Genetic diversity analysis of the first and second generations of fast-growing striped catfish (Pangasianodon hypophthalmus Sauvage, 1878) using microsatellite analysis

Indonesian Aquaculture Journal, 13 (1), 2018, 1-6

Genetic diversity analysis of the first and second generations of fast-growing striped catfish (Pangasianodon hypophthalmus) since 2010. The aim of this study was to evaluate the genetic variation of the first (G-1) and second (G-2) generations of fast-growing striped catfish using microsatellite analysis. The G-1 and G-2 populations were selected individually from populations. DNA samples were collected from 40 ind. fish of each population and analyzed using five microsatellite loci (Pg1, Pg2, Pg3, Pg13, and Pg14). The results showed that the number of alleles per locus in the G-1 and G-2 populations ranged from 4 to 7 alleles, with an average of five for each generation. The average of observed heterozygosity of the G-1 population (0.420) was lower than the G-2 population (0.495). Inbreeding level showed that the G-1 population was more inbred than the G-2 population. The study also found that both striped catfish populations had relatively low genetic variation. This result suggests that monitoring of genetic variation and better scheme of good spawning were needed on the next selection program to produce the intended fast-growing striped catfish.

KEYWORDS: genetic; microsatellite; Pangasianodon; catfish

Countergradient variation in growth of barb (Barbonymus balleroides Val. 1842) domesticated at different altitudes

Indonesian Aquaculture Journal, 13 (1), 2018, 7-12

Barb (Barbonymus balleroides Val. 1842) is one of the native species found in many rivers of Asian countries, including Indonesia. This species had higher commercial value compared with other fish species popular among consumers. In terms of supporting its domestication, information regarding the optimal aquaculture system of the fish is needed, one of which is its rearing location. Currently, there is limited information on rearing the fish at different locations with different altitude. This research aimed to obtain the growth of barb fingerlings reared in three locations with different altitudes. The study was conducted in the ponds located at Cijengkol area (ASL< 200 m), Maleber (200 m< ASL<400 m), and Cihong (ASL> 400 m), West Java. Fingerlings of domesticated barb (total length 4.48 ± 0.10 cm; weight 0.95 ± 0.06 g) were stocked in three fixed net cages (size 2 m × 2 m × 1 m) in a pond (40 m × 20 m) at each location. Fish were fed with commercial feed (30%protein) of 5%biomass three times per day during 120 days of rearing. Water quality parameters observed were temperature, dissolved oxygen, and pH. Measured parameters were length gain, weight gain, specific growth rate, average daily growth, biomass gain, feed conversion ratio, and survival rate. The results showed that the fish reared in Maleber showed the best growth and feed conversion ratio compared to other locations (P<0.05). Meanwhile, no significant differences were found on the survival rate within all treatments. The growth of barb fingerlings is more optimal if reared in midland areas which have suitable temperature ranges for their growth.

KEYWORDS: Barb fingerlings; Barbonymus balleroides; domestication; growth; altitude
Crablet production of mud crab *Scylla tranquebarica* by their larvae rearing supplemented with different dosages of commercial feed

The effects of an artificial commercial feed supplementation on larval rearing and crablet production of mud crab *Scylla tranquebarica*. In mass production of mud crab seeds, only rotifer and Artemia nauplii are usually fed to mud crab larvae rearing until the larvae develop to crablet stage. The supplementation of artificial commercial feed from zoea-3 stage is expected to supply an essential nutrient required for an optimum larval development. The research was aimed to determine the optimum dosage of commercial feed supplementation for a successful larval rearing to produce crablet in hatchery. Newly hatched larvae of mud crab were stocked at a density of 100 ind./L. The larvae were fed with rotifer and Artemia nauplii. Microbound artificial commercial feed sized <100 microns (protein 52%, fat 14.5%, fiber 3% and water content 10%) was supplemented to the larvae from zoea-3 to megalopa stage at different dosages namely: a). 0.5 mg/L/2 days; b). 0.75 mg/L/2 days; c). 1.0 mg/L/2 days; d). 1.25 mg/L/2 days. Larval population, larval development indices (LDI), megalopa occurrence index (MOI) and crablet production were observed and measured. Water quality (ammonium, nitrite, Total Organic Matter (TOM), and total *Vibrio* sp. count were also monitored. The LDI, MOI, and crablet production from each treatment were compared and tested using one way-ANOVA. The results showed that the survival rate of larvae at zoea-5 ranged between 29-33%. The LDI was not significantly different (P>0.05) among treatments. However, the MOI of treatment A and B at day 21 ph was significantly higher (P<0.05) compared with treatment C and D. In addition, the crablet production in treatment B, C and D were significantly higher (P<0.05) compared with treatment A. It was concluded that the supplementation of artificial commercial feed in larval rearing of *S. tranquebarica* could be applied at the dosage range of 0.75-1.25 mg/L/2-days from zoea-3 until crablet (C-7) stage.

