P-1

# A Study on the Seedling Production of *Saxidomus purpuratus* (Sowerby)

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## Introduction

The purple clam, *Saxidomus purpuratus* (Class Bivalvia, Family Veneridae) inhabits relatively restricted areas along the coasts of Korea, Japan, and China (Choe, *et al.*, 1999), and is one of the most important shellfish resources for human consumption with high prices. Recently, the commercial yields from the exploitation of fisheries by divers has been declining due to over-harvesting. So, much attention was concentrated to the aquaculture of this species. This study was performed to establish the optimal rearing conditions for successful seedling production of *S. purpuratus*. This study focused especially on the biological aspects of early life stage of *S. purpuratus*. Therefore, the success of fertilization and development from artificial spawning among different months of a year, the viability of sperms after exposure to seawater, and the effects of physical/biological parameters (temperature, salinity, and food organism) on the survival and growth of the larvae were evaluated in this study.

## Materials and Methods

Adult *S. purpuratus* were collected monthly from a subtidal area near Geoje Island from Sep. 2001 to Jun. 2002. Since there were no significant responses against physical/chemical/biological stimuli from the preliminary experiments, gametes were obtained by dissection. To evaluate the possibility to produce seedlings out of their natural spawning periods, rates of fertilization and development to the veliger larvae were measured monthly. Sperm viability (survival and activity) was observed for 8 hrs after they were exposed to seawater. To know the effects of temperature and salinity on the survival, larvae were incubated under the combinations of temperature (20, 25, 30, 35℃) and salinity (10, 20, 30, 40 psu) for 24 hrs. To know the effects of food organisms on the growth rate of the larvae, both monoculture and dual mixtures of *Isochrysis galbana*, *Pavlova gyrans*, or *Nannochloris oculata* were supplied to the larvae for 20 days.

## Results and Discussion

Fertilization was successful (>90%) at all months with gametes obtained from dissected clams. But, the rate of development to the veliger larvae was higher (78.3~90.2%) only during spawning period (May to July), and was less than 30% during winter. Higher rate of fertilization seemed not always guarantee higher rate of development. It seems that developmental success is related with the quality of eggs at the time of fertilization. At 20℃, elapsed time to develop into the veliger larvae was 32 hrs, while that of population from the western coast was 45~53 hrs (Kim, pers. comm.) and that from China 24~26 hrs (Wei *et al.*, 1982; 23~24℃). Sperm could survive even 8 hrs after exposure to seawater, but the proportion of actively swimming sperm decreased down to less than 10% after 4 hrs. Therefore, sperm should be used for fertilization within 2 hrs after exposure. Temperature and salinity affected the survival of larvae. The survival was less than 50% at 35℃. Lowest survival was found in hyposaline conditions (10 psu). At salinity of 30 psu and temperature range of 20~30℃, the survival was higher than 90%. Thus, the culture condition should be maintained with salinity of 30 psu and temperature range of 20~30℃. The shell length increased from 111.5 to 235.3 μm during 20 days. The growth rates of the larvae fed either unialgal diet of *P. gyrans* or mixed diets of *P. gyrans* + *I. galbana* or *P. gyrans* + *N. oculata* were lower than other combinations. *P. gyrans* seems not suitable for food organisms of *S. purpuratus* larvae. Growth rate of larvae was highest when fed on mixed diet of *I. galbana* + *N. oculata*. Growth rate for the first 10 day was also highest with the same diet. To ensure faster growth (hence reduced mortality) of *S. purpuratus* larvae, it is necessary to supply a mixed diet of *I. galbana* and *N. oculata*.

## References

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