

Morphological variations among distinct genotypes of the pen shell *Atrina pectinata* in Japan and Korea

Katsumasa Yamada¹, Kazumasa Hashimoto², Takenori Sasaki³,
Mayumi Kobayashi⁴, Yasuhisa Henmi⁵, Masashi Sekino⁴

¹Center for Water Cycle, Marine Environment and Disaster Management, Kumamoto University, Kumamoto, Japan, ²Seikai National Fisheries Research Institute, Fisheries Research and Education Agency, Nagasaki, Japan, ³The University Museum, The University of Tokyo, Tokyo, Japan, ⁴National Research Institute of Fisheries Science, Fisheries Research and Education Agency, Yokohama, Japan, ⁵Aitsu Marine Station, Center for Water Cycle, Marine Environment and Disaster Management, Kumamoto University, Kumamoto, Japan

E-mail: kyamada@kumamoto-u.ac.jp

Keywords: Phenotype, Genotype, Lineage-diversification, Shell Morphology, Discriminant function

Abstract

The pen shell *Atrina pectinata* is one of the most popular bivalves around the coasts of Japan and East Asia. Despite its high commercial value, the taxonomic status of this species has been unclear. So far, six distinct genotypes (Lineage 1-6 [L1-6]) of *A. pectinata* have been revealed based on the nucleotide sequence of mitochondrial COI gene. However, morphological difference among the lineages is obscure. In order to evaluate morphs-variation among the *A. pectinata* genotypes (L1, L2, and L6), we collected individuals with three distinct genotypes ($N > 50$ in total) along the coasts of Japan and Korea. We also measured morphological traits of *Pinna bicolor*, in which genus *Pinna* is a sister taxon to the genus *Atrina*, to compare inter- and intra-specific variation. Inter-specific variation of morphology was clearly separated between the pen shell and *P. bicolor*. In the intra-specific variations, L2- and L6-individuals were separately grouped with the ease of morphological classification. On the other hand, L1-individuals were ambiguously grouped, where some showed a morphological similarity to L2 or L6. Although the results support that more intensive surveys are necessary to elucidate the relationships between the genetic lineages and the morphology, these morphological results also suggest that L1 might be the ancestral lineage of L2 and L6.