**KEYWORDS:** dosage; mangrove crab; *Scylla tranquebarica*; supplemented feed

Metabolic rates (SMR, RMR, AMR, and MMR) of *Oplegnathus fasciatus* on different temperature and salinity settings

The metabolic rate of aquatic animals is closely related to oxygen concentration and influenced by internal and external factors. Despite its high value as marine fish species in South Korea, information on rock bream *Oplegnathus fasciatus* metabolism is scarcely available. This study observed the standard metabolic rate (SMR), routine metabolic rate (RMR), and active metabolic rate (AMR) of rock bream *Oplegnathus fasciatus* subjected to different temperature settings. Another observation was performed to find out the maximum metabolic rate (MMR) on rock bream subjected to different salinity settings. Fish (TL: 26.86 ± 0.29 cm and BW: 469.40 ± 38.21 g for SMR, RMR, and AMR measurement; TL: 26.7 ± 0.4 cm and BW: 451.0 ± 44.4 g for MMR measurement) were observed using respirometer (dimension = 30 cm × 20 cm × 20 cm; volume: 10.4 L) inside a recirculation systems. SMR, RMR, and AMR were measured at 15°C, 20°C, and 25°C. Meanwhile, MMR was measured at 15, 25, and 35 psu. The results showed that SMR, RMR, and AMR increased linearly by increasing the temperatures (SMR: 58.7 ± 3.2, 102.7 ± 4.3, and 157.1 ± 4.1 mg O$_2$/kg/h at 15°C, 20°C, and 25°C, respectively; RMR: 66.0 ± 8.6, 112.6 ± 10.2, and 175.2 ± 21.3 mg O$_2$/kg/h at 15°C, 20°C, and 25°C, respectively; AMR: 73.4 ± 7.4, 122.0 ± 6.3, and 196.7 ± 15.4 mg O$_2$/kg/h at 15°C, 20°C, and 25°C, respectively), whilst MMR decreased by lowering salinity (48.5 ± 5.2, 61.1 ± 5.5, and 89.3 ± 14.7 mg O$_2$/kg/hour at salinity of 15, 25, and 35 psu, respectively).

**KEYWORDS:** rock bream; *Oplegnathus fasciatus*; temperature; salinity; metabolic rates
Milky hemolymph disease of spiny lobster (MHD-SL) is categorized as the most destructive disease in farming spiny lobster. Therefore, it is required to investigate the routes of milky disease infection in spiny lobster as a basic knowledge in order to prevent milky disease transmission. The aim of the present study was to perform an experimental infection of milky disease in spiny lobster *Panulirus homarus*. Experimental infection of milky disease was carried out by several modes of infection which were injection, immersion and per os exposure. Injection of each 0.2 mL undiluted and diluted hemolymph from the diseased lobster resulted in a cumulative mortality of 100% at 15 days post-infection (dpi), and 75% at 16 dpi, respectively. Experimental infection through water immersion caused in a cumulative mortality of 50% at 7 dpi. In contrast, no mortality was observed in per os exposure as well as in control groups. Results of this experimental study provided evidence for horizontal transmission of MHD-SL among *P. homarus*. Histopathological analysis exhibited that there were masses of Rickettsia-like bacteria (RLB) in the connective tissues of the gill, hepatopancreas, gonad, midgut, and muscle tissues of the affected lobsters. Mass of RLB was not only found in the moribund lobsters but also in the surviving lobsters with milky hemolymph appearance.

