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The freshwater ostracod (Crustacea) genus *Notodromas* Lilljeborg, 1853 (Notodromadidae) from Japan; taxonomy, ecology and lifestyle

ROBIN J. SMITH¹ & TAKAHIRO KAMIYA²

¹Lake Biwa Museum, 1091 Oroshimo, Kusatsu, Shiga 525-0001, Japan. email: smith@lbm.go.jp

²College of Science and Engineering, School of Natural System, University of Kanazawa, Kakuma, Kanazawa 920-1192, Japan

¹Corresponding author

Abstract

Although *Notodromas monacha* (O. F. Müller, 1776) was first reported from Japan over 85 years ago, detailed comparisons between Japanese and European specimens reveal that the Japanese specimens have been misidentified. The Japanese specimens are described as a new species, *Notodromas trulla* n. sp., herein. This species differs from *Notodromas monacha* by the morphology of the male fifth limbs and sexual organs, and the morphology of the female carapace. Like other *Notodromas* species, it is at least partially neustonic, spending considerable amounts of time hanging upside down from the water surface, facilitated by an oval concavity on its ventral surface. It is found in rice fields and small, shallow ponds with few or no floating plants and a muddy substrate, and in suitable habitats can be very abundant. However, evidence suggests that this conspicuous species has experienced a significant and widespread population decline in Japan; reported as abundant in rice fields, swamps and ponds in the 1940s–70s, this species has been collected from only a small number of localities in recent years.

Key words: aquatic fauna, neuston, biogeography, population decline

Introduction

The subfamily Notodromadinae has a global distribution and consists of five genera: *Centrocypris* Vávra, 1895, *Gurayacypris* Battish, 1987, *Kennethia* De Deckker, 1979, *Newnhamia* King, 1855 and *Notodromas* Lilljeborg, 1853. *Notodromas*, consisting of five species, is the most widely distributed genus, with the type species, *Notodromas monacha* (O. F. Müller, 1776), found across the northern hemisphere. Another three *Notodromas* species are also known from the eastern half of Asia, including India (Fig. 1A). *Notodromas monacha* is the only species of the genus with a fossil record. One broken juvenile valve attributed to *N. monacha* has been recovered from Miocene sediments in Germany (Janz 1997), and it has also been recovered from Pleistocene and Holocene deposits in Europe (Absolon 1973; Diebel & Wolfschläger 1975; Diebel & Pietrzeniuk 1977; 1984; Pietrzeniuk 1991; Scharf et al. 1995; Fuhrmann 2012), and China (Mischke et al. 2002) (Fig. 1A). *Notodromas* species spend some of their time upside down at the water/air interface (neustonic). This unusual lifestyle for ostracods (most being benthic, nektobenthic or interstitial), is facilitated by a highly modified, concave ventral surface of the carapace, which can attach to the underside of the water surface. The amount of time spent at the surface by *N. monacha* has been shown to be related to the presence or absence of predators, with significantly less time spent at the surface when fish chemical cues are present in the water (Kiss 2004). In experiments, *N. monacha* showed a preference for neustonic food over other types, indicating that it is primarily a neuston feeder (Kiss 2004).

Notodromas monacha was one of the first species of freshwater ostracods to be reported from Japan, when it was figured in the Illustrated Encyclopedia of the Fauna of Japan (Komai 1927). Later, it was recorded in Japan by Brehm (1933), Okubo & Ida (1989), and Okubo (2003; 2004), as well as being repeatedly featured in later variations and versions of the Illustrated Encyclopedia of the Fauna of Japan series (Ueno 1947; 1957; 1965 in Ueno & Hanai; 1979 in Ueno & Hanai; Uchida 1948; Okubo 2000 etc), and in checklists of Japanese ostracods (Hanai 1959; Hanai et al. 1977).

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