the past eight years of operation. This method of induced spawning will also be tested in Indonesia in 1997.

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Part 3b. ACIAR Trochus Reef Reseeding Research: An improved hatchery method for mass production of juvenile trochus

by Dr Chan L. Lee

Introduction

On metamorphosis, postlarval (P/L) trochus settle on benthic substrates where they graze on benthic diatoms and grow into juveniles (Js). Most inter-tidal benthic invertebrates use the substrata as a source of food, for attachment, shelter, as well as protection either from predators or adverse environmental conditions. The effects of substrata on different groups of marine invertebrates have been reviewed by Newell (1979), Bacescu (1985), Crisp & Bourget (1985) and Dall et al. (1990); more recently, Gimin & Lee (1997) investigated the effects of different substrata on the growth rate of early juvenile trochus. The most common substratum used for increasing the surface area for growing benthic algae in molluscs hatcheries is corrugated PVC plates or fibreglass (FRP) plates (Shokita et al., 1991). This method has been universally used in abalone and trochus hatcheries. In the NTU trochus hatchery, newly settled postlarvae were allowed to feed and graze on benthic algae growing on the surface of FRP. However, it was observed that juveniles which grew in such a substratum avoided coral pieces when they were introduced into the tank. Since the juveniles were meant to be used for reef reseeding research, we were faced with the dilemma of producing juveniles which were potentially 'afraid' of grazing on the rough coral surfaces and could consider coral as hostile habitat. Based on the preliminary work of Gimin & Lee (1997), it was decided that coral pieces should be used in place of FRP as a substrate for growing juveniles.

Materials and methods

Larval tank

Fertilised eggs were produced according to the method given in Part 3a and transferred to the larval tank. Each rectangular fibreglass larval tank measured 3,500 mm long x 2,000 mm wide x 900 mm high. The tank was divided into two compartments; a smaller filter compartment (SFC) measuring 900 mm long x 2,000 mm wide x 900 mm high and a larger spawning and P/L and Js rearing compartment (LRC) measuring 2,600 mm long x 2,000 mm wide x 900 mm high. Each larval tank could carry up to 3 million eggs.

Additional details on the design, setting up and operation of the tank are given in Lee (1997).

Coral substrate

Mixed dried coral pieces up to 15 cm in diameter were collected from the beach, washed with fresh water and left to dry in the sun for three weeks before being spread across the bottom of the LRC. A water-soluble compound fertiliser 'Aquasol' was added to the LRC at the concentration of 10 ppm. Sessile diatoms, *Nitzschia* sp., initially cultured in F/2 medium, were added to inoculate the tank. Within two weeks, a thin brownish layer of diatom mat covered the coral pieces and the tank was now ready for stocking of fertilised eggs or P/L. During the Js rearing period, the diatom culture was maintained by fertilising the culture water with 'Aquasol' on a fortnightly basis.

Results

Fertilised eggs released into the LRC hatched within 5–7 days. Two to three weeks later, a thin mat of 100,000 Js or more was observed to grow on the coral pieces. As the Js grew, competition for diatoms became very severe and increasing numbers of Js could be seen moving away from the coral substrates in search of food and grazing along and up the wall of the culture tanks. At this stage, the population was thinned down to prevent the Js from suffering high mortality. This was easily done by transferring some of the coral pieces to another tank with well established diatom growth. At the end of 6–8 weeks, each tank was carrying between 10–20,000 Js, each measuring 3–5 mm in size. These Js were well adapted to live in corals and could be used for reseeding or further growth to produce larger Js. To produce larger Js, the thinning process and preparation of diatom growth on the coral pieces are repeated in another tank.

The project is presently looking at improving the coral substrate method of Js production by using FRP plates coated with small coral pieces. If this proves to be successful, it would achieve the dual aims of producing Js well adapted to grow on natural coral substrate and at the same time increasing the grazing surface area, thereby increasing the food available.

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