

Original article

Distribution of freshwater shrimps in Myanmar estuary

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Introduction

About 700 fauna live in the aquatic region of the Union of Myanmar [1]. The freshwater area of Myanmar is primary fishery ground, and its production in fiscal year 2013-2014 was 2.35 million tons (46% of total fish production) [2]. In the estuary system of Myanmar, freshwater shrimps are important commercially.

Macrobrachium rosenbergii is one of the most valuable freshwater species in Myanmar. Whereas polyculture of *M. rosenbergii*, mainly carps, is promoted throughout the entire country [2], the structure of the wild populations remains unclear at the taxonomical level. *M. rosenbergii* and similar but unidentified species are often captured in the rivers around urban areas. In central Myanmar, another species of the same genus, *M. lanchesteri* is a dominant [3]. Therefore, biological classification of these shrimps would be necessary as the first step for sustainable fishery management.

In this study, we examine species compositions and the abundance of freshwater shrimps in the estuary system around Yangon city.

Materials and methods

Specimens were obtained from fisheries in rivers near Yangon city in 2014/12 and 2016/1 (Fig. 1). Fresh samples were immediately preserved in 90% ethanol after collection. In the laboratory in Tokyo, we classified these shrimps, which are called “palaemonid prawn,” based on morphological differentiation [4].

Tissue was isolated from the muscle of the abdomen of five shrimp species. A portion of the mitochondrial cytochrome oxidase I (COI) gene was amplified with the primers LCO1490 (5,-GGTCAACAAATCATAAA GATATTGG-3,) and HCO2198 (5,-TAAACTTCAGGG TGACCAAAAATCA-3,) [5]. The polymerase chain reaction (PCR) conditions for the primers were 40 cycles of denaturation for 50 s at 94°C, annealing for 70 s at 45°C, and extension for 60 s at 72°C, followed by a 72°C extension for 10 min. After PCR, DNA

sequences were isolated using the Ultra Clean Gel Purification Kit (MO BIO). Sequences were obtained using a custom DNA synthesis service by a food analysis and biotechnology company in Japan (FASMAC) and were aligned using GENETYX (ver.11) for Windows.

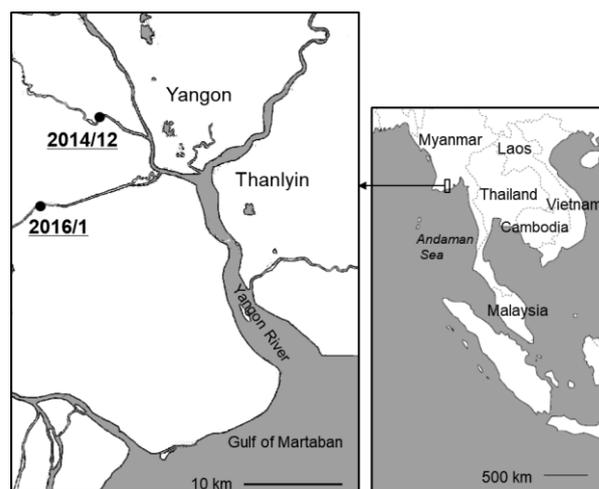


Fig. 1. Map of the sampling sites in the rivers in Myanmar.

Results

A total of 1200 shrimps were collected from rivers, canals, and aquaculture ponds around the Yangon and Ayeyarwaddy regions (Fig. 2). These “palaemonid prawns” were classified morphologically as follows:

- 90 samples from the Too River, Ayeyarwaddy region, on 2014/12/27
 - FAMILY: *Palaemonidae*
 - GENUS: *Macrobrachium*
- Approximately 800 samples from an aquaculture pond on 2014/12/27
 - FAMILY: *Palaemonidae*
 - GENUS: *Palaemon* or *Macrobrachium*
- Approximately 300 samples from Twante Canal, Yangon region, on 2016/1/16
 - FAMILY: *Palaemonidae*
 - GENUS: *Palaemon* or *Macrobrachium*



Fig. 2. Photograph of sampled shrimps: *Macrobrachium* spp.

COI (680-bp) was amplified from two specimens collected from Twante Canal. Using the BLAST homology search of the DNA Data Bank of Japan (DDBJ), both COI segments were found to closely corresponded to the in *M. rosenbergii* segment (homology: 99%).

Discussion

This study was the first attempt to characterize mitochondrial COI gene markers in palaemonid prawns in the estuary system of Myanmar. Although several species of two genera, *Macrobrachium* and *Palaemon*, can be morphologically detected in this region, the most familiar species, *M. rosenbergii*, was classified with two specimens in this genetic study.

Freshwater shrimp of the Palaemonidae family are distributed mainly in tropical and temperate zones and found in various freshwater environments, such as rivers, canals, lakes, swamps, groundwater and anchialine caves [6]. Approximately 210 *Macrobrachium* species are classified at present, and *M. rosenbergii*, has been captured or farmed for food in localities such as Asia, Hawaii, the Americas, and New Zealand [7]. Forty-five species of the genus *Palaemon* are classified [8].

Similar methods should be used to analyze many more specimens from this estuary system in the future in order to manage a reasonable stock of freshwater shrimp.

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