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Sulaeman and Ravi Fotedar (Research Institute for Coastal Aquaculture and Fisheries Extension)

Reproductive performance of domesticated broodstock of silver perch, *Bidyanus bidyanus* (Mitchell 1838) and the relationship between oil globule fragmentation and egg quality

Indonesian Aquaculture Journal, 12 (2), 2017, 43-51

The experiments investigated the reproductive performance of the domesticated broodstock of the silver perch and the relationship between various degrees of oil globule fragmentation and egg quality. Six years old of second generation broodstock (n = 3) were evaluated based on the fecundity, fertilisation rate, hatching rate, the degree of oil fragmentation of egg, and the quality of embryos and larvae produced. The fragmentation were grouped into three categories: un-fragmented (cat-1), moderately fragmented (cat-2), and highly fragmented (cat-3). The results showed that the broodstock had a relatively high fecundity (132,000 ± 7,22), fertilization rate (94.27 ± 1.28%), and hatching rates (87.94 ± 1.23%). The survival rate of larvae at 12 days post hatching (dph) in cat-1 (71.3 ± 0.9%) was higher than cat-2 (66.7 ± 0.9%) whereas cat-2 was higher than cat-3 (61.3 ± 0.3%). The eggs was dominated by cat-1 (78.11 ± 2.44%) which was significantly higher than cat-2 (21.26 ± 2.45%) and cat-3 ones (0.40 ± 0.21%). The survival rate of embryo at 20 hours post hatching (hps) and hatching rate of cat-1 (95.33 ± 0.00% and 93.33 ± 0.00%) and cat-2 (90.00 ± 0.00% and 85.00 ± 0.00%) were significantly higher than cat-3 (72.33 ± 1.76% and 60.33 ± 0.00%). The total length (TL) of the larvae of cat-1 and cat-2 (8.44 ± 0.21 mm and 8.35 ± 0.23 mm respectively) were significantly higher than larvae of cat-3 (7.09 ± 0.14 mm). No significant difference was found in the larval deformities among any categories. In conclusion, the reproductive performance of six year-old broodstock silver perch showing acceptable performance and egg categorisation based on oil globule fragmentation can be used as a useful tool to indicate eggs quality of silver perch.

KEYWORDS: reproductive; oil globule; egg quality; perch; *Bidyanus*

UDC 639.31

Vitas Atmadi Prakoso and Kurniawan (Institute for Freshwater Aquaculture Research and Fisheries Extension)

Compensatory growth of *Oreochromis niloticus* selected strain from Bogor, West Java

Indonesian Aquaculture Journal, 12 (2), 2017, 53-58

In efficient feed management strategy in aquaculture will increase the fish production cost. One of the most effective strategies to solve this problem is through a better understanding of the compensatory growth of cultured fish. *O. niloticus* BEST tilapia strain (total length: 7.23 ± 0.11 cm mean ± SD; Body weight: 7.04 ± 0.08 g mean ± SD) were reared in aquariums at 26.3 ± 1.4°C for 10 weeks. During the experiment, the control group was fed twice a day. The other two groups were deprived of food for one and two weeks and then fed twice a day during refeeding period. At the end of the experiment, the fish deprived for one week had a body weight, biomass and specific growth rate that were not significantly different from the control group. The body weight, biomass and specific growth rate of fish deprived for two weeks were significantly lower than the other groups. This study revealed that concentrations of ash and lower concentrations of protein and lipid on the deprived groups were higher compared to those without feed deprivation. Mortality of fish was lower than 9% and not significantly different among the treatments. Fish aggressive behavior was the main reason for injuries and death. Given the results, BEST tilapia strain was only able to reach complete growth compensation not longer than one week deprivation period. The results of the present study could be applied as basic information for further research on feeding management of BEST tilapia strain.

KEYWORDS: *Oreochromis niloticus*; compensatory growth; feed deprivation; mortality

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Asda Laining, Ike Trismawanti, Kamaruddin, and Makmur (Research Institute for Coastal Aquaculture and Fisheries Extension)

Carotenoid-enriched diet for pre-maturation stage of pond-reared tiger shrimp, *Penaeus monodon* part I. the Eeffects on growth, pigmentation and whole body nutrient content

