Abstract of the doctoral thesis

Ecological study on the Asian sheephead wrasse *Semicossyphus reticulatus* (Labridae) in the western Seto Inland Sea

（瀬戸内海西部におけるコブダイ（*Semicossyphus reticulatus*）の生態に関する研究）

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The Asian sheephead wrasse *Semicossyphus reticulatus* is well known as the largest labrid in temperate waters around Japan and for the well-developing humphead. Only three Pacific temperate water species constitute the genus *Semicossyphus*, i.e., *S. pulcher*, *S. darwini*, and *S. reticulatus*, and all species commonly have large bodies being close to (or sometimes over) 1 m in total length. There are few ecological study about *S. reticulatus* in contrast to other two congeners are attribute from their local importance of fisheries and recreational fishing.

The aim of this study is to reveal their ecology with discussing that of congener wrasses and the general biological characters of the genus jumping over geographical isolation. I conducted present study focused on following four ecological aspects, Age and growth, spawning and hermaphroditism, head morphology and feeding habits. All fish samples were collected from fish markets and fishing from the breakwater.

The study on age and growth was based on age determination by reading annuli of sectioned otolith extract from the fish. Calculated von Bertalanffy growth equation from estimated age and standard length was $L_t = 489\ (1\text{-}e^{-0.12\ (t+1.75)})$, indicating considerably slow growth especially after 10 yrs age similar to a congener the California sheephead wrasse *S. pulcher*. The maximum age of *S. reticulatus* was estimated was 31 yrs and was sexed as a male.

Males were significantly larger than females in SL only appeared larger size class than about 450mm SL. In addition, histological study (existence of the gonad that was intermediate stage) also suggests that the fish has a life history of monandric protogyny. However, some female fish exceeded some of male samples in SL, it may represent their hermaphroditic system that is controlled by their social structures not automatically change sex with age or size.

Elevation of humps on forehead of *S. reticulatus* was concluded non sex-specific

morphology from present study that has been assumed sex-specific until now. The hump of the fish gradually enlarged with body growth, namely the size-associated development, resulting in often occurrence of conspicuous humpheads even in large females.

In the present Ph D thesis, I first revealed the basic ecology of *S. reticulatus*. The fish shows ecological similarity to congener wrasses jumping off geographical separation through the Pacific Ocean. Considering their ecology that is slow growth speed and long life-span, large male size suggests their weakness against to the fishery activities and environmental change. Fortunately, I can continue to study on this large reef fish because there is not so strong fishery pressure for the fish, in contrast to most of large reef fishes have threatened with exploitation by fisheries. We should The fish may play a very important role in coastal ecosystem of the temperate water.