



## The larva of *Dicterias* Selys, 1853 (Odonata: Heliocharitidae [= Dicteriadidae]), and taxonomic and phylogenetic notes on Heliocharitidae

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### Abstract

The larva of *Dicterias* Selys, 1853, a monotypic genus, is described and illustrated for the first time. It is morphologically very close to the larva of *Heliocharis* Selys, 1853. The larvae of these two genera are compared, and a larval diagnosis for the family is provided. The family Heliocharitidae (= Dicteriadidae) shares derived characters with some Calopterygoidea and is probably related to Calopterygidae. The larvae of Heliocharitidae are also amazingly similar to those of some Megapodagrionidae, and long-legged Megapodagrionidae related to *Megapodagrion* could be related to the family Heliocharitidae and could represent a basal stem within the Calopterygoidea.

**Key words:** *Heliocharis*, *Allopodagrion*, *Megapodagrion*, *Teinopodagrion*, larva, damselfly, taxonomy, phylogeny, Brazil

### Introduction

According to Dunkle (1991), the family Heliocharitidae Tillyard & Fraser, 1939 (= légion des *Dicterias* sensu Selys, 1853; = Dicteriadidae Montgomery, 1967) consists of only two genera, the monotypic *Heliocharis* Selys, 1853, with *H. amazona* Selys, 1853, and *Dicterias* Selys, 1853, also monotypic with *D. atrosanguinea* Selys, 1853. Whereas *Heliocharis* is widely distributed in South America, from Venezuela to Argentina, *Dicterias* has a restricted distribution, being confined along the lower course of the Amazon River. *D. atrosanguinea* is rather abundant in “igarapés” (small streams). Adult males have attractive colors (pale blue markings on the head, pale green stripes on the thorax and bright red abdomen) and are commonly found in sunny areas where they perch with horizontally opened wings on leaves of marginal vegetation above the streams (Fig. 1A). The same behavior is also observed in *Heliocharis* (Fig. 1B), and it may represent a trait of the family. The larva of *Heliocharis* was described by Geijskes (1986). The larva of *Dicterias* is for the first time described and illustrated based on a reared specimen and seven last-instar larvae collected in the Amazonas state of Brazil.

### Material and methods

The larvae of *Dicterias* were sampled in the Reserva Florestal Adolpho Ducke, Manaus, and Presidente Figueiredo, Amazonas state, Brazil. Seven last-instar larvae (4♂ and 3♀) were collected between 2008 and 2010 in different streams. They were collected in typical blackwater streams of the Amazon lowland forest, with acidic blackwater (pH range: 3.7–5), stream width varying from 2 to 3 m, and depth from 0.3 to more than 1 m (Fig. 2). At the collection sites the riparian vegetation was well preserved, the canopy was partially closed, and the dominant stream bottom was sand with tree roots and accumulations of leaves. Larvae were collected among roots at stream banks with moderate to low flow (Fig. 2).

The wing terminology follows Bechly (1996) adapted from Riek & Kukalová-Peck (1984); the mandibular formula is based on the work of Watson (1956). Abbreviations: S1–S10: abdominal segments 1–10; F-0, and F-1: larvae respectively of ultimate and penultimate instars. The drawings were made using a stereoscope MZ8 with a