



Micromolluscs in Japan: taxonomic composition, habitats, and future topics

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Abstract

Studies of micromolluscs are essential in the malacology of the 21st century. Our understanding of molluscs has been chiefly based on large-sized species, and there are little-known taxa that comprise only of small-sized species. In Japan, an obvious change occurred from classic conchology to more advanced microscopic work in the 1990s, but further research must be accelerated to reveal the entire fauna. In this review, a summary of the current state of knowledge is given for all known micromolluscan families distributed in Japan. Since the 1990s new micromolluscs have been described from various microhabitats such as the undersides of half-buried boulders, burrows of other invertebrates, submarine caves, sunken wood, deep-sea hydrothermal vents and cold seeps. These are promising habitats for more intensive sampling in addition to unexplored environments. Basic taxonomy is still necessary in advancing biological studies at all levels including anatomy, molecular phylogenetics, development, ecology, and paleontology. The importance of micromolluscs is also rising in the field of conservation biology, especially with regard to endangered and introduced species. The genus *Lepetella* (Lepetellidae) is recorded for the first time from Japan.

Keywords: Gastropoda, Bivalvia, diversity, fauna, Lepetellidae

Introduction

Discovering and describing micromolluscan faunas is an unlimited frontier anywhere in the world. In Japan, more than 8,000 species of molluscs have been recorded since the 18th century (Higo *et al.* 1999; Minato 1988a). But there are still numerous unidentifiable or undescribed species, and most of them are micromolluscs. According to estimations by various malacologists, there may be more than 1,400 undescribed species of molluscs in Japan (Union of Japanese Societies for Systematic Biology 2002–2003).

The study of micromolluscs is obviously essential to Japanese malacology in this century. Macromolluscs are already well examined as a whole (Okutani 2000), and the forefront for the future is clearly in studies of micromolluscs. This is true of all fields, including taxonomy, anatomy, molecular phylogenetics, ecology and development. The importance of micromolluscs can be readily understood by referring to the history of Japanese malacology.

The study of Japanese molluscs started around the 1860s (see Cosel 1998 for review). The fauna was examined by European and American expeditions, and many small species were described by malacologists such as A. Adams, Dunker and Martens. A. Adams especially introduced numerous names for micromolluscs.

In the 1900s the finding of new species was further accelerated by Henry A. Pilsbry and Yoichiro Hirase, especially in the field of land snails (Callomon 2003; Callomon & Tada 2006). Hirase em-