THE EFFECT OF SALINITY ON THE GROWTH AND SURVIVAL RATE OF JUVENILE GIANT CLAM (*TRIDACNA GIGAS*), SOUTH SULAWESI, INDONESIA

Aspari Rachman & Hilal Anshary
Faculty of Marine Science and Fisheries, Hasanuddin University, Ujung Pandang, South Sulawesi 90245, Indonesia

ABSTRACT

A total of 240 juvenile *Tridacna gigas* were cultured in 15 litre containers in salinities of 27, 30, 33, and 36 ‰; three replications for each salinity. The water was fertilised with ammonia, and the containers exposed to light. There was a significant relationship between salinity and total weight but not between salinity and length. The optimal salinity was 30 ‰ for growth (shell length and weight) and survival rate, though survival rates were not statistically different within the range of 27 to 33 ‰.

INTRODUCTION

Seven species of Tridacnidae are found in Indonesia: *Tridacna gigas, T. derasa, T. squamosa, T. crocea, T. maxima, Hippopus hippopus* and *H. porcellanus* (Pasaribu 1988). Among these giant clams *T. gigas* is the largest species. The tasty meat of the clam is used for food. The shell is utilised for a variety of purposes, such as ornaments, ash trays, wash basins, and for tile industry (Pasaribu 1988). Formerly, giant clams occurred abundantly on Indonesian coral reefs, the habitat of giant clam, but stocks have decreased gradually due to overexploitation by fisherman, and destruction of coral reefs (Sya'rani & Lachmuddin 1987). According to Usher (1984) *T. gigas* has disappeared from Western Indonesia.

Culture and restocking of giant clam might be a method to stop the decrease of populations in natural habitats. However, the main problem of the Tridacnidae is that they, in general, have a very low rate of growth. Beckvar (1981) found that *T. gigas* could reach a size of 2.6 cm after 10 months under laboratory conditions.

The present study has focused on salinity as a factor influencing growth and survival of *T. gigas* juvenile in laboratory experiments.

MATERIALS AND METHODS

A total of 240 juveniles (13 to 18 mm in length) were collected from the Barrang Lompo Island's Hatchery. They were placed in 12 containers (20 juveniles in each) filled with 15 litre filtered water. Tile served as a substratum in the containers which were placed randomly in the light. The water was daily fertilised with 10 mM zuewesur ammonia (ZA).

Four different salinities were applied (27, 30, 33, and 36 ‰), three replications for each salinity. Shell length and weight were measured at the beginning and the end of the experiment, and survival rate calculated. In addition, pH, temperature, nitrite, nitrate, and dissolve oxygen were monitored.

Growth in terms of shell length (mm) was calculated by subtraction of the length at the start, and the length at the end of the experiment. Similarly, growth (g) was calculated by difference in weight at the start and the end of the experiment.

Survival rate was calculated by using the formula:

$$SR (\%) = N_t \times N_0^{-1} \times 100$$

where SR = survival rate (%); N_0 = number of

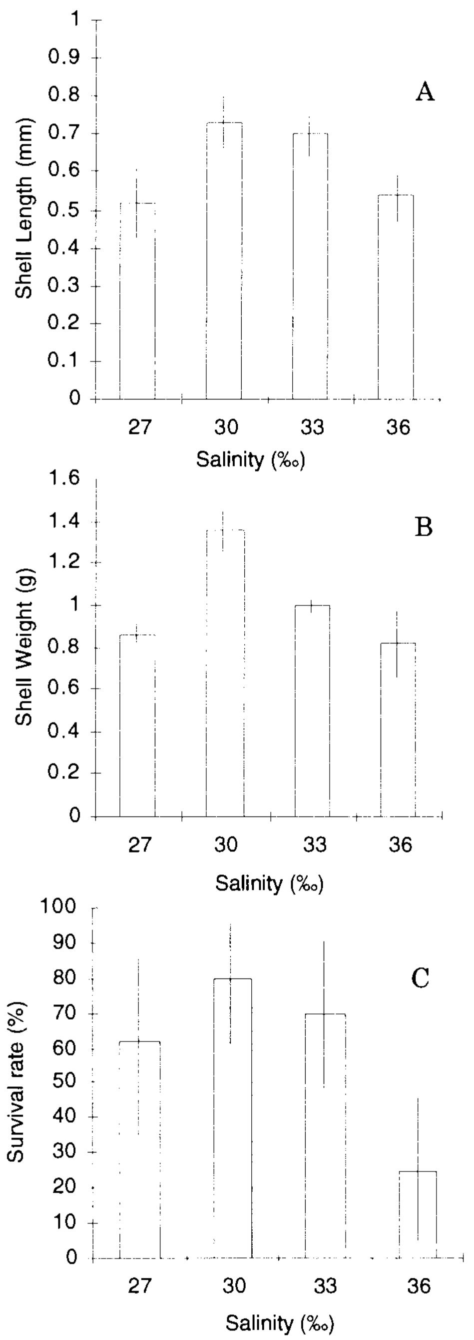

Figure 1. Means of shell length, weight, and survival rate as a function of salinity. Bars indicate standard error of mean, 95 % confidence interval. A. mean increment of shell length ($F_{3,8}$ = 1.33, P > 0.05). B. mean increment of weight ($F_{3,8}$ = 7.67, P<0.05). C. survival rate ($F_{3,8}$ = 4.16, P<0.05).

juveniles before experiment; N_t = number of larvae at the end of experiment.

RESULT AND DISCUSSION

Shell Length

Increment of shell length is presented in Fig. 1A. It appears that a salinity of 30 ‰ gives a better growth of shell length than the other salinities. However, the results are not statistically different. It might be due to the short duration of the experiment. Another reason could be that light intensity was too low. This would affect the photosynthetic process of zooxanthellae.

Weight

The total weight of *T. gigas* reared in the 4 experimental salinities were 0.86 g, 1.36 g, 0.99 g, and 0.81 g after 3 months. Weight increment (Fig. 1B) was low in 27 ‰ salinity but increased rapidly in 30 ‰ salinity. It decreased again in higher salinities. Statistical analyses showed that weight increment was significantly higher in 30 ‰ salinity. This is in accordance with Heslinga *et al.* (1984) who found that the optimum salinity for giant clam's juvenile ranged from 32-34 ‰. It is therefore concluded that salinities of 30 to 33 ‰ provide optimal conditions for giant clam's juvenile growth.

Survival Rate

Survival in the 4 salinities were 61.7 %, 80 %, 70 %, and 25 %, respectively. The highest survival rate was found in 30 ‰ salinity (Fig. 1C) but not statistically significant compared with 27 and 33 ‰. The low survival of juveniles in 36 ‰ salinity is puzzling. In nature, salinity up to 35-36 ‰ is common in the dry season, where evaporation is high. However, the consequences for free living juveniles are unknown.

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ISSN 0858-3633