

Effect of Different Pearl Nuclei Implantation and Culture Techniques on Survival and Pearl Formation in Two Freshwater Mussels in Sri Lanka

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Abstract

Though different pearl production techniques have been described for fresh water pearl production, so far no study had been conducted in identifying the most appropriate methods and protocols under local conditions. Therefore, to study the comparative effect of different pearl nuclei implantation and culture methods on the percentage nucleus rejection, survival and growth of two freshwater mussel, *Lamellidens marginalis* and *Lamellidens corrianus* were monitored from February 2014 to August 2016 at Vijaya Katupotha tanks, in the northwest region of Puttalam district using the mussels collected from the same location. Three sources of nucleus namely, “mantle tissue”; “plastic beads” (~5mm in diameter); and “two shapes of cut and polished bivalve shells” i.e rounded (~5.5mm in diameter) and oval (~5mm & 10 mm in perpendicular lengths and 2.5 mm in height) were used for implanting purpose. For implantation, the mantle tissue was used from a sacrificed mussel of same species and the best size range of mantle tissue was tested by using < 2 mm²; 3-4 mm²; 5-6 mm² and > 8 mm² tissues. Implanted mussels were cultured for 16 months by two methods: gunny sacks suspended from bamboo rafts and in plastic mesh cages placed on the bottom of the tank. Mussel mortality, nucleus rejection and water quality parameters were monitored weekly for 3 months during post-implantation. Randomly selected five mussels were opened and observed for pearl formation at 3, 6, 9, 12 and 16 month intervals. Significantly highest survival rates were observed in the individuals implanted with mussel shells (P<0.05); but no significant difference among the two shell-shapes. Moreover, the nuclear rejection rates were significantly higher (P<0.05) in the mussel implanted with the plastic beads. There was no any significant difference in nuclear rejection rate among the two shapes of mussel shell implantations. A significantly higher growth (P<0.05) in terms of mean length and mean weight gain was observed in the mussels cultured in plastic mesh cages compared to mussels cultured in gunny sacks. Formation of image pearls was observed within 12 months irrespective to the source of nucleuse. But different pearl formation rates were evident among different sources of nucleuse.

Relatively rounded shape shell nucleus resulted highest pearl formation rate but those pearls were not properly attached to the mussel valve. This study reports the first record of successful image pearl production in Sri Lanka using fresh water pearl mussels within 6-12 months period. Seasonal entrance of flood water and consumption of implanted mussels by carnivorous birds were the main drawbacks during the research period. The result reveals that the implantation of bivalve shells and culturing implanted mussels in plastic mesh cages keeping on bottom substrate is the most suitable combination for producing freshwater pearls under local climatic conditions of Sri Lanka.

Keywords: Immersed pear; Vijaya Katupotha; *Lamellidens marginalis*; *Lamellidens corrianus*

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