Phylogeography of the Chydorus sphaericus group (Cladocera: Chydoridae) in the Northern Palearctic.

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Author: Kotov
Karabanov
Bekker
Neretina
Taylor

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Abstract: The biodiversity and the biogeography are still poorly understood for freshwater invertebrates. The crustacean Chydorus sphaericus-brevilabris complex (Cladocera: Chydoridae) is composed of species that are important components of Holarctic freshwater food webs. Recent morphological and genetic study of the complex has indicated a substantial species diversity in the northern hemisphere. However, we know little of the geographic boundaries of these novel lineages. Moreover, a large section of the Palearctic remains unexamined at the genetic level. Here we attempt to address the biodiversity knowledge gap for the Chydorus sphaericus group in the central Palearctic and assess its diversity and biogeographic boundaries. We sequenced nuclear (ITS-2) and mitochondrial (COI) gene regions of Chydorus specimens across the Palearctic and compared them with already available Holarctic sequences. We detected six main clades in the C. sphaericus group in the Palearctic, of which two of the groups are novel. Three of the more divergent clades are geographically widespread. The central portion of Eurasia (the Yenisey River basin) appears to be a narrow zone of secondary contact for phylogroups that expanded from European and Beringian refugia. As such, the previously unsampled central Palearctic represents an important region for understanding the evolutionary consequences of Pleistocene climatic oscillations on the Chydorus sphaericus group.

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