

Seasonal changes of biochemical compositions and reproductive effort of the Manila clam, *Ruditapes philippinarum* from the west coast of Jeju Island, Korea

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Abstract

Manila clam, *Ruditapes philippinarum* is one of the most common mollusks distributed on mid to low tidal areas on the beaches along the coasts of Jeju Island, Korea. They are exploited by local villagers and by tourists visiting the beaches. Clam populations in Jeju have been declined for the past few years due to over exploitation without proper management. Understanding clam spawning pattern would be valuable not only for biological research but also for commercial purpose.

Clams were collected monthly from tidal flat of Shi-Heung Ri, west coast of Jeju Island from May 2001 to April 2002. In each month, 30 clams were used for determining proximate composition of clam tissues. A known quantity of dry tissues was homogenized in PBS using a ultrasonifier. Protein was estimated with BCA Protein Assay. Carbohydrates were quantified by phenol-sulphuric acid method modified by Taylor (1995). Lipid was analyzed following the method of Marsh and Weinstein (1966). Enzyme-linked immunosorbent assay (ELISA) along with rabbit anti-clam egg IgG was applied to measure quantity of the egg protein and quantity of the eggs was then expressed as gonado-somatic index (GSI, Choi et al., 1993).

The results showed that water temperature fluctuated from 10.4 °C in January to 27.3 °C in August. Highest salinity was also recorded in January (36.0‰) and lowest salinity occurred in October (27.5‰). Fatness index of clams varied from 0.09 during winter-early spring to 0.16 in early August. Average percentage weight of protein in clam tissues were 32.6-51.2%, total lipid ranged between 9.3-22.2% and carbohydrate were 12.1-30.1%. Changes in the proximate composition were correlated to the annual reproduction cycle of clams. The mean GSI showed highest value in late June (19.5%) when clams were ready for spawning. ELISA data indicated that clams in Shi-Heung-Ri produced 3.7 million eggs in first spawning peak and 2.9 million eggs in the second. Relatively low egg production and short spawning period of Manila clam in Shi-Heung-Ri suggested that food availability in the water column could act as a limiting factor for clam reproduction.