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# Ostracods (Crustacea) from Sarobetsu Marsh, Northern Hokkaido, Japan: Taxonomy and Phenology with Description of *Pseudocandona tenuirostris* sp. nov.

Shimpei F. Hiruta[1,2] and Shunsuke F. Mawatari[1]

[1] *Department of Natural History Sciences, Faculty of Science, Hokkaido University, Kita 10, Nishi 8, Sapporo 060–0810, Japan*
*E-mail: s-hiruta@sci.hokudai.ac.jp (SFH)*
[2] *Corresponding author*

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We sampled ostracods in Sarobetsu Marsh, Rishiri Rebun Sarobetsu National Park, Hokkaido, Japan, from April 2005 to November 2007 and identified four species: *Cryptocandona* sp., *Pseudocandona tenuirostris* sp. nov., *Physocypria nipponica* Okubo, 1990, and *Metacypris digitiformis* Smith and Hiruta, 2004. *Cryptocandona* sp. is similar to *C. reducta* (Alm, 1914) and *C. brehmi* (Klie, 1934), but positive identification is postponed due to the absence of male specimens. In having three setae in the setal group of the second segment of the mandibular palp, *Pseudocandona tenuirostris* sp. nov. belongs to the *Ps. rostrata* species group, and it is characterized by a beak-like medial lobe on the distal end of each hemipenis. From literature based information, Japanese populations of *Physocypria nipponica* and *Ph. kraepelini* from Europe have morphological differences at their hemipenis. We regard *Ph. nipponica* as a distinct species, even though this taxon has been suggested to be a synonym of *Ph. kraepelini* Müller, 1993. We discuss the seasonal prevalence of the four species detected.

**Key Words:** Crustacea, Ostracoda, new species, seasonal changes, Hokkaido, Japan.

## Introduction

Freshwater ostracods are small crustaceans, usually less than 1 mm in body length, with a bivalved carapace made of magnesium calcite (Karanovic 2012); different groups of ostracods are thought to have invaded non-marine habitats independently from marine ancestors (Martens *et al.* 1998). So far, approximately 1900 living species in 200 genera of freshwater ostracods are known worldwide (Martens *et al.* 2008), of which 90 have been reported from Japan (*e.g.*, Okubo 1990; Hiruta and Smith 2001; Smith and Hiruta 2004; Smith and Kamiya 2006; Smith and Janz 2008). Rather than in lotic environments including mountain rivers, they are more frequently found in lentic ecosystems such as freshwater wetlands (Meisch 2000).

Previous studies have detected a number of ostracod species in freshwater wetlands in Japan; for example, 16 non-marine species have been reported from Kushiro Marsh, Japan's largest freshwater wetland (Hiruta and Smith 2001; Smith and Hiruta 2004). Sarobetsu Marsh is the second largest; located in Hokkaido, northern Japan, it covers 67 $km^2$ and accounts for 15% of the total area of Japan's freshwater wetlands. The ostracod fauna in Sarobetsu Marsh, however, has not been previously investigated.

In this paper, we report the results of our three-year faunal survey of freshwater ostracods in Sarobetsu Marsh. We also show the seasonal prevalence of each species found within the research period; like in many other aquatic organisms, abundance and diversity of ostracods are known to vary with the seasons (*e.g.*, Hull 1997).

## Material and Methods

We sampled at five sites (Figs 1, 2) once a month, from April to November, for three years from 2005 to 2007. The five sampling sites covered various environments in and around Sarobetsu Marsh (Table 1). Samples were quantitative, each consisting of 300 $cm^3$ of material retained after straining both water and substrates through a 0.1 mm mesh sieve at each sampling site. We preserved samples in 70% ethanol and extracted ostracods from them under a stereoscopic microscope.

We dissected appendages, mounted them in Hoyer's solution on glass slides, and drew them with the aid of a camera lucida. We used a tragacanth gum solution to paste some carapaces onto microfossil slides. We treated carapaces (including the soft parts) with hexamethyldisilazane (HMDS) (Nation 1983) and examined them by SEM at 15–20 kV accelerating voltage. The material used in this study has been deposited in the Hokkaido University Museum, Sapporo (ZIHU). All specimens listed in "Material examined" sections were collected and prepared by S. F. Hiruta.

The chaetotaxic notation follows that of Broodbakker and Danielopol (1982), as revised for the antenna by Martens (1987) and for the thoracopods by Meisch (1996). Hemipenis terminology follows that of Danielopol (1969).

We use the same abbreviations for appendages as Meisch (2000): $y_a$, aesthetasc of antennule; $G_{1-3}$, apical claws on penultimate segment of antenna; $G_M$, $G_m$, apical claws on terminal segment of antenna; Y, $y_1$, $y_2$, $y_3$, aesthetascs on antenna; $h_{1-3}$, terminal setae 1–3 on walking leg and cleaning

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