Assessment of nutritional conditions of olive flounder (*Paralichthys olivaceus*) larvae and juveniles with special emphasis on metamorphosis and settlement

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Olive flounder *Paralichthys olivaceus* larvae and early juveniles were reared for 43 days after hatching in order to observe the effects of starvation during development and metamorphosis. Morphological, histological and biochemical measurements were made to assess the nutritional condition during growth and starvation from pre-matamorphic through post-metamorphic phases. Two groups of fish were compared ; one with sufficient food supply and one under continuous starvation until death.

Among morphometric analyses, both ratios of body height at anus/head height and pre-/post-anal lengths appeared to be sensitive to starvation during which substantial reduction was observed within a day of food deprivation. Histological variables as intestinal and rectal epithelial heights and gall bladder volume changed significantly with onset of starvation. The gut epithelial heights of starving fish decreased with advances in starvation, although they fluctuated during mid-metamorphic phase. In contrast, gall bladder volume increased remarkably soon after starvation. Ontogenetic changes in both gut epithelial height and gall bladder volume were evident, those associated with settlement and/or completion of metamorphosis. Abrupt decrease in the RNA/DNA ratios of starving fish were found right after onset of starvation. Even in the fed fish marked fluctuations in its ratios during metamorphosis were observed, evident by decreasing from late-metamorphic to post-metamorphic stages. These findings suggest that a combination of morphologically and histologically sensitive characteristics, and biochemical

measurement could be utilized as a measure to evaluate nutritional condition related to starvation in wild olive flounder larvae and juveniles.

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