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Amphinemura palmeni is a valid Holarctic stonefly species (Plecoptera: Nemouridae)

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Abstract

The taxonomic status of *Amphinemura palmeni*, a rare stonefly from northern Fennoscandia, was re-evaluated in a morphological study combined with analyses of mitochondrial COI and nuclear 28S sequences. Taxon sampling included *A. standfussi*, with which *A. palmeni* has been confused, the Nearctic *A. linda* and seven other *Amphinemura* species. *Amphinemura palmeni* is confirmed as a valid species, and *A. norvegica* and *A. linda* identified as junior synonyms. The species is illustrated with line drawings, photographs and SEM micrographs. Its COI haplotype diversity is compared with the intraspecific diversity in other stonefly species.

Key words: stoneflies, *Amphinemura*, *A. palmeni*, *A. norvegica*, *A. linda*, *A. standfussi*, Holarctic, Fennoscandia, Nearctic, COI, 28S, SEM, systematics, synonymy, validity

Introduction

Four species of the genus *Amphinemura* are known from Finland and northern Scandinavia. Three of these are widespread Palaearctic species: *A. standfussi* (Ris, 1902), *A. sulcicollis* (Stephens, 1835) and *A. borealis* (Morton, 1894). The fourth species, *A. palmeni* (Koponen, 1917) is listed as an endemic from northern Fennoscandia (Illies, 1978; Lillehammer, 1988), but there has been much uncertainty about its identity and its valid name.

Koponen (1917) described *Nemoura (Amphinemura) palmeni* on the basis of one male and one female specimen collected by Envald in Tuloma Lapland on the Kola Peninsula. The type locality, Lake Nuorti (Russian: Notozero), disappeared when the Verkhnetulomskoe Reservoir was constructed in the 1960s (Gusev *et al.*, 2011).

According to Brinck (1949: 19) *A. palmeni* was a synonym of *A. standfussi*, “considering the description and the type material”. Subsequently D. Tobias (1973) described *A. norvegica* from northern Norway. Meinander (1975) reported that Tobias and Baumann later checked the type of *A. palmeni* and thought that both *A. norvegica* and the Nearctic *A. linda* (Ricker, 1952: 22) were conspecific with *A. palmeni*. However, their work on this taxon was never published. Illies’s catalogue (1966: 185) reproduced Brinck’s opinion, but his chapter in Limnofauna Europaea (Illies, 1978) followed Meinander in considering *A. norvegica* a synonym of *A. palmeni*, without mentioning *A. linda*. Lillehammer (1988: 96) likewise considered *A. norvegica* (sic!) a synonym of *A. palmeni* and did not mention *A. linda*. However it is not clear whether he has studied specimens of *A. palmeni* himself, since his publications do not mention this and no specimens were found in the Plecoptera collection in Oslo (Boumans, 2011b).

We reconsider the taxonomic status of *A. palmeni* and *A. linda* on the basis of morphological study of the types and freshly collected specimens of these taxa as well as *A. standfussi*. In addition, we performed a molecular phylogenetic analysis of fragments of the mitochondrial gene cytochrome oxidase I (COI) and the nuclear ribosomal gene 28S of the aforementioned species together with additional *Amphinemura* species.

Note: The type specimen label (see below) and some literature sources (Lillehammer, 1988; Fochetti & Tierno de Figueroa, 2004) state the publication year of *A. palmeni* as 1916. Volume 44 of the journal *Acta Societatis pro fauna et flora Fennica* was published in eight issues from 1916 to 1919. The description of *A. palmeni* appeared in issue 3 dated 1917.