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68. GROWTH OF THE LARVAE OF *SACCOSTREA CUCULLATA* (BORN)

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ABSTRACT

The present study on the growth of the larvae of the rock oyster *Saccostrea cucullata* is intended to provide some basic information for the efficient operation of commercial oyster hatcheries. The effect of algal concentration on the growth of the larvae were measured. Algal concentration can be optimized to provide for maximal larval growth and efficient use of algal food

INTRODUCTION

Study of the growth of oyster larvae provides some basic information necessary for the efficient operation of commercial oyster hatchery. The food requirements of the larvae of commercially important bivalves from other regions of the world were examined and reviewed by Loosanoff and Davis (1963), Walne and Spencer (1968), Ukeles (1975) and Bayne (1983). Studies on the growth rates of bivalve larvae from Indian waters are scanty. Hence the present study was undertaken to measure the growth rate of the larvae of *Saccostrea cucullata* under laboratory conditions.

MATERIAL AND METHODS

The oysters were collected from the natural population of Porto Novo and they were thoroughly cleaned before subjected to induced spawning. Gonadial smears were taken to ascertain the condition of the gonad. Batches of 8-10 oysters were taken at a time and spawning was induced by increasing the water temperature and addition of sperm extract as suggested by Loosanoff and Davis (1963).

Filtered and sterilized seawater was used for the larval rearing. Pipettes and 1 l beakers used for the larval rearing were sterilized chemically (using chlorinated water) and washed with distilled water.

After the spawning, the bivalves were removed from the trough. The eggs were screened by bolting silk of fine mesh (40 μ) and placed in beakers containing sterilized seawater. The developing larvae were screened through bolting silk of fine mesh (40 μ) and resuspened in another beaker containing sterilized water. One ml of sample was pipetted to sedgewick rafter counting cell and the larval number was counted. The average number was calculated after 4-5 counts.

The density of the larvae was adjusted to 5 larvae/ml. The pure cultures of *Isochrysis galbana* were enumerated using a Haemocytometer. The effect of different concentrations of the algal food, *I. galbana*, such as 5, 10, 20, 80 cells/μl on the growth of the bivalve larvae was determined. The medium water was changed daily and the required volume of algal cultures were added to this medium contained in the rearing containers. The growth of the larvae was monitered on the 4th and 8th day and the shell length of 30 larvae was measured by means of an ocular micrometer, for comparing the same with measurements taken on a sample of larvae, at the start of the experiment. The growth coefficient (K) value was calculated using the formula of Helm, (1977) :

$K = \log_e l_4 - \log_e l_0$ where l_4 is the length of the larvae after four days of the experiment and l_0 is the length of the larvae at the start of the experiment.

RESULTS

Table 1 shows the growth of larvae (expressed as the coefficient K_4) for the larvae of *S. cucullata* recorded after feeding with different concentrations (5,10,20,40,80 cells/ μl) of *I. galbana*. Growth increased with increasing

algal density upto 40 cells/ µl and declined at the algal density of 80 cells/ µl. Maximum growth was achieved at a concentration of 40 cells/ µl

TABLE 1. *The growth of larvae (expressed as the coefficient K_4) between days 0.4 and 4 8 when fed with different cell concentration of* I. galbana.

Days	Cells/µl				
	5	10	20	40	80
0 4	0.143	0.268	0.325	0.431	0.208
4-8	0.125	0.057	0.201	0.337	0.118
Mean	0.134	0 168	0.263	0.384	0.163

DISCUSSION

Much of the work was concerned with unicellular algal cultures as potential source of food supply for the larvae of commercially important bivalves of other regions of the world. This work has been comprehensively reviewed by Loosanoff and Davis (1965) and Bayne (1983).

Maximum growth Increment in the bivalve larvae was recorded at an algal density of 40 cells/ µl and it decreased at 80 cells/ µl. Reduction in the growth of the larvae at high algal density of 80 cells/ µl may be due to mechanical disturbances of food cells on the larval swimming and feeding mechanisms and also by producing external metabolites which are toxic to the larvae. Similar conclusions were made by Davis and Guiliard (1958), Loosanoff and Davis (1963), Walne (1966) and Malouf and Breese (1977).

Loosanoff and Davis (1963) reported that high concentrations of certain food organisms, such as *Chlorella* sp affect the larvae of *M. mercenaria,* as well as those of several other species, both by mechanical interference of the food cells with larval swimming and feeding mechanisms, and chemically by producing metabolites which are toxic to larvae. Malour and Breese (1977) observed that the important cause of reduced growth at high algal densities might be due to excessive formation of pseudofeces. Davis and Guillard (1958) found that *Isochrysis* is known to produce substances toxic to bivalve larvae under certain conditions.

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