

# ZOOTAXA

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**Morphological characteristics of water mite larvae of the  
genus *Arrenurus* Dugès, 1834, with notes on the phylogeny of  
the genus and an identification key**

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## Abstract

The larval characteristics of 42 European *Arrenurus* species are provided, based on earlier descriptions. Diagnostic characters are elucidated. The division of the genus into the subgenera *Arrenurus* s. str., *Micrarrenurus*, *Megaluracarus*, *Micruracarus*, and *Truncaturus* has been retained. Principal Components Analysis (PCA) and phylogenetic analysis using the Maximum Parsimony (MP) method were used to construct a phylogenetic tree of the genus. Recommendations on changes to the traditional subgeneric systematics are given, concerning mainly the subgenera *Micruracarus* and *Truncaturus* as well as subgeneric allocation of *Arrenurus nobilis* Neuman which is transferred from *Arrenurus* s. str. to *Micruracarus*. An identification key, supplemented with diagnostic descriptions of individual species, is supplied.

**Key words:** Systematic, European, *Arrenurus*

## Introduction

Water mites have three active stages: larva, deutonymph and adult. Deutonymph and adult mites are predators and the larva of most species is parasitic (Smith *et al.* 2001; Davids *et al.* 2007). Several orders of aquatic insects are hosts for water mites: Colembolla, Coleoptera, Diptera, Heteroptera, Odonata, Plecoptera and Trichoptera. Contemporary knowledge on water mites is based primarily on adults; larval and nymphal stages being considerably less known. And yet, some contemporary research problems, such as distribution and dispersal of species, parasite-host relationships, coevolution of parasitic species and their hosts, etc., calls for knowledge on the morphology of larval stages.

*Arrenurus* is one of the most speciose water mite genera, occurring in most zoogeographic regions. However, the genus lacks cosmopolitan species, and each region supports its own set of species. Europe is inhabited by 152 *Arrenurus* species; about 30% of them have wide distributions and may be regarded as occurring throughout the Palearctic. Larval stages are known for 43 European species.

The subgeneric classification is based on male morphology because male *Arrenurus* are much more differential than females (Viets 1936; Sokolov 1940). This classification uses features like the presence or absence of the petiole or shape and length of cauda. However, in one subgenus the petiole can be present or absent and the cauda differs in shape, raising doubts about the current subgeneric classification. The genus *Arrenurus* is sub-divided into four commonly accepted sub-genera: *Arrenurus* s. str., *Megaluracarus*, *Micruracarus*, and *Truncaturus* as well as the sub-genus *Micrarrenurus* which, established by Cassagne-Méjean