

3rd International Conference on

Aquaculture & Fisheries

September 29-October 01, 2016 London, UK

Combined interaction of size phenotype of donor and recipient pearl oyster and gene expression on final pearl growth in *Pinctada margaritifera*

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The pearl oyster, *Pinctada margaritifera*, produces valuable cultured pearls as a result of the biomineralization process of a selected mantle graft from a donor oyster inserted together with a nucleus into the gonad of a recipient oyster. Production and annual exportation of cultured pearls increased from 86 kg in 1980 to 16 tons in 2012 valuing 65 million Euros of incomes. The commercial value of cultured pearls depends on different parameters, including pearl size, shape, color, darkness level, classification grade, luster and surface quality. Overall feature, pearl size is the most valuable one, with the largest pearls being the most valuable. To explore the respective roles of donor and recipient in pearl formation, a uniform experimental graft was designed with large and small donor oyster shell phenotypes, used to graft recipient oysters monitored for their growth-related traits every 3 months over one year period. At the same time, phenotypic parameters corresponding to pearl size and quality traits were recorded. Phenotypic interaction analysis demonstrated: 1) a positive correlation between recipient shell biometric parameters and pearl size and 2) donor effect on cultured pearl quality traits. Furthermore, the expressions of biomineralization biomarkers encoding proteins in the aragonite or prismatic layer showed: 1) overexpression of an aragonite-related gene in the large-shelled donor phenotype in the graft tissue, and 2) correlation of gene expression in the pearl sac tissue with pearl quality traits and recipient biometric parameters. These results emphasize that the recipient mainly drives pearl size and the donor mainly drives pearl quality traits.

Biography

Carole Blay has graduated as a Biology Engineer in 2009 (France). She has worked on the domestication of cultivated crops such as *Pennisetum glaucum* and *Digitaria* spp. of the research institute for the development. She has worked at the IFREMER on "Pearl Oyster" *Pinctada Margaritifera* and on the genetic improvement of the donor oyster. In 2016, she has started her PhD studies on genetic determinism of pearl quality trait on pearl oyster *Pinctada margaritifera*.

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