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Histological characteristics of the digestive tract of the Gobiidae from Jeju Island, Korea

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Introduction

Worldwide, there are 1,875 species in the family Gobiidae (Nelson, 1984), which is slightly smaller than that of the Cyprinidae. Gobies are found in both freshwater and seawater. In Korea, there are 22 genera and 46 species of the Gobiidae, most of which live in inland waters, including estuaries, rivers, and brackish inland seas (Kim, 1986). The digestive tract of most teleosts consists of an oral cavity, pharynx, stomach, intestine, rectum, and anus. However, since the feeding habits of these fish differ by species and the environment that they inhabit, the morphologies and structures of their digestive tracts differ as well (Tanaka, 1969). In this study, we investigated the internal structures of the digestive tracts, the characteristics of the epithelial tissues, and the distributions and characteristics of mucus-secreting goblet cells with respect to the habitats and ingesta of individual species in order to provide a basis for understanding the digestive physiology and biology of the Gobiidae.

Materials and Methods

T. obscurus and *R. giurinus* were collected from an estuary at Cheonjiyeon waterfall on Jeju Island, Korea. The length of the digestive tract (DL, 0.1 mm) and the relative length of the gut (RLG) were measured. The digestive tract of each species were fixed in Bouin's solution, dehydrated in a graded series of ethanol, embedded in paraffin, and then cut in 5 ㎛ cross and longitudinal sections. Slides were stained with Hansen's hematoxylin and 0.5% eosin (HE) and with Alcian blue (AB) at pH 2.5 and periodic-acid-Schiff (PAS).

Results

1) *Tridentiger obscurus*

The digestive tract of *T. obscurus*, which is a brackish water species, is longer (RLG = 0.66) than *R. giurinus*. This fish has a simple stomach but pyloric caeca are absent. The mucosal folds are regularly branched and the muscularis externa is thickest in the esophagus. Mucus-secreting goblet cells were most abundant in the mid intestine portion

2) *Rhinogobius giurinus*

R. giurinus, which is also a brackish water species, has a short (RLG = 0.42), simple, and narrow gut. The gastric glands are well developed in the stomach, but pyloric caeca are absent. The mucosal folds are regularly branched, and, as in the other species, the muscularis externa is thickest in the esophagus, which also contained the largest number of mucus-secreting goblet cells.

In *T. obscurus* and *R. giurinus*, which are brackish water fish, their digestive action occurs in the mid intestine portion and the anterior portion to protected and functions to activate digestion.

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