
Reassessment of the geographical distribution of indigenous branchiobdellidans (Annelida, Clitellata) ectosymbiotic on Japanese crayfish

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Abstract

The Japanese crayfish, *Cambaroides japonicus*, is found on the islands of Hokkaido and northern Honshu in association with 12 species of *Cirrodrilus*, a genus of ectosymbiotic branchiobdellidans. To clarify the distributional ranges of these species, we examined museum-deposited specimens and collected branchiobdellidan assemblages from 68 locations on Hokkaido and 60 on northern Honshu. Molecular analyses (mt COI) were performed on a part of the specimens examined.

The present investigation found 10 morphologically distinct species; however, *Cirrodrilus cirratus* and *C. uchidai* were combined into a single taxon, *Cirrodrilus cirratus* complex, following molecular analyses in which the two taxa nested together in a phylogenetic tree. The following 6 species: *Cirrodrilus digitatus*, *C. sapporensis*, *C. nipponicus*, *C. ezoensis*, *C. homodontus* and *C. cirratus* complex were recorded from Hokkaido, while *C. aomorensis*, *C. tsugarensis* and *C. iwakiensis* were found on Honshu. The presence of *Cirrodrilus digitatus* (= *C. inukaii*) and *C. cirratus* complex (*C. uchidai*) on Honshu resulted from the translocation of crayfish from Hokkaido, but finding *C. tsugarensis* and *C. iwakiensis* on Hokkaido is currently inexplicable. No significant difference in the species composition was found between eastern and western regions on Hokkaido, where divergent lineages have been detected in the Japanese crayfish host. Morphological and molecular studies suggest that six species with dissimilar dorsal and ventral jaws form a monophyly, in which four species were found on Hokkaido and two on Honshu. The present reassessment supports the hypothesis that ectosymbiotic branchiobdellidans had undergone diversification into multiple species prior to the host's divergence on Hokkaido and northern Honshu.

Two species previously reported from Hokkaido, *Cirrodrilus megalodontatus* and *C. maki-noi* were not found in the present study. It is possible that the two species are rare, or that they are intraspecific variants of the respective, similarly appearing *C. ezoensis* and *C. homodontus*.

Keywords: branchiobdellidans, distribution, Japan

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