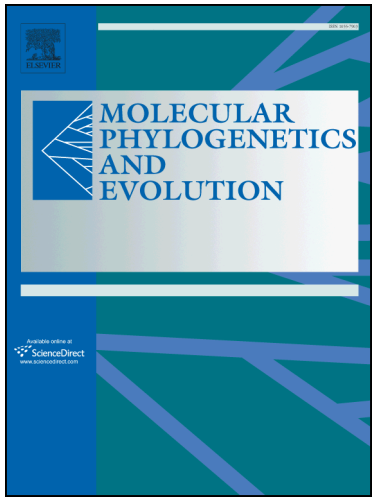

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Multi-locus phylogenetic analysis of the genus *Limnodrilus* (Annelida: Clitellata: Naididae)

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Keywords

Oligochaetes, clitellates, *Limnodrilus,* phylogeny, coalescent, molecular systematics.

Abstract

Limnodrilus species are annelid worms distributed worldwide in various freshwater sediments. The systematics of *Limnodrilus* has chiefly been based on morphology, but the genus has not been subject to any closer phylogenetic studies over the past two decades. To reconstruct the evolutionary history of *Limnodrilus,* and to assess the monophyly of this genus and its systematic position within the subfamily Tubificinae (Annelida: Clitellata: Naididae), 45 *Limnodrilus* specimens, representing 19 species, and 35 other naidid species (representing 24 genera) were sampled. The data consisted of sequences of three mitochondrial genes (COI, 12S and 16S rDNA) and four nuclear markers (18S and 28S rDNA, Histone 3, and ITS). The phylogeny was estimated, using Maximum Likelihood and Bayesian analyses of concatenated data of seven DNA loci, as well as a multi-locus coalescent-based approach. All analyses strongly suggest that *Limnodrilus* is monophyletic, but only if the morphospecies *L. rubripenis* is removed from it. *Limnodrilus rubripenis* and (at least) *Baltidrilus, Lophochaeta* and some species attributed to *Varichaetadrilus* comprise the sister group to the clade *Limnodrilus sensu stricto*, and the latter is further divided into three well-supported