

P1.05**Experimental Study on Environmental Tolerance of Hard Clam in Tokyo Bay**

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Abstract

Manila clam (*Ruditapes philippinarum*), which is a valuable fishery resource, has been caught in the inner part of Tokyo Bay. However, its production has declined year by year due to adverse marine environmental conditions, such as intermittent high temperature, anoxia, and low salinity. By contrast Hard clam (*Mercenaria mercenaria*), an introduced species since the late 1990s, has gradually been increasing probably because of high tolerance to hypoxia and become a fishing target in the bay. Quantitative information about the tolerance has, however, been, missing in the bay. In order to develop a clam model for sustainable fishery management, we conducted laboratory experiments on tolerance of these clams to marine environmental conditions in summer. Results for tolerance to anoxia showed that at a low temperature of 20 °C Manila clams died within 10 days whereas Hard clams survived for more than 60 days. The survival time of Hard clams took the minimum of around 10 days from 28 °C to 32 °C; all of them died within a few days at 33 °C or higher. At a temperature of 34 °C or higher all the Hard clams died nearly at the same period under both oxic and anoxic conditions, which indicates the maximum allowable temperature was below 34 °C. Using these results and existing knowledge in the literature, we developed a mortality estimation model of each clam considering the influence of intermittent anoxia. This model was applied to predict time series of each clam population using sets of water quality data continuously observed at multiple stations in the past few years at the head of the bay. It revealed that some of the Manila clams were killed, whose mortality was affected by the magnitude and location of upwelling of anoxic water, while all of the Hard clams survived under the intermittent anoxic conditions.

Keywords

mortality of clams, high temperature, anoxia, hypoxia