RESEARCH UPDATES

DEVELOPMENT OF SENSE ORGANS AND BEHAVIOR IN FISH LARVAE-TOOLS FOR UNDERSTANDING ECOLOGY OF FISH AND ITS LARVAL REARING OPTIMIZATION

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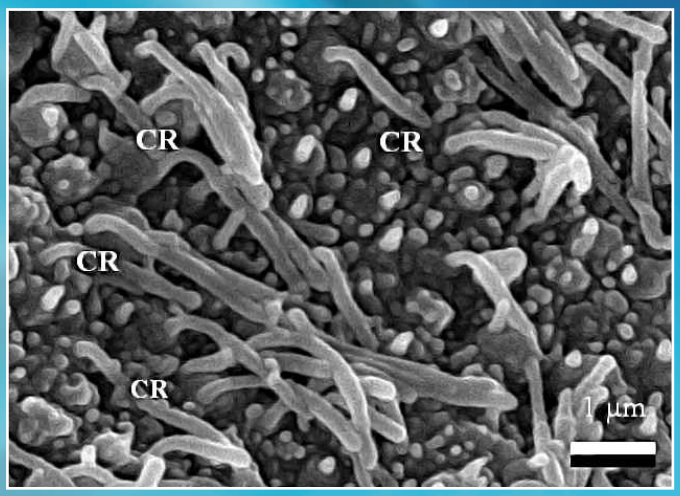
Survival in any environment depends on an organism's ability to acquire information from its environment through its senses. Therefore, study on the development of sense organs and behaviour in fish larvae can be used to gain information on their ecology.

Behavioral changes in fish larvae are closely related with sense organs development. Most fish hatch with immature sense organs that develop rapidly before the onset of first exogenous feeding, and shift in the habitat. The larvae of brown-marbled grouper (*Epinephelus fuscoguttatus*) had pigmented eyes, ciliated olfactory organ and other sense organs (free neuromasts and inner ear). They appear before the onset of first exogenous feeding. When they undergo metamorphosis and change their distribution in tank from the upper level to bottom region, the inner ears and olfactory organs fully developed to help the fish hear and smell very well. In the wild, these larvae may listen to the coral reef noise in order to orient shoreward, and seek seagrass beds for settlement by their developed olfactory sense.

Analysis of sense organs and behavior can contribute much to fish farming by widening the knowledge of larval trophic ecology and improve the rearing protocols for aquaculture species. Indeed, optimum light intensity for larval rearing has been suggested for grouper species. Previous studies provided evidence that the brown-marbled grouper larvae at early stage have only bright light vision and they could not feed in dim light and dark conditions. Therefore, optimum light intensity for larval rearing is necessary to optimize their feeding activity for survival.
Feeding the larvae at this stage is one of the prime problems that has to be overcome in successful aquaculture of fish. In future, studies on the feeding behaviour by chemoreception might contribute to the development of feeding enhancers.



Scanning electron micrograph of the surface of olfactory organ in 1 day old larva. CR: ciliated receptor cells.

Histological section on the pigmented left eye of brown marbled grouper larva just before the first exogenous feeding (2 days old).