Indonesian Aquaculture Journal, 12 (2), 2017, 59-66

Carotenoids, besides as a natural pigment, may have vital roles in the growth of crustacean. The aim of this study was to clarify the influence of combined carotenoids given since pre-maturation stage on the growth performances, pigmentation and biochemical composition of the whole body of pond-reared tiger shrimp, *Penaeus monodon*. Two experimental diets were supplemented with or without carotenoid mixture consisting of astaxanthin, canthaxanthin and other carotenoids contained in Spirulina. The carotenoid mixture was supplemented in the commercial diet normally used as a starter feed for tiger shrimp, re-pelleted and fed to tiger shrimp with an initial body weight of 31.7 ± 1.3 g. Shrimp were stocked in four 1,000 m^2 concrete ponds with a density of 1 shrimp/m^2 and fed until the shrimp reached maturation stage (broodstock size). Variables observed were growth performances and pigmentation properties during the pre-maturation stage and total carotenoid content in several tissues of the female broodstock after being fed with the diets until maturation stage. After 16 weeks, shrimp fed with carotenoid-enriched diet (PC) diet produced significantly ($P < 0.05$) higher biomass than the diet without the enrichment (PO). The color of raw shrimp fed with PC diet was darker with greenish-brown compared to shrimp fed PO diet which was greenish blue. The visual appearances of 3-min steamed shrimp produced the color of red-orange for shrimp fed carotenoid compared to orange-yellow for control PO. The total carotenoid content in the whole body of shrimp fed PC diet were significantly ($P<0.05$) enhanced compared to control PO diet which was 42.8 ±5.8 and 55.8± 5.1 μg/g for PO and PC diet, respectively. Supplemental carotenoid in the pre-maturation diet increased the biomass production from 23.1 ± 1.9 kg to 30.2 ± 0.1 kg and enhanced the color of the shrimp which was in line with carotenoid content in the whole body of pond-reared tiger shrimp.

KEYWORDS: pre-maturation; carotenoid-enriched diet; pigmentation; pond-reared tiger shrimp

UDC 639.512

Andi Parenrengi, Alimuddin, and Andi Tenriulo (Research Institute for Coastal Aquaculture and Fisheries Extension)

Characteristics of viral protein, VP-15, of white spot syndrome virus isolated from infected tiger shrimp *Penaeus monodon* (Fabricius, 1798)

Indonesian Aquaculture Journal, 12 (2), 2017, 67-75

White spot syndrome virus (WSSV) has caused mass mortality on tiger shrimp (*Penaeus monodon*) culture and adversely affects prawn industry worldwide including Indonesia. It is well known that the protein structure of WSSV plays an important role in the virus infection and morphogenesis process. A viral protein structure called VP-15 is located in the nucleocapsid of virion virus. The protein structure involves in the life cycle of WSSV in host cells. A gene encoding VP-15 could be involved in constructing the RNA interference (RNAi), so it is needed to isolate and characterize for RNAi technology purpose. The study was aimed to isolate and characterize the VP-15 from the infected WSSV tiger shrimp. The characterization of VP-15 was undertaken through assessment of nucleotide sequence, amino acid deduction, alignment nucleotide/protein searches using Genetyx and BLAST program, and dendrogram construction analysis. The results showed that VP-15 was successfully isolated in form of ORFDNA with a fragment size of 243 bp. The phylogenetic tree analysis revealed three clusters corresponding to the time (year) of isolates collection. The VP-15 consisted of 80 amino acids, two start codons (ATG), one stop codon (TAA), and one Kozak context (AAAATGG). Hydrophilic amino acid was the highest composition (44.2%), followed by neutral (31.2%) and hydrophobic (24.6%) amino acid groups. The VP-15 was rich in amino acid of lysine (21.3%), arginine (22.9%) and serine (24.6%). The successful isolation of VP-15 is a very important step in providing a basic yet suitable material in constructing the dsRNA vaccine to control shrimp diseases in aquaculture.

KEYWORDS: tiger shrimp; WSSV; VP-15 gene; isolation; characterization

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Noviana Dewi and Isti Koesharyani (Fish Quarantine, Quality Control and Food Safety for Fish Products)

Studies on *Aeromonas hydrophila* bacteria diseases in wild and cultured elver EEL (*Anguilla bicolor*)

Indonesian Aquaculture Journal, 12 (2), 2017, 77-82

This study was performed to detect *Aeromonas hydrophila* infection in wild and cultured elver eel (*Anguilla bicolor*). In total, 20 live elvers (10 wild and 10 cultured) were collected and subjected to *Aeromonas hydrophila* tests. Polymerase Chain Reaction (PCR) was done for an accurate identification of *Aeromonas hydrophila* using an universal primer and detection of the aerolysin gene in *A. hydrophila* using a specific primer. The virulence of *A. hydrophila* was determined using a pathogenicity test injection. The results showed that *A. hydrophila* could be detected using PCR and amplification of 685bp DNA. *A. hydrophila* could also be confirmed to contain the aerolysin gene of 290 bp DNA which could be a virulence indicator. Pathogenicity test revealed that LC_{50} was estimated to be $10.9 \times 10^{6.33}$. Histopathological changes were found in the abdominal and wounded muscles. Those changes were mainly in tissue ephitel cell hyperplasia. Based on the present study, *A. hydrophila* is a virulent bacteria in elver eel. *A. hydrophila* disease preventive measures need to be formulated. Elver eels should be tested for the *A. hydrophila* before restocking into farms.

