

Dual appearance of xanthophores, and ontogenetic changes in other pigment cells during early development of Japanese flounder *Paralichthys olivaceus*

Abstract

Flatfishes display a left-right asymmetry that is unique in the animal kingdom. In order to clarify the mechanisms of the asymmetrical development of pigment cells, changes in pigment cell densities were examined in Japanese flounder *Paralichthys olivaceus*. During development from symmetrical larvae to asymmetrical juveniles, pigment cell densities were monitored on the skin on both the left side (ocular side in juvenile; eventually has two eyes) and the right side (blind side in juvenile; eventually has no eyes). A symmetrical and constant decrease was observed in leucophores and larval type melanophores. A mostly symmetrical (slightly delayed on the blind side) and constant increase in iridophores from metamorphosis was observed. Adult-type melanophores appeared and then increased only after metamorphosis on the ocular side. However, the pattern of xanthophores was complicated: they first existed symmetrically and decreased symmetrically until metamorphosis, and they later increased only on the ocular side. The dual appearance of the xanthophores, as well as the differences between their depths and sizes on the ocular and blind sides, may suggest the presence of two types of xanthophores-just as melanophores are well known to exhibit two types. The ontogenetic study of pigment cells described here is likely to help to elucidate the process of abnormal pigmentation in flatfishes. © The Japanese Society of Fisheries Science 2010.