

NOTE ON THE VARYING EFFECTS OF SALINITY ON  
THE GROWTH OF THE JUVENILES OF  
*PENAEUS INDICUS* FROM THE COCHIN BACKWATER

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ABSTRACT

The commercially important prawn *Penaeus indicus* was grown in different salinities. The effect of concentration of the medium on the growth of prawns of different sizes is discussed.

Growth rate was significantly high in low salinity for the post-larval specimens, but the larger juveniles showed a significantly high growth-rate in high saline waters. *Penaeus indicus* enters the backwaters during the early part of its life history and goes back to the sea for maturation and breeding. The study is interesting in view of the implications regarding the physiological mechanisms involved in their seaward migration and maturation.

In view of the importance of the large scale culture of Penaeid prawns, a study of the effect of salinity on the growth of *Penaeus indicus* during the estuarine phase of its life history is important. The results of a preliminary study on the growth of the juveniles in relation to three different salinities is reported here. The salinity concentrations used in this study were within the range to which these prawns are usually exposed in their natural habitat. Individuals of two different size range were chosen for the experiment. Their initial weights were on the average 0.0777 and 1.4265 gms respectively.

Ten each of the smaller sized prawns and two each of the larger ones were kept in experimental media of salinities 10, 20 and 30‰. This procedure which did not permit individual observation was adopted because of the limited facilities available. A biological filter was provided for each of the experimental tanks for maintaining optimum conditions and to minimise accumulation of waste products. The animals were fed with equal amounts of food twice daily. The excess food left behind was removed two hours after the supply of food. The experiment lasted for four weeks in the case of larger individuals and five weeks for the post larvae. The prawns in

each culture trough were weighed together once a week regularly and the average individual weight was noted. The data were tested by the analysis of variance for studying the effect of different salinities on the growth rate.

The mean growth increments of the individuals in each trough at the end of each week are given in Tables I and II. The prawns kept in different salinities showed significant differences in growth rate. The optimum salinity required for growth also seems to be different for the smaller and larger sized individuals. The postlarvae recorded maximum growth in 10% salinity while the larger juveniles registered maximum growth in 30% salinity. From the tables it can also be seen that with decrease in salinity the growth of the postlarvae increased, while that of the larger ones decreased and that this trend was maintained throughout the experimental period. Analysis of variance performed on Tables I and II showed that the results were highly significant ( $P \leq 0.001$  and  $P \leq 0.01$  respectively).

Table I

Average weekly growth increment of the post larvae of  
*Penaeus indicus* in different salinities

Salinity %	Average initial weight gms.	Growth increment in successive weeks				
		I	II	III	IV	V
30	0.0764	0.0071	0.0109	0.0132	0.0089	0.0019
20	0.0781	0.0022	0.0100	0.0266	0.0119	0.0091
10	0.0788	0.0125	0.0245	0.0248	0.0192	0.0017

Table II

Average weekly growth increment of larger juveniles of  
*P. indicus* in different salinities

Salinity %	Average initial weight gms.	Growth increment in different weeks			
		I	II	III	IV
30	1.4209	0.2434	0.0807	0.2684	0.2942
20	1.4306	0.1774	0.0021	0.2113	0.2224
10	1.4282	0.0020	0.1527	0.1159	0.2096

Postlarvae of *Penaeus indicus*, as in most of the commercially important Penaeid prawns, also migrate into the estuaries where they grow rapidly into subadults and go back to the sea. During their stay in the estuaries they encounter wide diurnal and seasonal variations in salinity. It is therefore expected that they are euryhaline during this part of their life history which implies that optimum growth may be maintained by the species over a wide range of salinity. Zein-Eldin (1963) found that under controlled temperature, salinity did not have significant influence on the growth of the postlarvae of Penaeid prawns. Zein-Eldin and Aldrich (1965) observed that the growth of *Penaeus aztecus* was not affected by salinity except under extreme temperatures. Venkataramiah, Lakshmi and Gunter (1974) disagree with these findings. They found that the postlarvae of *Penaeus aztecus* showed faster growth in low saline waters. The present study with *Penaeus indicus* also agrees with the findings of Venkataramiah *et. al.* (1972, 74). Although they live under extreme euryhaline conditions, the results seem to demonstrate a preference for low salinity during the postlarval period. Since *Penaeus indicus* migrates back to the sea, a gradual change to stenohalinity is to be expected along with other physiological changes. The preference for higher saline conditions for optimum growth by the larger sized individuals of *Penaeus indicus* seems to suggest such a gradual change, in this species. Gunter *et. al* (1964) pointed out that the adaptation to low salinity is highly developed in younger stages while Panikkar (1968) has indicated that osmoregulation in dilute media is less effective in full sized individuals especially in their reproductive phase. Panikkar considers this feature as one of the principal factors which forces them to migrate back to sea. The present study therefore, is interesting as it indicates the physiological changes taking place gradually in the organism and the possible relevance of the underlying mechanisms in aquacultural work.

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