Acute and chronic effects of salinity on larval development and survival of *Scylla paramamosain*

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It has been observed that planktonic larvae of estuarine crabs returned to coastal and estuarine areas when they metamorphosed to megalopae after being exposed to high salinities in the continental shelf. Thus, through larval development until megalopal stage, individuals must be adapted to survive the changes in salinities and salinity may act as a limiting factor to the distribution of crustaceans. This study aimed to examine the acute and chronic effects of salinity on survival and development in zoeae and megalopae of mud crab *Scylla paramamosain* reared at constant temperature of 29°C.

Females were obtained from Urado Bay, Kochi Prefecture and induced spawning in tanks at Tamano Station, NCSE. Actively swimming zoeae were collected in the first three hours after hatching. To test acute effects of salinities, larvae were reared in two 500 L tanks of 25 and 35‰ salinity. Newly moulted first to fifth stage zoeae and megalopae were then exposed to salinities 4, 7, 10, 13, 16, 19, 22, 25 and 28‰ during 24 hours. Surviving larvae were counted. To test chronic effect of salinity, animals were reared in 1L beakers from first zoeal stage until first crab stage at salinities of 10, 15, 20, 25, 30, and 35‰. Rearing experiments began with a density of 30 individuals per L.

Rearing experiments showed that salinities of 10 and 15‰ were unsuitable to larval development. Salinity of 10‰ resulted in 100% mortality without successfully moulting to second zoeal stage, while at 15‰ zoeae did not reach first crab stage and showed the lowest survival rate for all zoeal stages. Development time varied according to salinities and zoeal stages, with animals reared at 15‰ to take longer time to moult into next larval stage.

When testing acute effects of low salinities, no zoeal stages survived at 4 and 7‰ in none of the treatments. Exposure to 10‰ resulted in no survival for all treatments except second and third zoeal stages, and megalopal stage reared at 25‰. Through subsequent zoeal stages, animals reared at 25‰ had higher survival rates at lower salinities than animals reared at 35‰.

Larvae of *S. paramamosain* could survive and develop at salinities of 20‰ ≤ in rearing experiments. Furthermore, acclimatization of larvae at 25 ‰ increased larval tolerance to lower salinities when compared to larvae reared at 35‰. This might reflect the natural history of this species larvae; larvae could be released in open sea or estuarine area and survive, but a migratory movement of zoeae could only occur from estuarine areas towards open sea.