CHAPTER II

LITERATURE REVIEW

Amphidromus Albers (1850), a genus of endemic arboreal snails belongs to the family Camaenidae. This genus is distributed from Assam, north of India, throughout South East Asia and down south to Darwin, north of Australia (Solem, 1959; Laidlaw and Solem, 1961; Solem, 1983). Since Linnaeus (1758) firstly named a species of Indonesia *Amphidromus perversus*, a great number of taxa have been then described mainly based on shell morphology. Many of those remain taxonomically effective today.

The basic classification of *Amphidromus* has been established by Fulton (1896), Pilsbry (1900), Laidlaw and Solem (1961), Solem (1965) and Panha (1996). Those authors used shell morphology and color patterns to separate species. In this genus, however, these traits vary to a great extent within many species. Only a few malacologists have used the genital system to improve the taxonomy of *Amphidromus*. Bishop (1977) and Solem (1983) suggested that the pineal and vaginal sculpture could be useful characters to distinguish species. Their phylogenetic relationship, however, has been little explored. Shell traits in general have been shown to be insufficient even to identify species or to investigate their evolutionary pattern and process or biogeography.

Scott (1996) and Wade *et al.* (2001) attempted to determine phylogenetic relationships of the Camaenidae with other taxa based on morphology and molecular traits. They proposed a hypothesis that camaenids are polyphyletic and that Asian camaenids are a sister group of the Bradybaenidae. Chiba (1999) worked on the phylogeny and biogeography of a camaenid genus *Mandarina* endemic to oceanic islands. He showed that a mitochondrial 16S rRNA gene is useful for reconstruction of phylogeny and for biogeographic analysis.

There have been some studies that evaluate the conventional taxonomy of pulmonates by using mitochondrial DNA sequences (Remigo and Blair, 1997; Douris *et al.*, 1998a,b; Thacker and Hadfield, 2000). They found unexpectedly large sequence divergence between taxa, especially those in which small populations are isolated. Those studies also revealed that the evolution of morphology and ecology could occur at an extremely high rate through adaptive radiation. Morphological traits are likely exhibit the

outcome of convergent evolution and thus may lead to misunderstanding of evolutionary history. Molecular phylogeny may not well be correlated with morphological phylogeny for that reason. Understanding the phylogeny of *Amphidromus* is indispensable to correct and improve the taxonomy of them. At the same time, the taxonomy is critically important to study biological processes, which resulted in the present diversity of morphology and ecology uniquely found in *Amphidromus*.

For these reasons, a synthetic approach to shell morphology, genital anatomy and molecular data will be employed for the project to revise the taxonomy and to propose a testable hypothesis of the phylogeny of *Amphidromus*.