KEYWORDS: disease; bacteria; eel; Polymerase Chain Reaction

UDC 556.551

Tri Heru Prihadi, Adang Saputra, Imam Taufik, and Idil Ardi (Institute for Freshwater Aquaculture Research and Fisheries Extension)

'The application of life cycle assessment to evaluate water quality condition around fish cages in Cirata Reservoir, Indonesia

Indonesian Aquaculture Journal, 12 (2), 2017, 83-91

Life Cycle Assessment (LCA) is an analytical tool used primarily for evaluating environmental conditions. The sources of decomposed organic matters in Cirata Reservoir originate from industrial activities, household waste, agricultural waste, and effluent from floating fish net cages. The wastes consist mainly of fat, protein, and carbohydrate. Bacteria are responsible for aerobic decomposition process of organic matters in the sediment. As bacteria consume oxygen during the decomposition processes, significant depletion of dissolved oxygen level in the waters may occur. This happens in Cirata Reservoir where a low level of oxygen in the water leads to anaerobic decomposition processes at the bottom of the reservoir. The porpuse of this study was to evaluate Cirata Reservoir water conditions, in terms of water quality, organic sediment and organic materials level based on the application of LCA. In this study, water and sediment samples were collected. Water quality conditions were measured in-situ. Water and sediment samples were analyzed in the laboratories. The results of the analyses showed that water quality condition in all sampling stations was relatively homogeneous. Based on the level of decomposition of organic matter, water quality conditions in Cirata reservoir could be classified as Class I, II, and III in IKA_STORET scale and categorized as poor. DO, sulfide, phenol, BOD, COD, total phosphate were outside the ranges of acceptable water quality standards.

KEYWORDS: Cirata Reservoir; anaerobic; sediment decomposition; organic matter

Author index

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I Nyoman Adiasmara Giri*)#, Ketut Sugama), Alimuddin***), and Anang Hari Kristanto****)**

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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

Phases	Periods (days)	Final mean body weight (g)		Response to selection	
		Third generation	Control	Gram (g)	Percentage (%)
Larval rearing	25	0.19 ± 0.10	0.19 ± 0.07	-	-
Nursery	30	6.12 ± 2.93	5.80 ± 3.50	-	-
Grow-out	60	198.67 ± 82.82	165.22 ± 71.09	33.45	20.24

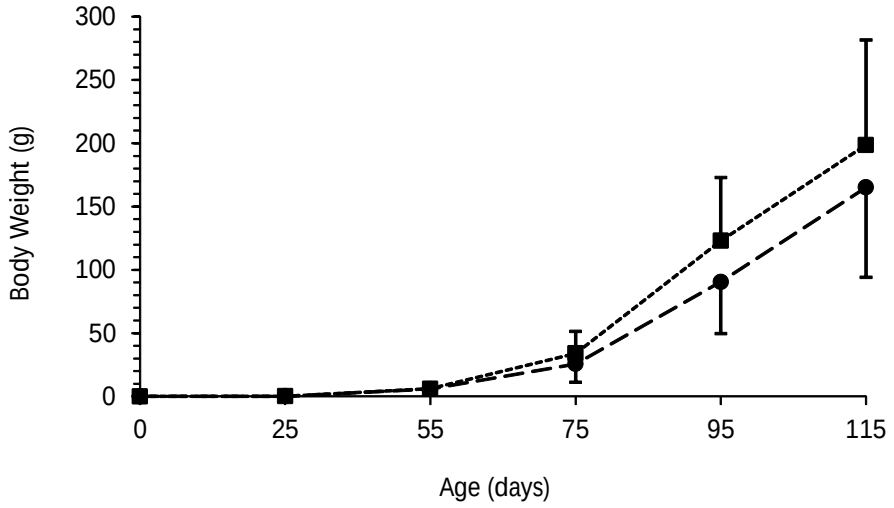

Figure 1. Growth performances based on body weight during 25 days of larval rearing phase, 30 days of nursery phase and 60 days of grow-out phase (based on samplings of 2% populations) of the third generation (■) and control population (●) of the African catfish (*Clarias gariepinus*) genetic improvement 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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Bekker, J.G., Craig, I.K., and Pistorius, P.C. (1999). Modeling and Simulation of Arc Furnace Process. ISIJ International, 39 (1), 23-32.

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