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Studies on subterranean amphipod crustaceans of Primory, Russia. Part 1. Three new species of the genus *Pseudocrangonyx* from springs and other groundwater habitats in far eastern Russia

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Abstract

Three new species of the subterranean amphipod of the genus *Pseudocrangonyx*: *P. tiunovi* **sp. nov.**, *P. holsingeri* **sp. nov.**, *P. sympatricus* **sp. nov.** and male specimen for *P. kseniae* Sidorov, 2012 from the South Primory, Far East of Russia are described. The species were found in springs and related groundwater habitats of several river systems belonging to the Japan Sea basin. Phylogenetic analysis based on mt-*cox1* sequences supported the species distinctness. A key for the South Primory species of *Pseudocrangonyx* is provided.

Key words: Amphipoda, *Pseudocrangonyx*, mt-*cox1* sequences, subterranean fauna, Far East

Introduction

The stygobiont amphipod genus *Pseudocrangonyx* Akatsuka et Komai, 1922 inhabits exclusively subterranean freshwaters in the Asian-Pacific region. Hitherto 17 described species of *Pseudocrangonyx*, including 10 species from the Far East of Russia are known (Sidorov 2006, 2012).

The pseudocrangonyctids are adapted morphologically for life in groundwater conditions: body narrow, teretial, without teeth and combs; appendages relatively elongated, eyes and pigmentation entirely lost and sterna respiratory organs are presented by humps (pulvinate sternal epithelium). In our view, the family is interesting because distribution pattern of its species can mark lands and land-bridges of submerged Tertiary Okhotia and Nipponida. However, a more or less harmonious system of the family and relationships within the group is not known yet, because a number of species requires redescription or being a mix of several different species. For example, *P. asiaticus*—a relatively widespread species is recognized by us as a complex of three to some narrow local species. It should be also noted that biodiversity of the group is still much understudied.

Recent biological exploration of the subterranean waters in the southern part of Primory yielded three new species belonging to the genus *Pseudocrangonyx*.

Material and methods

Taxonomic sampling. A new species described below were sampled in the southern part of Primory (Fig. 1): *P. tiunovi*, **sp. nov.** was collected by tweezers directly from a spring in the Vladivostok suburb, whereas both *P. holsingeri*, **sp. nov.** and *P. sympatricus*, **sp. nov.** were pumped from subterranean waters of the Steklajnuha and Kievka rivers respectively by a hand-pump (similar to a Bou-Rouch pump). The groundwater intake was at a depth of ~ 1.2–0.4 m. At pump-site, 100 liters of arenaceous water was pumped through a pipe and clarified through a common hand net with a 250- μ m mesh. Samples were preserved in 96% ethanol solution. The geographic coordinates were obtained using Garmin 72 GPS navigator.