（学位第３号様式）

学 位 論 文 要 旨

氏　名	VILLAMOR Shiela Sibugan
題　目	Ecology of *Monetaria annulus* (Linnaeus, 1758) (Mollusca: Gastropoda: Cypraeidae) from Temperate to Tropical Areas （温帯域から熱帯域におけるハナビラダカラの生態学的研究）

Monetaria annulus (Linnaeus, 1758), commonly known as gold-ringed cowry, is one of the most common species in the Cypraeidae family, widely distributed in the Indo-West Pacific from tropical to temperate areas. Cypraeids are important not only ecologically but also economically, because they are utilized for the shell craft industry, however, their populations decline due to overexploitation and habitat degradation. Resource management based on scientific information is necessary for the sustainable utilization. The ecology of *M. annulus* was investigated from temperate to tropical areas including its habitat diversity (Study I), reproductive biology (Study II) and population characteristics (Study III).

The objective of Study I was to describe and compare the habitat characteristics from temperate to tropical areas. In the temperate and sub-tropical areas, most of surveyed coasts were rocky irregular and flat and sandy-rocky irregular and flat, mostly were exposed to strong wave actions. The boulders in the rough coasts could be one of the important factors for suitable habitats and the presence of coral rubbles in some coasts indicated the presence of cowries. In the tropical area, cowries were found in sandy-rocky and sandy-muddy flat coasts covered with coral rubbles or seagrass.

For Study II, the objectives were to determine the spawning season in a temperate area through seasonal changes in the proportion of developmental stages in the gonads by using histological analysis; and to analyze the sex ratio and sexual dimorphism through gonad histology. Reproductive stages were identified and classified as Stage 1 (initial maturity), Stage 2 (peak maturity) and Stage 3 (spawned). Stage 2 males and females were found during more than half of the year, but their proportion varied seasonally. Although the reproductive peak was slightly different year by year in the temperate area, they seemed to have two reproductive seasons (spring and from late summer to winter). We found more females than males in samples, but the sex ratio was not statistically significant. The mean shell length of females was significantly larger than that of males, though they overlapped widely.

Study III compared their population characteristics including density, abundance of different developmental stages, sex ratio, and size dimorphism between sexes from temperate to tropical areas. The population density in the tropical area was intermediate between that in the sub-tropical and temperate areas, although density varied among stations in the same geographical area. There was a low proportion or absence of immature cowries in the habitat shared with adults, except for Nogas Island, Philippines. Females were larger than males in some sampling sites.

Establishing of marine protected areas (MPAs) is recommended as effective method of management of this important resource, particularly in the tropical area where there is an apparent extensive harvest. MPAs can be located in habitats preferred by cowries and especially must include a nursery ground where immature cowries can be sheltered. Also, sex ratio and sexual size dimorphism should be considered in restricting the harvest of larger cowries in order to avoid a sex ratio that is biased towards males.