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Studies on phylogeny and biogeography of damselflies (Odonata) with emphasis on the Argiolestidae

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Vincent J. Kalkman

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2013

LEIDEN

Disclaimer

None of the zoological names and combinations in this thesis are published for purpose of zoological nomenclature. This is a disclaimer with reference to Article 8.2 of the International Code for Zoological Nomenclature (ICZN 1999).

Cover plate: Selection of Argiolestidae, illustration by A.G. Orr

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INTRODUCTION

Damselflies and dragonflies (Odonata) are, compared to most groups of insects, well studied and a relatively high percentage of the world's dragonfly fauna has been formally described. They are popular with amateur odonatologists and play an important role in conservation policy. The wealth of information on damselflies and dragonflies found in books or on internet seems to indicate that nearly everything on them is known. Nonetheless no proper overview of patterns of diversity or conservation status was available at the start of this project. Furthermore, while the classification of dragonflies was rather stable at the end of the last century, scientific justification for the system in use at that time was poor.

The stability of the classification system for the families did not signify the end result of a well resolved phylogeny, but merely reflected the lack of true progress during the 20th century.

Much of the work conducted for this thesis was focused on what was at the time known as the family Megapodagrionidae. It was suspected that this family included several, not necessarily closely related, lineages. Based on molecular data this group was divided into eight families. The distribution of the largest of these new families, the family Argiolestidae, includes Africa, Australia, mainland Southeast Asia and the Malesian region. The diversity patterns found in the latter region are still only partially understood and well-based phylogenetic reconstructions of groups occurring in this area are rare, especially so for aquatic invertebrates.

The above mentioned gaps in knowledge on dragonflies and damselflies led to the following four objectives for this thesis:

1. To describe the patterns of global diversity of damselflies and dragonflies and summarize the main processes thought to have led to these patterns. (Chapter 1)
2. To describe how damselflies and dragonflies under threat of extinction are distributed across the globe and to summarize the main processes that might have created these patterns. (Chapter 2)
3. To develop a hypothesis on the phylogeny of damselflies in general and the Megapodagrionidae *sensu lato* in particular, based on molecular data. (Chapters 3, 4, 5)
4. To contribute to the understanding of the diversity patterns of dragonflies and damselflies in Australia and the Malesian region and to reconstruct the history of Argiolestidae in this area. (Chapters 6, 7)