**KEYWORDS:** experimental infection; milky hemolymph disease of spiny lobster (MHD-SL); *Panulirus homarus*; spiny lobster

**Identification and life cycle of marine leech isolated from cultured hybrid grouper in the Northern Bali waters of Indonesia**

The aims of this study were to identify and to determine life cycle of marine leech isolated from cultured hybrid grouper “cantik” (*Epinephelus fuscoguttatus* x *E. polyphekadion*) in the northern Bali waters of Indonesia under laboratory conditions. Observation of the life cycle of the marine leech was done using petri-dishes (9 cm in diameter) arranged into two groups. In group-1, a petri-dish was filled with sterile seawater (with water exchange of 50%-60% every two days) and in group-2, a petri-dish was filled with continuous running water. DNA sequence was aligned with the sequences from GenBank by BLAST program. Results of similarity index with GenBank sequence exhibited that the nucleic acid of the marine leech isolated from the hybrid grouper “cantik” showed high similarity (99%) with *Zeylanicobdella arugamensis*. One adult leech could produce 1-63 eggs. The eggs were developed into morula, blastula, and gastrula within five days. The early phase of the embryo with daily water exchange treatment started on day-6 and hatched into larvae on day-10. The eggs incubated with continuous running water had hatched faster (eight days). However, not all eggs hatched at the same time. Some of the eggs hatched 1-3 days after the first one. Hatching rate of eggs varied from 2.70% to 100%. The newly hatched *Z. arugamensis* larva has transparent color and length of 1.0-1.5 mm. On day-6, *Z. arugamensis* larvae were already seen attaching to the body of the fish. The size of the *Z. arugamensis* larvae ranged between 3-11 mm on day-9. In that stage, they were able to produce eggs. Therefore, we argue that *Z. arugamensis* only requires 17 to 22 days to develop into the adult stage.

**KEYWORDS:** hybrid grouper “cantik”; life cycle; marine leech; *Zeylanicobdella arugamensis*
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SEND INSTRUCTIONS FOR WRITING AND PUBLISHING ARTICLES OF
INDONESIAN AQUACULTURE JOURNAL 2016 (12pt Bold)

I Nyoman Adiasmara Giri™*, Ketut Sugama™, Alimuuddin™, and Anang Hari Kristanto****

*) Research and Development Institute for Mariculture, Gondol
**) Center for Fisheries Research and Development, Jakarta
****) Bogor Agricultural University, Bogor
*****) Institute for Freshwater Research and Development, Bogor (10pt Normal Italic)

ABSTRACT (12pt Bold)

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KEYWORDS: Author guidelines; research journal; aquaculture; article template

1. Introduction

Indonesian Aquaculture Journal has a p-ISSN 0215-0883; e-ISSN: 2502-6577 with Accreditation Number: 591/AU2/P2MI-LIPI/03/2015 (period April 2015-April 2018). First published in 2006, with the publication frequency of twice a year, in June and December. (http://ejournal-balitbang.kkp.go.id/index.php/iaj) is a peer-reviewed Journal Indonesian Aquaculture accept manuscripts or articles in the field of aquaculture various academics and researchers nationally.

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CONCLUSION: The conclusion describes the response of hypotheses and / or research purposes. Conclusions not contain looping of results and discussion, but rather to a summary of the research results.

Table 1. Response to selection and final mean body weight of the third generation compared to the control population of the African catfish Clarias gariepinus at the end of larval rearing, nursery and grow-out phases

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<td>Third generation</td>
<td>Control</td>
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<tr>
<td>Larval rearing</td>
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<td>0.19 ± 0.10</td>
<td>0.19 ± 0.07</td>
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<tr>
<td>Nursery</td>
<td>30</td>
<td>6.12 ± 2.93</td>
<td>5.80 ± 3.50</td>
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<tr>
<td>Grow-out</td>
<td>60</td>
<td>198.67 ± 82.82</td>
<td>165.22 ± 71.09</td>
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</table>

Figure 1. Growth performances based on body weight during 25 days of larval rearing phase, 30 days of nursery phase and 60 days of grow-out phase (based on samplings of 2% populations) of the third generation (■) and control population (●) of the African catfish (Clarias gariepinus) genetic improvement program held at Research Institute for Fish Breeding, Sukamandi. Vertical lines represent its each standard deviation.
ACKNOWLEDGEMENTS: thanks mainly devoted to research funders. Acknowledgements can also be delivered to the parties that support the implementation of the research and writing of the manuscript.

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\[ RPS = \left(1 - \frac{\text{% fish mortality of vaccinated}}{\text{% Fish mortality of control}}\right) \times 100 \]

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10. Acknowledgements

Thanks delivered to the Center for Fisheries Research and Development, which has funded the sustainability of this journal.

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