Studies on the Broodstock Management and Larval Rearing of the Commercially Important Snapper*

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Introduction

Snapper belonging to the family Lutjanidae command a relatively high market price in Southeast Asia (FAO, 1990) and are cultured in floating net cages and brackishwater ponds (Cheong, 1988). Nowadays, in Malaysia the demand of snapper seeds was increased especially due to the introduction of open sea cage culture. However, the seed still come exclusively from the wild. Naturally, the young and adult snapper can be found around the river mouth and along the coastal area (Verreth, *et.al.*, 1992). Among the snapper, John's Snapper (*Lutjanus johnii* (Bloch)) is the one of the popular species with high market demand and very potential as commercial culture either in ponds or any cage culture system. According to few past studied, this species has spawned naturally or artificially, but the larvae died at early development or survived to metamorphosis at very low rates (Suzuki and Hioki, 1979; Minton *et.al.*, 1983; Lim *et.al.*, 1985). Therefore, studies on this species especially in term of seed production is very important for booming aquaculture industries and also beneficial to our economic consolidation.

Materials and Methods

This project was carried out with Marine Fishes Research and Production Center, Tanjung Demong, Besut Terengganu co-operation. Fifteen pairs of broodstock (3.5 – 5.0 kg) were stocked in 150 ton circular concrete tank (10 m dia. X 2 m deep) with salinity 30 – 31 ppt. The tank was cleaned every 1-3 day with 80-100% water changes. The tank also was supplied with aeration and fish were fed trash fish and fresh squid at 1-2% body weight per day. For induced breeding experiment, four pairs of broodstock were intramuscularly injected using HCG (dosage: 500 IU/kg female; 250 IU/kg male) during the spawning season. Naturally spawned and fertilised eggs were collected using net (< 0.2 mm mesh size) before incubation in the hatching tank (5-20 ton concrete tank). Hundred incubated oocyte were sampled time to time and fixing in Bouin's solution to investigate their embryonic development followed Hassan's (1990) histological technique. The investigation on morphology changes especially in term of mouth size also conducted by sampling the hatched larvae. It's important to determine the suitable food supply for the larvae.

Results and Discussion

The John's Snapper (*Lutjanus johnii* (Bloch)) broodstock easily adapted to captivity and the gonad were able to develop. This study showed that the spawning season of captivated broodstock was followed by the natural conditions – during monsoon season from November to February.

The study also demonstrated successfully the induced spawning of this species, with HCG as a potent agent for inducing final maturation and ovulation leading to spawn. Used the suggested dose with water temperature and salinity constant at about 28.5°C and 30 ppt respectively, spawning occurred 24 hours after injection. However, the induce breeding practice on this species might not be practical because they were also able to spawn naturally. During their spawning season, spawning occurred at night (9.00 – 10.00 pm) and early morning (4.00 - 5.00 am) every early and middle of Muslim's month without any artificial inducing. The fertilisation and hatching rate of natural spawning were 0–61% and 15–84%, respectively.

The eggs had a mean diameter of 0.80 mm at the time of spawning. First hatching of fertilised eggs occurred at 14 hours after spawning. The newly hatched larvae measured 1.66 ± 0.15 mm (n=20) total length. The larvae had yolk sac (capacity of 0.00663 ± 0.0013 mm^3) that extended forward of the snout and the oil globule (capacity of 0.0060 ± 0.0010 mm^3) was situated at the midventral to posterior side of the yolk sac. The mouth began to develop at 28 hours after hatching but the function just started at around 35-57 hours after hatching. The yolk sac was fully absorbed 75 hours after hatching while the oil globul at 43-95 hours after hatching. At this time, the larvae commenced feeding.

Based on mouth size development, which started from 50 hours after hatching, the John's Snapper larvae were willing to accept the exogenous nutrient. From this study, *Chlorella sp. Tetracelmis, Nannochloropusis* or other phytoplankton in green water was the best first feeding for this larva. After day 3 the completed mouth development showed that the larvae were able to take the zooplankton as their further food. However, the larvae cannot take the normal rotifer due to the very small mouth size and the high mortality occurred around the 7th day after hatching due to starvation. Supplied of dwarf rotifer was suggested to solve this problem. But it was not carried out in this study due to the weakness of information and knowledge to produce and maintain this life food.

Conclusions

The rearing of *Lutjanus johnii* broodstock was evident that it could be done in 150 tones concrete tank with simple maintenance of water quality and food supplied. Although the breeding of this species was conducted successfully either by or without hormone inducing during their spawning season, some

problems was existed in their larval rearing especially in term of suitable food and feeding regime. Ability to produce mass of small live food such as dwarf rotifer or any organisms that suitable with their earliest mouth opening size (0.05 – 0.1 mm) may able to dissolve that problems.

Benefits from the study

The successful information obtained on broodstock rearing and their breeding technique will serve as good basis for further studies on the production of John's Snapper fry. On the other side, the information on early development of their larval can be used for other further studies on food supply needed for larvae of this species. Finally, the results of this study will also serve as base for development of breeding programs on other snapper species such as *Lutjanus kasmiras, L. argentimaculatus, L. camphecanus* etc.; which is also popular as food fish in Malaysia.

Literature cited in the text

None.

Project Publications in Refereed Journals

None.

Project Publications in Conference Proceedings

Ambok Bolong Abol-Munafi, Nik Razali, N.L., Norhisyam, A. and Khamis, M. (1998). Induced spawning of *Lutjanus johni* and development of early larvae stage. *in* : Malaysian Science and Technology Congress'98. 1998. Primula Park Royal, Terengganu.

Graduate Research

None.

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