Coating Rate Of Round Nucleus In Mantle Transplantation of Freshwater Pearl Mussel *margaritifera* Sp. to *Anodonta woodiana*

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**Abstract.** Mantel is a living tissue that can secrete the mother's pearl layer. The purpose of this study was to determine the exact position of the mantle to produce the best pearl coating rate. Random block design was applied using three replications. The treatment is a coat piece from *Margaritifera* sp. which is transplanted into the anterior center (A) center, between the antero-posterior (B) and posterior (C) of *Anodonta woodiana*. The results showed that the best pearl quality and coating rate in treatment C (mean 196.89 µm ± 8.87; n = 25), followed by treatments A and B (mean 128.84 µm ± 6.30 ; 124.68 µm ± 5.73), respectively. The best mantle position to produce the best pearl layer is posterior.

**Keyword:** Freshwater Mussels; coating rate; transplantation; mantle.

1. **Introduction**

In Indonesia, many technology were applied to increase fishery product [1]. The first time Freshwater pearl culture was done in 2006 at BBPBAT Sukabumi [2] and start to succeed producing of pearl by the end of 2007, but until at present in number and also quality of its pearl still unexpected [2]. Graft mantle transplantation in marine pearl oyster generally conducted by using three method, that is out-graft, homograft or heterograft. Graft of mantle have importance role at process of pearl forming, and also have an effect on pearl colours and lousters [4, 5, 6]. A pearl nucleus is an object or a bead implanted into the the gonad of a marine mollusk or into an existing pearl sac in the gonad or mantle of a freshwater mussel around which nacre deposition occurs [7]. The pearl production is the layering of an egg-white-like substance called nacre onto the nucleus [5, 8, 9]. The purpose of this study was to determine the exact position of the mantle to produce the best pearl coating rate.

2. **Materials and Methods**

Two species mussels *Margaritifera* sp. and *Anodonta woodiana* were used with the size of 15 cm (antero-posterior). Research was done in freshwater fish pond measured of 2x6 m and depth of 100 cm. Mussel was cultured in wire basket (20x20x50 cm) and hang on rack method. The variables observed were the rate of coating and the quality of pearls produced in various positions of *A. woodiana* as a house from the results of transplanting mantle pieces of *Margaritifera* sp. (Fig. 1).
Figure 1. The mantle pieces position of Margaritifera sp. transplanted to A. woodiana as a house. (A) Anterior mantle piece; (B) Midle of mantle piece; (C) Posterior mantle

Randomized block design was applied using three replicates. The treatment was mantle pieces from Margaritifera sp. which transplanted to the middle-shares of anterior center (A), the middle between of antero-posterior (B) and posterior (C). The number of sample on each treatment was 25 mussels. Nucleus diameter which implanted was 6 mm.

3. Results and Discussion

The result showed that coating rate and best pearl quality there were at treatment C in the part of posterior mantle (196.89 ± 8.87 µm; n = 25), then followed by part of anterior mantle (A:128.84 ± 6.30 µm) and the middle of mantle (B:average 124.68 ± 5.73 µm), but among mantle of A and B not significant (P>0.05) (Figure 2).

Figure 2. The coating rate of nucleus after 4-month culture period. (A) Anterior mantle; (B) Midle of mantle; (C) Posterior mantle
The number of nucleus rejections in the posterior mantle (treatment C), the middle between of antero-posterior (treatment B) and the anterior was 8.33%, 11.67% and 16%, respectively.

High of survival rate 46.67% was also find in the treatment C (Fig. 4). Different result submitted by [6,10], in pearl culture by using marine pearl oyster *Pinctada maxima* and *P. fucata*, graft mantle implant taking away from the middle shares of pallial mantle start from shares anterior until posterior, marginal mantle and the jetty thrown. Different result submitted by [6,10] in pearl culture by using marine pearl oyster Pinctada maxima and P. fucata, graft mantle implant taking away from the middle shares of pallial mantle start from shares anterior until posterior, marginal mantle and the jetty thrown. Yielded of pearl quality equal relative, only its pearl colour is different. Mantle is lifing tissue consisted of three parallel layers, started from external to internal layer that is periostracum, prismatic and nacreous.

Have old known that at normal condition this layers is secreted from different side of mantle, that is first from mantle edge, second from external epidermis shares of mantle peripherik and the last
from all of mantle shares [11,12,13]. Referring at statement of all the expert, anticipated by survival rate and rejecting of nucleus not correlated with part of mantle which the transplantation, but rather because of weak condition effect of operate or hurt effect of nucleus implantation. [14] were have study on mantle transplantation in three species of freshwater pearl mussels, *Hyriopsis (Limnoscapha) myersiana*, H. (L.) *desowitzi* and *Chamberlainia hainesiana*, which is used Allograft dan Xenograft methods by transplanting foreign mantle tissue into the mantle tissue of a host mantle.

4. Conclusion
Best position of mantle graft from the mantle of *Margaritifera* sp. for implant which transplanted to *Anodonta woodiana* as a house was the posterior mantle and the coating rate of it was 196.89 µm± 8.87

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