



## Recent Cyprididae and Ilyocyprididae (Crustacea: Ostracoda) from Lake Biwa, Japan, including a summary of the lake's ostracod fauna

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## Abstract

Sampling between 1999 and 2007 of the recent ostracod fauna of Lake Biwa, an ancient lake located in Japan, produced ten Cyprididae and one Ilyocyprididae species. One Cyprididae species, belonging to the genus *Ilyodromus* is described herein, *Ilyodromus intermedius* Okubo **n. sp.**, and *Bradleytribella lineata* (Victor & Fernando, 1981c) is redescribed. One Cyprididae species is a new record for Japan, namely *Stenocypris malayica* Victor & Fernando, 1981a, while seven others are new records for Lake Biwa. The family Ilyocyprididae is represented by only one species in Lake Biwa, *Ilyocypris salebrosa* Stepanaitys, 1960. The Lake Biwa population of this species is the first record of males and they are described in this paper. Including this study, forty ostracod species have now been reported from Lake Biwa. Most species (70%) were found at depths of less than 1 meter. Only four species were found below 44 m, the mean depth of the north basin.

**Key words:** Ancient lake, *Ilyodromus*, *Ilyocypris*, diversity, thermocline

## Introduction

The Family Cyprididae is the most diverse group of freshwater ostracods, found in a wide variety of habitats. Forty-five species have previously been reported from Japan, mostly from agricultural fields or irrigation infrastructure associated with the fields (e.g. Okubo 2000; 2004), while a much smaller number are known from marshes and springs (e.g. Matzke-Karasz *et al.* 2004; Smith & Kamiya 2006). Three Cyprididae species have been previously reported from Lake Biwa: *Stenocypris hislopi* Ferguson, 1969, *Strandesia biwaensis* Okubo, 2004 *nomen nudum*, and *Cypridopsis biwaensis* Okubo, 2004 *nomen nudum* (Okubo 2004). Four Ilyocyprididae species are known in Japan (Okubo 2004; Schornikov 2004), but none have previously been reported from Japanese lakes, even though this family is often represented in lakes elsewhere. During sampling of Lake Biwa in west-central Japan, ten Cyprididae and one Ilyocyprididae species were recovered, and are the subjects of this paper. Their distribution and depth preferences are compared with the 18 Candonidae, seven Cytheroidea and four Darwinuloidea species that have recently been reported from the lake (Smith & Janz 2008; 2009).

Lake Biwa is located in west-central Japan (Fig. 1) and is Japan's largest lake. It is one of the world's few ancient (i.e. long-lived) lakes, with a continuous lacustrine history of approximately one million years (Meyers *et al.* 1993). Before the formation of the current lake there was a series of four palaeo-lakes to the southeast, the oldest of which formed almost four million years ago (Nakajima & Nakai 1994). The present lake consists of a shallow, narrow, eutrophic south basin (mean depth of 3.5 meters with a maximum depth of 8 meters) and a much larger, deeper mesotrophic north basin (mean depth of 44 meters and a maximum depth of 104 m). The lake has an area of 674 km<sup>2</sup> and a volume of 27.5 km<sup>3</sup>. (See Rossiter 2000; Nakajima & Nakai 1994 for a detailed overview of the lake.)

## Material and methods

Shore samples were taken by scooping up sediment and washing it through a 125 µm sieve. The resulting residue was then transferred to sample jars and transported back to the laboratory, where live specimens were picked with the aid of a stereo-microscope. Offshore samples were taken using an Ekman sediment grabber deployed from a boat. The recovered sediment was transferred to a net (200 µm mesh size) on a long pole and washed over the side of the boat in the lake. The resulting residues were then processed in the same way as the shore samples. For storage specimens were transferred to small vials containing 70% ethanol. Appendages were dissected and mounted in glycerine and drawn with the aid of a camera lucida. Carapaces are stored dry in micropalaeontological cavity slides. Carapaces used for SEM investigation were coated with gold before being photographed with a JEOL 5800 LV scanning electron microscope.

All figured material is deposited in the Lake Biwa Museum, Shiga Prefecture, Japan (Numbers: LBM1430003539 to LBM1430003567).

**Terminology in descriptions and figures.** Antennule—An1; antenna—An2; mandible—Md; maxillula—Mx; fifth limb—L5; sixth limb—L6; seventh limb—L7; caudal ramus—CR; caudal seta—CS; female reproductive organ—FRO; hemipenis—Hp. Terminology of the appendages follows that of Broodbakker and Danielopol (1982), Martens (1987), and Meisch (2000).