

# PHYSIOLOGY AND ECOLOGY OF FISHES

## Lab. Marine Stock-Enhancement Biology

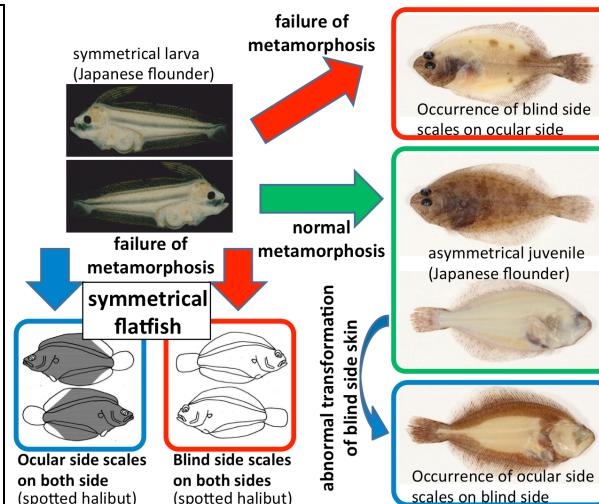
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For sustainable utilization of diverse bio-resources in the sea, it is critical to accumulate the basic knowledge on ecology, physiology and systematics of the organisms in the target habitat. Our laboratory is conducting research mainly on teleosts, with special emphasis on the relationship between organisms and environment. Our goal is to contribute to the effective utilization of bioresources of the sea, without adversely affecting the biodiversity.

In our laboratory, acquiring comprehensive knowledge on various teleosts, as well as on the sea itself, is strongly recommended, regardless of thesis subject. For this purpose, most students start their study using live fish or conducting field sampling. A significant number of graduates from our laboratory are working on research on marine organisms and/or the sea, belonging to national and prefectural institutes.

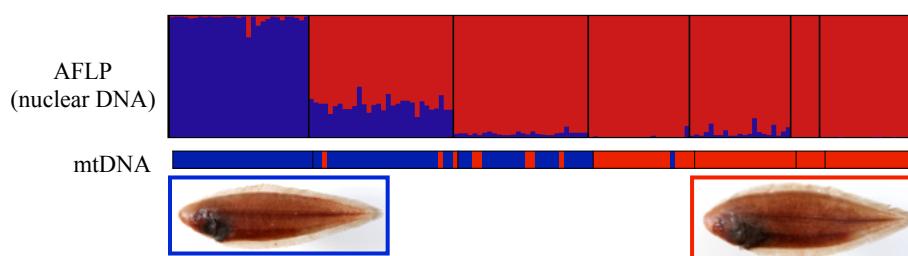
### Physiological understanding of morphological abnormality in artificially reared juveniles

Symmetrical larvae of flatfishes transform into asymmetrical juveniles during metamorphosis. However, some individuals, sometimes greater than 50%, failed to construct normal body shape due to inadequate rearing conditions. As shown in the figure for example, occurrence of "symmetrical flatfish", having pigments on both sides, or lacking pigments on neither side, is a serious issue in aquaculture. Malformation of bones are also widely known in other teleost. We are trying to clarify the formation mechanism of such morphological abnormalities through rearing experiment, based on endocrinology and developmental biology.



### Genetic population structure and species diversity of fishes

The elucidation of species diversity and genetic diversity of fishes is essential for marine stock management and enhancement. This laboratory investigates intraspecific population structure, cryptic species, phylogeography, secondary contact of diversified lineages, or interspecific hybridization and introgression using molecular tools. Our species of interest are mainly temperate coastal marine fishes inhabiting western Japan and the Korean Peninsula.



Interspecific hybridization and subsequent introgression between two *Cynoglossus* species

## Keywords

*Metamorphosis, hormone, organismal physiology, morphological abnormality, early life history, population structure, species diversity, interspecific hybridization*

## Recent Publications

### **Undulated bottom of rearing tank decreases hypermelanosis in Japanese flounder *Paralichthys olivaceus*.**

Nakata K, Yamamoto I, Miyama Y, Nakamaru T, Masuda R, Tagawa M (2017).  
Fisheries Science (in press).

### **Population structure and sequence divergence in the mitochondrial DNA control region of gizzard shad *Kynosirus punctatus* (Temminck & Schlegel) in Korea and Japan.**

Gwak WS, Lee YD, NAKAYAMA K (2015).  
Ichthyological Research, 62, 3, 379-385.

### **Effects of time and duration of rearing with bottom sand on the occurrence and expansion of staining-type hypermelanosis in the Japanese flounder *Paralichthys olivaceus*.**

Isojima T, Makino N, Miyama Y, Tagawa M (2014).  
Fish. Sci. 80: 785-794.

### **Transplantation of pigmented and non-pigmented scales into the ocular and blind sides of the Japanese flounder *Paralichthys olivaceus*, suggesting the presence of ocular-side characteristic inducer in pigmented scales.**

Isojima T, Tagawa M (2014).  
Fish. Sci. 80: 1027-1035.

### **Evidence for an ontogenetic change from pre-programmed to meal-responsive cck production in Atlantic herring, *Clupea harengus* L.**

Kamisaka Y, Helvik JV, Tagawa M, Tanaka M, Ronnestad I (2013).  
Comp. Biochem. Physiol., A 164: 17-20.

### **Developmental changes in melanophores and their asymmetrical responsiveness to melanin-concentrating hormone during metamorphosis in barfin flounder (*Verasper moseri*).**

Yoshikawa N, Matsuda T, Takahashi A, Tagawa M (2013).  
Gen. Comp. Endocrinol. 194: 118-123.

### **Mitochondrial DNA sequence divergence between "Kunimasu" *Oncorhynchus kawamurae* and "Himemasu" *O. nerka* in Lake Saiko, Yamanashi Prefecture, Japan, and their identification using multiplex haplotype-specific PCR.**

Nakayama K, Muto N, Nakabo T (2013).  
Ichthyological Research, 60, 3, 277-281.

### **Distinct genetic isolation between "Kunimasu" (*Oncorhynchus kawamurae*) and "Himemasu" (*O. nerka*) in Lake Saiko, Yamanashi Prefecture, Japan, inferred from microsatellite analysis.**

Muto N, Nakayama K, Nakabo T (2013).  
Ichthyological Research, 60, 2, 188-194.