Zootaxa 2800: 1–17 (2011)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Revision of the genus *Alonopsis* Sars, 1862 and its position within Aloninae (Cladocera: Anomopoda: Chydoridae)

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Abstract

Taxonomic status of the genus *Alonopsis* was clarified by the morphological study and cladistic analysis. Morphology of both valid species, *A. elongata* (Sars, 1861) and *A. aureolata* Doolitle, 1912, was investigated. So far, generic status of the group was questioned, some authors treated *Alonopsis* as a part of the genus *Acroperus*. Our data confirm independent status of *Alonopsis*, and emended diagnosis of the genus is provided. According to our analysis, *Acroperus* and *Alonopsis* are the sister-groups of a monophyletic clade, each having their own autapomorphies. Both genera belong to a well-defined group of Aloninae (named here as Arthrocauda-group), which is characterized by the presence of well-developed abdominal joint and elongated narrow postabdomen. There are two parallel clades within the group, one formed by *Acroperus* and *Alonopsis*, other by *Parakozhowia*, *Kozhowia* and *Camptocercus*. According to our analysis, these branches have numerous homoplasies, the most significant of them is the independent appearance of the head keel in two most successful genera, *Acroperus* and *Camptocercus*.

Key words: Cladocera, *Alonopsis*, *Acroperus*, Arthrocauda-group, morphology, systematics, phylogeny

Introduction

The genus *Alonopsis* Sars, 1862 was established by Sars (1862) for the species he had described earlier as *Alona elongata* (Sars, 1861). The initial description was very generalised, so a number of other taxa assigned to the genus was lately recognised as members of the genera *Kurzia* Dybowski & Grochowski, 1894, *Tretocephala* Frey, 1965, *Oxyurella* Dybowski & Grochowski, 1894, and *Euryalona* Sars, 1901 (for full list of these species see Kubersky 1977). Position of one former *Alonopsis* taxa, endemic of Titicaca Lake *Alonopsis titi* Harding, 1955, remains unclear, but this taxa clearly differs from *Alonopsis* s. str. in morphology of postabdomen and belongs to *Alona* s. lato (Sinev & Elmoor-Loureiro 2010, Van Damme et al., 2010). Only two valid species are now recognised within the genus: Eurasian *A. elongata* (Sars, 1861) and North American *A. aureolata* Doolittle, 1912, later redescribed as *A. americanus* by Kubersky, (1977). *A. aureolata* was described from four immature specimens recovered from guts of fishes, one from Lake Sebago, Maine, and three from Sunapee Lake, New Hampshire, USA (Doolittle, 1912). Single specimen from the latter location was deposited in U.S. National museum, so it is reasonable to treat Sunapee lake as type location. Kuberski (1977) described *A. americanus* from the type location of *A. aureolata*, but stated: "Nevertheless, inasmuch as *A. aureola* is represented by a single immature female that cannot be assigned to *A. americana* with certainty, the taxon must be regarded as a *nomen incognitum*." This position contradicts the Code of Zoological Nomenclature, and the name *A. aureolata* should be preserved, while *A. americanus* should be treated as synonym.

Sars (1862, 1993) commented on the resemblance of *A. elongata* to the genus *Acroperus* in relation to the structure of the antennules, postabdomen, and shell. Lilljeborg (1900) also noted that thoracic limbs of *Alonopsis elongata* are similar to those of *Acroperus*. These similarities were summarised and discussed by Smirnov (1966, 1971), who transferred the genus *Alonopsis* to the genus *Acroperus*. He especially emphasised the similarity of the thoracic limbs. But it should be noted, that while Smirnov's (1966, 1971) study of limbs was quite outstanding for

Accepted by M. Alonso: 21 Feb. 2011; published: 25 Mar. 2011