

ABSTRACT

The research presented in my PhD thesis consists of phylogenetic, biogeographic, taxonomic and ecological research of Southern Hemisphere water scavenger beetles (Coleoptera: Hydrophilidae) with a special emphasis on New Zealand. The introductory chapter provides a brief outline on the break-up of Gondwana and geological processes that shaped New Zealand and its fauna. Furthermore, the diversity of New Zealand Hydrophilidae and worldwide diversity of the hydrophilid subfamily Cylominae and its taxonomic history are illustrated. The scientific part of the thesis contains 4 published papers and 2 manuscripts. The first study recalibrates the Coleoptera time tree, providing new age estimates for the Hydrophiloidea, among others. The new age estimate is implemented in the second study, a phylogenetic study that reconstructs the biogeography of the ‘Gondwanan’ Cylominae beetles. The Cylominae, whose name was reinstated through nomenclatural priority over Rygmodinae in a separate paper, are found to consist of two tribes, Andotypini and Cylomini. The disjunct distribution of Cylominae is shown to be partly the result of vicariance and partly of long-distance oversea dispersal. The most remarkable long-distance dispersal is that of the only African representative of the subfamily which reached Africa from Australia about 50 million years after Africa diverged from the remaining Gondwanan land masses. Based on morphological evidence, a new genus *Relictorygmus* is established for the two African species and is diagnosed from the Chilean *Cylorygmus*. The morphological and molecular studies of New Zealand cylomine beetles revealed a total of 13 genera and 61 species of which 3 genera and 25 species remain undescribed. The New Zealand genus *Saphydrus* is revised, revealing two new species, *S. moeldnerae* and *S. tanemahuta*, known from very few specimens indicating the extreme rarity of the genus. Furthermore, immature stages were associated with *Saphydrus* adults by DNA sequences and described. Another lineage genetically and morphologically distant to *Saphydrus*, is described as *Enigmahydrus larvalis*. It is the first hydrophilid genus and species described from immature stages only. Lastly, the ecology of *Rygmodus*, the enigmatic New Zealand hydrophilid with flower-visiting pollen-feeding adults and aquatic larvae, is studied and summarized. The genus is found to be unique within the Hydrophilidae in inhabiting different habitats as adult and larvae. The larvae of *Rygmodus* are described for the first time.