograph is an important and welcome contribution by a world authority of curculionoid paleontology, phylogeny, and evolution. Its author has enjoyed an impressively long and productive career, working on weevils of predominantly the southern hemisphere since the mid 1940s (Zimmermann 1993). The present volume will only add to this legacy. It is a *tour de force* of related yet also partly independent results and conclusions, reminiscent of Kuschel's influential 1995 analysis of Curculionioidea. The range of information presented within the 100 pages could easily constitute a series of articles. With respect to the treated subject areas it will be a reference framework for generations to come.

Kuschel provides a comprehensive overview of three of the four orthocerous weevil families occurring in New Zealand: Nemonychidae, Belidae, and Brentidae. Holloway (1982) revised the remaining family Anthribidae in an earlier volume from the same series. The monograph includes keys to genera and species with detailed descriptions of all taxa, and a key to the families of adult New Zealand Curculionioidea. A total of 17 species are treated in this work: one genus and four species of Nemonychidae; six species in four genera of Belidae; and seven species in six genera of Brentidae. Three of the genera and six of the species are new. The book includes 187 illustrations, with habitus drawings for 12 of the species, numerous additional drawings including side views, drawings of the head, mouthparts, hind wings, genitalia, and several photographs and scanning electron micrographs. Distribution maps are provided for each species.

In addition to the revision, Kuschel discusses host plant relationships of orthocerous weevils in New Zealand, gives a brief overview of fossil weevil families, and contributes information about glands associated with the female reproductive tract of many weevils. Finally, a phylogenetic analysis of the genera of Belinae is included in an appendix written by Kuschel and R. Leschen.

In his section on host-plant information, Kuschel notes that in New Zealand, Australia, and Chile over 50% of weevils having host-specific relationships with conifers are orthocerous. This contrasts remarkably with 2.5% of weevils in Europe specializing on conifers being orthocerous. The author hypothesizes that this dissimilarity between Orthoceri in the southern versus the northern hemisphere could be due to differences in the level of climate change between them, as well as the loss of Araucariaceae and Podocarpaceae and the great success of Scolytinae in temperate northern zones. A list of known host plants for each of the 17 revised species is also included.

Kuschel discusses the general patterns of distribution for each of the four families of orthocerous weevils occurring in New Zealand, as well as their levels of endemicity. Apparently,

these taxa are most closely related to genera from New Caledonia, then from Australia, the area northwest of New Caledonia to Sulawesi, and finally Chile.

The section entitled "Fossil Evidence" is not specific to New Zealand, and contains information relevant to anybody interested in the taxonomy of fossil weevils. The author provides evidence for the exclusion of the fossil family Obrienidae from the Curculionoidea. Characters considered important for the placement of Eobelidae, Ulyanidae, and Eccoptarthridae are discussed, and relationships among these and extant taxa are suggested.

Based on their phylogenetic analysis of the genera of Belinae, Kuschel and Leschen propose that Agnesiotidini (*sensu lato*) and Pachyurini are paraphyletic. Belini and Agnesiotidini (*sensu stricto*) are monophyletic yet their positions within the phylogeny are still ambiguous. Pachyurini is paraphyletic and should be recognized only for convenience. Clearly these insights will form a basis for further discussions at the upcoming Phytophaga symposium in Brisbane, Australia.

In light of such a wide scope and the duration of the study it is understandable that some idiosyncrasies will occur. We have noticed that the quality of the illustrations is inconsistent, ranging from excellent to somewhat ambiguous. Most of them lack scale bars. In our view it is also useful to complete a cladistic analysis by selecting a particular cladogram and optimizing the included characters along its branches, even if the overall consensus is less resolved. Character optimization is the most efficient way to convey the diagnostic achievements and problems inherent in a character matrix, particularly when morphological characters are used. Apparently the author also omitted results from recent and critical publications on fossil weevils by Gatshev and Zherikhin (R. Oberprieler, pers. comm.).

These minor issues notwithstanding, we strongly recommend Kuschel's authoritative and wide-ranging monograph to anyone interested in the fauna of New Zealand. For experts and students of phylogeny and evolution it represents a valuable step towards the understanding of the origins of the Curculionoidea as a whole. The shipping costs are conveniently included in the moderate price for this paperback edition.

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