

Growth of hatchery produced green mussel spat integrated with finfish culture in open sea cage: Implications for integrated multi-trophic aquaculture

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Integrated multi-trophic aquaculture (IMTA) is a multidimensional concept that utilizes the available unit space to augment the production efficiency of the system. It also enables nutrient recycling among trophic levels and can be exploited by bivalves in integrated culture. The study aimed to evaluate the sex-dependent growth of hatchery produced spat of the green mussel *Perna viridis* in suspended culture in box cages at two stocking densities and at two depths. Green mussel spat with mean dorso-ventral measurement (DVM) of 17.7 mm and mean total weight (TWT) of 0.6 g were stocked at 200 (T3) and 400 (T4) numbers per netlon screen box cage and suspended at 2 m (T1) and 3 m (T2) depths along with the open sea grouper cage moored off Visakhapatnam coast in Andhra Pradesh, India and cultured for 30 days, during February- March 2011. The specific growth rate in DVM, and total weight and thickness (THK) were comparatively higher in females in all treatment groups, but antero-posterior measurement (APM) was only marginally higher. The growth in weight was highest at a depth of 3 m. Survival was highest at 3 m depth with a stocking density of 200 per box cage and lowest at 2 m depth with a stocking density of 200 per box cage. The difference in DVM was significant between the sexes at T2 and T4 treatments ($p < 0.05$). There was no significant difference between the sexes of APM in T4; of THK in T2 and T3; of TWT in T2. They attained comparably good growth (mean DVM of 45.98 mm, total weight of 9.7 g, meat weight of 2.7 g and meat % of 28.83 in females and average DVM of 42.28 mm, total weight of 7.87 g, and meat weight of 2.36 g and meat % of 30.63) in 30 days of open sea multi-trophic culture. The females showed an increase in DVM, APM, THK, total weight, meat weight and shell weight while males showed increased meat percentage. Meat percentage was highest when cultured at a density of 400 and depth of 3 m in both the sexes and lowest at a density of 200 and depth of 2 m for males and at a density of 400 and depth of 2 m. However, there was no significant difference in the growth parameters irrespective of sex with respect to stocking densities and depth, when cultured along with finfish. The suitable density was found to be 400 numbers of green mussel spat and culture depth at 3 m in a multi-trophic aquaculture system.

Keywords: Dorso-ventral measurement, IMTA, *Perna viridis*, Stocking density, Suspended culture