THE EFFECTS OF DIFFERENT REARING CONDITIONS ON THE GROWTH AND SURVIVAL OF *PENACUS MERGUIENSIS* JUVENILES

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Introduction

The nursery system has been incorporated into the shrimp culture industry in many countries because of its inherent advantages all of which enable managers to more accurately predict survival, standing crop, feeding rates and production levels in grow-out ponds (Wyban and Sweeny, 1991; Sturnner et al. 1992). This research was therefore conducted in other to determine the effects of rearing *Penaeus merguiensis* juveniles under different rearing conditions by studying the effects of utilizing algal supplements and commercial pellets as feed supplements in nursery rearing of *P. merguiensis* and the effects of different stocking densities on the growth, survival and production of *P. merguiensis* in raceways.

Materials and Methods

Postlarvae were stocked into 400 *l* round tanks containing 300 *l* filtered seawater from PL 10 at 1,200 PL *1* tank and reared till PL 28 under three treatments; treatment A consisted of feeding the PLs with trashfish and commercial pellets in a clear-water rearing medium, treatment B consisted of feeding the PLs with trashfish in a medium containing commercial *Spirulina* while, treatinent C consisted of feeding the PLs with trashfish in a medium containing cultured *Skeletonema.* Another experiment was carried out by stocking *P. merguiensis* PLs at PL 10 into rectangular tanks containing 300 *l* of seawater at two different densities, 1,200 and 2,400 PLs. The PLs were fed with trashfish and commercial pellets. Growth in length and weight were measured every three days by randomly removing four postlavae from each rearing tank. The growth, survival and production of the different treatments were compared at the end of the experiments. F- test statistical analysis was used to test significant differences between growth and survival in the treatments.

Results and Discussion

Juveniles reared under treatment A had the highest mean specific growth rate of 14.53. This was followed by a mean specific growth rate of 12.16 in treatment C although there was no significant difference between the two treatments. The mean specific growth rate in treatment B was significantly lower ($p < 0.05$) than treatment A but not treatment C. The average survival rate followed the same pattern as the mean specific growth rate. Mean survival rate was 96.92% and 89.55% for treatments A and C respectively. Average survival rate of juveniles in treatment B was significantly ($p<0.05$) lower than treatments A and C at 44.39%. These results suggest that the juvenile were capable of deriving some nutrition from the live microalgae *(Skeletonema* sp.) but not so much from the artificial microalgae *(Spirulina* sp.). The nutrition derived from the live microalgae appears to compare favourably with that obtained from the commercial pellets in terms of growth and survival. The lower coefficient of variation for juveniles raised on *Skeletonema* showed that growth was more uniform for the juvenileswhich could be as a result of better conditions due to the diet fed. Sturnner et al. (1992) observed that natural productivity in rectangular tanks can contribute significantly to the nutritional requirement of shrimp. Algal populations in tanks also reduce ammonia levels, which may rise in the presence of high shrimp biomass. Juveniles reared at the lower stocking density of 1,200 larvae ($800/m^2$) had the higher mean specific growth rate of 15.34 while the juveniles reared at higher stocking density of 2,400 larvae ($600/m^2$) had a lower mean specific growth rate of 11. 82 but the difference was not significant ($p<0.05$). The results showed that although growth was faster at the lower stocking density, the average survival rate (84.50%) of juveniles was lower than that of the juveniles reared under the higher stocking density where the average survival rate was (90.57%). However, the difference was not significant ($p<0.05$). The higher survival rate seen in juveniles reared at the higher density could be attributed to the more uniform size of the juveniles because of their lower coefficient of variation. Production per tank for the feeding experiment was significantly greater in treatment A than for other treatments ($p<0.05$) while for experiments in raceways, production for the 1200 and 2400 PL *1* tank was 61.01 and 61.93 g 1 tank respectively. Production for the 2400 PL / tank was about the same as that of 1200 PL / tank and there is no significant difference between them ($p<0.05$).

Conclusions

Production was highest for juveniles reared with pellets as feed supplements although growth and survival was also high for juveniles reared in *Skeletonema* medium. Juveniles reared in tanks gave a better performance than those reared in raceways under the same conditions. From the results of these experiments, it is believed that feeding a combination of trashfish and pellets in a medium containing *Skeletonema* will give optimum performance in the nursery rearing of *P. merguiensis* juveniles. It is estimated from this study that at a stocking density of 3,960 PLs (about 4000 PLs) per ton, a 100-ton tank can produce enough juveniles to stock a 1 hectare pond.

References

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