Abstract

This study aimed to determine the effect of size and density of blood cockle on specific growth rate under the natural pond's environment. Costs and benefits of culturing were calculated. Results of this study were useful for improving cockle culture that was suitable with environment and investment. The study is divided into four phases. The first phase is the assessment pond's environment. Results revealed that the concentrations of total suspended solids during spring tide was 0.17 mg/l and neap tide was 0.15 mg/l. Sedimentation rate was found to vary with the particle size of suspended solid, which fluctuate during spring tide and neap tide. Water and sediment quality parameters were suitable for marine aquaculture. Analysis of nitrogen budget of pond showed potential to produce organic nitrogen in terms of phytoplankton. Result from the first phase indicated the pond, which had potential to be the estuarine bivalve mollusk culture.

The second phase aimed to analyze physiological of cockle in terms of clearance rate and oxygen consumption. Results showed seeding of cockle (size 300 inds./kg) had higher clearance rate than commercial size (80 inds./kg). However, in terms of dry weight gained per individual, the commercial sizes of cockle had clearance rate higher than the seeding size. Result in terms of oxygen consumption showed the similar pattern of clearance rate too. Considerate the first and the second phases (available oxygen and food in the pond), the density of cockle were limited by available oxygen in the pond and it was used for calculated the stocking density of cockle culture.

The third study phase was a culturing cockles in natural pond. There were 4 density levels: 25, 50, 100, and 150 individual/m^2. The initial length of cockles were 1-≤2 cm. (330 individual / kg) and 2-≤3 cm. (165 individual / kg). The specific growth rate between two length groups of cockle were significantly difference ($P<0.05$) but they were found to be not significant during the 4 levels of densities ($P>0.05$). The nutrient abundance because the water exchange among culture may cause non-significant different.

The fourth phase was study of costs and benefits that showed three structures of cockles' culture in Bangkhunthian. The highest variable costs in terms of cash was cockle seeds and in terms of non-cash was the opportunity cost of family labor. The main fixed cost was associated with land.

The results of this study could be summarized that reduced the density of cockle which appropriated with environment factor was another option that increase the benefit per cost (B/C ratio). The benefit per cost may increase from 1.36-5.33 to 4.32-13.69 and the remaining cash may use for other investment such as buy seed of sea bass or black tiger shrimp.

Keyword: Nitrogen cycling, *Anadara nodifera*, bivalve aquaculture, Extensive farming, stocking density of cockle