

DIGESTIVE TRACT AND ENZYMES DEVELOPMENT IN EARLY LIFE
STAGES OF MARBLE GOBY (*Oxyeleotris marmoratus* BLEEKER)

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MASTER OF SCIENCE
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI
MALAYSIA

2005

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Perpustakaan Sultanah Nur Zahirah (UMT)
Universiti Malaysia Terengganu



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QP 609 .D52 V3 2005



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**DIGESTIVE TRACT AND ENZYMES DEVELOPMENT IN EARLY LIFE
STAGES OF MARBLE GOBY (*Oxyeleotris marmoratus* Bleeker)**

MAI VIET VAN

**Thesis Submitted in Fulfilment of the Requirement for the
Degree of Master of Science in the Institute of Tropical Aquaculture
Kolej Universiti Sains dan Teknologi Malaysia**

2005

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Abstract of thesis presented to the Senate of Kolej Universiti Sains dan Teknologi Malaysia in fulfilment of the requirement for the degree of Master of Science.

DIGESTIVE TRACT AND ENZYMES DEVELOPMENT IN EARLY LIFE STAGES OF MARBLE GOBY (*Oxyeleotris marmoratus* Bleeker)

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September 2005

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A study on the development of the digestive system of marble goby (*Oxyeleotris marmoratus*) larvae was conducted from hatching until 35 days after hatching (DAH) by histological and histochemical techniques. At hatching, the digestive system appear as a straight undifferentiated tube, with a small lumen and the mouth and anus still not open. During the endogenous feeding phase (0-3 DAH), yolk was absorption while the gut differentiated into a buccal cavity, oesophagus and intestine. The liver appeared as compact basophilic tissue and situated between the yolk sac and the developing gut without any vacuoles. The epithelium of the intestine started to fold on 2 DAH. The rectum was separated from the anterior intestine by the ileorectal valve. Lipid vacuoles were observed in the rectum on 3 DAH and in small intestine on 7 DAH. At onset of exogenous feeding (4-5 DAH), the digestive tract was divided into 5 parts: buccopharynx, oesophagus, stomach, intestine and rectum. The stomach became more elongated on 10-18 DAH but only circular muscle blocks were

identified in the muscularis external. On 30-35 DAH, the liver had a typically alveolar aspect with the nucleus of hepatocytes completely squashed against the cell wall. Glycogen reserve were seen within the liver and the hepatocytes morphology were more defined with a big spherical and central nucleus. The present of gastric glands in the stomach and the intestine were observed. Several zymogen granules were noted within the pancreas.

The activities of some digestive enzymes were studied in early larvae stage of marble goby (*Oxyeleotris marmoratus* Bleeker). At hatching, all main digestive enzymes: acid phosphatase, alkaline phosphatase, trypsin, chymotrypsin were detected in the yolk, mainly at the periphery of the yolk sac. Lipase activity was observed in the intestine at 3 DAH, in the liver and pancreas at 5 DAH, and in the rectal epithelium at 7 DAH, and the lipase activity increased in intensity until 35 DAH.

The trypsin and chymotrypsin levels of the larvae fed on the various types of food using clear water were very low: 3.635 - 3.916U/mg tissue and 1.034 - 1.204U/mg tissue, while the trypsin and chymotrypsin levels of the larvae fed with the same types food using green water were higher: 5.274 -5.873U/mg tissue and 1.556 - 2.236U/mg tissue. Among the treatments using green water, the highest trypsin and chymotrypsin levels were observed in the larvae fed on live food (copepods nauplii mixed rotifer nauplii). However, there were no significant difference of trypsin and chymotrypsin levels ($p>0.05$) among the larvae fed with different types of food using clear water group and those using green water group.