

## Effects of Temperature and Body Size on the Clearance Rate of a Tidal Flat Bivalve, *Coecella chinensis* (Deshayes)

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### Introduction

There were many studies on the dependence of clearance rate on temperature and the body size of bivalves (Winter, 1973; Bayne et al., 1976; Yukihiro et al., 1998). Most of these studies dealt with relatively large species, especially commercially important species. Studies with smaller but ecologically important species were relative rare (Werner and Hollibaugh, 1993). *Coecella chinensis* (Family Mesodesmatidae) is a small bivalve (5-30 mm in shell length) inhabiting upper tidal flats of sand-dominated sediments. We have found a dense population of *C. chinensis* in a tidal flat in Goeje Island. They inhabit in a relatively restricted area with a narrow band in tidal flats, which are free from contamination. Though not used for human consumption, the ecological role of *C. chinensis* in tidal flat community cannot be disregarded. In addition, the maintenance and conservation of uncommon species like *C. chinensis* are also important. This study was performed to understand the role of *C. chinensis* as a primary consumer in tidal flat community. As the first step, we assessed the effects of temperature and body size on the clearance rate of *C. chinensis*.

### Materials and Methods

*C. chinensis* were collected at Songjinpo tidal flat, Geoje Island, southern coast of Korea. The clams were separated from sediments by sieving with a 5-mm mesh screen and transported to the laboratory within 1 hr of collection. Thirty clams with 7-29 mm in shell length were used for experiments. They were rinsed with GF/F filtered seawater (FSW) and acclimated to the experimental temperatures (10, 15, and 20 °C) for 24 hr, and were maintained in a 20-L aquarium with FSW in an undisturbed place. They were not fed during this period of acclimation.

Clearance rate was measured by indirect method with *Isochrysis galbana* as food. Algal cell concentrations before and after the feeding experiments were determined by counting in a Neubauer hemacytometer. Clearance rate was calculated using the equation of Coughlan (1969).

## Results and Discussion

The clearance rates (CR) of *C. chinensis* were highly different with different body size for each temperature. In general, CR increased as the flesh dry weight (FDW) of clam increased. CR data were fitted well to the equation  $CR = a(FDW)^b$ . The exponent  $b$  value at 10°C (0.793) was higher than those at 15 and 20°C (0.689 and 0.685, respectively), which are similar to *Glauconome chinensis* (Lee et al., 2002) and *Mytilus edulis* (Winter, 1973). As for temperature, the range of CR was much lower at 10°C (3.0-49.9 ml/ind./hr) than at 15°C (7.9-84.9 ml/ind./hr) and 20°C (6.5-80.5 ml/ind./hr). Therefore, the effect of temperature on CR of *C. chinensis* was greater within 10-15°C than 15-20°C.

## References

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